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OF DOUBLE SHELL TANK

Tank: 241-AP-108

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This Document consists of pages 1 through 1417.

CASE NARRATIVE

WHC-SD-WM-DP-Q65, REV. 0

ANALYSIS AND CHARACTERIZATION OF DOUBLE
SHELL TANK 241-AP-108

CASE NARRATIVE

INTRODUCTION

SOURCE DOCUMENTATION

Evaporator candidate feed from tank 241-AP-108 (hereafter referred to as 108-AP) was sampled under the protocol described in 242-A Evaporator Waste Analysis Plan, WHC-SD-WM-EV-060, Rev. 3 and in 242-A Evaporator Quality Assurance Project Plan, WHC-SD-WM-QAPP-009, Rev. 0. Waste contained in tank 108-AP was characterized chemically by the Westinghouse Hanford Company 222-S Laboratory as directed by four documents:

1. 242-A Evaporator Waste Analysis Plan (WAP), WHC-SD-WM-EV-060, Rev.3
2. 242-A Evaporator Quality Assurance Project Plan (QAPjP), WHC-SD-M-QAPP-009, Rev. 0,
3. 242-A Evaporator Project Analytical Services, Statement of Work (SOW), (WHC-SOW-93-0006, Rev. 1,
4. Technical Project Plan for the 222-S Laboratory in Support of the 242-A Evaporator Waste Analysis Plan, WHC-SD-WM-EV-060, Revision 2, WHC-SD-WM-TPP-048, Rev. 0, Technical Project Plan (TPP), and
5. Technical Project Plan for the 222-S Laboratory in Support of the 242-A Evaporator Waste Analysis Plan, WHC-SD-WM-EV-060, Revision 2, WHC-SD-WM-TPP-048, Rev. 0-A, a partial modification of the original TPP per Engineering Change Notice, number 600949.

Laboratory operations at the 222-S Laboratory were/are performed according to the Technical Project Plan (TPP). For those activities not defined or specified in the TPP, the successive document priority (in high to low order) is WAP, QAPjP, SOW, QAPP-002 (Quality Assurance Project Plan for the Analysis of Highly Radioactive Samples in Support of Environmental Activities on the Hanford Site, WHC-SD-CP-QAPP-002). Deviations from these documented instructions are discussed in this narrative and are generally supported with additional documentation.

Physical, inorganic, and radiochemical analyses were performed on tank 108-AP by the 222-S Laboratory. Organic analyses on this tank were performed by Battelle Pacific Northwest Laboratory's (PNL) 325 Laboratory and are not discussed.

Characterization of evaporator feed tank waste is needed primarily for an evaluation of its suitability to be safely processed through the evaporator. Such analyses should provide sufficient information regarding the waste composition to confidently determine whether constituent concentrations are within not only safe operating limits (e.g., nonflammable, nonexplosive), but should also be relevant to functional limits (e.g., solids formation) for operation of the evaporator. Characterization of tank constituent concentrations should provide data which enable a prediction of where the types and amounts of environmentally hazardous waste are likely to occur in the evaporator product streams.

RELEVANCE TO SW-846 PROCEDURES

Although SW-846 methods are mentioned in the source documents as examples of the desired analytical technology to use in this characterization effort, it is clear that the evaporator program anticipated the use of in-house controlled procedures within the 222-S Laboratory. The WAP, section 5.1.2 states, "Laboratory operations and test procedures that are performed in carrying out the requested characterization activities will be determined by laboratory personnel and will be defined in the TPP".

Each inorganic chemical analyses performed by the 222-S Laboratory was conducted using a controlled procedure. Some procedures were consistent with SW-846 guidance and others were patterned after U.S. Environmental Protection Agency, Contract Laboratory Program (CLP) methods. All procedures, however, use SW-846 *analytical technology*. Deviations from exact SW-846 procedures (such as sampling, aliquot size, sample holding time and sample preservation) are essential when handling samples containing dangerous levels of radioactive material, and are consistent with the final rule regarding "Hazardous Waste Management System; Testing and Monitoring Activities, 40 CFR Parts 260, 261, 264, 265, 268, and 270 as stated in the Federal Register, volume 58, number 167, Tuesday, August 31, 1993. Generally these deviations are practiced to limit exposure of personnel to ionizing radiation to an amount that is "as low as reasonably achievable" (ALARA).

SAMPLING

The WAP provided instructions regarding sampling procedures for waste samples collected from Hanford tanks. The "bottle-on-a-string" method was used to collect the liquid samples from the tank. Each glass sample bottle contained approximately 100 milliliters and was closed with a teflon seal cap.

Field blanks plus the initial tank samples from the first (1W) of three vertical risers within tank 108-AP were collected on March 17 and 18. The remaining tank samples from the other two risers, 1(NE) and 1(SE), were collected on March 21, 1994. Duplicate samples were collected at each of the five tank sampling locations and the field blank, of which one set was for the 222-S Laboratory and one set was for PNL's 325 Laboratory. Two sample locations were selected at random depths within tank 108-AP from risers 1(W)

and 1(NE). The fifth tank sample location was within the remaining riser 1(SE).

Field blanks were generated by placing deionized water into sampling bottles and closed with the same caps used for the tank samples.

One additional sample was collected from the surface of the tank waste for which the PNL 325 Laboratory was to perform a total organic carbon analysis.

Samples were not preserved (neither acidified nor refrigerated) nor was there an attempt to assure the complete filling of the bottles so as to exclude all headspace. These actions were consistent with safety procedures, which attempt to limit personnel exposure to hazardous ionizing radiation.

Chain-of-Custody forms were generated by the sample collector. Samples were transported to the laboratory receiving door in pigs by the B-Plant sample truck.

The two tank samples from riser 1(W), which were collected on March 17 and 18, were received into the laboratory on March 21, 1994 but were held until the following day to be opened with the other samples. The remaining tank samples from risers 1(NE) and 1(SE) and the field blank were received into the 222-S Laboratory on March 22, 1994, when all samples were inspected and the bottles were transferred from the large pigs to smaller pigs.

On March 22, 1994, it was discovered that an error had been made during sample collection by noting that all samples, *including the field blank* had similar visual appearances and dose rates. Various communication documents discussing this situation in detail and its resolution are provided in the Communications section of this narrative, marked as Items 1 through 11. In summary, however, it was determined that the error associated with samples delivered to the 222-S Laboratory concerned the field blank. Because duplicate samples were collected to provide one set for each laboratory (WHC's 222-S and PNL's 325), a potential for mixup in samples was possible and did happen. One of the tank samples that was to be delivered to the PNL 325 Laboratory was accidentally delivered to the 222-S Laboratory, complete with a incorrect chain-of-custody form, as the "field blank". To rectify the situation, the field blank was "recollected" on June 29, 1994 and was given the revised sample number of R3643-A. The 136-day clock for generation of complete data package for tank 108-AP started on June, 29, 1994, as per directions in the Tri-Party Agreement, which states that the time begins on the collection date of the last sample.

The sample from tank riser 1(W), which was misidentified as being the field blank, was discarded as directed by Nonconformance Report number 050650 (shown as item number 7 in the Communication section of this data package).

Because of the initial uncertainty regarding sample integrity and the subsequent course of recovery that would be taken, analytical work was placed on hold until March 31, 1994. On that date a notice was issued to proceed with analyses on all tank samples that were currently at 222-S. This action

caused a 13 to 14 day delay in analyses, and did impact the sample holding time in some cases.

LABORATORY OPERATIONS

SAMPLE TRACKING

RECEIVING PROCEDURES/CHAIN-OF-CUSTODY

Tank 108-AP samples were received into the laboratory at door 13, where the laboratory sample custodian signed the Chain-of-Custody form as the new sample custodian. The Chain-of-Custody form is a legal document, which tracks the transfer of samples between individuals or organizations to establish sample ownership.

The pigs containing the samples were transported to a hood. The radioactive dose rate "over the top" of each pig's opening was measured by a Health Physics Technician (HPT). It was determined that the corrected dose rate for all tank samples was approximately 125 mRad per hour. Samples were removed from the pigs, relabeled to include the laboratory identification number, and transferred to the metal storage cabinets in a secured area.

Subsequently, a determination was made to not process the samples through the hot cell, thus expediting the analyses. Hot cell processing of samples is required when the "over-the-top" dose rate exceeds 2 rem per hour or 25 rad per hour.

REQUEST FOR SPECIAL ANALYSIS

Request for Special Analysis (RSA) forms were generated for each sample, which provided a laboratory identification number, stated the preparative and analytical procedures, set groups of samples into analytical batches, and stated the degree of quality control. RSAs served as the controlling documents for analytical operations. Sample preparation instructions on the RSAs included such things as dilutions, acid digestions, and compositing. Hydroxide, arsenic, and tritium are examples of analytical procedures shown on the RSA sheet. Generally a maximum of three samples were included in a sample batch so that quality control determinations (such as a blank, standard(s), duplicate sample, spiked sample, and duplicate spiked sample) may be included. From the instructions on the RSA, traveler cards were generated.

SAMPLE IDENTIFICATION

The 108-AP samples were identified by the sample collector using a shipping number which began with "R". Table 1 references the shipping number to the sampling location within tank 108-AP. As can be seen in Table 1, duplicate samples from each location were given unique shipping numbers and were sent to

either the Westinghouse Hanford Company's (WHC) 222-S Laboratory or to the Battelle, Pacific Northwest Laboratory's 325 Laboratory.

Table 1. Tank 108-AP Sample Sources and Identification				
Shipping Number	Riser	Sample Elevation (inches)	Sample Type	String Length (inches)
R3632	1(W)	132	inorg/rad (WHC)	432
R3633-A		132	organic (PNL)	432
R3634		204 note 1	inorg/rad (WHC)	360
R3635-A		204 note 1	organic (PNL)	360
R3636	1(NE)	96	inorg/rad (WHC)	468
R3637		96	organic (PNL)	468
R3638		228	inorg/rad (WHC)	336
R3639		228	organic (PNL)	336
R3640	1(SE)	180	inorg/rad (WHC)	384
R3641		180	organic (PNL)	384
R3911 note 2		144	organic (WHC)	420
R3642		411	surface sample TOC/appr (PNL)	153
R3643-A	- - -	- - -	field blank inorg/rad (WHC)	- - -
R3644	- - -	- - -	field blank organic (PNL)	- - -

Note 1. At the time of this writing, it was uncertain whether this elevation was or was not correct. The actual elevation may have been 348 inches as was stated in the J-4 document (see item #1 in the Correspondence section). It is known that the originally designated elevation for this sample was above the surface of the waste and had to be redesignated and recollected.

Note 2. This sample was collected coincidentally as an organic analysis practice sample for the 222-S Laboratory, and was never intended to be a part of the protocol sampling for tank 108-AP characterization. Consequently, data for this sample are not included with this data package.

Upon arrival at the 222-S Laboratory, each sample was given a laboratory identification number, which began with "V", and a description.

Each of the five samples were analyzed for physical parameters and for inorganic constituents. A composite sample was generated from each of the five samples in equal proportions for radiochemical analyses.

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Table 2 shows the relationship between the original sample number, the laboratory sample identification number, and the laboratory sample description.

The sample description was a letter designation, A through E, added as a suffix to the tank number. For example, "108-AP-A" served as an easy way to remember the sample identification for R3632 from riser 1(W), 132 inches elevation. It was shown on the RSA in the "Customer ID" column.

Table 2. Laboratory Identification of Tank 108-AP Samples		
Original Sample Number	Lab Sample Number	Lab Sample Description
- - -	V60	LMCS Standard for V62, V63
- - -	V61	Reagent Blank for V62, V63
R3632	V62	108-AP-A
R3634	V63	108-AP-B
- - -	V64	Ending LMCS Std for V62, V63
- - -	V65	LMCS Standard for V67 - V69
- - -	V66	Reagent Blank for V67 - V69
R3636	V67	108-AP-C
R3638	V68	108-AP-D
R3640	V69	108-AP-E
- - -	V70	Ending LMCS Std for V67-V69
- - -	V71	LMCS Standard for V73
- - -	V72	Reagent Blank for V73
R3643-A	V73	Field Blank, 108-AP-FB
- - -	V74	Ending LMCS Std for V73
- - -	V75	LMCS Standard for V77
- - -	V76	Reagent Blank for V77
Composite of R3632, R3634, R3636, R3638, and R3640	V77	108-AP-COM

TRAVELER CARDS

Analyses were tracked in the laboratory using a serial number coding system placed on a "traveler" card. One card was generated for each analytical

determination (sample, duplicate, spike, blank, and standard). Each card was identified with unique serial numbers, which allowed tracking within the Laboratory Customer Communication System (LCCS), a computerized information base.

The current coding system was modified for samples originating from the 242-A Evaporator project, which use a "V" as the initial code prefix. Following the V is a sequential number, which coded the sample source (e.g., original sample, composite sample, Laboratory Measurement Control System (LMCS) standard, reagent blank, etc.). This sequential number is listed on the RSA form.

An extension (a decimal point followed by four numbers) was added to every serial number. The first digits coded the type of sample preparation (e.g., acid digestion, fusion, direct, etc.). The second digit coded the quality control function of the sample (e.g., sample, spike, spike duplicate, blank, etc.). The last two digits coded the analysis type (e.g., ammonia, specific gravity, tritium, selenium, etc.).

An example of the serial number, which coded for direct analysis (no sample dilution or digestion) of a duplicate sample for total inorganic carbon on laboratory's evaporator sample number 62 (108-AP-A, original sample number R3632) was V62.5827.

Example:

V62.5827

Table 3 shows the coding used to identify each traveler card serial number.

Table 3. Serial Number Extension Codes for Evaporator Samples		
Sample Preparation	Direct	Vxx.5xxx
	Water Leach (water dil'n)	Vxx.7xxx
	Acid Digest	Vxx.8xxx
Quality Control Function	LMCS Standard	Vxx.x5xx
	Reagent Blank	Vxx.x6xx
	Sample	Vxx.x7xx
	Sample Duplicate	Vxx.x8xx
	Spike	Vxx.x9xx
	Spike Duplicate	Vxx.x0xx
Analysis Type	Appearance	Vxx.xx01
	Specific Gravity	Vxx.xx06
	Differ. Scanning Calorimetry	Vxx.xx11
	Total Beta	Vxx.xx20
	Total Alpha	Vxx.xx25
	Total Inorganic Carbon	Vxx.xx27
	Ammonia	Vxx.xx28
	Hydroxide	Vxx.xx29
	Gamma Energy Analysis	Vxx.xx30
	Uranium, total	Vxx.xx40
	Inductively Coupled Plasma	Vxx.xx50
	Ion Chromatography	Vxx.xx71
	Cyanide	Vxx.xx78
	Pu ^{239/240}	Vxx.xx81
	Am ²⁴¹	Vxx.xx82
	Np ²³⁷	Vxx.xx83
	Tc ⁹⁹	Vxx.xx84
	I ¹²⁹	Vxx.xx85
	Sr ⁹⁰	Vxx.xx86
	H ³	Vxx.xx87
	C ¹⁴	Vxx.xx88
	Se ⁷⁹	Vxx.xx89
	Arsenic	Vxx.xx95
	Selenium	Vxx.xx96
	Mercury	Vxx.xx97

There were exceptions to the coding system shown above. For visual appearance, the extension was always Vxx.1001. No extension code number was generated for curium-244, because it did not have a specific procedure number. It was determined, however, as a by-product of americium-241 analysis. The same situation occurred for plutonium-238 (for which data were provided, but not required), which was determined when Pu^{239/240} was analyzed.

When the codes for the evaporator project were generated on the computer, a code for a simple sample dilution was omitted because no controlled procedure for sample dilution was available. It was necessary to track all sample handling within the laboratory, including dilution factors, consequently the code for a water digestion (actually a water leach procedure for solid samples, LA-504-101) was used. It should be clearly understood that the tank samples were *not* subjected to a leaching procedure, but the traveler cards which were generated with the water digestion code were used simply to document the dilution factors acquired during the sample preparation phase.

ANALYTICAL BATCH SHEET

An Analytical Batch sheet was prepared for each batch of traveler cards by a Lab Leader. Data were added to this sheet by the technician, who performed the analysis, which described analytical conditions (e.g., analyst, instrument, date, time, temperature, etc.) and procedures used (e.g., type of sample preparation, analytical procedure, and revision numbers).

ANALYTICAL BATCH SUMMARY SHEETS

Upon completion of each analytical batch, several data calculation or evaluation steps were performed. Raw data were converted to final values by technicians. Chemists reviewed the calculations for approval and then generated an Analytical Batch Summary Sheet for all analyses (except for inductively coupled plasma/emission spectrometry) (ICP). This sheet brought together the final data from each of the traveler cards (representing each determination). Additional information from calculations of quality assurance parameters, such as percent recovery, relative percent difference (RPD), etc., were added to the summary sheet by the chemists. Occasionally, chemists included descriptive information regarding the batch on these sheets. This narrative information was generally included in this case narrative.

All data were reviewed by the chemists and the project coordinator to determine that correct values were transcribed from the traveler cards to the analytical batch summary sheets.

Instead of generating an Analytical Batch Summary Sheet for ICP, raw analytical data as well as analytical quality control parameters were summarized into an independent report known as the "Ward's¹ package". It was necessary to use this Ward's package in place of the batch summary sheet because of the significantly greater quantity of data generated by ICP analyses.

¹ Ward's is a trademark of Ward's Scientific, LTD.

ANALYTICAL AND REPORT SCHEDULING

A computerized logic schedule was generated to plan each major event necessary to produce the final validated data package. Responsible individuals were assigned to each event. During the weekly scheduling meeting, each assignee was responsible for reporting progress on assigned actions. Milestones were closely monitored to assure that targeted schedule dates were being met. Reports, which tracked the scheduling status, were published and distributed weekly throughout the WHC, Analytical Laboratories division.

A preliminary report of data through the use of the LCCS was scheduled by the Statement of Work (SOW) to be due to the customer (the evaporator program) 85 days after collection of the last sample from tank 108-AP. That date was September 22, 1994. In discussions with the customer in mid July, it was mutually agreed that an LCCS report would not be required. Instead the data would be provided to the customer as preliminary summary tables for only selected analytes. It was also understood that these data would be neither final nor validated, because validation would be performed by Analytical Services, Office of Quality Assessment upon completion of the entire data package. Summary data tables were provided to the program on August 1, 1994 for the following analytes:

DSC, TIC, NH_4^+ , OH^- , Al, F^- , NO_2^- , NO_3^- , $\text{SO}_4^{=}$, $\text{PO}_4^{=3}$, total uranium, tritium, C^{14} , Pu^{238} , $\text{Pu}^{239/240}$, Am^{241} , $\text{Cm}^{243/244}$, Se^{79} , I^{129} , Np^{237} , Sr^{90} , Tc^{99} , Co^{60} , Nb^{94} , Ru/Rh^{106} , Cs^{134} , Cs^{137} , Ce^{144} , Eu^{154} , Eu^{155} , and Ra^{226} .

QUALITY ASSURANCE OF THE ANALYTICAL SYSTEM AND DATA

CONTROLLED PROCEDURES

Every analytical procedure used to develop data for the evaporator project was performed under the direction of written procedures (except for the dilution procedure, as discussed above) which were/are reviewed and approved at least every two years. Revisions to existing procedures were and are generated for corrections or updating as needed, and were/are distributed promptly to replace obsolete versions.

STATISTICAL EVALUATION

Performance data have been gathered historically on each analytical procedure for which there is a Laboratory Measurement Control System (LMCS) standard available. The percent recovery (an assessment of procedure accuracy) has been determined and stored in the LMCS computer data base for each LMCS standard. On a yearly basis, a statistical evaluation of these data has been made to generate new acceptance control limits for future analyses of LMCS standards.

An evaluation of the mean and standard deviation values for each of the procedures has also been used to signal needed improvements in these procedures, when means deviate significantly from 100 percent or when standard deviations are relatively large.

REVIEW OF DATA

Each batch was reviewed for accuracy at several levels. Chemists reviewed not only analytical calculations, but checked to determine that the analytical system was performing appropriately and that the laboratory technicians were following written procedures.

A team of technicians recalculated values on the traveler cards, and checked the information reported by the chemists for completeness.

The Quality Control Officer, within 222-S Laboratory's Program Support Group performed the second general review of analytical data, by recalculating final values from the raw data and checking the information reported by the chemists and technicians for completeness.

A third general review was performed by the project coordinator, which included those items checked previously by others, but also included checking of tabular data summaries. A peer review of this narrative was performed by other project coordinators in the Program Support Group.

The Sample Data and Laboratory Administration group within Analytical Services performed a final review of the data package immediately prior to data package validation.

ANALYTICAL DATA REPORTING

LABORATORY CUSTOMER COMPUTER SYSTEM

Following the completion of Analytical Batch Summary Sheets, all data within each batch were taken to a Lab Leader for keyboard entry of final values into the Laboratory Customer Computer System (LCCS).

ANALYTICAL DATA SPREADSHEETS

Computer generated summary data tables were created from a spreadsheet program to facilitate evaluation of both sample and quality control data. All data were reviewed by the project coordinator to determine that these data were transcribed correctly from the batch summary sheets and Ward'sTM package to the spreadsheets. These spreadsheets were incorporated into the Results of Analyses section of this data package.

CASE NARRATIVE

This case narrative was prepared in accordance with the following source documents:

- WAP, section 5.1.7,
- QAPJP, sections 3.1, 3.2, 3.4, 3.6, 7.1, 7.3, and 8.1 (with the exception as stated in the TPP that the "QA Report" which was generated was not produced by a QA Officer),
- SOW, sections 4.0 through 4.3, and
- TPP, sections 2.2.4, 5.1 and 5.3.

The intent of this narrative is to:

- Present required analytical data,
- Evaluate the quality of these data,

- Document problems encountered while performing the analytical procedures,
- Characterize the nature of the constituents within tank 108-AP, and
- Interpret, whenever possible, the relevance or impact of these findings on the evaporator program.

ANALYTICAL REQUIREMENTS AND PROCEDURES

SAMPLE PRESERVATION

As per directions in the WAP, section 5.1.5.1, no preservation of samples (acidification or refrigeration) was performed at the time of sampling.

No attempt was made to preserve the samples while they were held in the laboratory because of the small initial sample volume (100 ml). The project coordinator was concerned that if part of the sample was split for acid preservation, that there would likely be insufficient sample volume remaining to perform all of the requested analyses. See the discussion below on Analytical Aliquots for further details.

SAMPLE HOLDING TIME

The QAPjP, section 3.6 states the following:

"Holding times for samples that need not require processing in the hot cell shall be equivalent to SW-846 (EPA 1986) defined times. If no SW-846 holding time exists for a specific constituent, the holding time will be three months."

The 1986 version of SW-846 was superseded by the 1992 revision. For this project, the SW-846 maximum sample holding time limits that were applicable are found in volume IA, Table 2-21 (revision 1, July 1992). Table 4 below shows these sample holding times.

Table 4. Maximum SW-846 Sample Holding Limits		
Parameter	Maximum Holding Time	Preservation
Chloride	28 days	none
Cyanide	14 days	4°C
Nitrate	48 hours	4°C
Sulfate	28 days	4°C
Mercury	38 days (in glass)	HNO ₃ to pH<2
Metals *	6 months	HNO ₃ to pH<2
Total Alpha	6 months	HNO ₃ to pH<2
Total Beta	6 months	HNO ₃ to pH<2
Radium **	6 months	HNO ₃ to pH<2

* Other than Hg & Cr⁺⁶

** Radiological

Agreement within the scientific community is divided with regard to reasonable sample holding times. SW-846 holding times are based on worst-case scenarios and in many cases are excessively short. Note that SW-846 protocol expects that samples are to be preserved at the time of collection for SW-846 holding times to be valid. However, Tank 108-AP samples were intentionally not preserved so as to limit the exposure dosage of ionizing radiation to personnel.

Sample degradation can occur due to many factors. One of these factors, biological degradation, is typically controlled by the addition of a strong acid, creating a hostile biological environment due to extreme pH. For biological degradation of tank 108-AP samples, it can be argued that sample preservation with the use of acid was unnecessary because of ionizing radiation lethal to micro-organisms. In the case of cyanide, the native sample pH (approximately 8.5 to 9) was a natural preservative because it prevented the formation of volatile HCN.

The sample holding time for each analyte is discussed individually in the Results of Analyses section later in this narrative.

ANALYTICAL ALIQUOTS

Because of the possibility of exhausting the sample before all of the analyses could be analyzed and accepted, analytical aliquots were minimized whenever possible. Aliquot size was generally not minimized when the analyte was considered by the project coordinator to be a significant constituent and the analyte concentration in the sample was expected to approach the detection limit.

A check was made of the original sample volume remaining upon completion of all analyses. It was evident in retrospect that this conservative approach was warranted. Otherwise, it is likely that analyses on sample V62 would not have been completed. The final sample volumes are shown in Table 5.

Table 5. Final Sample Volumes		
Sample ID	Sample Description	Final Volume (ml)
V62	108-AP-A	5
V63	108-AP-B	50
V67	108-AP-C	30
V68	108-AP-D	35
V69	108-AP-E	30
V73	108-AP-FB	60

PREPARATIVE METHODS

The TPP, which was the implementation document, was written prior to sample collection, consequently it was necessary to decide which preparative procedures to use on the samples without having an opportunity to see them in advance. Such visual observations generally yield significant information,

allowing better decisions regarding sample digestions, and so forth. For this reason, directions given in the TPP on preparative procedures should be considered as general guidance only.

A TPP appendix table specified which preparative method was to be used for each constituent. All sample preparations conformed to the TPP specifications except for ammonia, strontium-90, selenium-79, technetium-99 and total alpha. Ammonia analyses were performed on dilutions to preserve the limited volume of available sample. When the samples were received, it was decided by the project coordinator and the cognizant scientist that an acid digestion of the samples for Sr^{90} , Se^{79} , Tc^{99} , and total alpha would more completely solubilize the sample analytes (rather than a direct or acid dilution preparation as directed in the TPP). It was expected that better homogenization through solubilization would produce better analytical precision and accuracy.

Table 6 shows a comparison of the preparative procedures stated in the TPP with preparative procedures actually performed:

Table 6. TPP Cited Preparation Procedures vs. Actual Procedure Used		
Analytical Procedure	Procedure Stated in TPP	Actual Procedure Used
Appearance	direct	direct
Diff. Scanning Calorimetry	direct	direct
Specific Gravity	direct	direct
Induct Coupled Plasma	acid digestion	acid digestion
Arsenic	acid digestion	acid digestion
Selenium	acid digestion	acid digestion
Mercury	direct	direct
Uranium	direct	direct
Ion Chromatography	direct or H ₂ O dilution	direct & H ₂ O dilution
Ammonia *	direct or acid dilution	H ₂ O dilution
Cyanide	direct or H ₂ O dilution	direct & H ₂ O dilution
CO ₂ (TIC)	direct or H ₂ O dilution	direct
Hydroxide	direct or H ₂ O dilution	direct
Gamma Energy Analysis	acid dig, direct, or acid dil	acid digest
Pu ^{239/240}	acid dig, direct, or acid dil	acid digest
Am ²⁴¹	acid dig, direct, or acid dil	acid digest
Cm ²⁴⁴	acid dig, direct, or acid dil	acid digest
Np ²³⁷	acid dig, direct, or acid dil	direct
Sr ⁹⁰ *	direct or acid dilution	acid digest
Tc ⁹⁹ *	direct or acid dilution	acid digest
Se ⁷⁹ *	direct or acid dilution	acid digest
C ¹⁴	direct or H ₂ O dilution	direct
H ³	direct or H ₂ O dilution	direct
I ¹²⁹	direct or H ₂ O dilution	direct
Total Alpha *	direct or acid dilution	acid digest
Total Beta	acid dig, direct, or acid dil	acid digest

* Deviations from stated procedure in TPP.

ANALYTICAL PROCEDURES

Each procedure used for this project was a controlled procedure. All procedures were evaluated and approved for a maximum period of two years. Procedures may be modified, or deleted as appropriate. Each time a procedure was modified, however, a new revision number was added to the procedure number. Upon review (at the end of the two year period), a procedure approval may be extended for another two year period without a change in revision number. During this project the following procedures were reviewed, approved, and extended without a revision number change to meet the 2-year requirement.

Strontium-90	LA-220-101/D-0	Reviewed 6/22/93
Specific gravity	LA-510-112/C-2	Reviewed 6/26/92
Gamma energy analysis	LA-548-121/D-0	Reviewed 6/10/93
Gamma energy analysis	LA-508-052/B-4	Reviewed 6/9/93
Ion Chromatography	LA-533-105/C-1	Reviewed 8/24/93
Uranium	LA-925-106/B-1	Reviewed 2/14/94
Liquid Scintillation	LA-508-121/B-0	Reviewed 8/11/93
Carbonate	LA-622-102/B-2	Reviewed 4/14/94

Analytical procedures used for the evaporator project were listed initially in the TPP and are shown in Table 7. Several of those listed in the TPP were for process control sample analyses (nonprotocol) and were not used for the evaporator feed tank samples.

Table 7. 108-AP Procedure Listing

TPP Cited Procedure			Actual Procedure Used			
Procedure #	Procedure Title	Procedure #	Rev #	Procedure Title	Issue Date	Analysis Dates
LA-505-151	ICP Emission Spectrometer Method for Trace Element Analysis	LA-505-151	D-1	ICP Emission Spectrometer Method for Trace Element Analysis	02-17-93	04-28 to 05-03-94
	Not Cited	LA-505-161	A-0	Inductively Coupled Plasma (ICP) Emission Spectrometric Method for the Thermal Jarrell Ash (TJA), Type 61E	03-22-94	07-21-94
LA-325-104	Mercury Analysis by Atomic Absorption (Manual Cold Vapor Technique)	LA-325-104	A-1	Mercury Analysis by Atomic Absorption (Manual Cold Vapor Technique)	03-12-93	04-15 to 07-07-94
LA-695-102	Microdistillation and Spectrophotometric Determination of CN	LA-695-102	B-2	Microdistillation and Spectrophotometric Determination of CN	02-24-94	04-17 to 07-29-94
LA-510-112	Specific Gravity of High Beta Gamma Caustic Samples	LA-510-112	C-2	Specific Gravity of High Beta Gamma Caustic Samples	Reviewed 06-26-92	04-07 to 04-16-94
LA-519-151	Visual Check and Over-The-Top Reading	LA-519-151	E-1	Visual Check and Over-The-Top Reading	02-22-93	04-07-94
LA-533-105	Anion Analysis of Dionex Model 4000i	LA-533-105	C-1	Anion Analysis of Dionex Model 4000i	Reviewed 08-24-93	04-13 to 04-21-94
LA-533-105	Anion Analysis of Dionex Model 4000i	LA-533-105	C-2	Anion Analysis of Dionex Model 4000i	06-30-94	07-24-94
LA-355-131	Arsenic Analysis by Hydride Generation Atomic Absorption	LA-355-131	B-1	Arsenic Analysis by Hydride Generation Atomic Absorption	12-09-92	06-15 to 08-10-94
LA-365-131	Selenium Analysis by Hydride Generation Atomic Absorption	LA-365-131	B-2	Selenium Analysis by Hydride Generation Atomic Absorption	12-09-92	05-10 to 08-03-94
LA-514-113	Differential Thermal Analysis of Caustic Samples	LA-514-113	B-0	Differential Thermal Analysis of Caustic Samples	12-14-93	04-08 to 04-25-94
LA-925-106	Determination of Uranium by Laser Fluorimetry	LA-925-106	B-1	Determination of Uranium by Laser Fluorimetry	Reviewed 02-14-94	04-10 to 07-04-94
LA-661-102 or LA-661-103	Determination of Hydroxide Ion in solutions containing Hydrolyzable Anions (Auto) Determination of OH Ion in Solutions by Potentiometric Titration Manual	LA-211-102	B-1	Determination of Acid/Base/pH Using Metrohm 682 Titrprocessor (Hydroxide)	08-18-93	04-26 to 07-03-94
LA-634-102	Ammonia by Kjeldahl	LA-634-102	D-2	Ammonia by Kjeldahl	10-18-93	04-16 to 07-22-94
	Not Cited	LA-631-001	A-0	Determination of Ammonia by Selective Ion Electrode Using a Double Increment Known Additions Method	04-13-94	05-29 to 08-31-94

Table 7. 108-AP Procedure Listing						
TPP Cited Procedure			Actual Procedure Used			
Procedure #	Procedure Title	Procedure #	Rev #	Procedure Title	Issue Date	Analysis Dates
LA-622-102	Determination of Carbonate in Solutions by Coulometry	LA-622-102	B-2	Determination of Carbonate in Solutions by Coulometry	Reviewed 04-14-94	04-12 to 07-18-94
	Not Cited	LA-505-158	A-3	Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by FLAA and ICP Spectroscopy	09-14-93	04-14 to 07-18-94
	Not Cited	LA-504-101	C-0	Water Leach of Solids with Residual Solids Collection.	06-22-93	04-08 to 07-18-94
LA-548-121	Preparation of Sample Mounts for GE(Li) GEA - Low Level	LA-548-121	D-0	Preparation of Sample Mounts for GE(Li) GEA - Low Level (preparation for LA-508-052)	Reviewed 06-10-93	05-03 to 07-18-94
LA-508-052	Gamma Energy Analysis on the Canberra Jupiter System	LA-508-052	B-4	Gamma Energy Analysis on the Canberra Jupiter System (subsequent to LA-548-121)	Reviewed 06-09-93	
LA-508-052	Gamma Energy Analysis on the Canberra Jupiter System	LA-508-052	B-5	Gamma Energy Analysis on the Canberra Jupiter System (subsequent to LA-548-121)	06-20-94	
LA-508-101	Low Level Alpha and Beta in Water Samples (prep)	LA-508-101	D-0	Low Level Alpha and Beta in Water Samples (preparation for LA-508-114)	08-19-92	05-10-94
LA-508-101	Low Level Alpha and Beta in Water Samples (prep)	LA-508-101	D-1	Low Level Alpha and Beta in Water Samples (preparation for LA-508-114)	07-19-94	07-23-94
	Not Cited	LA-508-114	A-1	Operation of Gamma Products Alpha Beta Counting Systems Using PC Control (Subsequent to LA-508-101)	Reviewed 05-15-92	
LA-503-156	Determination of Pu and Ion Exchange Solvent Extraction	LA-503-156	D-0	Determination of Pu and Ion Exchange Solvent Extraction (also Am-241 and Cm-244)	12-03-91	04-28-94
LA-503-156	Determination of Pu and Ion Exchange Solvent Extraction	LA-503-156	D-1	Determination of Pu and Ion Exchange Solvent Extraction (also Am-241 and Cm-244)	05-23-94	08-05-94
LA-365-132	Determination of Se-79	LA-365-132	B-0	Determination of Se-79	09-25-91	05-04-94
LA-933-141	Determination of Np-237 by ToiOA/TTA Extraction and Alpha Counting	LA-933-141	H-0	Determination of Np-237 by ToiOA/TTA Extraction and Alpha Counting	09-09-91	04-20-94
LA-220-101	High Level Strontium-89, 90 in Aqueous Samples	LA-220-101	D-0	High Level Strontium-89, 90 in Aqueous Samples	Reviewed 06-22-93	05-04-94
LA-438-101	Determination of Tc-99 by Solvent Extraction and Liq. Scint Counting	LA-438-101	D-1	Determination of Tc-99 by Solvent Extraction and Liq. Scint Counting	09-04-91	04-29-94
LA-378-103	Determination of Iodine-129 in Waste Tank Samples	LA-378-103	B-3	Determination of Iodine-129 in Waste Tank Samples	11-02-93	04-09-94

Table 7. 108-AP Procedure Listing						
TPP Cited Procedure		Actual Procedure Used				
Procedure #	Procedure Title	Procedure #	Rev #	Procedure Title	Issue Date	Analysis Dates
LA-348-104	C-14 in Small Volume Samples by Persulfate Oxidation and Liq. Scint.	LA-348-104	B-0	C-14 in Small Volume Samples by Persulfate Oxidation and Liq. Scint.	07-31-91	04-12-94
LA-218-114	Tritium by Lachat Micro-Dist. and Liquid Scintillation Counting (LS)	LA-218-114	A-2	Tritium by Lachat Micro-Dist. and Liquid Scintillation Counting (LS)	01-14-93	04-13-94
LA-508-121	Operation of the Beckman Liquid Scintillation Counter	LA-508-121	B-0	Operation of the Beckman Liquid Scintillation Counter (subsequent to LA-218-114 & LA-348-104)	Reviewed 08-11-93	
LA-645-001	Spectrophotometric Determination of Nitrite	Not Used		See LA-533-105		
LA-212-101	Set Up and Standardization of pH Meter and Glass Electrode	Not Used		See LA-211-102		
LA-212-102	Determination of pH Direct Measurement	Not Used		See LA-211-102		

DETECTION LIMITS

Detection limits were defined for each procedure without reference to a uniform laboratory protocol to determine such limits. ICP detection limits were derived from CLP protocol. Some of the procedures used the reagent blank value as the detection limit. Some procedures used the concentration of the lowest standard in the calibration curve as the detection limit. In no case was the matrix considered in generating the detection limit and therefore would not qualify as a "method detection limit". Wherever possible, and unless stated differently in the discussion of each analyte, the detection limit was modified by the typical dilution factor of the samples to provide a more representative value relative to the samples. All of those practices described above are allowed as estimated quantitation limits by SW-846 protocol.

SIGNIFICANT FIGURES

The QAPjP, page 6, states that the report must not contain a greater number of significant figures than is defined in the procedure. A review was made of each controlled procedure to insure compliance with any stated significant figure requirements. The only procedure which specified significant figures was specific gravity. For this parameter, the reported value must have three digits to the right of the decimal in standard numerical notation (not scientific notation) format. Specific gravity was reported with the specified number of significant figures.

CALIBRATION DATA

The QAPjP states that for manually generated calibration curves, sufficient data will be placed into the data package that will allow the recalculation of the slope, Y-intercept, and correlation coefficient (r^2); and that the r^2 is within specifications given in the procedure.

Raw calibration data can be found on instrumentation printouts, copies of logbook pages, traveler cards and/or summary sheets, but are not given in this narrative. These data were incorporated in the raw data portion of this data package for reference. Of those analytes for which a standard curve was manually generated, summary data [i.e. slope, Y-intercept, and correlation coefficient (r^2)] are provided in the Results of Analyses section of the narrative.

Only two of the 222-S analytical procedures stated a required correlation coefficient (r^2). The required correlation coefficient for mercury was $r^2 > 0.995$. Cyanide had a required r^2 of > 0.999 . During analyses, both cyanide and mercury had r^2 values greater than the required value for all batches.

EVAPORATOR BOUNDARY CONDITION LIMITS

To evaluate compliance with required boundary conditions, final values for Differential Scanning Calorimeter, nitrate, nitrite and hydroxide concentrations have been used. These are shown and evaluated in the Results of Analyses section and in the Summary Tables.

Those boundary conditions given in section 4 of the Waste Analysis Plan which were relevant to the analyses performed by the 222-S Laboratory are shown in Table 8.

Table 8. Relevant Boundary Conditions for Tank 108-AP	
Parameter	Boundary Condition
DSC	No exotherms <450°F
Nitrate	<40% by weight
Nitrite	<40% by weight
Condition 1 Hydroxide Nitrite	When $[NO_3] \leq 1.0 \text{ M}$: $0.01\text{M} \leq [OH] \leq 5.0\text{M}$ $0.011\text{M} \leq [NO_2] \leq 5.5\text{M}$
Condition 2 Hydroxide Nitrite	When $1.0\text{M} < [NO_3] < 3.0 \text{ M}$: $0.01 \times [NO_3] \leq [OH] \leq 10\text{M}$ $[OH] + [NO_2] \geq 0.4 \times [NO_3]$
Condition 3 Hydroxide Nitrite	When $3.0\text{M} < [NO_3] < 5.0 \text{ M}$: $0.3\text{M} \leq [OH] \leq 10\text{M}$ $[OH] + [NO_2] \geq 1.2$

No DSC exotherms were observed on any of the Tank 108-AP samples.

Nitrate was determined to be approximately 1560 $\mu\text{g/ml}$, which equates to 0.0252M or 0.16 percent (w/v).

Hydroxide was determined to be less than 125 $\mu\text{g/ml}$ for each of the samples (except for V62, which was <250 $\mu\text{g/ml}$). If it is assumed that the hydroxide concentration of all samples is the same (<125 $\mu\text{g/ml}$), then the average concentration is <125 $\mu\text{g/ml}$, which is <0.0073M.

The tank's mean nitrite concentration was determined to be approximately 1,012 $\mu\text{g/ml}$, which equates to 0.0220M or 0.10 percent (w/v).

The nitrate molar concentration of 0.0252 places condition 1 (Table 8) into effect. Under condition 1, the boundary condition for hydroxide concentration (which was determined to be <0.0073M in Tank 108-AP) was not within limits because it was less than the lower limit of 0.01M. Under condition 1, the

boundary condition for nitrite concentration (which was determined to be 0.0220M in Tank 108-AP) was within limits, because it was greater than the lower limit of 0.011M and less than the upper limit of 5.5M.

QUALITY CONTROL REQUIREMENTS

STANDARDS

The laboratory control standards (LCS), which were discussed in numerous places of the source documents (WAP, QAPjP, SOW, and TPP), were interpreted to mean Laboratory Measurement Control System (LMCS) standards, which are specific to the 222-S Laboratory. Statistical data on LMCS standards were discussed previously in the Statistical Evaluation section. These standards were generated in house by a special group within 222-S Laboratory using controlled procedures. Analyte concentrations within these standards were known to the analysts.

LMCS control limits (typically the statistical mean $\pm 3\sigma$) existing at the time of analysis were used to meet laboratory control standard (LCS) control limit requirements, as described in the TPP, section 4.2. For some procedures (for example ICP), an administrative control limit was used rather than a statistically derived limit. In the case of ICP, not enough analytical data had been produced on the Thermal Jarrell Ash instrument to generate statistically valid control limits, so limits of 85 to 115 percent were set for all batches analyzed on that instrument.

Nondigested LMCS standards were used to assess the quality control status of procedures. If an LMCS standard failed to meet the control criteria, an Off Standard Condition existed. As a consequence, no data were allowed to be reported from that batch.

No LMCS standard was available for the following analytes: appearance, Cs¹³⁴, Ce¹⁴⁴, Ru¹⁰³, Ru¹⁰⁶, Nb⁹⁴, Eu¹⁵⁴, Eu¹⁵⁵, Se⁷⁹, Cm²⁴⁴, Ra²²⁶ and Pu²³⁸.

The QAPjP, section 3.1, states the following regarding acceptance criteria of LMCS standard data generated by ICP.

"When at least 10 analytes fail to meet the LCS recovery, the sample must be rerun. Only one rerun will be performed. If the rerun results are unacceptable and remain outside the QC specifications, the rerun set of results will be reported in the data package narrative as a potential quality control problem."

This statement was interpreted to mean that if 10 or more of the 12 required analytes determined by ICP fail to meet the 85 to 115 percent control limit criteria for LMCS standards, then those data will be rejected and one rerun be performed.

LMCS control limits for each analyte are discussed in the Results of Analyses section later in the narrative.

BLANKS

One reagent blank was analyzed with each batch of non-digested samples except for appearance and DSC. One preparation blank was analyzed with each batch of acid digested samples.

The QAPjP, section 8.2, required that the field blank be analyzed for only these ICP parameters: Ag, Al, As, Ba, Cd, Cr, Na, and Pb. During a telephone conversation in late June, 1993, between the evaporator project cognizant engineer and the 222-S Laboratory project coordinator, it was agreed that a single determination of the field blank for each radiochemistry analysis would be performed whenever possible. It was also agreed that duplicate analyses of the field blank would be performed on each inorganic analysis whenever possible.

A field blank was analyzed for the following constituents: Ag, Al, Ba, Ca, Cd, Cr, Fe, Mg, Mn, Na, Pb, Zn, As, Se, Hg, OH⁻, TIC, CN⁻, U, NH₄⁺, F⁻, Cl⁻, NO₃⁻, NO₂⁻, PO₄⁻³, SO₄⁻⁴, Ce¹⁴⁴, Cs¹³⁴, Cs¹³⁷, Co⁶⁰, Eu¹⁵⁴, Eu¹⁵⁵, Nb⁹⁴, Ra²²⁶, Ru¹⁰⁶, total alpha, and total beta.

No field blank was analyzed for the following constituents: appearance, DSC, specific gravity, H³, C¹⁴, Se⁷⁹, Tc⁹⁹, Sr⁹⁰, I¹²⁹, Np²³⁷, ^Pu^{239/240}, Pu²³⁸, Am²⁴¹, and Cm²⁴⁴.

Blanks were considered by the project coordinator to be contaminated when any constituent was determined to be equal to or greater than 20 percent of the average concentration of that analyte in the sample. If both the blank and sample were detectable but very near the detection limit, the preceding criterion did not apply.

The definition given by the QAPjP, section 8.3, to contamination of blanks applied only to field blanks. It stated:

"Contamination shall be evaluated by comparison to a reagent blank run at the same time. The field blank is acceptable if the concentration of all analytes in the reagent blank is less than 20% of the concentration of the corresponding analytes in the field blank."

The mathematical interpretation of the QAPjP definition is that the field blank's constituents must be no greater than 5 times the reagent blank concentration. Although this definition is certainly more conservative than the definition used by the project coordinator, it is unrelated to the sample concentrations. The purpose of analyzing a field blank is to determine

whether sampling conditions (in the field) inadvertently increase the sample's true concentration. Unless field blank analyte concentrations are relevant to the sample (rather than to a reagent blank), the designation of "contamination" is meaningless.

DUPLICATE ANALYSIS

Duplicate analyses were performed on every sample for every analyte except for appearance. No quality control criteria were specified in any of the source documents, and generally no reruns were performed when it appeared that a significant difference occurred between a sample and its duplicate.

SPIKE/SPIKE DUPLICATE ANALYSIS

The QAPjP, section 8.4, 8.5, and 8.7, required spike/spike duplicate analyses on the following parameters: each of the analytes by the ICP, atomic absorption spectrophotometry and ion chromatography procedures, and for TIC, CN^- , U, NH_4^+ , H^3 , C^{14} , total alpha, total beta, Nb^{94} , and Ru^{106} . Table 15A of the QAPjP has inconsistencies compared with the narrative in its sections 8.4, 8.5 and 8.7. When inconsistencies appeared, priority was given to the narrated sections.

One spike and one spike duplicate were performed for each of the procedures above for each sampling event. Sampling event was defined (consistent with QAPjP, section 8.2, paragraph 1) to mean all sample collections from a tank. In practice, one spike/spike duplicate was analyzed for each of the analytes by the ICP, atomic absorption spectrophotometry and ion chromatography procedures, and for TIC, CN^- , U, NH_4^+ , Am^{241} , H^3 , C^{14} , Tc^{99} , Sr^{90} , I^{129} , Np^{237} , $\text{Pu}^{239/240}$, total alpha, and total beta.

No spikes and spike duplicates were performed for the following analytes: OH^- , DSC, specific gravity, Cs^{137} , Co^{60} , Nb^{94} , Ru^{106} , Ce^{144} , Cs^{134} , Eu^{154} , Eu^{155} , Ra^{226} , Se^{79} , Pu^{238} , and Cm^{244} .

It was not necessary to perform a spike/spike duplicate on Nb^{94} and Ru^{106} because they were analyzed by gamma energy analysis, for which the only LMCS standards that exist are for Cs^{137} and Co^{60} . The cognitive chemist has stated that for analytes determined by gamma energy analysis, a spike was unnecessary. This was because the purpose of spiking was to determine the impact of the sample matrix on analyte recovery, yet the chemist claimed that the matrix does not interfere with gamma counting when quantifying these radionuclides.

For an evaluation of accuracy, the QAPjP required a recovery on all spiked samples of 75 to 125 percent, except for DSC (which required recovery limits of 90 to 110 percent). A stipulation was made in the TPP that the 75 - 125 percent recovery criteria were valid only when the analyte

concentration in the spiked sample was increased by at least 25 percent more than the original sample concentration. In the case of DSC, it was not possible to measure percent recovery, not only because there is no spiking standard available for DSC, but also because the data are qualitative. That is to say, that data generated by DSC on each sample either detected exotherms or did not detect exotherms. As is noted later in the Results of Analyses section, no DSC exotherms were observed in any sample.

To evaluate precision, the QAPjP required a relative percent difference (RPD) between the spike and spike duplicate of equal to or less than 20 percent. A stipulation was made in the TPP that this criterion was valid only when the analyte concentrations of the spike and spike duplicate were greater than ten times the detection limit.

RESULTS OF ANALYSES (DATA SUMMARY AND EVALUATION)

PHYSICAL ANALYSES

APPEARANCE/HOMOGENEITY

Observations were performed on the direct (unmodified) sample. No instruments were used, consequently there was no instrument calibration. No quality control criteria were defined in the source documents nor were they required.

All analyses were performed on 4/7/94. SW-846 does not define a holding time criteria for this parameter.

Analyses were performed by procedure number LA-519-151/E-1 at approximately 24°C and are shown in Table 9.

Table 9. Appearance/Homogeneity Analysis Summary				
Sample ID	Lab ID	Visual Observations	Dose Rate/hr	Sample Size
V62	108-AP-A	Cream color, clear, no solids, single phase: liquid	8 mRad at 4"	≈100 ml
V63	108-AP-B	Pale yellow color, clear, small amount of solids, single phase: liquid	7 mRad at 4"	≈100 ml
V67	108-AP-C	Pale yellow color, clear, small amount of solids, single phase: liquid	7 mRad at 4"	≈100 ml
V68	108-AP-D	Pale yellow color, clear, no solids, single phase: liquid	7 mRad at 4"	≈100 ml
V69	108-AP-E	Pale yellow color, clear, small amount of solids, single phase: liquid	7 mRad at 4"	≈100 ml
V77	108-AP-COM	Pale yellow color, clear, small amount of solids, single phase: liquid	4 mRad at 4"	≈45 ml

From the visual appearance, the samples were nearly homogeneous. The precipitated solids that were seen in samples V63, V67, V69 and V77 constituted a minor fraction of the sample. These samples did not require heating or dilution to maintain solubility.

DIFFERENTIAL SCANNING CALORIMETRY

Analyses were performed on the direct sample using procedure/revision number LA-514-113/B-1 (Differential Thermal Analysis) and instrument number WC16134.

No unusual instances or problems occurred during the analyses of DSC. SW-846 protocol do not specify a hold time for DSC. Sample holding times ranged from 18 to 39 days.

The QAPjP requires an LMCS percent recovery of 90 to 110 percent. The new LMCS control limits for DSC are 27 to 30 joules per gram, which is equivalent to 94.9 to 105.4 percent recovery for electronic data processing (EDP) code number R230. DSC analyses of LMCS standards for tank 108-AP yielded recoveries ranging from 97.0 to 103.7 percent, and met QAPjP and LMCS quality control criteria.

Endotherms were observed as expected in the standards, as well as in all samples. The sample endotherms were due to the presence of water, but because no exotherms were present, the water endotherms were not integrated. No blank was run for DSC, because it was unnecessary for the Mettler DSC instrument, which is sufficiently stable that baseline aberration would be observable on the sample thermogram.

Although sample precision was not quantifiable, there were no deviations between the sample data and the corresponding duplicate sample data. Because no standard exists that can be spiked into the samples, the evaluation of spike accuracy and duplicate spike precision was not possible.

Table 10 summarizes the DSC data.

Table 10. Summary of DSC Results	
Sample	Analytical Results
V60 (STD), 4/11/94	endotherm occurred between approximately 155°C and 163°C, 102.6% recovery.
V62	no exotherms
V62 dup1	no exotherms
V60 (STD), 4/25/94	endotherm occurred between approximately 155°C and 163°C, 101.2% recovery.
V63	no exotherms
V63 dup1	no exotherms
V65 (STD)	endotherm occurred between approximately 155°C and 163°C, 103.7% recovery.
V67	no exotherms
V67 dup1	no exotherms
S7954 (STD)	endotherm occurred between approximately 155°C and 163°C, 97.0% recovery.
V68	no exotherms
V68 dup1	no exotherms
V69	no exotherms
V69 dup1	no exotherms

SPECIFIC GRAVITY

Specific gravity analyses were performed on direct samples using procedure/revision number LA-510-112/C-2 (reviewed on 6/26/92) and instrument number WA90787.

No unusual instances or problems occurred during the analyses of specific gravity.

For specific gravity EDP code number S332, the LMCS control limits are 96.81 to 100.53 percent recovery. The historic mean recovery was 98.65 percent. For Tank 108-AP samples, LMCS standard recoveries (99.4 and 99.0 percent) were within acceptance limits.

Because a spiking standard was not available and spiking was not required, spikes and spike duplicates were not performed. As a consequence, data for spike accuracy and spike duplicate precision were not available.

The reagent blank values were 0.984 and 0.976 (relative to an expected value of 1.000 for pure water). Precision between each sample and its duplicate ranged from 0.20 to 0.91 relative percent difference. No Relative Percent Difference (RPD) quality control criteria were specified in the source documents between samples and their duplicates.

Specific gravity values for the samples were nearly equivalent to blank values, indicating that Tank 108-AP constituents were low in dissolved solids. The grand average of sample averages was 0.988.

INORGANIC ANALYSES

ION CHROMATOGRAPHY

All ion chromatography (IC) analyses were performed on dilutions of the direct samples, using procedure/revision numbers LA-533-105/C-1 and LA-533-105/C-2, and instruments numbered WB54428 and WC41533. As was discussed above, Tank 108-AP samples were not preserved. Due, however, to the characteristic high radioactivity of the waste, the samples were not likely to be subject to biodegradation, which is generally the greatest source of nitrate deterioration.

The detection limit for all of the IC analytes was set at the concentration equivalent to the lowest standard within the calibration curve multiplied by the dilution factor from the "water leach" pretreatment. For some analytes, the *sample* detection limit was generated by multiplying the above detection limit by an additional factor based on the sample aliquot that was injected into the IC (that is to say, 11 or 101).

FLUORIDE

For fluoride (EDP code R974), the LMCS control limits ranged from 84.01 to 114.39 percent recovery. The historic mean recovery within the data base was 98.94 percent. LMCS standard recoveries for all Tank 108-AP samples were acceptable with values ranging from 95.2 percent to 100.5 percent.

Sample holding times ranged from 24 to 27 days. Because SW-846 does not specify a holding time for fluoride, all sample holding times were met.

A partially coeluting peak (unidentified compound) interfered with the quantitation of fluoride peaks. The chemist noted that oxalate-interference occurred for the V68 duplicate sample. A rerun was performed for V62 and V63, however the spike recoveries were worse than the original run, consequently the original data were reported. Fluoride accuracy using the ion chromatography procedure was a problem for wastes from tanks 101-AP and 107-AP and continued to be a problem for tank 108-AP as evidenced by the unacceptable spike recovery of 142.2 percent.

Precision between the V62 spike and spike duplicate was unacceptable with 26.2 RPD, which was slightly over the acceptance limit of 25%. RPDs between the samples and their duplicates ranged from 2.6 to 17.6, indicating reasonable precision.

The reagent blanks and field blank fluoride concentrations were less than the detection limits of 0.1 $\mu\text{g/ml}$ and 1 $\mu\text{g/ml}$, respectively, indicating the absence of contamination.

Average fluoride concentrations of the samples ranged from 19.4 to 51.3 $\mu\text{g/ml}$, with the grand average of 34.1 $\mu\text{g/ml}$. These fluoride values are questionable with regard to accuracy and should be used as estimates only.

CHLORIDE

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Sample holding times ranged from 24 to 27 days. SW-846 specifies a holding time for chloride of 28 days, consequently all sample holding times were met.

For chloride (EDP code R972), the LMCS control limits ranged from 89.67 to 115.08 percent recovery. The historic mean recovery within the data base was 99.66 percent. LMCS standard recoveries were acceptable at 100.7 percent, 100.0 percent and 109.6 percent.

Acceptable accuracy as indicated by recoveries of the spike and spike duplicate were 112.9 percent and 97.7 percent, respectively.

Precision between the spike and spike duplicate was acceptable with 14.4 RPD. Precision between the tank samples and their duplicates was reasonable with values ranging from 0.9 to 14.0 relative percent difference.

A precision problem was noted in the field blank where the RPD was 95.7 between the sample and its duplicate. Although this situation was noted, it was determined to be insignificant because the sample values were less than 10-fold greater than the detection limit. Additionally, the source documents do not specify precision quality control criteria which apply to the sample/sample duplicate. Despite these qualifications a discussion of this situation follows. These two sample preparations were reinjected into the ion chromatograph with essentially the same results as for the initial injections. The cognitive chemist speculated in the batch narrative that there was a problem with either sample homogeneity or with contamination of the sample duplicate during sample preparation. Because the field blank was generated from laboratory derived reagent grade water, non-homogeneity was not likely, indicating that the imprecision occurred during sample preparation. Due to the qualifications discussed above, it was, however, determined that the field blank was not contaminated.

The reagent blank chloride concentrations were uniformly less than the detection limit of 0.2 $\mu\text{g/ml}$, and were determined to not be contaminated.

Average sample chloride concentrations ranged from 29.4 to 60.0 $\mu\text{g/ml}$, with a grand average of 56.3 $\mu\text{g/ml}$.

NITRATE

There did appear to be a matrix interference for nitrate as noted by spike recoveries for sample V62, which was the reason for rerunning the test. The rerun data were of equivalent quality, consequently data from the original run were reported.

Sample holding times ranged from 24 to 27 days. SW-846 specifies a holding time for nitrate of 48 hours, consequently none of the sample holding times were met.

For nitrate (EDP code R978), the LMCS control limits ranged from 87.36 to 114.65 percent recovery. The historic mean recovery within the data base was 98.56 percent. LMCS recoveries were acceptable at 96.9 percent, 102.9 percent and 100.5 percent.

Acceptable accuracy was indicated for spiked sample V63 with a recovery of 104.2 percent recovery. Although this technically meets program requirements for accuracy, it must be noted that the spike duplicate's recovery was an unacceptable 169.5 percent.

Precision between the spike and spike duplicate failed to meet the program's precision criterion of 20%, by yielding a 47.7 relative percent difference.

RPDs between the samples and their duplicates ranged from 2.5 to 13.9, indicating reasonable precision.

The reagent blank nitrate concentrations were less than the detection limit of 1 $\mu\text{g}/\text{ml}$, and were determined to not be contaminated. Although the field blank failed to meet the program's 20% criterion for contamination (relative to the reagent blank), its chloride concentration was two orders of magnitude less than average sample concentrations, and would constitute an insignificant fraction of the sample concentration. As a consequence, the field blank was determined to not be contaminated.

Average nitrate concentrations of the samples ranged from 1,170 to 1,920 $\mu\text{g}/\text{ml}$, with the grand average of 1,560 $\mu\text{g}/\text{ml}$, which equates to 0.0252M or 0.16 percent (w/v).

Relative to environmental levels, Tank 108-AP nitrate concentrations are high. As a point of reference, the maximum contaminant level for nitrate in drinking water is 44 $\mu\text{g}/\text{ml}$. Relative to typical double shell tanks, however, Tank 108-AP nitrate values are low.

NITRITE

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Sample holding times ranged from 24 to 27 days. SW-846 does not specify a sample holding time for nitrite, consequently all sample holding times were met. It is known nonetheless that in the environment, nitrite is chemically less stable than nitrate, suggesting that at least for environmental samples, a sample holding time of short duration is reasonable. Tank 108-AP matrix is significantly different from that encountered environmentally, and may, however, have such conditions that nitrite could be chemically stable.

For nitrite (EDP code R968), the LMCS control limits ranged from 90.15 to 113.68 percent recovery. The historic mean recovery within the data base was 100.74 percent. LMCS standard recoveries were acceptable at 101.3, 99.8 and 101.9 percent.

Accuracy, as indicated by recoveries of the spike and spike duplicate, was acceptable with 84.5 percent and 112.7 percent, respectively.

Precision between the spike and spike duplicate failed to meet the acceptance criterion, where the value for V62 was 28.6 RPD. This condition occurred because although the spike and spike duplicate were within the accuracy range of 75 to 125 percent recovery, the recovery of the spike was on the low end of the range yet the spike duplicate's recovery was on the upper end. RPDs between the samples and their duplicates ranged from 0.5 to 12.7, indicating reasonable precision.

WHC-SD-WM-DP-065, REV. 0

The reagent blanks and field blank nitrite concentrations were less than the detection limits of 1 and 10 $\mu\text{g/ml}$, respectively. These blanks were determined to not be contaminated.

Average nitrite concentrations of the samples ranged from 764 to 1,160 $\mu\text{g/ml}$, with the grand average of 1,012 $\mu\text{g/ml}$, which equates to 0.0220M or 0.10 percent (w/v).

Environmentally, nitrite is usually undetectable ($<0.1 \mu\text{g/ml}$). Tank 108-AP nitrite concentrations are high, but relative to typical double shell tanks, the values are low.

PHOSPHATE (ORTHO-PHOSPHATE)

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Sample holding times ranged from 24 to 27 days. Because SW-846 does not specify a holding time for phosphate, all sample holding times were met.

For phosphate (EDP code R976), the LMCS control limits ranged from 87.80 to 115.45 percent recovery. The historic mean recovery within the data base was 99.97 percent. LMCS standard recoveries were acceptable at 109.1, 108.5 and 105.6 percent.

Accuracy was acceptable as indicated by recoveries of the spike and spike duplicate with 98.3 percent and 91.3 percent, respectively.

Precision between the spike and spike duplicate was an acceptable 7.4 RPD. RPDs between the samples and their duplicates were good, ranging from 0.4 to 8.6 RPD.

The reagent blanks and field blank phosphate concentrations were less than the detection limits of 1 and 10 $\mu\text{g/ml}$, respectively.

Average sample phosphate concentrations ranged from 79.8 to 98.2 $\mu\text{g/ml}$, with a grand average of 92.7 $\mu\text{g/ml}$.

SULFATE

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Sample holding times ranged from 24 to 27 days. Because the SW-846 specified sample holding time for sulfate is 28 days, all sample holding times were met.

For sulfate (EDP code R970), the LMCS control limits ranged from 95.15 to 112.14 percent recovery. The historic mean recovery within the data base was

97.63 percent. LMCS standard recoveries were acceptable at 103.8 percent, 103.2 percent and 103.7 percent.

Accuracy was acceptable as indicated by percent recoveries of 106.5 and 93.3 for the spike and spike duplicate, respectively.

Precision between the spike and spike duplicate was an acceptable 13.2 RPD. RPDs between the samples and their duplicates was reasonable with values ranging from 6.5 to 11.1 relative percent difference.

Tank 108-AP reagent blank sulfate concentrations were less than the detection limit of 1 $\mu\text{g/ml}$. The field blank concentrations were less than the detection limit of 10 $\mu\text{g/ml}$, while the reagent blank for the field blank had a concentration of 1.5 $\mu\text{g/ml}$. All blanks were determined to not be contaminated.

Average sulfate concentrations of the samples ranged from 155 to 234 $\mu\text{g/ml}$, with the grand average of 201 $\mu\text{g/ml}$.

The sulfate concentration in Tank 108-AP is within the range of many western USA drinking water sources.

AMMONIA (by KJELDAHL/TITRATION and by ION SELECTIVE ELECTRODE)

Protocol analyses of ammonia were performed using procedure/revision number LA-634-102/D-2 (a kjeldahl/titration procedure) on "water digestion" samples. Instruments numbered AL-10696 and AL-10665 were used for all samples by this procedure. Because the kjeldahl procedure was relatively insensitive, an alternative procedure using ion selective electrode (ISE), LA-631-001/A-0, was also used. An instrument number was not assigned to the ISE instrumentation, but "water digestion" samples were also analyzed in this procedure. To prevent confusing these two sets of analyses, the analytical data will be discussed separately.

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte by either procedure.

SW-846 does not specify a sample holding time for ammonia. Sample holding times ranged from 23 to 30 days for the kjeldahl procedure. Sample holding times ranged from 66 to 73 days for the ISE procedure. Although all sample holding times were officially met, these sample holding times for ammonia seemed unacceptably long, especially for unpreserved samples. The accepted method for ammonia preservation is to acidify samples at the time of collection to pH <2 with nitric acid. Although biodegradation was not expected to be a significant factor in decomposition of Tank 108-AP samples due to lethal radioactivity, it was expected and quite likely that, due to the slightly high pH of these samples, sample degradation could occur due to chemical reactions. At higher pH, ionic ammonia reacts with hydroxide to generate NH_3 , which is volatile and readily is dissipated at ambient temperature. Hydroxide concentration of these samples was less than the

detection limit. Thus due to sample matrix conditions, it is not certain that ammonia data are biased low due to the lengthy holding time.

The statistically derived LMCS control limits for the ammonia standard by the kjeldahl procedure (EDP code number S235) were 77.16 and 122.40 percent recovery. The historic mean recovery of that standard by that procedure was 99.49 percent. Actual LMCS standard recoveries were acceptable at 106.0 percent, 93.8 percent, and 96.9 percent for the three batches.

Ammonia accuracy by the kjeldahl procedure was determined to be acceptable, where the spike and spike duplicate recoveries were 101.4 percent and 100.4 percent, respectively.

Precision using the kjeldahl procedure was determined to be acceptable with a 1.0 RPD between the spike and its duplicate. Precision between samples and their duplicates was not able to be calculated because all values were "less than" values.

Ammonia concentration by the kjeldahl procedure was less than the detection limit for all reagent blanks and for the field blank, indicating that contamination was not a problem for the ammonia analysis.

Average sample concentrations using the kjeldahl procedure were all less than the detection limit of 800 $\mu\text{g}/\text{ml}$ NH_3 . It was because the detection limit by this procedure was so high that the ISE procedure was used in an attempt to better define the actual ammonia concentration in the samples.

No spike or spike duplicate was prepared to evaluate accuracy and precision using the ISE procedure. No LMCS standard control limits have been established because the procedure was only recently developed, allowing insufficient time to acquire a statistical data base. LMCS standards were analyzed, however, yielding good recoveries of 97.9, 95.3 and 103.9 percent.

Using the ISE procedure, the precision between samples and their duplicates appeared to be poor with values ranging from 5.8 to 35.8 RPD. These relative percent differences, however, were not valid, per TPP criteria, because the ammonia concentration of every sample was less than 10-fold greater than the detection limit. The TPP criterion is applied because analytical variability is expected to be much greater as values approach the detection limit.

Using the ISE procedure, all preparation blanks and the field blank had ammonia concentrations less than the detection limit.

Using the ISE procedure, the average sample concentrations ranged from 3.21 to 14.1 $\mu\text{g}/\text{ml}$, with a grand average of 8.22 $\mu\text{g}/\text{ml}$. These data were generated using a non-protocol procedure, consequently the sample values should be considered to be estimated.

HYDROXIDE (by TITRATION)

Hydroxide by procedure/revision number LA-211-102/B-1 was performed on the direct samples, using instruments numbered AL10636, AL10666 and AL10711.

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Sample holding times ranged from 4 to 45 days. SW-846 did not specify a sample holding time for hydroxide, consequently all sample holding times were met.

The autotitrator pH was calibrated using standards of pH 7.00 and 10.00. During sample analyses, all titration endpoints were within the calibration range of pH 7 to 10 (except for the blanks as expected, where the pH shift was extreme with a minute addition of HNO_3 titrant).

Typical titration curves were seen in the analyses of Tank 108-AP samples in contrast to Tank 101-AP samples (which was discussed in the Tank 101-AP case narrative). It was believed that the cause of this situation was due to the relative absence of ammonia in tank 108-AP, which was shown to be the cause of interference with Tank 101-AP samples using this procedure.

No spikes were required by the source documents, consequently, no percent recovery data are available because no spikes were analyzed.

The statistically derived LMCS control limits for the hydroxide standard (EDP code number S273) were 93.28 and 108.71 percent recovery. The historic mean recovery was 101.20 percent. Actual LMCS standard recoveries for 108-AP analyses were acceptable with values of 103.4 percent, 98.8 percent and 102.0 percent for the three batches.

Precision of the sample and sample duplicate was not able to be calculated due to the "less than" sample values.

Reagent blanks are used to correct sample values, consequently it is not possible to "analyze" a reagent blank since a blank would be subtracted from the blank to yield a result of zero. Field blank hydroxide concentrations were less than their detection limits, which were dependent on the determination's aliquot size. All blanks were determined to not be contaminated.

Average hydroxide concentrations were not able to be calculated because of the "less than" sample values, however the estimated hydroxide concentration of all samples was $<125 \mu\text{g/ml}$. It was not possible to analyze sample V62 in duplicate because of insufficient sample.

CYANIDE (by DISTILLATION/SPECTROPHOTOMETRY)

Cyanide analyses were performed on direct and water diluted samples using procedure/revision number LA-695-102/B-2, and instrument number AL10724.

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Sample holding times ranged from 27 to 54 days. Because the SW-846 specified sample holding time for cyanide was 14 days, each sample failed to meet the required sample holding time.

For this procedure, full calibration curves were not generated at the time of each batch analysis. A standard curve was generated on December 16, 1993, for the tank samples where the following curve statistics were obtained: Y intercept = - 0.00313, slope = 0.157645, and the correlation coefficient (r^2) = 0.999898. A second standard curve was generated on June 20, 1994, for the field blank where the following curve statistics were obtained: Y intercept = 0.006250, slope = 0.160059, and the correlation coefficient (r^2) = 0.999803. For Tank 108-AP cyanide analyses, the LMCS standard had additional importance because it was used to check the validity of the standard curve which was generated several months prior.

The statistically derived LMCS control limits for the cyanide standard (EDP code number S244) were 89.24 and 104.92 percent recovery. The historic mean recovery was 98.50 percent. LMCS standard recoveries were acceptable with percent recoveries of 100.3, 99.1, and 91.5.

Accuracy of the spike and spike duplicate determinations were within acceptance limits with percent recoveries of 100.3 and 99.9.

Precision between the spike and spike duplicate was acceptable with 0.4 RPD. Precision between the samples and their duplicates was good for samples V62 and V63, with RPDs ranging from 0.0 to 1.7 percent. Precision RPD values were not able to be calculated for samples V67, V68 and V69 as well as the field blank because the sample concentrations were less than the detection limit.

The concentrations of reagent blanks and field blanks were determined to be less than their detection limits, indicating the absence of contamination.

Average sample values ranged from <0.1 to 1.03 $\mu\text{g/ml}$ with a grand average of $\leq 0.45 \mu\text{g/ml}$.

TOTAL INORGANIC CARBON (CARBONATE)

Total inorganic carbon (TIC) analyses were performed using instruments numbered WB39927 and AL10656 on "water digest" samples with procedure/revision number LA-622-102/B-2.

A maximum sample holding time for this analyte was not specified in SW-846 protocol, but the holding times ranged from 19 to 103 days.

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Statistically derived LMCS control limits for the carbonate standard (EDP code number S223) were 86.93 and 108.01 percent recovery. The historic mean recovery was 102.22 percent. LMCS standard recoveries were acceptable with values of 96.4, 99.0 and 97.0 percent.

Accuracy for the spike and spike duplicate was acceptable with percent recoveries of 83.7 and 91.6, respectively.

Precision between the spike and spike duplicate was acceptable with an RPD of 12.6. Precision between samples and their duplicates was quite good with values ranging from 0.4 to 6.4 RPD.

The field blank's carbonate concentration was less than the detection limit of 50 $\mu\text{g/ml}$. The preparation blank concentrations were all less than the detection limit of 25 $\mu\text{g/ml}$. The detection limit shown on the data summary sheet was based on a standard volume of 0.20 milliliters (an optimal value). Generally the least amount of inorganic carbon detectable was 1 μg . Thus, one microgram of carbon divided by 0.20 ml equaled 5.00 $\mu\text{g C/ml}$, which, when multiplied by the "water digestion" dilution factor of 5 for the tank samples, yielded the detection limit for this procedure of 25 $\mu\text{g C/ml}$.

In calculating the sample carbonate concentrations, an instrument blank value was subtracted from the sample value. Values shown on the data summary sheet for each reagent blank were uncorrected because, if the result blank value was subtracted from itself, it would yield an erroneously corrected blank value of zero.

Average carbonate concentration of the samples ranged from 417 to 572 $\mu\text{g/ml}$. The grand average concentration of all samples was 486 $\mu\text{g/ml}$.

TOTAL URANIUM (by LASER FLUORIMETRY)

Chemical (not radiochemical) analyses for total uranium were performed on direct samples. These determinations were performed using instrument number WB88807 by procedure/revision number LA-925-106/B-1.

The sample holding times for uranium ranged from 5 to 25 days. A maximum sample holding time was not specified for this analyte in SW-846 protocol.

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

The LMCS standard recovery control limits for uranium (EDP code number S267) were 77.19 and 121.70 percent. The historic mean percent recovery was 99.45.

LMCS standard accuracy was acceptable for Tank 108-AP samples with percent recoveries of 91.5, 95.8, and 104.9. Note that in the data summary spreadsheets, standard results are in g/L of uranium.

Spike/duplicate-spike recoveries were acceptable with both having a percent recovery of 98.5 percent.

Precision between the spike and spike duplicate was acceptable with a value of 0.0 relative percent difference. Precision between samples and duplicates was reasonable with values ranging from 0.0 to 18.0 RPD.

Preparation blank and field blank concentrations were uniformly less than the detection limit. The blank were determined to not be contaminated.

The average sample concentrations ranged from 2.29 $\mu\text{g/ml}$ to 23.4 $\mu\text{g/ml}$, with a grand average of 13.5 $\mu\text{g/ml}$ of uranium.

ARSENIC (by HYDRIDE ATOMIC ABSORPTION SPECTROPHOTOMETRY)

Samples were acid digested prior to arsenic analyses to ensure complete solubility and better recovery. Arsenic analyses were performed using procedure/revision number LA-355-131/B-1 and instrument numbers PE2280 (hydride AA) and WB27979. Instrument calibration data are as follows:

<u>Samples</u>	<u>Batch</u>	<u>Y-intercept</u>	<u>Slope</u>	<u>r²</u>
V60-V63	3516	0.0239	0.0800	0.9989
V65-V69	3512	-0.0138	0.0246	0.9999
V71-V73	3021	0.0689	0.0223	0.9981

SW-846 protocol require a sample holding time of six months or less for arsenic. Sample holding times for arsenic analyses ranging from 42 to 97 days were within the SW-846 required holding time.

Two major difficulties were encountered with arsenic analyses, causing three reruns. Ultimately one of the problems (differences in final hydrochloric acid concentration for various types of samples being acid digested) was resolved following extensive investigation. The solution, where calibration standards were digested in the same matrix as the samples resulting in significantly improved spike and spike duplicate recoveries, reinforced the same opinion regarding the problem that was stated in the 107-AP narrative. The second difficulty, lack of adequate sample volume, was intensified because of the reruns, where finally there was not a sufficient volume of V62 to redigest the samples, standards and blank once the problem of varying HCl concentration was solved. A full discussion of these difficulties was provided in the chemist's narrative for batch #3516 (samples V60-V63).

The LMCS standard (EDP code R741) control limits were 76.35 and 132.94 percent recovery. The historic mean percent recovery was 100.72 percent. The undigested LMCS standards analyzed with the field blank yielded an acceptable accuracy with a percent recovery of 99.2. Percent recoveries of digested LMCS

standards (because undigested standards were not available) for tank 108-AP samples were significantly higher, but acceptable, with percent recoveries of 105.4 and 102.4. The digested LMCS standard recoveries for the field blank was acceptable with 109.6 percent recovery.

The spike and spike duplicate values suggested that accuracy was unacceptable with percent recoveries of 53.7 and 52.1, respectively. The chemist's narrative commented that the poor recoveries were due to differences in the spiked sample matrix when digested and non-digested standard additions were used. Because of insufficient volume of sample V62, it was not possible to redigest the sample along with redigestions of the calibration standards and LMCS standard, consequently for the final rerun, the spikes that were generated for a prior digestion were to be included in that run. However, due to miscommunication, those spikes were not analyzed in that final run. It appeared from the chemist's narrative that it was necessary to use the digested duplicate sample V62 from a previous run to prepare a spike and spike duplicate (perhaps because the spikes from that run were discarded). Consequently, the only type of spikes which were available were post-digestion spikes, which exhibited the same inconsistent acid concentration problem that had been identified and corrected for the samples and standards. Thus, the V62 spike and spike duplicate results were very low (approx 50 percent recovery) despite the chemists's belief that the 108-AP sample data were OK.

Precision was acceptable between the spike and spike duplicate with an RPD of 2.4 percent. Precision between samples and their duplicates was reasonable for samples V62, V63 and V67 with values ranging from 0.0 to 15.4 RPD. The RPD for samples V68 and V69 was not able to be calculated because arsenic concentrations of these samples were less than the detection limit of 0.025 $\mu\text{g/ml}$.

The field blank and reagent blanks were uniformly below the detection limit, indicating the absence of contamination.

Average sample arsenic concentrations ranged from <0.025 to 0.0417 $\mu\text{g/ml}$, with a grand average of ≤ 0.0322 $\mu\text{g/ml}$.

SELENIUM (by HYDRIDE ATOMIC ABSORPTION SPECTROPHOTOMETRY)

Samples were acid digested prior to selenium analyses to ensure complete solubility and better recovery. Selenium analyses were performed using procedure/revision number LA-365-131/B-2 and instruments numbered PE2280(Hydride) and WB27979. Instrument calibration data are as follows:

<u>Samples</u>	<u>Batch</u>	<u>Y-intercept</u>	<u>Slope</u>	<u>r²</u>
V60-V63	2990	0.0063	0.0074	0.9999
V65-V69	3010	-0.0005	0.0074	0.9987
V71-V73	4126	0.0023	0.0071	0.9994

SW-846 protocol require a sample holding time of six months or less for selenium. Tank 108-AP sample holding times ranged from 35 to 54 days, which was within the required holding time.

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte, except for slight calibration drift at the end of the run where the field blank was analyzed, as noted in the chemist's narrative for batch 4126. Although the ending calibration check standard was not within LMCS control limits for that batch, the program does not require the analysis of ending standards.

LMCS standard (EDP code R743) control limits were 59.48 and 140.47 percent recovery. The historic mean percent recovery was 101.95 percent. Undigested LMCS standards which are required to be analyzed with 108-AP samples yielded acceptable accuracy with percent recoveries of 100.0, 107.0, and 105.8. Percent recoveries of digested LMCS standards were 111.1, 105.0 and 108.9.

Accuracy of spike and spike duplicates were acceptable with percent recoveries of 97.5 and 88.8, respectively.

Precision was acceptable between the spike and spike duplicate with an RPD of 9.3 percent. It was not possible to determine precision between samples and their duplicates because sample selenium concentrations were determined to be less than the detection limit of 0.0130 $\mu\text{g/ml}$.

The preparation blanks were uniformly below the detection limit of 0.013 $\mu\text{g/ml}$. The average field blank concentration was determined to be 0.0266 $\mu\text{g/ml}$ which was only slightly greater than the detection limit of 0.025 $\mu\text{g/ml}$. All of the blanks were determined to not be contaminated.

MERCURY (by COLD VAPOR ATOMIC ABSORPTION SPECTROPHOTOMETRY)

Although mercury analyses are noted on the batch sheets as being done on the direct sample (because no preparative work was performed by the Sample Preparations Group), procedure/revision number LA-325-104/A-1, a CLP derived procedure, includes a substantial digestion phase. The instruments used were PE2380 (Hydride AA) and WB26847.

Sample holding times for mercury analyses ranged from 8 and 32 days. SW-846 protocol require a maximum holding time of 38 days, consequently all mercury analyses were performed within the required holding time.

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

The correlation coefficient for each batch was acceptable with values greater than the minimum procedure required value of 0.995.

<u>Samples</u>	<u>Batch</u>	<u>Y-intercept</u>	<u>Slope</u>	<u>r²</u>
V60-V63	2986	-0.0190	0.0104	0.9995
V65-V69	3103	0.0041	0.0101	0.9996
V71-V73	3013	-0.0025	0.0097	1.0000

Statistically derived LMCS control limits for the mercury standard (EDP code number R716) were 76.57 to 121.40 percent recovery. The historic mean recovery was 98.70 percent. Actual LMCS standard recoveries were acceptable with 100.0, 93.1 and 106.0 percent recovery.

Accuracy of the spike and duplicate spike was acceptable with percent recoveries of 95.9 and 101.0.

Precision between the spike and spike duplicate was an acceptable 5.2 relative percent difference. Precision between samples V67, V68 and V69 and their duplicates was not measurable because their mercury concentrations were less than the detection limit of 0.005 µg/ml. Precision between samples and duplicates for samples V62 and V63 was on the high side, ranging from 19.7 to 20.0 RPD. Program requirements for precision do not specify acceptance criteria for samples/sample duplicates. Even if there were criteria, the sample mercury values are so near to the detection limit that they would be exempted per specifications in the TPP.

The field blank mercury concentration was determined to be less than the sample detection limit of 0.005 µg/ml. The mercury concentration of reagent blanks for samples V67, V68, and V69 were less than 0.005 µg/ml. The concentration of reagent blanks for samples V62 and V63 were less than 0.0002 µg/ml. All blanks were determined to not be contaminated.

INDUCTIVELY COUPLED PLASMA/EMISSION SPECTROSCOPY (ICP)

An acid predigestion was performed on ICP samples prior to analysis. Because two different ICP instruments were used, this work was performed under two separate procedures. Samples V60-V70 were analyzed by procedure/revision number LA-505-151/D-1, using instrument number WB39939. Samples V71-V74 were analyzed by procedure/revision number LA-505-161/A-0, using instrument number WC38935.

Sample holding times for ICP analyses ranged from 22 to 47 days. SW-846 protocol require that the holding time for these metals may not exceed six months. All ICP analyses were completed within the required holding time.

ICP data were reported using a CLP deliverable package. The software which converted the instrument generated data to the reporting format was referred to as the "Wards™* package".

* Ward is a registered trademark of Ward Scientific, Ltd.

The Wards™ package uses the concept of a sample delivery group (SDG), which includes samples, duplicates, spikes, blanks, instrument control standards and blanks, interference checks, serial dilutions and narrative information within a batch. The designations for initial calibration verification and continuing calibration verification are ICV and CCV, respectively. These are undigested LMCS control standards. The acronyms, ICB and CCB, denote initial calibration blank and continuing calibration blank (undigested reagent blanks).

Undigested blanks were used to initially calibrate the ICP instrument and to check calibration on a continuing basis. A digested reagent blank included with each batch, however, was used to determine the extent of blank contamination introduced during sample preparation (and by inference, the estimated amount of sample contamination).

As was specified in the TPP, section 4.2, sample accuracy evaluation criteria for ICP LMCS standards was to be based on the undigested initial calibration verification (ICV) standards. Although the same control standard, ICP-SST-4, was used for initial and continuing LMCS calibration checks for both ICP instruments, the control limits were different. The older ICP instrument, an ARL (WB39939), had acquired a base of data sufficient to generate statistically derived limits. No such base of data was available for the new ICP instrument, a Thermo-Jarrell Ash (WC38935), consequently the control limits were administratively set at 85% and 115% recovery. LMCS control limits are shown in table 11 for analytes as determined by each instrument.

Table 11. ICP LMCS Control Limits					
Analyte	ARL [old instrument] (WB39939)			Thermo-Jarrell Ash (WC38935) [new instrument]	
	EDP Code	Control Limits, RPD	Historical Mean	EDP Code	Control Limits, RPD
Ag	S157	88.96-111.34	99.00	S058	85 - 115
Al	S101	82.33-108.70	96.71	S002	85 - 115
Ba	S107	90.41-105.59	99.32	S008	85 - 115
Ca	S117	86.34-108.81	97.36	S018	85 - 115
Cd	S115	88.48-109.42	96.67	S016	85 - 115
Cr	S121	92.66-110.71	98.90	S022	85 - 115
Fe	S129	89.00-106.47	98.68	S030	85 - 115
Mg	S137	88.71-106.88	99.97	S038	85 - 115
Mn	S139	86.96-102.65	96.73	S040	85 - 115
Na	S159	89.36-104.26	97.53	S060	85 - 115
Pb	S133	88.37-111.10	98.08	S034	85 - 115
Zn	S179	81.53-106.91	98.67	S080	85 - 115

In the Wards™ package, if the reported values were less than the detection limit, precision for duplicate analyses was reported as 200 percent RPD and as 100 percent for serial dilution RPDs.

The ARL ICP (old instrument) performed interelement data corrections for aluminum, cadmium, chromium, lead, manganese, silver and zinc. The Thermo-Jarrell Ash ICP (new instrument) performed interelement data corrections for aluminum, cadmium, chromium, iron, lead, manganese, silver and zinc.

Because each ICP determination generated analytical values for 12 metals simultaneously, generally there were quality control failures within each run. Those failures were discussed in the Wards™ package narratives. In the Wards™ package, form VII-IN misleadingly identifies the *digested* LMCS standard as a "Laboratory Control Sample". This occurs because this is a "CLP type" data package, and CLP protocol designates the digested standard as the "Laboratory Control Sample". Header information in this package is not able to be edited. Similarly, a footer incorrectly identifies the control limits for the laboratory control sample as 90 to 110 percent recovery.

It is important to note that the units reported for ICP are $\mu\text{g/L}$ (or parts per billion), which is 1000 fold lower than the units of $\mu\text{g/ml}$, which are used elsewhere in this data package.

In the tabular data summaries, a column is included which is entitled, "Detection Limit, $\mu\text{g/L}$ ". This column indicates the instrument detection limit, which is the lowest detectable concentration by ICP without a sample dilution factor being applied. For several analytes, "less than" values are given for samples. These "less than" values represent the *sample's* detection limit which is equal to the instrument detection limit multiplied by the sample dilution factor. Sample dilutions will cause the sample detection limit to be greater than the instrument detection limit.

The linear concentration range was determined for ICP analytes. The maximum concentration within the linear range (defined as the highest concentration in which the percent recovery of a standard deviates less than five percent from 100 percent) is listed in table 12.

The percent recovery for spikes and spike duplicates tended to be biased low. Although the program's criterion for accuracy (75 to 125 % recovery) was generally met, these data suggest that matrix interference with the quantitation may be present. In the absence of data on other analytes, this premise is reasonable, however the general tendency for spike recovery of nearly all ICP analytes appeared to be biased low, indicating the possibility of problems with either the preparation of the spike and spike duplicate, or perhaps more likely with a poor spiking standard (having analyte concentrations other than the stated value). The chemist's narrative states that spike recovery bias may be attributed to a volumetric transfer error made during preparation of the spike.

Table 12. ICP Linear Concentration Ranges				
Analyte	ARL (WB39939) [old instrument] 3/31/94		Thermo-Jarrell Ash (WC38935) [new instrument] 1/10/94	
	Integration Time (Sec.)	Concentration ($\mu\text{g/L}$)	Integration Time (Sec.)	Concentration ($\mu\text{g/L}$)
Ag	5	50000.0	5	100000.0
Al	5	250000.0	5	1000000.0
Ba	5	100000.0	5	100000.0
Ca	5	50000.0	5	1000000.0
Cd	5	50000.0	5	100000.0
Cr	5	300000.0	5	100000.0
Fe	5	200000.0	5	500000.0
Mg	5	20000.0	5	1000000.0
Mn	5	100000.0	5	100000.0
Na	5	1000000.0	5	500000.0
Pb	5	50000.0	5	100000.0
Zn	5	100000.0	5	100000.0

ALUMINUM

Percent recoveries of all undigested LMCS standards (which ranged from 94.7 to 100.4) were within control limits.

The digested "laboratory control samples" for those batches which contained the tank samples had percent recoveries which were within the LMCS undigested standard control limits. The digested "laboratory control sample" which was run with the field blank was prepared incorrectly, consequently these data were invalid. The program does not require the use of digested control standards nor were control criteria specified for digested control standards.

Accuracy was unacceptable as indicated by the spike with 126.2 percent recovery, but the spike duplicate recovery of 120.4 percent recovery was good. The chemist's narrative indicated that aluminum recovery may have been impacted by the high level of sodium in the samples.

Precision between the spike and spike duplicate was an acceptable 3.2 relative percent difference. RPDs between the samples and their duplicates ranged from 0.7 to 16.8 percent.

All preparation blanks had aluminum concentrations which were less than the detection limit of 29 $\mu\text{g/L}$, indicating the absence of contamination. The

field blank's aluminum concentration was two orders of magnitude less than that of the samples, but more than an order of magnitude greater than its preparation blank. The field blank failed the 20% criterion for contamination as defined in the QAPjP, however, because the concentration is insignificant relative to the aluminum concentration of the samples it was determined that the field blank was not contaminated.

Average aluminum concentrations of the samples ranged from 32,500 to 54,700 $\mu\text{g/L}$, with a grand average of 41,700 $\mu\text{g/L}$.

BARIUM

Percent recovery of all undigested LMCS standards (which ranged from 95.1 to 101.1) were within control limits.

The digested "laboratory control samples" for those batches which contained the tank samples had percent recoveries which were within the LMCS undigested standard control limits. The digested "laboratory control sample" which was run with the field blank was prepared incorrectly, consequently these data were invalid. The program does not require the use of digested control standards nor were control criteria specified for digested control standards.

Accuracy was acceptable (but very near the limit) as indicated by spike and spike duplicate recoveries of 78.6 percent and 75.7 percent, respectively.

Precision between the spike and spike duplicate was an acceptable 3.8 relative percent difference.

RPD between the samples and their duplicates was not able to be calculated because all sample barium concentrations were less than the detection limit of 20 $\mu\text{g/L}$.

Preparation blank concentrations were all less than the detection limit of 4.0 $\mu\text{g/L}$. The field blank appeared to be contaminated because its average concentration, 81.6 $\mu\text{g/L}$, was greater than that of the samples. Despite being contaminated, it appears that it was not indicative of sample contamination because the sample concentrations were less than the detection limit.

CADMIUM

The percent recoveries of all undigested LMCS standards (which ranged from 97.3 to 102.0) were within control limits.

The digested "laboratory control samples" for those batches which contained the tank samples had percent recoveries which were within the LMCS undigested standard control limits. The digested "laboratory control sample" which was run with the field blank was prepared incorrectly, consequently these data were invalid. The program does not require the use of digested control standards nor were control criteria specified for digested control standards.

Accuracy was acceptable as indicated by the spike recovery of 76.0 percent, which was marginal. The percent recovery for the spike duplicate was 72.8. Although the program's criterion for accuracy was technically met, these data

indicate the occurrence of generally low spike recoveries, which suggests that matrix interference with the quantitation of cadmium may be present. In the absence of other data, this premise is reasonable, however the general tendency for spike recovery of nearly all ICP analytes appeared to be biased low, indicating the possibility of problems with either the preparation of the spike and spike duplicate, or perhaps more likely a poor spiking standard (having analyte concentrations other than the stated value). The chemist's narrative states that spike recovery failure may be attributed to a volumetric transfer error made during preparation of the spike.

Precision between the spike and spike duplicate was an acceptable 4.7 relative percent difference. RPDs between the samples and their duplicates were generally quite good with RPDs ranging from 1.4 to 5.7 for samples V62, V63, V67 and V69. Only sample V68 had a high precision deviation with 33.2 RPD.

Field blank and preparation blank concentrations were less than the detection limit, indicating the absence of contamination.

The average cadmium concentrations of the samples ranged from 129 to 158 $\mu\text{g/L}$, with a grand average of 141 $\mu\text{g/L}$.

CALCIUM

Percent recoveries of all undigested LMCS standards, which ranged from 94.6 to 102.4, were within control limits.

The digested "laboratory control samples" for those batches which contained the tank samples had percent recoveries which were within the LMCS undigested standard control limits. The digested "laboratory control sample" which was run with the field blank was prepared incorrectly, consequently these data were invalid. The program does not require the use of digested control standards nor were control criteria specified for digested control standards.

Accuracy appeared to be acceptable with recoveries of the spike and spike duplicate of 80.2 percent and 77.3 percent, respectively.

Precision between spike and spike duplicate was acceptable with a 3.6 relative percent difference. RPDs between the samples and their duplicates ranged from 12.4 to 69.9 percent. Only tank samples V63 and V67 had an RPD less than 20 percent. The poor precision pointed to contamination which may have occurred during the digestion or in the field.

The chemist noted variability of the continuing calibration blanks for samples V62 and V63, but indicated that there was "no impact on data quality". Preparation blank concentrations were generally two orders of magnitude less than the sample concentrations, indicating that any contamination due to sample preparation was insignificant. The average field blank concentration (1,300 $\mu\text{g/L}$) was 6.5 fold greater than its sample detection limit, and in some cases was greater than the sample concentrations, indicating the existence of contamination. Sample contamination in the field was indicated, because the samples and field blank had approximately the same concentrations, while the preparation blank's calcium concentration was much less.

Average calcium concentrations of the samples ranged from 875 to 2,260 $\mu\text{g/L}$, with a grand average of 1,710 $\mu\text{g/L}$. Because of significant contamination, these data should be considered as estimated values.

CHROMIUM

The percent recoveries of all undigested LMCS standards (which ranged from 97.1 to 102.1) were within control limits.

The digested "laboratory control samples" for those batches which contained the tank samples had percent recoveries which were within the LMCS undigested standard control limits. The digested "laboratory control sample" which was run with the field blank was prepared incorrectly, consequently these data were invalid. The program does not require the use of digested control standards nor were control criteria specified for digested control standards.

Accuracy was acceptable as indicated by recoveries of the spike and spike duplicate, which were 81.1 and 77.7 percent, respectively.

Precision between the spike and spike duplicate was an acceptable 4.1 relative percent difference. RPDs between the samples and their duplicates were good, with values ranging from 0.3 to 11.1 RPD.

The field blank and all sample preparation blank concentrations were either less than the detection limit or very near to the detection limit, indicating the absence of contamination.

Average sample chromium concentrations ranged from 1,960 to 2,110 $\mu\text{g/L}$, with a grand average of 2,030 $\mu\text{g/L}$.

IRON

Percent recovery of all undigested LMCS standards were within control limits, ranging from 95.5 to 101.5 percent.

The digested "laboratory control samples" for those batches which contained the tank samples had percent recoveries which were within the LMCS undigested standard control limits. The digested "laboratory control sample" which was run with the field blank was prepared incorrectly, consequently these data were invalid. The program does not require the use of digested control standards nor were control criteria specified for digested control standards.

Acceptable accuracy was indicated by recoveries of the spike and spike duplicate, which were 79.3 and 76.0 percent, respectively.

Precision between the spike and spike duplicate was acceptable with an RPD of 4.2 percent. RPDs between the samples and their duplicates was very poor, ranging from 5.0 to 142.5 percent.

All digested preparation blank concentrations were greater than the detection limit, but they were approximately 10-fold less than the sample concentrations.

The average field blank concentration (168 $\mu\text{g/L}$) was 8.4 fold greater than its sample detection limit, and in some cases was greater than the sample concentrations, indicating the existence of significant contamination. Sample contamination in the field was indicated, because the samples and field blank had approximately the same concentrations, although the possibility of contamination occurring during sample preparation in the laboratory was not ruled out because the preparation blank's iron concentrations were only about ten fold less.

Average iron concentrations of the samples ranged from 122 to 1,040 $\mu\text{g/L}$, with a grand average of 510 $\mu\text{g/L}$. Because of significant contamination, these data should be considered as estimated values.

LEAD

The percent recoveries of all undigested LMCS standards (which ranged from 97.8 to 101.4) were within control limits.

The digested "laboratory control samples" for those batches which contained the tank samples had percent recoveries which were within the LMCS undigested standard control limits. The digested "laboratory control sample" which was run with the field blank was prepared incorrectly, consequently these data were invalid. The program does not require the use of digested control standards nor were control criteria specified for digested control standards.

Acceptable accuracy was obtained for the spike with a 77.0 percent recovery. The spike duplicate recovery was 73.6 percent. Although the program's criterion for accuracy was technically met, these data indicate the occurrence of generally low spike recoveries, which suggests that matrix interference with the quantitation of lead may be present. In the absence of other data, this premise is reasonable, however the general tendency for spike recovery of nearly all ICP analytes appeared to be biased low, indicating the possibility of problems with either the preparation of the spike and spike duplicate, or perhaps more likely a poor spiking standard (having analyte concentrations other than the stated value). The chemist's narrative states that spike recovery failure may be attributed to a volumetric transfer error made during preparation of the spike.

Precision between the spike and spike duplicate was acceptable with a relative percent difference of 4.4. RPDs between the samples and their duplicates were not able to be calculated (except for V68 with a 196.2 percent RPD), because one or both of the determinations from each sample was less than the sample detection limit of 120 $\mu\text{g/L}$. It appeared that the duplicate sample of V68 was contaminated because its lead concentration was 100-fold greater than sample V68 as well as the other samples and duplicates. In his response to QA comments, the chemist indicated that the absence of lead in V68 duplicate was "verified".

All preparation blanks had lead concentrations that were less than the detection limit of 24.0 $\mu\text{g/L}$. Field blank values were less than its detection limit of 28 $\mu\text{g/L}$, indicating the absence of contamination in all blanks.

When the probably erroneous value for V68 duplicate was deleted, the average sample lead concentrations ranged from <120 to 138 $\mu\text{g/L}$, with a grand average of $\leq 126 \mu\text{g/L}$.

MAGNESIUM

Percent recovery of all undigested LMCS standards were within control limits, ranging from 94.2 to 98.5 percent.

The digested "laboratory control samples" for those batches which contained the tank samples had percent recoveries which were within the LMCS undigested standard control limits. The digested "laboratory control sample" which was run with the field blank was prepared incorrectly, consequently these data were invalid. The program does not require the use of digested control standards nor were control criteria specified for digested control standards.

Acceptable accuracy was obtained for the spike with 76.3 percent recovery, but the spike duplicate was low with 73.5 percent recovery. Although the program's criterion for accuracy was technically met, these data indicate the occurrence of generally low spike recoveries, which suggests that matrix interference with the quantitation of magnesium may be present. In the absence of other data, this premise is reasonable, however the general tendency for spike recovery of nearly all ICP analytes appeared to be biased low, indicating the possibility of problems with either preparation of the spike and spike duplicate, or perhaps more likely a poor spiking standard (having analyte concentrations other than the stated value). The chemist's narrative states that spike recovery failure may be attributed to a volumetric transfer error made during preparation of the spike.

Precision between the spike and spike duplicate was acceptable with an RPD of 3.8 percent. RPDs between the samples and their duplicates ranged between 6.5 and 57.5 percent. The poor sample precision pointed to the possibility of contamination.

The chemist noted variability of the continuing calibration blanks for samples V62 and V63, but also indicated that there was "no impact on data quality". Additional evidence of the contamination of samples was observable in the field blank. The field blank's magnesium concentration was greater than that of all of the samples (and almost four times greater than the average sample concentration). The preparation blank magnesium concentrations for all samples as well as for the field blank were less than the detection limit, indicating that the source of contamination was not from sample handling in the laboratory, but was derived in the field. All sample preparation blank concentrations were <3 $\mu\text{g/L}$, and the preparation blank for the field blank was <19 $\mu\text{g/L}$.

Average sample magnesium concentrations ranged from 28.4 to 144 $\mu\text{g/L}$, with a grand average of 87.0 $\mu\text{g/L}$. These data should be considered to be estimates because of the probability of contamination.

MANGANESE

Percent recovery of all undigested LMCS standards were within control limits, ranging from 96.5 to 101.2.

The digested "laboratory control samples" for those batches which contained the tank samples had percent recoveries which were within the LMCS undigested standard control limits. The digested "laboratory control sample" which was run with the field blank was prepared incorrectly, consequently these data were invalid. The program does not require the use of digested control standards nor were control criteria specified for digested control standards.

Acceptable accuracy was obtained for the V62 spike with 78.0 percent recovery and for its spike duplicate with 75.0 percent recovery.

Precision between the spike and spike duplicate was acceptable with a relative percent difference of 3.9. RPDs between samples V62, V67 and V68 and their duplicates were not able to be calculated because one or both of the determinations from each sample was less than the sample detection limit of 15.0 $\mu\text{g/L}$. For samples V63 and V69, the sample/duplicate precision values were 33.3 and 23.3 RPD, respectively. These sample precision values were not unreasonable because all sample concentrations that were greater than the detection limit were at most 1.9 times greater. At this low level, significant imprecision is expected and is reasonable.

Manganese concentrations for the field blank and its duplicate were less than the detection limit of 10.0 $\mu\text{g/L}$. None of the preparation blanks had detectable manganese concentrations, where the detection limit was 3.0 $\mu\text{g/L}$. All blanks were determined to not be contaminated.

The average sample concentrations for manganese ranged from <15.0 $\mu\text{g/L}$ to 25.1 $\mu\text{g/L}$. The grand average sample concentration was ≤ 18.0 $\mu\text{g/L}$. "Less than" values were deleted to enable mathematical calculations.

SILVER

All LMCS standard (undigested) percent recoveries were within acceptable accuracy control limits, ranging from 96.3 to 101.0.

The digested laboratory control samples, however, suggested that there may be a potential problem with the digestion. Such digestion problems were seen with samples from Tanks 101-AP and 107-AP. Tank 108-AP samples were prepared by the same procedure. The digestion procedure (LA-505-158), through which all ICP samples were processed, includes a step where samples were exposed to hydrochloric acid. Because silver precipitates in a matrix with high chloride concentration, it was expected that silver recovery during analysis would be negatively impacted. Significantly high silver concentrations were seen in the initial calibration blank and the continuing calibration blanks. This appeared to be related to the silver precipitation problem, because as indicated in the chemist's batch narratives, instrument carryover was occurring from digested standards.

Accuracy failed to meet the control limit criterion, where the spike and the spike duplicate had exceedingly low percent recovery values of 13.3 and 14.2

percent. This failure was again attributed to silver incompatibility with the hydrochloric acid, which was used in the sample digestion procedure.

Precision between the spike and spike duplicate was acceptable with a 7.0 relative percent difference.

RPDs between the samples and their duplicates ranged from 0.3 to 140.9 relative percent difference. Although program acceptance criteria do not apply to sample duplicate analyses, the very large sample RPDs point to a significant problem.

Silver concentrations for the field blank were essentially at or less than the detection limit of 40.0 $\mu\text{g/L}$. Silver concentration in all preparation blanks was less than the detection limit of 4.00 $\mu\text{g/L}$, indicating the absence of contamination.

The average silver concentration for tank samples ranged from 43.4 $\mu\text{g/L}$ to 79.8 $\mu\text{g/L}$. The grand average for all samples was 63.2 $\mu\text{g/L}$. All values for silver are highly suspect because of a failure in the analytical system. These data are to be used at the user's judgement.

SODIUM

The recovery of all undigested LMCS standards were within control limits, ranging from 96.3 to 101.0 percent recovery.

The digested "laboratory control samples" for those batches which contained the tank samples had percent recoveries which were within the LMCS undigested standard control limits. The digested "laboratory control sample" which was run with the field blank was prepared incorrectly, consequently these data were invalid. The program does not require the use of digested control standards nor were control criteria specified for digested control standards.

When sample analyte concentrations exceed 1000 $\mu\text{g/ml}$ (1,000,000 $\mu\text{g/L}$), the normal accuracy control limits of 75 to 125 percent recovery are not applicable to ICP analyses, as stated in the TPP, section 4.5. The sodium concentration of each sample was determined to exceed 1000 $\mu\text{g/ml}$, consequently the alternative evaluation of accuracy was applied using serial dilution. Following serial dilution and reanalysis of each sample, a dilution RPD value was determined. The formula for this calculation follows:

$$\text{Dilution RPD} = \frac{[\text{initial conc.}] - ([\text{serial dil'n conc.}] \times \text{dilution factor})}{[\text{initial concentration}]} \times 100$$

Using a dilution rather than a spike has advantages and disadvantages as a data quality evaluation tool. Although an evaluation of the deviation between the actually derived concentration and the expected concentration following dilution does not definitively indicate the degree of matrix interference within a sample, it does establish whether or not the analysis was performed within the linear portion of the calibration curve. Conversely, a spike is not particularly useful when the initial sample concentration is very high.

To be distinguishable above the initial sample concentration, spiking must generate a final concentration at least 25 percent greater than the initial concentration, yet this frequently places the analyte concentration within the region of calibration non-linearity. The result is that percent recovery is significantly underestimated. For example, accuracy was not acceptable as indicated by spike and spike duplicate recoveries of 2256.1 and 2103.1 percent, respectively. The dilution method was applied to sodium (the only ICP analyte in which the sample concentrations exceeded 1000 $\mu\text{g/ml}$). Dilution RPD values less than five percent indicate that measurements are within the linear portion of the calibration curve. Samples V62, V63 and V67 had dilution RPD failures with values of 8.4, 6.4 and 5.5 percent (greater than the 5% limit). Dilution RPD values for samples V68 and V69 were acceptable with values of 2.2 and 2.6 percent.

Precision between the spike and spike duplicate was meaningless but technically acceptable with a 3.0 relative percent difference. RPDs between tank samples and their duplicates was good, ranging from 0.8 to 3.1.

The chemist noted variability of the continuing calibration blanks for samples V62 and V63, but also indicated that there was "no impact on data quality". All preparation blank concentrations were less than the detection limit of 29 $\mu\text{g/L}$. Because the field blank did not meet the program's 20 percent criterion, it was determined to be contaminated by program criteria. They were determined to not be contaminated. The field blank's sodium concentration was, however, approximately 3660 times lower than the sample's sodium content. Under this condition, field "contamination" of the samples was trivial.

Average sodium concentrations of the samples ranged from 2,590,000 $\mu\text{g/L}$ to 3,030,000 $\mu\text{g/L}$, with a grand average of 2,770,000 $\mu\text{g/L}$ (2,770 $\mu\text{g/ml}$). Sodium concentrations for samples V62, V63 and V67 are estimated values because they did not meet dilution RPD criteria.

ZINC

Percent recovery of all undigested LMCS standards were within control limits, ranging from 100.1 to 103.1 percent.

All digested "laboratory control samples" had percent recoveries which were within the LMCS undigested standard control limits. The program does not require the use of digested control standards nor were control criteria specified for digested control standards.

Accuracy was acceptable as indicated by the spike and spike duplicate recoveries of 94.1 percent and 91.4 percent, respectively.

Precision between the spikes and spike duplicates was acceptable with a relative percent difference of 2.9 percent. RPDs between the samples and their duplicates were good to poor, ranging from 0.5 to 43.6 percent, however no acceptance criteria apply to the duplicate analyses. Such variability does indicate a potential problem.

All initial and continuing calibration blanks for all tank samples showed significant variability, tending to indicate excessive instrument instability

(noise). Such noise was also seen in the preparation blank for samples V62 and V63, where the reported zinc concentration was a negative value.

The preparation blank zinc concentrations were low, but not less than the detection limit. Conversely, the field blank concentration was approximately the same as the sample concentrations, indicating the presence of significant contamination. Imprecision between sample and sample duplicate values may be due to variable field contamination.

Average zinc concentrations in the samples ranged from 103 $\mu\text{g/L}$ to 615 $\mu\text{g/L}$, with an grand average of 299 $\mu\text{g/L}$. Zinc data should be considered estimates, because of the evidence of contamination.

RADIOCHEMICAL ANALYSES

For radiochemical analyses only, the five samples (V62, V63, V67, V68 and V69) were combined in equal portions to generate composite sample, V77. Except for the field blank, no radiochemical analyses were performed on non-composited samples, as directed in the WAP.

March 17, 1994 (the sample collection date of V62, the first sample to be collected) was used to calculate sample holding time of the composite sample.

When the field blank was analyzed (for GEA, total alpha and total beta), it was not analyzed in duplicate, as was discussed in the TPP, however the composite sample, V77, was analyzed in duplicate.

GAMMA ENERGY ANALYSES (GEA)

Samples were acid predigested and analyzed using procedure/revision number LA-548-121/D-0, and instrument number WC38931. The composite sample, V77, was tested on 5/3/94, a holding time of 47 days. The field blank, sample V73 was analyzed on 7/18/94, with a sample holding time of 18 days. Except for radium-226 with a maximum holding time of six months, there were no specified maximum holding times in SW-846 protocol. All GEA analytes were, therefore, within holding time criteria.

The GEA procedure does not use an LMCS quality control standard for every isotope. The LMCS standard, which contained Co^{60} and Cs^{137} as surrogate standards, was determined with both batches. Quality control parameters for all of the GEA analytes were expressed relative to these two isotopes.

Statistically derived LMCS control limits for the Cs^{137} standard (EDP code number R901) were 94.39 and 111.05 percent recovery. The historic mean recovery was 101.09 percent. Actual Cs^{137} LMCS standard recoveries for both GEA analyses were acceptable with 101.4 and 101.8 percent.

Statistically derived LMCS control limits for the Co^{60} standard (EDP code number R905) were 93.02 to 110.78 percent recovery. The historic mean recovery was 101.67 percent. Actual Co^{60} LMCS standard recoveries for both GEA analyses were acceptable with 103.7 and 101.9 percent.

Each of the 9 GEA analytes (Ce/Pr^{144} , Cs^{134} , Co^{60} , Cs^{137} , Eu^{154} , Eu^{155} , Nb^{94} , Ra^{226} , Ru/Rh^{106}) were determined in two batches. Sample V77 (the composite sample) and sample V73 (the field blank) were analyzed in separate batches, where each batch had a reagent blank and an LMCS standard.

Because not every analyte was included in the LMCS standard, it was not possible to spike the sample to determine percent recoveries for each analyte. The GEA procedure is sufficiently free of matrix interference with analyte quantitation that the procedure does not require spiking to assess matrix effects. Consequently, another quality control parameter, percent counting error was determined. It was found to be acceptable for both Co^{60} and Cs^{137} , with percent counting errors ranged in value from 1.28 to 4.84 for both batches.

There did not appear to be any analytical anomalies or difficulties during these analyses.

CERIUM-144 [includes PRASEODYMIUM-144] (by GEA)

Cerium-144 was requested in the WAP. Pr^{144} was included with Ce^{144} , because both are measured coincidentally in the GEA procedure. Pr^{144} is the decay daughter product of Ce^{144} . The combined activity was determined from the Pr^{144} gamma energy line when the parent and daughter were at secular equilibrium.

Ce/Pr^{144} was less than the sample detection limit for both the composite sample ($<0.00904 \mu\text{Ci/ml}$), and for the field blank ($<0.00126 \mu\text{Ci/ml}$). Thus, the field blank was shown not to be contaminated.

Because Ce/Pr^{144} was less than the detection limit, it was not possible to calculate a RPD value as an estimation of precision. An evaluation of accuracy was discussed above in the general GEA discussion.

The detection limit shown in the data summary table was based on the reagent blank value.

Reagent blank activities for both V77 and V73 were less than the detection limit.

CESIUM-134 (by GEA)

Cs^{134} activity was $<0.000721 \mu\text{Ci/ml}$ for the sample, but the duplicate had an activity of $0.00149 \mu\text{Ci/ml}$. The chemist's narrative noted that the activity reported for the duplicate sample had high uncertainty. The field blank with an activity of $<0.000245 \mu\text{Ci/ml}$, was determined to not be contaminated. Reagent blank activities for both V77 and V73 were less than the detection limit.

Because Cs^{134} activity was detectable only in the sample duplicate (not in the sample), it was not possible to calculate a RPD value as an estimation of precision. An evaluation of accuracy was discussed above in the general GEA discussion.

The detection limit shown in the data summary table was based on the reagent blank value.

CESIUM-137 (by GEA)

Average Cs¹³⁷ activity for the composite was 4.29 $\mu\text{Ci/ml}$, with the precision value of 0.68 relative percent difference. Field blank Cs¹³⁷ activity was $<0.000341 \mu\text{Ci/ml}$.

Reagent blank activities for both V77 and V73 were less than the detection limit, indicating the absence of contamination.

An evaluation of accuracy was discussed above in the general GEA discussion.

The detection limit shown in the data summary table was based on the reagent blank value.

COBALT-60 (by GEA)

Co⁶⁰ activity was $<0.000202 \mu\text{Ci/ml}$ for the composite sample and was $<0.000281 \mu\text{Ci/ml}$ for the field blank.

Reagent blank activities for both V77 and V73 were less than the detection limit, indicating the absence of contamination.

Because Co⁶⁰ was not detectable, it was not possible to calculate a RPD value as an estimation of precision.

An evaluation of accuracy was discussed above in the general GEA discussion.

The detection limit shown in the data summary table was based on the reagent blank value.

EUROPIUM-154 (by GEA)

Eu¹⁵⁴ activity was $<0.000901 \mu\text{Ci/ml}$ for the composite sample and was $<0.000751 \mu\text{Ci/ml}$ for the field blank.

Reagent blank activities for both V77 and V73 were less than the detection limit, indicating the absence of contamination.

Because Eu¹⁵⁴ was not detectable, it was not possible to calculate an RPD value as an estimation of precision.

An evaluation of accuracy was discussed above in the general GEA discussion.

The detection limit shown in the data summary table was based on the reagent blank value.

EUROPIUM-155 (by GEA)

Eu¹⁵⁵ activity was <0.00487 $\mu\text{Ci/ml}$ for the composite and was <0.000633 $\mu\text{Ci/ml}$ for the field blank.

Reagent blank activities for both V77 and V73 were less than the detection limit, indicating the absence of contamination.

Because Eu¹⁵⁵ was not detectable, it was not possible to calculate a sample RPD value as an estimation of precision.

An evaluation of accuracy was discussed above in the general GEA discussion.

The detection limit shown in the data summary table was based on the reagent blank value.

NIOBIUM-94 (by GEA)

Nb⁹⁴ activity was <0.000481 for the composite sample and was <0.000228 $\mu\text{Ci/ml}$ for the field blank.

Reagent blank activities for both V77 and V73 were less than the detection limit, indicating the absence of contamination.

Because Nb⁹⁴ was not detectable, it was not possible to calculate a sample RPD value as an estimation of precision.

An evaluation of accuracy was discussed above in the general GEA discussion.

The detection limit shown in the data summary table was based on the reagent blank value.

RADIUM-226 (by GEA)

Ra²²⁶ activity was <0.0374 $\mu\text{Ci/ml}$ for the composite sample and was <0.00430 $\mu\text{Ci/ml}$ for the field blank.

Because Ra²²⁶ was not detectable, it was not possible to calculate a sample RPD value as an estimation of precision.

Reagent blank activities for both V77 and V73 were less than the detection limit, indicating the absence of contamination.

An evaluation of accuracy was discussed above in the general GEA discussion.

The detection limit of Ra²²⁶ is approximately 10 fold greater than most other analytes by this procedure, and consequently is not the best available procedure. Prior to generation of the TPP, the customer was aware of this limitation and stated on May 11, 1993 that the GEA procedure would be acceptable for this isotope. 222-S Laboratory could analyze for Ra²²⁶ by only that procedure. The detection limit shown in the data summary table was based on the reagent blank value.

RUTHENIUM-106 (by GEA) [includes RHODIUM-106]

Ruthenium-106 was requested in the WAP. Rh¹⁰⁶ was included with Ru¹⁰⁶ because Ru¹⁰⁶ is detected in the presence of its daughter, Rh¹⁰⁶. Radioactivity values were shown in the spread sheet as the sum of Rh¹⁰⁶ and Ru¹⁰⁶ activities at secular equilibrium.

Ru/Rh¹⁰⁶ activity was <0.0272 $\mu\text{Ci/ml}$ for the composite sample and was <0.00328 $\mu\text{Ci/ml}$ for the field blank.

Reagent blank activities for both V77 and V73 were less than the detection limit, indicating the absence of contamination.

Because Ru/Rh¹⁰³ was not detectable, it was not possible to calculate a RPD value as an estimation of precision.

An evaluation of accuracy was discussed above in the general GEA discussion.

The detection limit shown in the data summary table was based on the reagent blank value.

TRITIUM (by LIQUID SCINTILLATION)

This procedure was performed on the direct sample using procedure/revision number LA-218-114/A-2. Tritium analysis was performed on 4/13/94 (a holding time of 28 days). A required sample holding time was not specified in SW-846 protocol for this analyte. Field blank analysis was not performed because it was not required.

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Statistically derived LMCS control limits for the H³ standard (EDP code number R907) were 75.55 and 118.04 percent recovery. The historic mean recovery was 91.80 percent. The 96.9 percent recovery of the H³ LMCS standard for sample V77 was within acceptance limits.

Accuracy was acceptable for both the spike and spike duplicate with values of 105.5 and 98.2 percent recoveries, respectively.

Precision as measured by the relative percent difference between the spike and spike duplicate was within acceptance limits at 2.3 percent. Precision was good between the sample and its duplicate with 1.78 RPD.

The reagent blank activity was less than the detection limit, indicating the absence of contamination.

H³ activities for the sample and sample duplicate were 0.0111 $\mu\text{Ci/ml}$ and 0.0113 $\mu\text{Ci/ml}$ for the duplicate sample respectively, with an average activity of 0.0112 $\mu\text{Ci/ml}$.

CARBON-14 (by LIQUID SCINTILLATION)

C¹⁴ was performed on direct samples using procedure/revision number LA-348-104/B-0 and instrument number WB27818 on 4/12/94, a sample holding time of 26 days. A required maximum sample holding time is not specified in SW-846 protocol for C¹⁴. Field blank analysis was not required in the source documents and was not performed.

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Statistically derived LMCS control limits for the C¹⁴ standard (EDP code number R909) were 61.78 and 115.72 percent recovery. The historic mean recovery was 93.44 percent. Percent recovery of the LMCS standard was within acceptance limits at 80.8 percent. Accuracy as measured by percent recovery of the spike and spike duplicate was within acceptance limits with values of 89.0 and 85.4 percent recovery, respectively.

Precision as measured by the relative percent difference between the spike and spike duplicate was within acceptance limits at 4.54 percent. The RPD between the sample and its duplicate was not able to be calculated because the sample value was less than the detection limit.

The reagent blank activity was less than the detection limit, indicating the absence of contamination.

C¹⁴ activities were <0.00000219 μ Ci/ml and <0.00000218 μ Ci/ml for the sample and sample duplicate, respectively. C¹⁴ activity (2,190 pCi/L in equivalent units) is approaching environmental levels.

SELENIUM-79 (by ION EXCHANGE/DIST/LIQUID SCINTILLATION)

Se⁷⁹ analysis was performed on an acid digestion instead of direct, as specified in the TPP, because acid digestion would ensure that the analyte was fully dissolved to facilitate detection. Additionally, this procedure requires an acid matrix, and the initial sample pH was basic.

The analysis was done on 5/4/94 (a sample holding time of 48 days) using procedure/revision number LA-365-132/B-0 and instrument number WB27818. A required maximum sample holding time was not specified in SW-846 protocol for this analyte, and no field blank was analyzed because it was not required in the source documents.

Se⁷⁹ activity was based upon calibration with a C¹⁴ standard, since both nuclides have approximately the same beta energy. This was necessary because no Se⁷⁹ standard exists. It was only possible to generate data for a reagent blank and for the composited sample in duplicate.

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Isotopic recovery through the preparative procedure was estimated gravimetrically through the use of a carrier for both the sample and the

blank. Carrier recoveries for the sample and duplicate were 92.9 and 95.6 percent, which were quite good.

The reagent blank's activity was $<0.0000122 \mu\text{Ci/ml}$, indicating the absence of contamination.

Se^{79} activity was $<0.0000121 \mu\text{Ci/ml}$ for the sample and was $<0.0000118 \mu\text{Ci/ml}$ for the sample duplicate. Because Se^{79} was not detectable, it was not possible to calculate a RPD value as an estimation of precision.

TECHNETIUM-99 (by EXTRACTION/LIQUID SCINTILLATION)

Tc^{99} analyses were prepared by performing an acid predigestion of samples instead of direct analysis or acid dilution as was specified in the TPP. This alternative method was recommended because acid digestion would insure that the analyte was fully dissolved to facilitate detection.

Analyses were performed on 4/29/94 (a sample holding time of 43 days) using procedure/revision number LA-438-101/D-1 and instrument number WB-27818. A required maximum sample holding time was not specified in SW-846 protocol for this analyte, and no field blank was analyzed because it was not required in the source documents.

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Statistically derived LMCS control limits for the Tc^{99} standard (EDP code number S363) were 71.90 and 135.03 percent recovery. The historic mean recovery was 97.43 percent. LMCS standard recovery for sample V77 was acceptable with 97.4 percent recovery.

Accuracy as evaluated by percent recovery of spike and spike duplicate was acceptable, with values of 100.9 percent and 101.5 percent, respectively.

Tc^{99} precision, as measured by the relative percent difference between the spike and its duplicate was acceptable at 0.6 percent. Precision between the sample and sample duplicate was good with 0.3 relative percent difference.

The field blank's activity was $<0.0000425 \mu\text{Ci/ml}$, indicating the absence of contamination.

Tc^{99} activities for the sample and sample duplicate were $0.000308 \mu\text{Ci/ml}$ and $0.000307 \mu\text{Ci/ml}$, respectively, with a grand average of $0.000308 \mu\text{Ci/ml}$.

STRONTIUM-90 (by SEPARATION/PROPORTIONAL COUNTING)

Sr^{90} analyses were prepared by performing an acid predigestion of samples instead of direct analysis or acid dilution as was specified in the TPP. This alternative method was recommended because acid digestion would insure that the analyte was fully dissolved to facilitate detection.

Analyses were performed on 5/4/94 (a sample holding time of 48 days) using procedure/revision number LA-220-101/D-0 and instrument number WA45676. A

required maximum sample holding time was not specified in SW-846 protocol for this analyte, and no field blank was analyzed because it was not required in the source documents.

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Statistically derived LMCS control limits for the Sr^{90} standard (EDP code number S376) were 79.76 and 113.11 percent recovery. The historic mean recovery was 100.11 percent. The LMCS standard recovery for sample V77 was 85.5 percent recovery.

Accuracy, as measured by the percent recovery of the spike and spike duplicate, was acceptable with 99.9 percent and 101.9 percent, respectively.

Precision between the spike and spike duplicate was acceptable with an RPD of 2.1 percent. The relative percent difference of 2.2 between the sample and duplicate was good.

A field blank was not analyzed (not required), however the reagent blank was less than the detection limit of $0.000325 \mu\text{Ci/ml}$, indicating the absence of contamination.

Sr^{90} activities for the composite sample and duplicate sample were $0.0763 \mu\text{Ci/ml}$ and $0.0780 \mu\text{Ci/ml}$, respectively, with an average of $0.0772 \mu\text{Ci/ml}$.

IODINE-129 (by DISTILLATION/ION EXCHANGE/GEA)

I^{129} analysis was performed on direct samples on 4/9/94 (a sample holding time of 23 days), using procedure/revision LA-378-103/B-3 and instrument numbers WB57237 and WB57265. Required maximum sample holding times are not specified in SW-846 protocol for this analyte, and no field blank was analyzed because it was not required in the source documents.

The chemist noted in the batch narrative that carrier recoveries (which ranged from 30.8 percent to 58.4 percent) were low, although acceptable. Other than this, there did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Statistically derived LMCS control limits for the I^{129} standard (EDP code number S928) were very broad at 45.69 and 147.85 percent recovery. The historic mean recovery was 105.03 percent. Accuracy as determined by the recovery of the LMCS standard for sample V77 was acceptable at 103.8 percent recovery. Accuracy was acceptable for both the spike and spike duplicate with percent recoveries of 88.2 and 94.3, respectively.

Precision as measured by relative percent difference between the spike and its duplicate was acceptable with 6.7 percent. Because I^{129} activity was less than the detection limit, it was not possible to calculate an RPD value between the sample and duplicate.

The reagent blank activity was less than the detection limit of $0.0000590 \mu\text{Ci/ml}$, indicating the absence of contamination.

I^{129} activity was $<0.0000630 \mu\text{Ci/ml}$ for the sample, and was $<0.0000580 \mu\text{Ci/ml}$ for the sample duplicate.

NEPTUNIUM-237 (by EXTRACTION/INTERNAL PROPORTIONAL COUNTER)

Np^{237} analysis was performed on direct samples, using procedure/revision LA-933-141/H-0, and instrument number WB57237.

This analysis was performed on 4/20/94, resulting in sample holding time of 34 days. A required maximum sample holding time was not specified in SW-846 protocol for this analyte, and no field blank was analyzed because it was not required in the source documents.

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Statistically derived LMCS control limits for the Np^{237} standard (EDP code number S380) were very broad at 36.87 to 112.63 percent recovery. The historic mean recovery was 70.48 percent. Accuracy as measured by the recovery of the LMCS standard for V77 was acceptable at 86.3 percent recovery. Accuracy was acceptable for both the spike and spike duplicate with percent recoveries of 82.4 and 83.8, respectively.

Precision was acceptable between the spike and spike duplicate with a 1.5 relative percent difference. Because sample Np^{237} activity was less than the detection limit, it was not possible to calculate a RPD value between the sample and duplicate.

The preparation blank activity was $<0.000201 \mu\text{Ci/ml}$, indicating the absence of contamination.

Np^{237} activity was $<0.000164 \mu\text{Ci/ml}$ and $<0.000163 \mu\text{Ci/ml}$ for the sample and sample duplicate, respectively.

PLUTONIUM-239/240 (By ALPHA ENERGY ANALYSIS)

$\text{Pu}^{239/240}$ analysis was performed on acid digested samples using procedure/revision LA-503-156/D-0 and instrument number WB57237.

Analyses were performed on 4/28/94 (a sample holding time of 42 days). A required maximum sample holding time was not specified in SW-846 protocol for this analyte, and no field blank was analyzed because it was not required in the source documents.

Carrier recovery was marginal for the sample and duplicate with percent recoveries of 41.2 and 33.9, respectively. Other than this, there did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Statistically derived LMCS control limits for the $\text{Pu}^{239/240}$ standard (EDP code number R211) were 74.04 and 120.82 percent recovery. The historic mean recovery was 106.72 percent.

Accuracy as determined by recovery of the LMCS standard for V77 was acceptable at 102.8 percent recovery. Accuracy was acceptable for both the spike and spike duplicate with percent recoveries of 103.7 and 102.4 percent, respectively.

Precision evaluation, as a function of the relative percent difference between the spike and its duplicate, was acceptable with 1.4 RPD. Because $\text{Pu}^{239/240}$ activity was less than the detection limit, it was not possible to calculate an RPD value between the sample and its duplicate.

The reagent blank activity was less than the detection limit of 0.00101 $\mu\text{Ci/ml}$, indicating the absence of contamination.

$\text{Pu}^{239/240}$ activity was $<0.000413 \mu\text{Ci/ml}$ for the sample and was $<0.000510 \mu\text{Ci/ml}$ for the sample duplicate. The reported sample result for $\text{Pu}^{239/240}$ was a "less than" value using 0.05 for the $\text{Pu}^{239/240}$ peak height.

PLUTONIUM-238 [not requested in WAP] (by ALPHA ENERGY ANALYSIS)

Although this analyte was not requested in the source documents, it was provided in this data package by a subsequent request over the telephone from the evaporator program. Pu^{238} was generated coincidentally with Pu^{240} in the $\text{Pu}^{239/240}$ procedure.

Pu^{238} analysis was performed on acid digested samples using procedure/revision LA-503-156/D-0 and instrument number WB57237.

Analyses were performed on 4/28/94, a sample holding time of 42 days). A required maximum sample holding time was not specified in SW-846 protocol for this analyte, and no field blank was analyzed because it was not required in the source documents.

Carrier recovery was marginal for the sample and duplicate with percent recoveries of 41.2 and 33.9, respectively. Other than this, there did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

The assessment of accuracy for this method was based on the recovery of the $\text{Pu}^{239/240}$ LMCS standard because no Pu^{238} LMCS standard was available. The recovery of this surrogate LMCS standard was acceptable with a recovery of 102.8 percent.

Because Pu^{238} activity was less than the detection limit for the sample and its duplicate, it was not possible to calculate a RPD value between them. Because no standard was unavailable to generate spikes, it was not possible to provide a precision value between a spike and a spike duplicate.

The reagent blank activity based on $\text{Pu}^{239/240}$ was less than the detection limit of 0.00101 $\mu\text{Ci/ml}$, indicating the absence of contamination.

Pu^{238} activity for the sample was $<0.000565 \mu\text{Ci/ml}$ and was $<0.000663 \mu\text{Ci/ml}$ for the duplicate sample. The Pu^{238} reported "less than" value was generated using 20 dpm for the Pu^{238} sample activity.

AMERICIUM-241 (by ALPHA ENERGY ANALYSIS)

Am²⁴¹ analysis was performed on acid digested samples using procedure/revision LA-503-156/D-1 and instrument number WB57237.

The sample holding time was 141 days. A required maximum sample holding time was not specified in SW-846 protocol for this analyte, and no field blank was analyzed because it was not required in the source documents.

Because of analytical anomalies and difficulties, Am²⁴¹ analysis was performed on V77 five separate times. These reruns were performed because of problems with chemical separation, low tracer recovery and low spike recovery. Data from the batch that was reported did not appear to have analytical anomalies, and there were no difficulties during analysis.

Statistically derived LMCS control limits for the Am²⁴¹ standard (EDP code number R201) were 62.61 and 128.86 percent recovery. The historic mean recovery was 106.38 percent. Accuracy of the LMCS standard for V77 was acceptable with 102.0 percent recovery.

Accuracy for the spike and spike duplicate was acceptable with recoveries of 100.3 and 106.2 percent, respectively.

Precision was acceptable between the spike and spike duplicate with a relative percent difference of 5.7 percent. Am²⁴¹ activities for the sample and sample duplicate were determined to be less than the detection limit, consequently it was not possible to calculate the relative percent difference.

The preparation blank activity was <0.000311 $\mu\text{Ci/ml}$, indicating the absence of contamination.

Am²⁴¹ activity was <0.000287 $\mu\text{Ci/ml}$, and was <0.000774 $\mu\text{Ci/ml}$ for the sample duplicate. These "less than" values were determined using 5 percent of the Am²⁴³ tracer peak as the Am²⁴¹ peak.

CURIUM-244/243 (by ALPHA ENERGY ANALYSIS)

Cm^{243/244} analytical data were generated as a byproduct of the Am²⁴¹ procedure/revision LA-503-156/D-1 on acid digested samples using instrument number WB57237.

The sample holding time was 141 days. A required maximum sample holding time was not specified in SW-846 protocol for this analyte, and no field blank was analyzed because it was not required in the source documents.

Because of analytical anomalies and difficulties with the Am²⁴¹ analysis, five reruns were performed on V77. These reruns were performed because of problems with chemical separation, low tracer recovery and low spike recovery of Am²⁴¹. Data from the batch that was reported did not appear to have analytical anomalies, and there were no difficulties during analysis.

Although Cm^{243/244} and Am²⁴¹ were analyzed simultaneously in the same procedure, there was no standard, spike or tracer available for Cm^{243/244}. Because of this, Am²⁴¹ was used as a tracer (surrogate standard). When the counter was

calibrated for efficiency, it was determined that this efficiency was uniform across the entire energy counting spectrum. An approximate value for other nuclides can also be determined with the use of a tracer, such as Am^{243} .

$\text{Cm}^{243/244}$ accuracy was measured as a function of percent recovery of the surrogate Am^{241} LMCS standard and was acceptable with a recovery of 102.0 percent. $\text{Cm}^{243/244}$ relative counting errors for the sample and sample duplicate were 138.6 and 138.7 percent, respectively.

Precision (based on Am^{241}) was acceptable between the spike and spike duplicate with a relative percent difference of 5.7 percent. Am^{241} activities for the sample and sample duplicate were determined to be less than the detection limit, consequently it was not possible to calculate the relative percent difference.

The preparation blank activity was less than the detection limit, indicating the absence of contamination.

$\text{Cm}^{243/244}$ activity was $<0.000287 \mu\text{Ci/ml}$, and was $<0.000774 \mu\text{Ci/ml}$ for the sample duplicate. These "less than" values were determined using 5 percent of the Am^{243} tracer peak as the $\text{Cm}^{243/244}$ and Am^{241} peaks.

TOTAL ALPHA (by proportional counter)

Total alpha analyses were performed on acid predigested samples rather than directly or by acid dilution as was specified in the TPP. This alternative method was recommended because acid digestion would insure that the analyte was fully dissolved to facilitate detection.

Analyses of samples V75 through V77 were performed on 5/10/94 (a sample holding time of 54 days) using procedure/revision number LA-508-101/D-0 and instrument number WA45709. Samples V71 through V73 were analyzed on 7/23/94 (a sample holding time of 24 days) using instrument number WB27810, and procedure/revision number LA-508-101/D-1. The required maximum sample holding time for total alpha activity as specified in SW-846 protocol is six months. Tank 108-AP analyses for total alpha were analyzed within the required holding time.

The field blank was analyzed without a sample duplicate, as was specified in the TPP.

Detection limits and "less than" values were determined using procedure LA-508-002.

There did not appear to be any analytical anomalies or difficulties during these analyses.

Statistically derived LMCS control limits for the total alpha standard (EDP code number S510) were 66.12 and 132.91 percent recovery. The historic mean recovery was 99.22 percent.

LMCS standard recoveries were acceptable for V77 and V73 batch with values of 89.0 and 98.0 percent, respectively.

The accuracy of the spike and its duplicate were acceptable, with recoveries of 90.0 and 93.2 percent, respectively.

Precision between the spike and spike duplicate was acceptable with 3.49 RPD. Precision between sample V77 and its duplicate was good with 8.17 RPD.

Field blank alpha activity was $<0.00000648 \mu\text{Ci/ml}$ ($<6.48 \text{ pCi/ml}$). The reagent blanks were less than the detection limit, indicating the absence of contamination.

Total alpha activity was $0.000293 \mu\text{Ci/ml}$ for the sample, and was $0.000270 \mu\text{Ci/ml}$ for the duplicate, with a grand average of $0.000282 \mu\text{Ci/ml}$ (282 pCi/ml).

TOTAL BETA (by proportional counter)

Total beta analyses were performed on acid predigested samples. Analyses of samples V75 through V77 were performed on 5/10/94 (a sample holding time of 54 days) using procedure/revision number LA-508-101/D-0 and instrument number WA57276. Samples V71 through V73 were analyzed on 7/23/94 (a sample holding time of 24 days) using instrument number WB27810, and procedure/revision number LA-508-101/D-1. The required maximum sample holding time for total beta activity as specified in SW-846 protocol is six months. Tank 108-AP analyses for total beta were analyzed within the required holding time.

The field blank was analyzed without a sample duplicate, as was specified in the TPP.

Detection limits and "less than" values were determined using procedure LA-508-002.

There did not appear to be any analytical anomalies or difficulties during these analyses.

Statistically derived LMCS control limits for the total beta standard (EDP code number S515) were 81.66 and 120.68 percent recovery. The historic mean recovery was 92.21 percent. LMCS standard recovery was acceptable for V77 and V73 with percent recoveries of 89.1 and 89.0 percent.

Total beta accuracy for the spike and the spike duplicate was acceptable with 87.4 and 87.1 percent recoveries, respectively.

Precision between the spike and duplicate spike was acceptable with 0.34 relative percent difference. Precision between sample V77 and its duplicate was good with an RPD of 2.24 percent.

The beta activity of the preparation blank for V77 was $<0.0134 \mu\text{Ci/ml}$. The activity of the preparation blank for V73 was $0.000100 \mu\text{Ci/ml}$, which was 2.4 fold greater than the detection limit. These blanks were determined to not be contaminated.

The field blank activity was $0.000153 \mu\text{Ci/ml}$, but was determined to not be contaminated as per the criteria specified in the QAPJP.

Beta activity was 6.18 $\mu\text{Ci/ml}$ for the sample and was 6.32 $\mu\text{Ci/ml}$ for the sample duplicate, with a grand average of 6.25 $\mu\text{Ci/ml}$.

CONCLUSIONS

Waste in tank 108-AP appeared to be relatively homogeneous. In general, inorganic analyte concentrations in each of the samples, which were collected from five separate locations within the tank, were approximately the same (generally less than a ten-fold difference between the samples of highest and lowest concentrations). It was not possible to draw such a conclusion from radiochemical analyses because the five samples were composited.

Table 13 gives a rough evaluation of sample heterogeneity by comparing variability between samples versus analytical variability. The relative percent difference between the greatest and least of average concentrations of the five individual samples was shown for selected analytes in Column 2. The maximum relative percent difference, which existed between any of the five samples and their duplicates for the corresponding analyte, was shown in Column 3. The comparative ratio between columns 2 and 3 was displayed in column 4.

Table 13. Homogeneity Analysis, a Comparison of RPD Data			
Column 1 Analyte	Column 2 Max. RPD Range between highest & lowest samples	Column 3 Max. RPD between any sample and its duplicate	Column 4 Comparative Precision (Col 2 $\div$ Col 3)
Specific Gravity	1.6	0.91	1.8
Cadmium	20.2	33.2	0.6
Sodium	15.7	3.1	5.1
Nitrate	48.5	13.9	3.5
Nitrite	41.2	12.7	3.2
Chromium	7.4	11.1	0.7
Carbonate	31.3	6.4	4.9
Chloride	68.5	14.0	4.9

Analytes were selected for which the concentration was significantly greater than the detection limit and for which there were five sample locations analyzed within the tank. For the above analytes, the maximum range of relative percent differences between each of the five analyses per analyte (Column 2) was less than or approximately equal to 5.0 fold the maximum relative percent difference between any of the five replicate analyses (Column 3). Column 4 equals Column 2 divided by Column 3. The maximum five fold difference between column 3 and column 4 is not a major difference, indicating that variability between samples was at most only five fold greater than the maximal amount of analytical precision. Because precision appears to be primarily a function of experimental error, differences between sample

concentrations appear to be as much a function of experimental error as actual heterogeneity of tank contents.

A summary of analyte grand average concentrations is shown in Table 14. Results shown are values derived by averaging the average results of each of the five individual samples for inorganics, or are simply the composite values for radiochemical analyses.

Table 14. Summary of Analytical Data for Tank 108-AP	
Parameter	Results
Visual appearance	Samples were nearly homogeneous
DSC	No exotherms were observed
Specific gravity, grand average	0.988
Fluoride, grand average	34.1 $\mu\text{g}/\text{ml}$ (estimated)
Chloride, grand average	56.3 $\mu\text{g}/\text{ml}$
Nitrate, grand average	1,560 $\mu\text{g}/\text{ml}$
Nitrite, grand average	1,010 $\mu\text{g}/\text{ml}$
Phosphate, grand average	92.7 $\mu\text{g}/\text{ml}$
Sulfate, grand average	201 $\mu\text{g}/\text{ml}$
Ammonia (by ISE), grand average	8.2 $\mu\text{g}/\text{ml}$ (estimated)
Hydroxide	<125 $\mu\text{g}/\text{ml}$
Cyanide,	≤ 0.45 $\mu\text{g}/\text{ml}$
Carbonate, grand average	486 $\mu\text{g}/\text{ml}$
Uranium, grand average	13.5 $\mu\text{g}/\text{ml}$
Arsenic	≤ 0.0322 $\mu\text{g}/\text{ml}$
Selenium	<0.0130 $\mu\text{g}/\text{ml}$
Mercury	<0.005 $\mu\text{g}/\text{ml}$
Aluminum, grand average	41,700 $\mu\text{g}/\text{L}$
Barium	<20.0 $\mu\text{g}/\text{L}$
Cadmium, grand average	141 $\mu\text{g}/\text{L}$
Calcium, grand average	1,710 $\mu\text{g}/\text{L}$ (estimated)
Chromium, grand average	2,030 $\mu\text{g}/\text{L}$
Iron, grand average	510 $\mu\text{g}/\text{L}$ (estimated)
Lead	≤ 126 $\mu\text{g}/\text{L}$
Magnesium, grand average	87.0 $\mu\text{g}/\text{L}$ (estimated)
Manganese	≤ 18.0 $\mu\text{g}/\text{L}$

Table 14. Summary of Analytical Data for Tank 108-AP	
Parameter	Results
Silver, grand average	(63.2 $\mu\text{g/L}$)
Sodium, grand average	2,770,000 $\mu\text{g/L}$ (2770 $\mu\text{g/ml}$)
Zinc, grand average	299 $\mu\text{g/L}$ (estimated)
Ce/Pr ¹⁴⁴	<0.00904 $\mu\text{Ci/ml}$
Cs ¹³⁴	$\leq$ 0.00149 $\mu\text{Ci/ml}$ (estimated)
Cs ¹³⁷	4.29 $\mu\text{Ci/ml}$
Co ⁶⁰	<0.000202 $\mu\text{Ci/ml}$
Eu ¹⁵⁴	<0.000901 $\mu\text{Ci/ml}$
Eu ¹⁵⁵	<0.00487 $\mu\text{Ci/ml}$
Nb ⁹⁴	<0.000481 $\mu\text{Ci/ml}$
Ra ²²⁶	<0.0374 $\mu\text{Ci/ml}$
Ru/Rh ¹⁰⁶	<0.0272 $\mu\text{Ci/ml}$
H ³	0.0112 $\mu\text{Ci/ml}$
C ¹⁴	<0.00000219 $\mu\text{Ci/ml}$
Se ⁷⁹	<0.0000121 $\mu\text{Ci/ml}$
Tc ⁹⁹	0.000308 $\mu\text{Ci/ml}$
Sr ⁹⁰	0.0772 $\mu\text{Ci/ml}$
I ¹²⁹	<0.0000630 $\mu\text{Ci/ml}$
Np ²³⁷	<0.000164 $\mu\text{Ci/ml}$
Pu ^{239/240}	<0.000413 $\mu\text{Ci/ml}$
Pu ²³⁸	<0.000565 $\mu\text{Ci/ml}$
Am ²⁴¹	<0.000287 $\mu\text{Ci/ml}$
Cm ^{243/244}	<0.000287 $\mu\text{Ci/ml}$
Total alpha	0.000293 $\mu\text{Ci/ml}$ (estimated)
Total beta	6.18 $\mu\text{Ci/ml}$

Total beta analysis yielded a value of 6.18 $\mu\text{Ci/ml}$. The sum of activities by beta emitting radionuclides (Cs¹³⁷ with 4.29 $\mu\text{Ci/ml}$, Tc⁹⁹ with 0.000308 $\mu\text{Ci/ml}$, and Sr⁹⁰ with 0.0772 $\mu\text{Ci/ml}$) accounted for 71 percent of the activity detected by the total beta analysis.

Total alpha analysis yielded a value of 0.000293 $\mu\text{Ci/ml}$. Because the activities of all of the alpha emitters were less than the detection limits,

it was not possible to compare the individual sums to the total alpha activity.

The major ionic constituents of tank 108-AP waste were predominantly sodium, carbonate (or bicarbonate), nitrate and nitrite with lesser amounts of sulfate, phosphate and aluminum. Table 15 shows the ionic concentrations of each of these major components, and it compares the ratio of the sum of anions to the sum of cations for each sample.

Several characteristics of the analytes were not determined by the analyses that were reported here, consequently some assumptions were necessary to perform the calculations. The assumptions included estimations of analyte valence states, the number of oxygen (and other) atoms associated with each analyte, and the pH was determined from analyses.

An estimation of the pH was derived from the initial pH measurement that was taken during the analysis of hydroxide. This pH is only an estimation because the sample (generally a μL amount) was diluted with reagent grade water (generally a few ml) to accommodate the titration. Consequently the initial pH may be effected by dilution, the amount of carbonate in the reagent water and by the carryover of acid and salts from the prior titration. Using these data to estimate sample pH values, it is observed that the pH values were unexpectedly low, ranging from approximately 8.15 to 9.5. In this range, it would be expected that bicarbonate would predominate over carbonate by an estimated 5.3 to 118 fold (the inverse of the ratio value in the ratio table below). By rearranging the equation for the second dissociation constant for carbonic acid (equation 2) and substituting the sample's hydrogen ion concentration (determined from pH), it is possible to calculate (using formula 1) the ratio of carbonate to bicarbonate, as shown in the table of ratios.

$$\text{Formula 1} \quad \frac{[\text{CO}_3^{2-}]}{[\text{HCO}_3^-]} = \frac{6 \times 10^{-11}}{[\text{H}^+]}$$

pH	Ratio $\text{CO}_3^{2-}/\text{HCO}_3^-$
8.0	0.006
8.5	0.02
9.0	0.06
9.5	0.19
9.75	0.34
10.0	0.60
10.25	1.07

Although the bicarbonate ion predominates significantly, because the ratio varies with pH, it was assumed that all of the inorganic carbon present was carbonate because the only pH data that were available were not particularly reliable.

All aluminum μ equivalent/L values were based on the assumption that aluminum was present as a trivalent cation without associated oxygen or hydrogen.

In table 15, the ratios of anions to cations (which ranged from 0.93 to 1.3) for each of the samples indicated that most of the major ionic constituents were accounted for with the analyses that were requested. For tank 108-AP's waste constituents, the activities that were determined by gross radiochemical procedures were compared with the summation of individual analyses.

Table 15
Cation/Anion Ion Balance

Analyte	V62		V63		V67		V68		V69	
	$\mu\text{g/mL}$	$\mu\text{eq/L}$	$\mu\text{g/mL}$	$\mu\text{eq/L}$	$\mu\text{g/mL}$	$\mu\text{eq/L}$	$\mu\text{g/mL}$	$\mu\text{eq/L}$	$\mu\text{g/mL}$	$\mu\text{eq/L}$
Na	3030	(R/10 ⁻⁶)/ 0.02299 = 0.132	2650	(R/10 ⁻⁶)/ 0.02299 = 0.116	2970	(R/10 ⁻⁶)/ 0.02299 = 0.129	2590	(R/10 ⁻⁶)/ 0.02299 = 0.113	2610	(R/10 ⁻⁶)/ 0.02299 = 0.114
Al	55	(R/10 ⁻⁶)/ 0.00899 = 0.006	34	(R/10 ⁻⁶)/ 0.00899 = 0.004	54	(R/10 ⁻⁶)/ 0.00899 = 0.006	33	(R/10 ⁻⁶)/ 0.00899 = 0.004	31	(R/10 ⁻⁶)/ 0.00899 = 0.003
Total Cation		0.138		0.120		0.135		0.117		0.117
NO3	1920	(R/10 ⁻⁶)/ 0.06201 = 0.031	1170	(R/10 ⁻⁶)/ 0.06201 = 0.019	1890	(R/10 ⁻⁶)/ 0.06201 = 0.030	1590	(R/10 ⁻⁶)/ 0.06201 = 0.025	1230	(R/10 ⁻⁶)/ 0.06201 = 0.020
NO2	1160	(R/10 ⁻⁶)/ 0.046 = 0.025	764	(R/10 ⁻⁶)/ 0.046 = 0.017	996	(R/10 ⁻⁶)/ 0.046 = 0.022	1110	(R/10 ⁻⁶)/ 0.046 = 0.024	1030	(R/10 ⁻⁶)/ 0.046 = 0.022
PO4	98	(R/10 ⁻⁶)/ 0.031 = 0.003	80	(R/10 ⁻⁶)/ 0.031 = 0.003	94	(R/10 ⁻⁶)/ 0.031 = 0.003	97	(R/10 ⁻⁶)/ 0.031 = 0.003	95	(R/10 ⁻⁶)/ 0.031 = 0.003
SO4	234	(R/10 ⁻⁶)/ 0.048 = 0.005	155	(R/10 ⁻⁶)/ 0.048 = 0.003	216	(R/10 ⁻⁶)/ 0.048 = 0.005	202	(R/10 ⁻⁶)/ 0.048 = 0.005	200	(R/10 ⁻⁶)/ 0.048 = 0.004
CO3=	2085	(R/10 ⁻⁶)/ 0.026 = 0.069	2110	(R/10 ⁻⁶)/ 0.026 = 0.070	2430	(R/10 ⁻⁶)/ 0.026 = 0.081	2860	(R/10 ⁻⁶)/ 0.026 = 0.095	2670	(R/10 ⁻⁶)/ 0.026 = 0.089
Total Anion		0.133		0.112		0.141		0.152		0.138
Ratio A/C		0.96		0.93		1.04		1.30		1.18
pH		V62 9.5		V63 8.67		V67 9.16		V68 8.15		V69 8.29

WHC-SD-WM-DP-065, REV. 0

DATA SUMMARY TABLES

DSC_2.Wk1

DIFFERENTIAL SCANNING CALORIMETRY

Direct Analysis

LA-514-113

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS	
Sample I.D.	Lab I.D.	Sample Exotherm J/g	Duplicate Exotherm J/g	Sample Endotherm J/g	Duplicate Endotherm J/g	Standard Indium % Rec	Standard I.D.
V62	108-AP-A	None	None	None*	None	101.2	V60
V63	108-AP-B	None	None	None*	None	102.6	V60
V67	108-AP-C	None	None	None*	None	103.7	V65
V68	108-AP-D	None	None	None*	None	97.0	S7954
V69	108-AP-E	None	None	None*	None	97.0	S7954

*Except for Exotherm due to water.

SPECIFIC GRAVITY
Direct Analysis
LA-510-112

SAMPLE INFORMATION		SAMPLE RESULTS			QC RESULTS				QC IDENTIFICATION	
Sample I.D.	Lab I.D.	Sample Result g/ml	Duplicate Result g/ml	Average Result g/ml	Sample RPD %	Standard Result g/ml	Standard % Rec.	Reagent Blank g/ml	Standard I.D.	Blank I.D.
V62	108-AP-A	0.992	0.986	0.989	0.61	1.408	99.4	0.984	V60	V61
V63	108-AP-B	0.982	0.991	0.987	0.91	1.408	99.4	0.984	V60	V61
V67	108-AP-C	0.994	0.996	0.995	0.20	1.403	99.0	0.976	V65	V66
V68	108-AP-D	0.991	0.986	0.989	0.51	1.403	99.0	0.976	V65	V66
V69	108-AP-E	0.977	0.981	0.979	0.41	1.403	99.0	0.976	V65	V66

WHC-SD-WM-DP-065, REV. 0

FLUORIDE by Ion Chromatography
Direct Analysis
LA-533-105

SAMPLE INFORMATION			SAMPLE RESULTS			QC RESULTS				QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/ml}$	Duplicate Result $\mu\text{g/ml}$	Average Result $\mu\text{g/ml}$	Sample RPD %	Detection Limit $\mu\text{g/ml}$	Standard Result $\mu\text{g/ml}$	% Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Reagent Blank $\mu\text{g/ml}$	Standard I.D.
V62	108-AP-A	4.84E+1	5.42E+1	5.13E+1	11.3	1E-1	5.61E+1	100.2	142.2	109.3	26.2	<1E-1	V60
V63	108-AP-B	1.96E+1	1.91E+1	1.94E+1	2.6	1E-1	5.61E+1	100.2	NA	NA	NA	<1E-1	V61
V67	108-AP-C	4.29E+1	5.12E+1	4.71E+1	17.6	1E-1	5.63E+1	100.5	NA	NA	NA	<1E-1	V65
V68	108-AP-D	2.47E+1	2.69E+1	2.58E+1	8.5	1E-1	5.63E+1	100.5	NA	NA	NA	<1E-1	V65
V69	108-AP-E	2.60E+1	2.76E+1	2.68E+1	6.0	1E-1	5.63E+1	100.5	NA	NA	NA	<1E-1	V65
V73	108-AP-FB	* <1E+0	* <1E+0	<1E+0	N/A	1E-1	5.33E+1	95.2	NA	NA	NA	* <1E-1	V71
													V72

* Average of two determinations.

WHC-SD-WM-DP-065, REV. 0

NO3_5.WK3

NITRATE by Ion Chromatography
Direct Analysis
LA-533-105

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS						QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/ml}$	Duplicate Result $\mu\text{g/ml}$	Average Result $\mu\text{g/ml}$	Sample RPD %	Detection Limit $\mu\text{g/ml}$	Standard Result $\mu\text{g/ml}$	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Reagent Blank $\mu\text{g/ml}$	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	1.99E+3	1.85E+3	1.92E+3	7.3	1E+0	5.60E+2	96.9	NA	NA	NA	<1E+0	V60	V61	NA
V63	108-AP-B	1.18E+3	1.15E+3	1.17E+3	2.6	1E+0	5.60E+2	96.9	104.2	169.5	47.7	<1E+0	V60	V61	V63
V67	108-AP-C	1.84E+3	1.94E+3	1.89E+3	5.3	1E+0	5.95E+2	102.9	NA	NA	NA	<1E+0	V65	V66	NA
V68	108-AP-D	1.57E+3	1.61E+3	1.59E+3	2.5	1E+0	5.95E+2	102.9	NA	NA	NA	<1E+0	V65	V66	NA
V69	108-AP-E	1.14E+3	1.31E+3	1.23E+3	13.9	1E+0	5.95E+2	102.9	NA	NA	NA	<1E+0	V65	V66	NA
V73	108-AP-FB	*2.11E+1	*1.46E+1	1.79E+1	36.3	1E+0	5.81E+2	100.5	NA	NA	NA	*1.47E+0	V71	V72	NA

*Average of two determinations.

WHC-SD-WM-DP-065, REV. 0

NO2_5.WK3

NITRITE by Ion Chromatography
Direct Analysis
LA-533-105

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS						QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/ml}$	Duplicate Result $\mu\text{g/ml}$	Average Result $\mu\text{g/ml}$	Sample RPD %	Detection Limit $\mu\text{g/ml}$	Standard Result $\mu\text{g/ml}$	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Reagent Blank $\mu\text{g/ml}$	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	1.20E+3	1.11E+3	1.16E+3	7.8	1E+0	5.32E+2	101.3	84.5	112.7	28.6	<1E+0	V60	V61	V62
V63	108-AP-B	7.62E+2	7.66E+2	7.64E+2	0.5	1E+0	5.32E+2	101.3	NA	NA	NA	<1E+0	V60	V61	NA
V67	108-AP-C	9.62E+2	1.03E+3	9.96E+2	6.8	1E+0	5.24E+2	99.8	NA	NA	NA	<1E+0	V65	V66	NA
V68	108-AP-D	1.07E+3	1.14E+3	1.11E+3	6.3	1E+0	5.24E+2	99.8	NA	NA	NA	<1E+0	V65	V66	NA
V69	108-AP-E	9.69E+2	1.10E+3	1.03E+3	12.7	1E+0	5.24E+2	99.8	NA	NA	NA	<1E+0	V65	V66	NA
V73	108-AP-FB	*<1.0E+1	*<1.0E+1	<1.0E+1	NA	1E+0	5.40E+2	101.9	NA	NA	NA	*<1E+0	V71	V72	NA

*Average of two determinations.

WHC-SD-WM-DP-065, REV. 0

ORTHOPHOSPHATE by Ion Chromatography
Direct Analysis
LA-533-105

SAMPLE INFORMATION		SAMPLE RESULTS			QC RESULTS					QC IDENTIFICATION		
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/ml}$	Duplicate Result $\mu\text{g/ml}$	Average Result $\mu\text{g/ml}$	Sample RPD %	Detection Limit $\mu\text{g/ml}$	Standard Result $\mu\text{g/ml}$	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Reagent Blank $\mu\text{g/ml}$
V62	108-AP-A	9.44E+1	1.02E+2	9.82E+1	7.7	1E+0	5.64E+2	109.1	98.3	91.3	7.4	<1E+0
V63	108-AP-B	7.96E+1	7.99E+1	7.98E+1	0.4	1E+0	5.64E+2	109.1	NA	NA	NA	<1E+0
V67	108-AP-C	9.03E+1	9.84E+1	9.44E+1	8.6	1E+0	5.61E+2	108.5	NA	NA	NA	<1E+0
V68	108-AP-D	9.42E+1	9.88E+1	9.65E+1	4.8	1E+0	5.61E+2	108.5	NA	NA	NA	<1E+0
V69	108-AP-E	9.12E+1	9.78E+1	9.45E+1	7.0	1E+0	5.61E+2	108.5	NA	NA	NA	<1E+0
V73	108-AP-FB	*<1.0E+1	*<1.0E+1	<1.0E+1	NA	1E+0	5.46E+2	105.6	NA	NA	NA	*<1E+0

*Average of two determinations.

WHC-SD-WM-DP-065, REV. 0

SO4_5.WK3

SULFATE by Ion Chromatography
Direct Analysis
LA-533-105

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS					QC IDENTIFICATION				
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/ml}$	Duplicate Result $\mu\text{g/ml}$	Average Result $\mu\text{g/ml}$	Sample RPD %	Detection Limit $\mu\text{g/ml}$	Standard Result $\mu\text{g/ml}$	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Reagent Blank $\mu\text{g/ml}$	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	2.21E+2	2.47E+2	2.34E+2	11.1	1E+0	6.22E+2	103.8	106.5	93.3	13.2	<1E+0	V60	V61	V62
V63	108-AP-B	1.50E+2	1.60E+2	1.55E+2	6.5	1E+0	6.22E+2	103.8	NA	NA	NA	<1E+0	V60	V61	NA
V67	108-AP-C	2.04E+2	2.28E+2	2.16E+2	11.1	1E+0	6.18E+2	103.2	NA	NA	NA	<1E+0	V65	V66	NA
V68	108-AP-D	1.94E+2	2.10E+2	2.02E+2	7.9	1E+0	6.18E+2	103.2	NA	NA	NA	<1E+0	V65	V66	NA
V69	108-AP-E	1.90E+2	2.09E+2	2.00E+2	9.5	1E+0	6.18E+2	103.2	NA	NA	NA	<1E+0	V65	V66	NA
V73	108-AP-FB	*<1.0E+1	*<1.0E+1	<1.0E+1	NA	1E+0	6.21E+2	103.7	NA	NA	NA	*1.5E+0	V71	V72	NA

*Average of two determinations.

WHC-SD-WM-DP-065, REV. 0

NH4_3.WK1

AMMONIA (as NH₄)
Direct Analysis / Kjeldahl Digestion – Titration
LA-634-102

SAMPLE INFORMATION			SAMPLE RESULTS				QC RESULTS					QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result ug/mL	Duplicate Result ug/mL	Average Result ug/mL	Sample RPD %	Detection Limit ug/mL	Standard Result M	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank ug/mL	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	<8.00E+2	<8.00E+2	<8.00E+2	N/A	8.00E+2	5.30E-2	106.0	101.4	100.4	1.0	<1.60E+2	V60	V61	N/A
V63	108-AP-B	<8.00E+2	<8.00E+2	<8.00E+2	N/A	8.00E+2	5.30E-2	106.0	N/A	N/A	N/A	<1.60E+2	V60	V61	N/A
V67	108-AP-C	<8.00E+2	<8.00E+2	<8.00E+2	N/A	8.00E+2	4.69E-2	93.8	N/A	N/A	N/A	<1.60E+2	V65	V66	N/A
V68	108-AP-D	<8.00E+2	<8.00E+2	<8.00E+2	N/A	8.00E+2	4.69E-2	93.8	N/A	N/A	N/A	<1.60E+2	V65	V66	N/A
V69	108-AP-E	<8.00E+2	<8.00E+2	<8.00E+2	N/A	8.00E+2	4.69E-2	93.8	N/A	N/A	N/A	<1.60E+2	V65	V66	N/A
V73	108-AP-FB	<4.00E+2	<4.00E+2	<4.00E+2	N/A	4.00E+2	4.94E-2	96.9	N/A	N/A	N/A	<4.00E+2	V71	V72	N/A

WHC-SD-WM-DP-065, REV. 0

NH3_5.WK1

AMMONIA (as NH3)
Direct Analysis / Ion Selective Electrode
LA-631-001

SAMPLE INFORMATION		SAMPLE RESULTS					QC RESULTS					QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result ug/mL	Duplicate Result ug/mL	Average Result ug/mL	Sample RPD %	Detection Limit ug/mL	Standard Result ug/mL	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank ug/mL	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	1.31E+1	9.50E+0	1.13E+1	32.0	2.00E+0	4.99E-2	97.9	NA	NA	NA	<2.00E+0	V60	V61	N/A
V63	108-AP-B	9.88E+0	6.88E+0	8.38E+0	35.8	2.00E+0	4.99E-2	97.9	NA	NA	NA	<2.00E+0	V60	V61	N/A
V67	108-AP-C	1.48E+1	1.34E+1	1.41E+1	9.15	2.00E+0	4.86E-2	95.3	NA	NA	NA	<2.00E+0	V65	V66	N/A
V68	108-AP-D	3.30E+0	3.11E+0	3.21E+0	5.76	2.00E+0	4.86E-2	95.3	NA	NA	NA	<2.00E+0	V65	V66	N/A
V69	108-AP-E	4.75E+0	3.45E+0	4.10E+0	31.7	2.00E+0	4.86E-2	95.3	NA	NA	NA	<2.00E+0	V65	V66	N/A
V73	108-AP-FB	<2.00E+1	<2.00E+1	<2.00E+1	NA	2.00E+1	5.30E-2	103.9	NA	NA	NA	<2.00E+1	V71	V72	N/A

WHC-SD-WM-DP-065, REV. 0

HYDROXIDE by Automated Titration
Direct Analysis
LA-211-102

SAMPLE INFORMATION			SAMPLE RESULTS			QC RESULTS						QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/ml}$	Duplicate Result $\mu\text{g/ml}$	Average Result $\mu\text{g/ml}$	Sample RPD %	Detection Limit $\mu\text{g/ml}$	Standard Result M	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Reagent Blank $\mu\text{g/ml}$	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	<2.50E+2	I.S. *	NA	NA	2.50E+2	9.69E-1	103.4	NA	NA	NA	<4.2E+1	V60	V61	NA
V63	108-AP-B	<2.50E+2	<1.25E+2	NA	NA	1.25E+2	9.69E-1	103.4	NA	NA	NA	<4.2E+1	V60	V61	NA
V67	108-AP-C	<1.25E+2	<1.25E+2	<1.25E+2	NA	1.25E+2	9.27E-1	98.8	NA	NA	NA	<4.2E+1	V65	V66	NA
V68	108-AP-D	<1.25E+2	<1.25E+2	<1.25E+2	NA	1.25E+2	9.27E-1	98.8	NA	NA	NA	<4.2E+1	V65	V66	NA
V69	108-AP-E	<1.25E+2	<1.25E+2	<1.25E+2	NA	1.25E+2	9.27E-1	98.8	NA	NA	NA	<4.2E+1	V65	V66	NA
V73	108-AP-FB	<1.25E+2	<1.25E+2	<1.25E+2	NA	1.25E+2	9.58E-1	102.0	NA	NA	NA	<4.2E+1	V71	V72	NA

* I.S. denotes insufficient sample volume available

WHC-SD-WM-DP-065, REV. 0

CYANIDE
Direct and Water Dilution
LA-695-102

SAMPLE INFORMATION			SAMPLE RESULTS			QC RESULTS						QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/ml}$	Duplicate Result $\mu\text{g/ml}$	Average Result $\mu\text{g/ml}$	Sample RPD %	Detection Limit $\mu\text{g/ml}$	Standard Result $\mu\text{g/ml}$	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Reagent Blank $\mu\text{g/ml}$	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	0.89	0.88	0.89	1.7	0.1	9.17E+2	100.3	100.3	99.9	0.4	<0.1	V60	V61	V62
V63	108-AP-B	1.03	1.03	1.03	0	0.02	9.17E+2	100.3	NA	NA	NA	<0.1	V60	V61	N/A
V67	108-AP-C	<0.1	<0.1	<0.1	N/A	0.1	8.91E+2	99.1	NA	NA	NA	<0.1	V65	V66	N/A
V68	108-AP-D	0.109	<0.1	N/A	N/A	0.1	8.91E+2	99.1	NA	NA	NA	<0.1	V65	V66	N/A
V69	108-AP-E	<0.1	<0.1	<0.1	N/A	0.1	8.91E+2	99.1	NA	NA	NA	<0.1	V65	V66	N/A
V73	108-AP-FB	<0.2	<0.2	<0.2	N/A	0.2	8.55E+2	91.5	NA	NA	NA	<0.2	V71	V72	N/A

WHC-SD-WM-DP-065, REV. 0

TOTAL INORGANIC CARBON
Water "Digestion"

LA-622-102

SAMPLE INFORMATION			SAMPLE RESULTS			QC RESULTS							QC IDENTIFICATION		
Sample I.D.	Lab I.D.	Sample Result ug/mL	Duplicate Result ug/mL	Average Result ug/mL	Sample RPD %	Detection Limit ug/mL	Standard Result M	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Prep Blank ug/mL	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	4.18E+2	4.15E+2	4.17E+2	0.7	2.50E+1	4.82E-2	96.4	83.7	91.6	12.6	<2.50E+1	V60	V61	V62
V63	108-AP-B	4.35E+2	4.08E+2	4.22E+2	6.4	2.50E+1	4.82E-2	96.4	NA	NA	NA	<2.50E+1	V60	V61	NA
V67	108-AP-C	4.88E+2	4.83E+2	4.86E+2	1.0	2.50E+1	4.95E-2	99.0	NA	NA	NA	<2.50E+1	V65	V66	NA
V68	108-AP-D	5.65E+2	5.65E+2	5.72E+2	2.3	2.50E+1	4.95E-2	99.0	NA	NA	NA	<2.50E+1	V65	V66	NA
V69	108-AP-E	5.35E+2	5.33E+2	5.34E+2	0.4	2.50E+1	4.95E-2	99.0	NA	NA	NA	<2.50E+1	V65	V66	NA
V73	108-AP-FB	<5.00E+1	<5.00E+1	<5.00E+1	NA	5.00E+1	4.85E-2	97.0	NA	NA	NA	<5.00E+1	V71	V72	NA

WHC-SD-WM-DP-065, REV. 0

U_4.WK1

URANIUM
Direct Analysis
LA - 925 - 106

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS					QC IDENTIFICATION				
Sample I.D.	Lab I.D.	Sample Result ug/mL	Duplicate Result ug/mL	Average Result ug/mL	Sample RPD %	Detection Limit ug/mL	Standard Result ug/L	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank ug/mL	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	4.42E+00	4.42E+00	4.42E+00	0	7.36E-01	3.53E-02	91.5	86.5	86.5	0	<7.69E-01	V60	V61	V62
V63	108-AP-B	2.29E+01	2.38E+01	2.34E+01	0.6	3.82E+00	3.53E-02	91.5	N/A	N/A	N/A	<7.69E-01	V60	V61	N/A
V67	108-AP-C	2.08E+00	2.49E+00	2.29E+00	17.9	4.15E-01	3.70E-02	95.8	N/A	N/A	N/A	<3.57E+00	V65	V66	N/A
V68	108-AP-D	1.37E+01	1.55E+01	1.46E+01	12.3	1.52E+00	3.70E-02	95.8	N/A	N/A	N/A	<3.57E+00	V65	V66	N/A
V69	108-AP-E	2.48E+01	2.07E+01	2.28E+01	18.0	4.13E+00	3.70E-02	95.8	N/A	N/A	N/A	<3.57E+00	V65	V66	N/A
V73	108-AP-FB	<8.18E-05	<8.57E-05	N/A	N/A	8.18E-05	4.05E-02	104.9	N/A	N/A	N/A	<8.18E-05	V71	V72	N/A

WHC-SD-WM-DP-065; REV. 0

As_3.WK1

ARSENIC
Acid Digestion
LA-355-131

SAMPLE INFORMATION			SAMPLE RESULTS				QC RESULTS						QC IDENTIFICATION *		
Sample I.D.	Lab I.D.	Sample Result ug/mL	Duplicate Result ug/mL	Average Result ug/mL	Sample RPD %	Detection Limit ug/mL	Standard Result ug/mL	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank ug/mL	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	4.05E-2	3.47E-2	3.80E-2	15.4	2.5E-2	1.05E-1	105.4	53.7	52.1	2.4	<2.5E-2	V60	V61	V62
V63	108-AP-B	3.59E-2	4.17E-2	3.90E-2	15.1	2.5E-2	1.05E-1	105.4	N/A	N/A	N/A	<2.5E-2	V60	V61	NA
V67	108-AP-C	3.4E-2	3.4E-2	3.4E-2	0	2.5E-2	1.02E-1	102.4	N/A	N/A	N/A	<2.5E-2	V65	V66	NA
V68	108-AP-D	2.5E-2	<2.5E-2	N/A	N/A	2.5E-2	1.02E-1	102.4	N/A	N/A	N/A	<2.5E-2	V65	V66	NA
V69	108-AP-E	<2.5E-2	<2.5E-2	<2.5E-2	N/A	2.5E-2	1.02E-1	102.4	N/A	N/A	N/A	<2.5E-2	V65	V66	NA
V73	108-AP-FB	<2.5E-2	<2.5E-2	<2.5E-2	N/A	2.5E-2	9.92E-2	99.2	N/A	N/A	N/A	<2.0E-2	V71	V72	NA

WHC-SD-WM-DP-065, REV. 0

SELENIUM
Acid Digestion
LA-355-131

SAMPLE INFORMATION			SAMPLE RESULTS				QC RESULTS					QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result ug/mL	Duplicate Result ug/mL	Average Result ug/mL	Sample RPD %	Detection Limit ug/mL	Standard Result ug/mL	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank ug/mL	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	<1.3E-2	<1.3E-2	<1.3E-2	N/A	1.3E-2	1.00E-1	100.0	97.5	88.8	9.3	<1.3E-2	V60	V61	V62
V63	108-AP-B	<1.3E-2	<1.3E-2	<1.3E-2	N/A	1.3E-2	1.00E-1	100.0	N/A	N/A	N/A	<1.3E-2	V60	V61	NA
V67	108-AP-C	<1.3E-2	<1.3E-2	<1.3E-2	N/A	1.3E-2	1.07E-1	107.0	N/A	N/A	N/A	<1.3E-2	V65	V66	NA
V68	108-AP-D	<1.3E-2	<1.3E-2	<1.3E-2	N/A	1.3E-2	1.07E-1	107.0	N/A	N/A	N/A	<1.3E-2	V65	V66	NA
V69	108-AP-E	<1.3E-2	<1.3E-2	<1.3E-2	N/A	1.3E-2	1.07E-1	107.0	N/A	N/A	N/A	<1.3E-2	V65	V66	NA
V73	108-AP-FB	2.52E-2	2.80E-2	2.66E-2	10.5	2.5E-2	1.06E-1	105.8	N/A	N/A	N/A	<2.5E-2	V71	V72	NA

WHC-SD-WM-DP-065, REV. 0

MERCURY
Direct Analysis
LA-325-104

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS						QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/ml}$	Duplicate Result $\mu\text{g/ml}$	Average Result $\mu\text{g/ml}$	Sample RPD %	Detection Limit $\mu\text{g/ml}$	Standard Result $\mu\text{g/ml}$	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Reagent Blank $\mu\text{g/ml}$	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	7E-3	6E-3	7E-3	19.7	5E-3	0.100	100.0	95.9	101.0	5.2	<2E-4	V60	V61	V62
V63	108-AP-B	6E-3	5E-3	6E-3	20.0	5E-3	0.100	100.0	N/A	N/A	N/A	<2E-4	V60	V61	N/A
V67	108-AP-C	<5E-3	<5E-3	<5E-3	N/A	5E-3	0.093	93.1	N/A	N/A	N/A	<5E-3	V65	V66	N/A
V68	108-AP-D	<5E-3	<5E-3	<5E-3	N/A	5E-3	0.093	93.1	N/A	N/A	N/A	<5E-3	V65	V66	N/A
V69	108-AP-E	<5E-3	<5E-3	<5E-3	N/A	5E-3	0.093	93.1	N/A	N/A	N/A	<5E-3	V65	V66	N/A
V73	108-AP-FB	<5E-3	<5E-3	<5E-3	N/A	5E-3	0.106	106.0	N/A	N/A	N/A	<5E-3	V71	V72	N/A

WHC-SD-WM-DP-065, REV. 0

ALUMINUM by Inductively Coupled Plasma/Emission Spectroscopy
Acid Digestion
LA-505-151

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS						QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/L}$	Duplicate Result $\mu\text{g/L}$	Average Result $\mu\text{g/L}$	Sample RPD	Detection Limit $\mu\text{g/L}$	Standard Result $\mu\text{g/L}$	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank $\mu\text{g/L}$	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	5.41E+04	5.53E+04	5.47E+04	2.10	2.90E+01	5.02E+03	100.4	126.2	120.4	3.2	<2.90E+01	V60	V61	V62
V63	108-AP-B	3.32E+04	3.42E+04	3.37E+04	2.70	2.90E+01	5.02E+03	100.4	NA	NA	NA	<2.90E+01	V60	V61	NA
V67	108-AP-C	5.53E+04	5.34E+04	5.44E+04	3.40	2.90E+01	4.73E+03	94.7	NA	NA	NA	<2.90E+01	V65	V66	NA
V68	108-AP-D	3.23E+04	3.27E+04	3.25E+04	1.30	2.90E+01	4.73E+03	94.7	NA	NA	NA	<2.90E+01	V65	V66	NA
V69	108-AP-E	3.32E+04	3.30E+04	3.31E+04	0.7	2.90E+01	4.73E+03	94.7	NA	NA	NA	<2.90E+01	V65	V66	NA
V73	108-AP-FB	1.81E+02	2.14E+02	1.98E+02	16.8	1.60E+01	4.95E+03	99.0	NA	NA	NA	<1.60E+01	V71	V72	NA

WHC-SD-WM-DP-065, REV.0

BARIUM by Inductively Coupled Plasma/Emission Spectroscopy
Acid Digestion
LA-505-151

SAMPLE INFORMATION			SAMPLE RESULTS				QC RESULTS					QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/L}$	Duplicate Result $\mu\text{g/L}$	Average Result $\mu\text{g/L}$	Sample RPD %	Detection Limit $\mu\text{g/L}$	Standard Result $\mu\text{g/L}$	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank $\mu\text{g/L}$	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	<2.00E+1	<2.00E+1	<2.00E+1	NA	4.0	5.06E+3	101.1	78.6	75.7	3.8	<4.0	V60	V61	V62
V63	108-AP-B	<2.00E+1	<2.00E+1	<2.00E+1	NA	4.0	5.06E+3	101.1	N/A	N/A	N/A	<4.0	V60	V61	NA
V67	108-AP-C	<2.00E+1	<2.00E+1	<2.00E+1	NA	4.0	4.75E+3	95.1	N/A	N/A	N/A	<4.0	V65	V66	NA
V68	108-AP-D	<2.00E+1	<2.00E+1	<2.00E+1	NA	4.0	4.75E+3	95.1	N/A	N/A	N/A	<4.0	V65	V66	NA
V69	108-AP-E	<2.00E+1	<2.00E+1	<2.00E+1	NA	4.0	4.75E+3	95.1	N/A	N/A	N/A	<4.0	V65	V66	NA
V73	108-AP-FB	8.16E+1	8.15E+1	8.16E+1	0.1	1.0	4.97E+3	99.5	N/A	N/A	N/A	<1.0	V71	V72	NA

WHC-SD-WM-DP-065, REV. 0

Cadmium by Inductively Coupled Plasma/Emission Spectroscopy
Acid Digestion
LA - 505 - 151

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS						QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/L}$	Duplicate Result $\mu\text{g/L}$	Average Result $\mu\text{g/L}$	Sample RPD %	Detection Limit $\mu\text{g/L}$	Standard Result $\mu\text{g/L}$	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank $\mu\text{g/L}$	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	1.38E+2	1.40E+2	1.39E+2	1.4	4.0	5.10E+3	102.0	76.0	72.5	4.7	<4.0	V60	V61	V62
V63	108-AP-B	1.40E+2	1.36E+2	1.38E+2	3.4	4.0	5.10E+3	102.0	N/A	N/A	N/A	<4.0	V60	V61	NA
V67	108-AP-C	1.47E+2	1.40E+2	1.43E+2	5.5	4.0	4.86E+3	97.3	N/A	N/A	N/A	<4.0	V65	V66	NA
V68	108-AP-D	1.32E+2	1.84E+2	1.58E+2	33.2	4.0	4.86E+3	97.3	N/A	N/A	N/A	<4.0	V65	V66	NA
V69	108-AP-E	1.25E+2	1.33E+2	1.29E+2	5.7	4.0	4.86E+3	97.3	N/A	N/A	N/A	<4.0	V65	V66	NA
V73	108-AP-FB	<5.00E+1	<5.00E+1	<5.00E+1	N/A	5.0	5.06E+3	101.2	N/A	N/A	N/A	<5.0	V71	V72	NA

WHC-SD-WM-DP-065; REV. 0

CALCIUM by Inductively Coupled Plasma/Emission Spectroscopy
Acid Digestion
LA-505-151

SAMPLE INFORMATION			SAMPLE RESULTS				QC RESULTS						QC IDENTIFICATION		
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/L}$	Duplicate Result $\mu\text{g/L}$	Average Result $\mu\text{g/L}$	Sample RPD %	Detection Limit $\mu\text{g/L}$	Standard Result $\mu\text{g/L}$	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank $\mu\text{g/L}$	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	1.26E+3	1.88E+3	1.57E+3	39.6	5.0	5.03E+3	100.5	80.2	77.3	3.6	22.0	V60	V61	V62
V63	108-AP-B	2.40E+3	2.12E+3	2.26E+3	12.4	5.0	5.03E+3	100.5	N/A	N/A	N/A	22.0	V60	V61	NA
V67	108-AP-C	9.31E+2	8.19E+2	8.75E+2	12.9	5.0	4.73E+3	94.6	N/A	N/A	N/A	14.8	V65	V66	NA
V68	108-AP-D	2.02E+3	1.33E+3	1.68E+3	41.4	5.0	4.73E+3	94.6	N/A	N/A	N/A	14.8	V65	V66	NA
V69	108-AP-E	1.72E+3	2.61E+3	2.17E+3	41.1	5.0	4.73E+3	94.6	N/A	N/A	N/A	14.8	V65	V66	NA
V73	108-AP-FB	1.75E+3	8.45E+2	1.30E+3	69.9	200.0	5.12E+3	102.4	N/A	N/A	N/A	<200.0	V71	V72	NA

WHC-SD-WM-DP-065, REV. 0

Cr_4.WK1

CHROMIUM by Inductively Coupled Plasma/Emission Spectroscopy
Acid Digestion
LA-505-151

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS						QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/L}$	Duplicate Result $\mu\text{g/L}$	Average Result $\mu\text{g/L}$	Sample RPD %	Detection Limit $\mu\text{g/L}$	Standard Result $\mu\text{g/L}$	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank $\mu\text{g/L}$	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	2.02E+3	2.05E+3	2.04E+3	1.7	5.0	5.11E+3	102.1	81.1	77.7	4.1	<5.00	V60	V61	V62
V63	108-AP-B	1.99E+3	2.22E+3	2.11E+3	11.1	5.0	5.11E+3	102.1	N/A	N/A	N/A	<5.00	V60	V61	NA
V67	108-AP-C	2.08E+3	2.03E+3	2.06E+3	2.9	5.0	4.85E+3	97.1	N/A	N/A	N/A	5.03	V65	V66	NA
V68	108-AP-D	1.97E+3	1.98E+3	1.98E+3	0.6	5.0	4.85E+3	97.1	N/A	N/A	N/A	5.03	V65	V66	NA
V69	108-AP-E	1.96E+3	1.96E+3	1.96E+3	0.3	5.0	4.85E+3	97.1	N/A	N/A	N/A	5.03	V65	V66	NA
V73	108-AP-FB	<2.00E+1	<2.00E+1	<2.00E+1	NA	2.0	5.09E+3	101.9	N/A	N/A	N/A	<2.00	V71	V72	NA

WHC-SD-WM-DP-065, REV. 0

IRON by Inductively Coupled Plasma/Emission Spectroscopy
Acid Digestion
LA-505-151

SAMPLE INFORMATION			SAMPLE RESULTS					QC RESULTS					QC IDENTIFICATION		
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/L}$	Duplicate Result $\mu\text{g/L}$	Average Result $\mu\text{g/L}$	Sample RPD %	Detection Limit $\mu\text{g/L}$	Standard Result $\mu\text{g/L}$	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank $\mu\text{g/L}$	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	1.42E+2	8.49E+2	4.96E+2	142.5	7.0	5.03E+3	100.5	79.3	76.0	4.2	29.27	V60	V61	V62
V63	108-AP-B	5.21E+2	1.55E+3	1.04E+3	99.4	7.0	5.03E+3	100.5	N/A	N/A	N/A	29.27	V60	V61	NA
V67	108-AP-C	2.00E+2	1.90E+2	1.95E+2	5.0	7.0	4.78E+3	95.5	N/A	N/A	N/A	8.17	V65	V66	NA
V68	108-AP-D	9.57E+1	1.49E+2	1.22E+2	43.4	7.0	4.78E+3	95.5	N/A	N/A	N/A	8.17	V65	V66	NA
V69	108-AP-E	5.74E+2	8.23E+2	6.99E+2	35.6	7.0	4.78E+3	95.5	N/A	N/A	N/A	8.17	V65	V66	NA
V73	108-AP-FB	1.32E+2	2.05E+2	1.68E+2	43.2	20.0	4.78E+3	101.5	N/A	N/A	N/A	<20.0	V71	V72	NA

WHC-SD-WM-DP-065, REV. 0

LEAD by Inductively Coupled Plasma/Emission Spectroscopy
Acid Digestion
LA-505-151

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS						QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/L}$	Duplicate Result $\mu\text{g/L}$	Average Result $\mu\text{g/L}$	Sample RPD %	Detection Limit $\mu\text{g/L}$	Standard Result $\mu\text{g/L}$	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank $\mu\text{g/L}$	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	<1.20E+2	<1.20E+2	<1.20E+2	NA	24.0	5.07E+3	101.4	77.0	73.6	4.4	<24.0	V60	V61	V62
V63	108-AP-B	<1.20E+2	<1.20E+2	<1.20E+2	NA	24.0	5.07E+3	101.4	N/A	N/A	N/A	<24.0	V60	V61	NA
V67	108-AP-C	<1.20E+2	1.32E+2	NA	NA	24.0	4.89E+3	97.8	N/A	N/A	N/A	<24.0	V65	V66	NA
V68	108-AP-D	1.38E+2	1.43E+4	7.24E+3	196.2	24.0	4.89E+3	97.8	N/A	N/A	N/A	<24.0	V65	V66	NA
V69	108-AP-E	<1.20E+2	<1.20E+2	<1.20E+2	NA	24.0	4.89E+3	97.8	N/A	N/A	N/A	<24.0	V65	V66	NA
V73	108-AP-FB	<2.80E+2	<2.80E+2	<2.80E+2	NA	28.0	5.07E+3	101.4	N/A	N/A	N/A	<28.0	V71	V72	NA

WHC-SD-WM-DP-065, REV. 0

Mg_3.WK1

MAGNESIUM by Inductively Coupled Plasma/Emission Spectroscopy
Acid Digestion
LA-505-151

SAMPLE INFORMATION			SAMPLE RESULTS				QC RESULTS						QC IDENTIFICATION		
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/L}$	Duplicate Result $\mu\text{g/L}$	Average Result $\mu\text{g/L}$	Sample RPD %	Detection Limit $\mu\text{g/L}$	Standard Result $\mu\text{g/L}$	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank $\mu\text{g/L}$	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	5.72E+1	9.00E+2	7.36E+1	44.6	3.0	4.92E+3	98.5	76.3	73.5	3.8	<3.0	V60	V61	V62
V63	108-AP-B	1.28E+2	1.59E+2	1.44E+2	22.1	3.0	4.92E+3	98.5	N/A	N/A	N/A	<3.0	V60	V61	NA
V67	108-AP-C	2.93E+1	2.75E+1	2.84E+1	6.5	3.0	4.71E+3	94.2	N/A	N/A	N/A	<3.0	V65	V66	NA
V68	108-AP-D	5.52E+1	9.97E+1	7.79E+1	57.5	3.0	4.71E+3	94.2	N/A	N/A	N/A	<3.0	V65	V66	NA
V69	108-AP-E	9.35E+1	1.28E+2	1.11E+2	31.2	3.0	4.71E+3	94.2	N/A	N/A	N/A	<3.0	V65	V66	NA
V73	108-AP-FB	3.31E+2	2.99E+2	3.15E+2	10.1	19.0	4.93E+3	98.5	N/A	N/A	N/A	<19.0	V71	V72	NA

WHC-SD-WM-DP-065, REV. 0

Mn_4.WK1

MANGANESE by Inductively Coupled Plasma/Emission Spectroscopy
Acid Digestion
LA-505-151

SAMPLE INFORMATION			SAMPLE RESULTS				QC RESULTS					QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/L}$	Duplicate Result $\mu\text{g/L}$	Average Result $\mu\text{g/L}$	Sample RPD %	Detection Limit $\mu\text{g/L}$	Standard Result $\mu\text{g/L}$	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank $\mu\text{g/L}$	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	<1.5E+1	1.87E+1	NA	NA	3.0	5.06E+3	101.2	78.0	75.0	3.9	<3.0	V60	V61	V62
V63	108-AP-B	1.5E+1	2.10E+1	1.80E+1	33.3	3.0	5.06E+3	101.2	N/A	N/A	N/A	<3.0	V60	V61	NA
V67	108-AP-C	<1.5E+1	<1.5E+1	<1.5E+1	NA	3.0	4.83E+3	96.5	N/A	N/A	N/A	<3.0	V65	V66	NA
V68	108-AP-D	<1.5E+1	<1.5E+1	<1.5E+1	NA	3.0	4.83E+3	96.5	N/A	N/A	N/A	<3.0	V65	V66	NA
V69	108-AP-E	2.22E+1	2.80E+1	2.51E+1	23.3	3.0	4.83E+3	96.5	N/A	N/A	N/A	<3.0	V65	V66	NA
V73	108-AP-FB	<1.00E+1	<1.00E+1	<1.00E+1	NA	1.0	4.97E+3	99.4	N/A	N/A	N/A	<1.0	V71	V72	NA

WHC-SD-WM-DP-065, REV. 0

Ag_3.WK1

SILVER by Inductively Coupled Plasma/Emission Spectroscopy
Acid Digestion
LA-505-151

SAMPLE INFORMATION		SAMPLE RESULTS					QC RESULTS					QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/L}$	Duplicate Result $\mu\text{g/L}$	Average Result $\mu\text{g/L}$	Sample RPD %	Detection Limit $\mu\text{g/L}$	Standard Result $\mu\text{g/L}$	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank $\mu\text{g/L}$	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	1.04E+2	5.60E+1	7.98E+1	59.7	4.0	5.04E+3	100.9	13.3	14.2	7.0	<4.0	V60	V61	V62
V63	108-AP-B	5.97E+1	5.98E+1	5.98E+1	0.3	4.0	5.04E+3	100.9	N/A	N/A	N/A	<4.0	V60	V61	NA
V67	108-AP-C	1.31E+2	2.27E+1	7.68E+1	140.9	4.0	4.82E+3	96.3	N/A	N/A	N/A	<4.0	V65	V66	NA
V68	108-AP-D	5.72E+1	5.53E+1	5.63E+1	3.3	4.0	4.82E+3	96.3	N/A	N/A	N/A	<4.0	V65	V66	NA
V69	108-AP-E	4.82E+1	3.87E+1	4.34E+1	21.9	4.0	4.82E+3	96.3	N/A	N/A	N/A	<4.0	V65	V66	NA
V73	108-AP-FB	4.99E+1	<4.00E+1	NA	NA	4.0	5.05E+3	101.0	N/A	N/A	N/A	<4.0	V71	V72	NA

WHC-SD-WM-DP-065, REV. 0

SODIUM by Inductively Coupled Plasma/Emission Spectroscopy
Acid Digestion
LA-505-151

SAMPLE INFORMATION		SAMPLE RESULTS					QC RESULTS							QC IDENTIFICATION		
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/L}$	Duplicate Result $\mu\text{g/L}$	Average Result $\mu\text{g/L}$	Sample RPD %	Detection Limit $\mu\text{g/L}$	Standard Result $\mu\text{g/L}$	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Dilution RPD %	Preparation Blank $\mu\text{g/L}$	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	3.00E+6	3.05E+6	3.03E+6	1.6	2.9E+1	5.11E+3	102.2	2256.1	2103.1	3.0	8.4	<2.9E+1	V60	V61	V62
V63	108-AP-B	2.62E+6	2.68E+6	2.65E+6	2.5	2.9E+1	5.11E+3	102.2	N/A	N/A	N/A	6.4	<2.9E+1	V60	V61	N/A
V67	108-AP-C	3.02E+6	2.92E+6	2.97E+6	3.1	2.9E+1	4.81E+3	96.3	N/A	N/A	N/A	5.5	<2.9E+1	V65	V66	N/A
V68	108-AP-D	2.58E+6	2.60E+6	2.59E+6	0.8	2.9E+1	4.81E+3	96.3	N/A	N/A	N/A	2.2	<2.9E+1	V65	V66	N/A
V69	108-AP-E	2.62E+6	2.60E+6	2.61E+6	0.8	2.9E+1	4.81E+3	96.3	N/A	N/A	N/A	2.6	<2.9E+1	V65	V66	N/A
V73	108-AP-FB	8.00E+2	7.14E+2	7.57E+2	11.3	1.9E+1	4.85E+3	96.9	N/A	N/A	N/A	N/A	<1.9E+1	V71	V72	N/A

WHC-SD-WM-DP-065, REV. 0

Zn_3.WK1

ZINC by Inductively Coupled Plasma/Emission Spectroscopy
Acid Digestion
LA-505-151

SAMPLE INFORMATION			SAMPLE RESULTS				QC RESULTS					QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result $\mu\text{g/L}$	Duplicate Result $\mu\text{g/L}$	Average Result $\mu\text{g/L}$	Sample RPD %	Detection Limit $\mu\text{g/L}$	Standard Result $\mu\text{g/L}$	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank $\mu\text{g/L}$	Standard I.D.	Blank I.D.	Spike I.D.
V62	108-AP-A	1.31E+2	2.03E+2	1.67E+2	43.3	5.0	5.16E+3	103.1	94.1	91.4	2.9	-23.4	V60	V61	V62
V63	108-AP-B	2.19E+2	2.18E+2	2.19E+2	0.5	5.0	5.16E+3	103.1	N/A	N/A	N/A	-23.4	V60	V61	NA
V67	108-AP-C	6.51E+2	5.80E+2	6.15E+2	11.6	5.0	5.01E+3	100.1	N/A	N/A	N/A	15.4	V65	V66	NA
V68	108-AP-D	1.25E+2	8.03E+1	1.03E+2	43.6	5.0	5.01E+3	100.1	N/A	N/A	N/A	15.4	V65	V66	NA
V69	108-AP-E	4.27E+2	3.52E+2	3.90E+2	19.4	5.0	5.01E+3	100.1	N/A	N/A	N/A	15.4	V65	V66	NA
V73	108-AP-FB	1.12E+2	1.08E+2	1.10E+2	3.2	4.0	5.03E+3	100.5	N/A	N/A	N/A	22.6	V71	V72	NA

WHC-SD-WM-DP-065, REV. 0

Ce144_2.WK1

Cerium - 144 by Gamma Energy Analysis
Acid Digestion
LA-548-121

SAMPLE INFORMATION		SAMPLE RESULTS					QC RESULTS					QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result uCi/mL	Duplicate Result uCi/mL	Average Result uCi/mL	Sample RPD %	Detection Limit uCi/mL	CS-137 Standard uCi/L	CS-137 Standard % Rec.	CS-137 % Counting Error	CO-60 Standard uCi/L	CO-60 Standard % Rec.	CO-60 % Counting Error	Reagent Blank uCi/mL	Standard I.D.	Blank I.D.
V77	108-AP-COM	<8.98E-3	<9.04E-3	N/A	N/A	5.56E-4	2.55E+1	101.4	1.52	2.18E+1	103.7	1.28	<5.56E-4	V75	V76
V73	108-AP-FB	<1.26E-3	N/A	N/A	N/A	1.11E-3	2.46E+1	101.8	4.84	2.09E+1	101.9	4.23	<1.11E-3	V71	V72

WHC-SD-WM-DP-065, REV. 0

Cs134_1.WK1

Cesium-134 by Gamma Energy Analysis
Acid Digestion
LA-548-121

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS						QC IDENTIFICATION		
Sample I.D.	Lab I.D.	Sample Result uCi/mL	Duplicate Result uCi/mL	Average Result uCi/mL	Sample RPD %	Detection Limit uCi/mL	CS-137 Standard uCi/L	CS-137 Standard % Rec.	CS-137 % Counting Error	CO-60 Standard uCi/L	CO-60 Standard % Rec.	CO-60 % Counting Error	Reagent Blank uCi/mL	Blank I.D.
V77	108-AP-COM	<7.21E-4	1.49E-3	N/A	N/A	1.17E-4	2.55E+1	101.4	1.52	2.18E+1	103.7	1.28	<1.17E-4	V75
V73	108-AP-FB	<2.45E-4	N/A	N/A	N/A	2.91E-4	2.46E+1	101.8	4.84	2.09E+1	101.9	4.23	<2.91E-4	V71
														V76
														V72

WHC-SD-WM-DP-065, REV. 0

Cs137_1.WK1

Cesium - 137 by Gamma Energy Analysis
Acid Digestion
LA-548-121

SAMPLE INFORMATION			SAMPLE RESULTS			QC RESULTS						QC IDENTIFICATION		
Sample I.D.	Lab I.D.	Sample Result uCi/mL	Duplicate Result uCi/mL	Average Result uCi/mL	Sample RPD %	Detection Limit uCi/mL	CS-137 Standard uCi/L	CS-137 Standard % Rec.	CS-137 % Counting Error	CO-60 Standard uCi/L	CO-60 Standard % Rec.	CO-60 % Counting Error	Reagent Blank uCi/mL	Blank I.D.
V77	108-AP-COM	4.30E+0	4.27E+0	4.29E+0	0.68	1.81E-4	2.55E+1	101.4	1.52	2.18E+1	103.7	1.28	<1.81E-4	V75
V73	108-AP-FB	<3.41E-4	N/A	N/A	N/A	3.03E-4	2.46E+1	101.8	4.84	2.09E+1	101.9	4.23	<3.03E-4	V71
														V72

WHC-SD-WM-DP-065, REV. 0

**Cobalt-60 by Gamma Energy Analysis
Acid Digestion
LA-548-121**

SAMPLE INFORMATION			SAMPLE RESULTS			QC RESULTS						QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result	Duplicate Result	Average Result	Sample RPD	Detection Limit	CS-137 Standard	CS-137 % Rec.	CS-137 % Counting Error	CO-60 Standard	CO-60 % Rec.	CO-60 % Counting Error	Reagent Blank uCi/mL	Standard I.D.	Blank I.D.
V77	108-AP-COM	<1.22E-4	<2.02E-4	N/A	N/A	1.13E-4	2.55E+1	101.4	1.52	2.18E+1	103.7	1.23	<1.13E-4	V75	V76
V73	108-AP-FB	<2.81E-4	N/A	N/A	N/A	2.79E-4	2.46E+1	101.8	4.84	2.09E+1	101.9	4.28	<2.79E-4	V71	V72

106

Eu154_1.WK1

Europium - 154 by Gamma Energy Analysis
Acid Digestion
LA - 548 - 121

SAMPLE INFORMATION		SAMPLE RESULTS					QC RESULTS						QC IDENTIFICATION		
Sample I.D.	Lab I.D.	Sample Result uCi/mL	Duplicate Result uCi/mL	Average Result uCi/mL	Sample RPD %	Detection Limit uCi/mL	CS - 137 Standard uCi/L	CS - 137 Standard % Rec.	CS - 137 % Counting Error	CO - 60 Standard uCi/L	CO - 60 Standard % Rec.	CO - 60 % Counting Error	Reagent Blank uCi/mL	Standard I.D.	Blank I.D.
V77	108-AP-COM	<8.91E-4	<9.01E-4	N/A	N/A	3.96E-4	2.55E+1	101.4	1.52	2.18E+1	103.7	1.28	<3.96E-4	V75	V76
V73	108-AP-FB	<7.51E-4	N/A	N/A	N/A	7.74E-4	2.46E+1	101.8	4.84	2.09E+1	101.9	4.23	<7.74E-4	V71	V72

WHC-SD-WM-DP-065, REV. 0

Eu155_1.WK1

Europium-155 by Gamma Energy Analysis
Acid Digestion
LA-548-121

SAMPLE INFORMATION		SAMPLE RESULTS					QC RESULTS					QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result uCi/mL	Duplicate Result uCi/mL	Average Result uCi/mL	Sample RPD %	Detection Limit uCi/mL	CS-137 Standard uCi/L	CS-137 Standard % Rec.	CS-137 % Counting Error	CO-60 Standard uCi/L	CO-60 Standard % Rec.	CO-60 % Counting Error	Reagent Blank uCi/mL	Standard I.D.	Blank I.D.
V77	108-AP-COM	<4.87E-3	<4.85E-3	N/A	N/A	3.20E-4	2.55E+1	101.4	1.52	2.18E+1	103.7	1.28	<3.20E-4	V75	V76
V73	108-AP-FB	<6.33E-4	N/A	N/A	N/A	6.36E-4	2.46E+1	101.8	4.84	2.09E+1	101.9	4.23	<6.36E-4	V71	V72

WHC-SD-WM-DP-065, REV. 0

Nb94_1.WK1

Niobium -94 by Gamma Energy Analysis
Acid Digestion
LA -548 - 121

SAMPLE INFORMATION		SAMPLE RESULTS					QC RESULTS						QC IDENTIFICATION		
Sample I.D.	Lab I.D.	Sample Result uCi/mL	Duplicate Result uCi/mL	Average Result uCi/mL	Sample RPD %	Detection Limit uCi/mL	CS - 137 Standard uCi/L	CS - 137 Standard % Rec.	CS - 137 % Counting Error	CO - 60 Standard uCi/L	CO - 60 Standard % Rec.	CO - 60 % Counting Error	Reagent Blank uCi/mL	Standard I.D.	Blank I.D.
V77	108-AP-COM	<4.81E-4	<4.54E-4	N/A	N/A	9.91E-5	2.55E+1	101.4	1.52	2.18E+1	103.7	1.28	<9.91E-5	V75	V76
V73	108-AP-FB	<2.28E-4	N/A	N/A	N/A	1.70E-4	2.46E+1	101.8	4.84	2.09E+1	101.9	4.23	<1.70E-4	V71	V72

WHC-SD-WM-DP-065, REV. 0

Ra226_1.WK1

Radium - 226 by Gamma Energy Analysis
Acid Digestion
LA - 548 - 121

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS						QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result uCi/mL	Duplicate Result uCi/mL	Average Result uCi/mL	Sample RPD %	Detection Limit uCi/mL	CS-137 Standard uCi/L	CS-137 Standard % Rec.	CS-137 % Counting Error	CO-60 Standard uCi/L	CO-60 Standard % Rec.	CO-60 % Counting Error	Reagent Blank uCi/mL	Standard I.D.	Blank I.D.
V77	108-AP-COM	<3.73E-2	<3.74E-2	N/A	N/A	2.18E-3	2.55E+1	101.4	1.52	2.18E+1	103.7	1.28	<2.18E-3	V75	V76
V73	108-AP-FB	<4.30E-3	N/A	N/A	N/A	4.28E-3	2.46E+1	101.8	4.84	2.09E+1	101.9	4.23	<4.28E-3	V71	V72

WHC-SD-WM-DP-065, REV. 0

Ru106_1.WK1

Ruthenium/Rhodium – 106 by Gamma Energy Analysis
Acid Digestion
LA – 548 – 121

SAMPLE INFORMATION		SAMPLE RESULTS					QC RESULTS						QC IDENTIFICATION		
Sample I.D.	Lab I.D.	Sample Result uCi/mL	Duplicate Result uCi/mL	Average Result uCi/mL	Sample RPD %	Detection Limit uCi/mL	CS-137 Standard uCi/L	CS-137 Standard % Rec.	CS-137 % Counting Error	CO-60 Standard uCi/L	CO-60 Standard % Rec.	CO-60 % Counting Error	Reagent Blank uCi/mL	Standard I.D.	Blank I.D.
V77	108-AP-COM	<2.72E-2	<2.70E-2	N/A	N/A	1.88E-3	2.55E+1	101.4	1.52	2.18E+1	103.7	1.28	<1.88E-3	V75	V76
V73	108-AP-FB	<3.28E-3	N/A	N/A	N/A	3.36E-3	2.46E+1	101.8	4.84	2.09E+1	101.9	4.23	<3.36E-3	V71	V72

WHC-SD-WM-DP-065, REV. 0

H3_4.WK1

TRITIUM
Direct Analysis
LA-218-114

CR-210-114

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS						QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result uCi/mL	Duplicate Result uCi/mL	Average Result uCi/mL	Sample RPD %	Detection Limit uCi/mL	Standard Result uCi/L	Standard % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank uCi/mL	Standard I.D.	Blank I.D.	Spike I.D.	
V77	108-AP-COM	1.11E-2	1.13E-2	1.12E-2	1.78	1.81E-5	8.23E-1	96.9	105.5	98.2	2.3	<1.81E-5	V75	V76	V77

WHC-SD-WM-DP-065, REV. 0

C14_4.WK1

CARBON - 14
Direct Analysis
LA - 348 - 104

SAMPLE INFORMATION		SAMPLE RESULTS					QC RESULTS					QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result uCi/mL	Duplicate Result uCi/mL	Average Result uCi/mL	Sample RPD	Detection Limit uCi/mL	Standard Result uCi/L	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD	Preparation Blank uCi/mL	Standard I.D.	Blank I.D.	Spike I.D.
V77	108-AP-COM	<2.19E-6	<2.18E-6	N/A	N/A	2.20E-6	1.43E-3	80.8	89.0	85.4	4.54	<2.20E-6	V75	V76	V77

WHC-SD-WM-DP-065, REV. 0

Se79_4.WK1

SELENIUM - 79
Acid Digestion
LA - 365 - 132

SAMPLE INFORMATION			SAMPLE RESULTS				QC RESULTS					QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result uCi/mL	Duplicate Result uCi/mL	Average Result uCi/mL	Sample RPD %	Detection Limit uCi/mL	Standard Result uCi/L	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank uCi/mL	Standard I.D.	Blank I.D.	Spike I.D.
V77	108-AP-COM	<1.21E-5	<1.18E-5	N/A	N/A	1.21E-5	N/A	N/A	N/A	N/A	N/A	<1.22E-5	N/A	V76	N/A

WHC-SD-WM-DP-065, REV. 0

Tc99_4 WK1

TECHNETIUM -99
Acid Digestion
LA -438 - 101

SAMPLE INFORMATION		SAMPLE RESULTS					QC RESULTS						QC IDENTIFICATION		
Sample I.D.	Lab I.D.	Sample Result uCi/mL	Duplicate Result uCi/mL	Average Result uCi/mL	Sample RPD %	Detection Limit uCi/mL	Standard Result uCi/L	Standard % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank uCi/mL	Standard I.D.	Blank I.D.	Spike I.D.	
V77	108-AP-COM	3.08E-4	3.07E-4	3.08E-4	0.3	4.24E-5	2.29E+0	97.4	100.9	101.5	<4.25E-5	V75	V76	V77	

WHC-SD-WM-DP-065, REV.0

Sr90_4.WK1

STRONTIUM -90
Acid Digestion
LA-220-101

LA-220-101

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS						QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result uCi/ml	Duplicate Result uCi/ml	Average Result uCi/ml	Sample RPD %	Detection Limit uCi/ml	Standard Result uCi/L	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank uCi/ml	Standard I.D.	Blank I.D.	Spike I.D.
V77	108-AP-COM	7.63E-2	7.80E-2	7.72E-2	2.2	6.75E-4	1.16E+0	85.5	99.9	101.9	2.1	<3.25E-4	V75	V76	V77

WHC-SD-WM-DP-065, REV. 0

IODINE - 129
Direct Analysis
LA - 378 - 103

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS				QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result uCi/mL	Duplicate Result uCi/mL	Average Result uCi/mL	Sample RPD %	Detection Limit uCi/mL	Standard Result uCi/L	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank uCi/mL	Standard I.D.
V77	108-AP-COM	<6.30E-5	<5.80E-5	N/A	N/A	5.90E-5	8.14E-1	103.9	88.2	94.3	6.7	<5.90E-5	V75
													V76
													V77

WHC-SD-WM-DP-065, REV. 0

Np237_4.WK1

NEPTUNIUM -237
Acid Digestion
LA-933-141

LA-555-1471

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS						QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result uCi/mL	Duplicate Result uCi/mL	Average Result uCi/mL	Sample RPD %	Detection Limit uCi/mL	Standard uCi/L	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank uCi/mL	Standard I.D.	Blank I.D.	Spike I.D.
V77	108-AP-COM	<1.64E-4	<1.63E-4	N/A	N/A	3.01E-4	2.09E-2	86.3	82.4	83.8	1.5	<2.01E-4	V75	V76	V77

WHC-SD-WM-DP-065, REV. 0

Pu2394_4.WK1

PLUTONIUM 239/240
Acid Digestion
LA - 503 - 156

SAMPLE INFORMATION			SAMPLE RESULTS				QC RESULTS							QC IDENTIFICATION		
Sample I.D.	Lab I.D.		Sample Result uCi/mL	Duplicate Result uCi/mL	Average Result uCi/mL	Sample RPD %	Detection Limit uCi/mL	Standard Result uCi/L	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank uCi/mL	Standard I.D.	Blank I.D.	Spike I.D.
V77	108-AP-COM		<4.13E-4	<5.10E-4	N/A	N/A	4.13E-4	1.46E+2	102.8	103.7	102.4	1.4	<1.01E-3	V75	V76	V77

WHC-SD-WM-DP-065, REV. 0

Pu238_4.WK1

PLUTONIUM 238
Acid Digestion
LA-503-156

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS					QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result uCi/mL	Duplicate Result uCi/mL	Average Result uCi/mL	Sample RPD %	Detection Limit uCi/mL	Standard Result* uCi/L	Standard* % Rec.	Sample Carrier % Rec.	Duplicate Carrier % Rec.	Preparation Blank uCi/mL	Standard I.D.	Blank I.D.	Spike I.D.
V77	108-AP-COM	<5.65E-4	<6.63E-4	N/A	N/A	6.63E-4	1.46E+2	102.8	41.2	33.9	<1.01E-3	V75	V76	V77

* Based on Pu-239/240 LMCS standard.

WHC-SD-WM-DP-065, REV. 0

AMERICIUM – 241
Acid Digestion
LA – 503 – 156

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS					QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result uCi/mL	Duplicate Result uCi/mL	Average Result uCi/mL	Sample RPD %	Detection Limit uCi/mL	Standard Result uCi/L	Standard % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank uCi/mL	Standard I.D.	Blank I.D.	Spike I.D.
V77	108-AP-COM	<2.87E-4	<7.74E-4	NA	NA	2.87E-4	2.46E+1	102.0	100.3	5.7	<3.11E-4	V75	V76	V77

WHC-SD-WM-DP-065, REV. 0

Cm2434_4.WK1

CURIUM 243/244
Acid Digestion
LA - 503 - 156

SAMPLE INFORMATION		SAMPLE RESULTS				QC RESULTS						QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result	Duplicate Result	Average Result	Sample RPD	Detection Limit	Standard Am -241	Standard Am -241	Spike*	Spike Duplicate*	Spike RPD*	Preparation Blank	Standard I.D.	Blank I.D.	Spike I.D.
		uCi/mL	uCi/mL	uCi/mL	%	uCi/mL	% Rec.	% Rec.	% Rec.	% Rec.	%	uCi/mL			
V77	108-AP-COM	<2.87E-4	<7.74E-4	NA	NA	2.87E-4	2.46E+1	102.0	100.3	106.2	5.7	<3.11E-4	V75	V76	N/A

* Spike values are based on Am - 241 spike recoveries.

WHC-SD-WM-DP-065, REV. 0

AT_3.WK1

TOTAL ALPHA
Acid Digestion
LA-508-101

SAMPLE INFORMATION		SAMPLE RESULTS					QC RESULTS					QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result	Duplicate Result	Average Result	Sample RPD	Detection Limit	Standard Result	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank	Standard I.D.	Blank I.D.	Spike I.D.
V77	108-AP-COM	2.93E-4	2.70E-4	2.82E-4	8.17	1.09E-4	9.25E-6	89.0	90.0	93.2	3.49	<4.13E-5	V75	V76	V77
V73	108-AP-FB	<6.48E-6	N/A	N/A	N/A	1.49E-5	9.55E-6	98.0	N/A	N/A	N/A	<6.48E-6	V71	V72	N/A

WHC-SD-WM-DP-065, REV. 0

TB_3.WK1

TOTAL BETA
Acid Digestion
LA-508-101

SAMPLE INFORMATION		SAMPLE RESULTS					QC RESULTS					QC IDENTIFICATION			
Sample I.D.	Lab I.D.	Sample Result uCi/mL	Duplicate Result uCi/mL	Average Result uCi/mL	Sample RPD %	Detection Limit uCi/mL	Standard Result uCi/L	Standard % Rec.	Spike % Rec.	Spike Duplicate % Rec.	Spike RPD %	Preparation Blank uCi/mL	Standard I.D.	Blank I.D.	Spike I.D.
V77	108-AP-COM	6.18E+0	6.32E+0	6.25E+0	2.24	2.87E-2	2.39E-4	89.1	87.4	87.1	0.34	<1.34E-2	V75	V76	V77
V73	108-AP-FB	1.53E-4	N/A	N/A	N/A	4.17E-5	2.18E-1	89.0	N/A	N/A	N/A	1.00E-4	V71	V72	N/A

WHC-SD-WM-DP-065, REV. 0

WHC-SD-WM-DP-065, REV. 0

CORRESPONDENCE

*** INFORMATION ONLY ***

=====J-4 RESOLUTION/RETEST (W140)=====

Page: 1

08:13:18 16 MAR 1994

1. Document Number 2E-94-00064/W *GENERIC WORK ITEM*
 Work Item Title +241 AP: TAKE LIQUID GRAB SAMPLES ON 108 AP

2. Essential Systems N/A

3. Resolution

OBJECTIVE: TAKE LIQUID GRAB SAMPLES FROM TANK 108-AP AS FOLLOWS:

1. PERFORM PREJOB MEETING & DISCUSS SCOPE AND SAFETY CONCERNS.

2. ESTABLISH RADIOLOGICAL BASELINE, CONTROLS & TEST FOR LFL.

3. REMOVE RISER SAMPLING PIPE CAP & PERFORM SAMPLING AS REQUESTED IN THE SECTIONS A, B,C, AND D. THESE SECTIONS CAN BE PERFORMED IN ANY ORDER. REFERENCE THE RISER & SAMPLE DATA SHOWN IN THOSE SECTIONS FOR DEPTH, LENGTH, TYPE AND SHIPPING NUMBER.

4. REPLACE THE RISER SAMPLING PIPE CAP.

WHC-SD-WM-DP-065, REV.0

5. CLEAN UP THE JOBSITE.

4. Impact Level/Approval Requirements -S Q

5. Tech Spec/OSR Requirements/Reference
 N/A

6. Reference Documents	Type
WTWP-94-004,REV.0/0	PROC
H-2-90536	DWG

7. Comments

COG. ENG. E.LE APPROVAL WAS PER TELE/CON-JC MEIGS

** CALL JOSH MULLEN @ 373-4739 48 HRS. PRIOR TO TAKING SAMPLE SO THEY CAN PREPARE THE SAMPLE BLANKS.

COG. E. LE AND COG MANAGER B. JOHNS REVIEWED THE CHANGES MADE TO THIS PACKAGE AND BOTH GAVE TELE/CON APPROVAL. - JC MEIGS 2/16/94

8. Retest Requirement N

9. Mode N/A

10. Retest
 N/A

11. QC Involvement in Retest NONE

12. PIC HALL,BL

13. PIC Org. 7C150

14. Resolution By	Signature X MEIGS,JC	Date 01/23/94
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=====J-4 RESOLUTION/RETEST (W140)=====

*** INFORMATION ONLY ***

*** INFORMATION ONLY ***

=====J-4 RESOLUTION/RETEST (W140)=====

Page: 2

08:13:18 16 MAR 1994

1. Document Number 2E-94-00064/W *GENERIC WORK ITEM*
Work Item Title +241 AP: TAKE LIQUID GRAB SAMPLES ON 108 AP

=====

15. Plant Forces Work Review Required N Number N/A

16. Approvals	Signature	Date
Cognizant Engineer	LE, EQ	02/07/94
Cognizant Manager	X JOHNS, BR	02/07/94
Environmental Assurance	N/A	
Health/Safety Assurance	X SHERMAN, RN	02/16/94
Quality Assurance	X TRZCINSKI, FE	02/17/94
Additional Approvals	_____	_____

17. Resources Required

Res Code	Description	No.	Est Hrs	Act Hrs
54H	ZONE-6 HPT	2	16	
04H	ZONE 6 OPERATORS	4	32	
96	RESPIRATORY PROTECTION	1	8	

	Signature	Date
18. Field Work Complete	_____	_____
19. Retest Satisfactory	_____	_____
20. QC Verify Retest (If Required)	_____	_____

=====

WHC-SD-WM-DP-065, REV. 0

=====J-4 RESOLUTION/RETEST (W140)=====

*** INFORMATION ONLY ***

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1. Document Number 2E-94-00064/W *GENERIC WORK ITEM*
 . Work Item Title +241 AP: TAKE LIQUID GRAB SAMPLES ON 108 AP

3. Resolution

WHC-SD-WM-DP-065, REV.0

OBJECTIVE:

1. PERFORM PREJOB MEETING, DISCUSS SCOPE AND SAFETY CONCERNS.
2. ESTABLISH RADIOLOGICAL BASELINE/CONTROLS, & TEST FOR LFL.
3. REMOVE RISER SAMPLING CAP & SAMPLE AS REQUESTED IN SECTION A, B,C, AND D. THESE SECTIONS CAN BE PERFORMED IN ANY ORDER. REFERENCE THE RISER & SAMPLE DATA SHOWN IN THOSE SECTIONS FOR DEPTH, LENGTH, TYPE AND SHIPPING NUMBER.
4. REPLACE THE RISER SAMPLING CAPS.
5. CLEAN UP THE JOBSITE.

PREQUISITES:

1. RESPIRATORY PROTECTION AND MONITORING REQUIREMENTS FOR TOXIC GASES AND LFL SHALL BE IN ACCORDANCE WITH THE SAFE WORK PRACTICES CONTAINED IN THE HASP (WHC-SD-WM-HSP-002), CURRENT REVISION. SPECIFIC INSTRUCTION WILL BE PART OF THE PRE-JOB SAFETY MEETING.
2. A PRE-JOB SAFETY MEETING HAS BEEN CONDUCTED UTILIZING THE PRE-JOB SAFETY MEETING CHECKLIST AND THE JOB HAZARD ANALYSIS CHECKLIST.

SIGNATURE

DATE

3. THE WASTE PLANNING CHECKLIST HAS BEEN PROVIDED AND THE CORRECT WASTE CONTAINERS ARE AVAILABLE TO PERFORM THE WORK ACTIVITIES.

SIGNATURE

DATE

4. PIC/SUPERVISOR SHALL BE IN ATTENDANCE DURING THE PREFORMANCE OF THIS WORK.
5. ERRECT THE PREFABICATED CONTAINMENT TENT. THIS CONTAINMENT TENT IS FREE-STANDING AND HAS 10'X 10' WORK AREA WITH A 3'X 10' ANTE ROOM.

RISER 1(W)

PIC SIGNATURE

DATE

*** INFORMATION ONLY ***

=====J-4a RESOLUTION/RETEST (W145)=====

Page: 2

(Cont.)

08:15:56 16. MAR 1994

1. Document Number 2E-94-00064/W GENERIC WORK ITEM
Work Item Title +241 AP: TAKE LIQUID GRAB SAMPLES ON 108 AP

RISER 1(NE) _____
PIC SIGNATURE DATE

RISER 1(SE) _____
PIC SIGNATURE DATE

7. HEALTH PHYSICS MANAGER OR SENIOR HPT WILL VERIFY THE ADEQUACY FOR WALK-IN CONTAINMENTS AND APPROVE THEIR USAGE PRIOR TO BREACHING A RADIOACTIVE SYSTEM. THE ROUTINE CONTAINMENT TENT INSPECTION ID TAG SHALL BE INSTALLED AT THIS TIME. THE FORM NUMBER 6001-226 WILL BE USED WHEN APPROVING THE CONTAINMENT AND THE FORM NUMBER BT-6000-787R WILL BE USED FOR THE ROUTINE CONTAINMENT TENT INSPECTION.

RISER 1(W) _____
MANAGER/SHPT DATE

RISER 1(NE) _____
MANAGER/SHPT DATE

RISER 1(SE) _____
MANAGER/SHPT DATE

8. HPT AIR SAMPLING IS REQUIRED DURING SUPERNATE SAMPLING.
9. ALL SAMPLES GOING TO PNL REQUIRE THE SAMPLE PIG TEMPERATURE TO BE RECORDED ON THE SHIPPING DATA SHEETS PER EACH SECTION WORK PREREQUISITES LISTED BELOW.
10. PIC TO OBTAIN THE TEMPERATURE INDICATOR FROM JIM LEE AND VERIFY IT IS AT THE JOB LOCATION AND READY FOR USE.

FLUKE MDL #27 & TC # T-80-150-U AVAILABLE _____
PIC DATE

WORK SCOPE:

NOTE THAT SECTION A.B.C. & D CAN BE PERFORMED IN ANY ORDER.

SECTION A.

THE DATA REQUIRED FOR RISER 1(W) IS AS FOLLOWS:

=====J-4a RESOLUTION/RETEST (W145)=====

*** INFORMATION ONLY ***

*** INFORMATION ONLY ***

J-4a RESOLUTION/RETEST (W145)

Page: 3

(Cont.)

08:15:56 16 MAR 1994

1. Document Number 2E-94-00064/W *GENERIC WORK ITEM*
 Work Item Title +241 AP: TAKE LIQUID GRAB SAMPLES ON 108 AP

RISER #1(W)

SHIPPING NUMBER	SAMPLE ELEVATION	SAMPLE TYPE	STRING LENGTH
R3632	132"	INORG/RAD (WHC)	432"
**R3633	132"	ORGANIC (PNL)	432"
R3634	348"	INORG/RAD (WHC)	216"
**R3635	348"	ORGANIC (PNL)	216"

**NOTE: ALL SAMPLES GOING TO PNL REQUIRE THE SAMPLE PIG
 TEMPERATURE TO BE RECORDED ON THE SUPERNATE DATA SHEET
 PER THE SECTION A WORK PREREQUISITES LISTED BELOW.

PREREQUISITES FOR WORK ON SECTION A, PIC TO VERIFY:

1. CONTAINMENT TENT SHALL BE POSTED AIRBORNE AND THE ANTE ROOM SHALL BE POSTED SCA PRIOR TO BREECHING TANK CONTAINMENT.
2. PLACE THE MDL #27 FLUKE DIGITAL TEMPERATURE INDICATOR THERMOCOUPLE MDL# T-80-150-U INSIDE & AGAINST THE SAMPLE PIG BODY FOR SAMPLES #3633 AND 3635 AT LEAST 3 MIN., PRIOR TO PLACING THE SAMPLE BOTTLE IN THE PIG. ON ATTACHMENT 1 OF THE WORK PLAN WTP-94-004, REV.0/0, RECORD THE TEMPERATURE ON THE APROPRIATE SUPERNATE SAMPLING DATA SHEET, IN THE COMMENTS SECTION ON PAGE 2.
3. VERIFY THAT THE YELLOW LIGHT ON THE 271-AP CONTROL ROOM IS ILLUMINATED AND FLASHING. LIGHT IS TO REMAIN ON UNTILL POST JOB SURVEY VERIFIES RELEASE TO RADIOLOGICAL CONTROL AREA.

PIC VERIFY STEPS 1 - 3 ARE COMPLETE

DATE

SECTION A WORK SCOPE:

- A.1 REMOVE THE SAMPLING PIPE CAP AT RISER 1 (W).
- A.2 HPT VERIFY PROPER RADIOLOGICAL POSTING.

TANK 108-AP, RISER 1(W):

HPT

DATE

- A.3 PERFORM PROCEDURE WTP-94-004, REV.0/0

J-4a RESOLUTION/RETEST (W145)

*** INFORMATION ONLY ***

*** INFORMATION ONLY ***

=====J-4a RESOLUTION/RETEST (W145)=====

Page: 4 (Cont.) 08:15:56 16 MAR 1994

1. Document Number 2E-94-00064/W *GENERIC WORK ITEM*
 Work Item Title +241 AP: TAKE LIQUID GRAB SAMPLES ON 108 AP
- =====

A.4 INSTALL THE RISER SAMPLING PIPE CAP AT 1 (W).

A.4 PRIOR TO EXIT FROM CONTAINMENT TENT ANTE ROOM ENSURE A
 WHOLE BODY SURVEY IS PERFORMED.

A.5 JOB COMPLETION AT RISER 1(W):

PERFORM HOUSEKEEPING AT THE JOB SITE AND REQUEST HP SURVEY
 OF CONTAINMENT TENT AND OUTER BOUNDARY FOR RELEASE TO RCA
 STATUS.

_____ HPT VERIFY _____ DATE _____

B. THE DATA REQUIRED FOR RISER 1(NE) IS AS FOLLOWS:

RISER #1(NE)

SHIPPING NUMBER	SAMPLE ELEVATION	SAMPLE TYPE	STRING LENGTH
R3636	96"	INORG/RAD (WHC)	468"
**R3637	96"	ORGANIC (PNL)	468"
R3638	228"	INORG/RAD (WHC)	336"
**R3639	228"	ORGANIC (PNL)	336"

**NOTE: ALL SAMPLES GOING TO PNL REQUIRE THE SAMPLE PIG
 TEMPERATURE TO BE RECORDED ON THE SHIPPING INFORMATION
 PER THE SECTION B WORK PREREQUISITES LISTED BELOW.

PREREQUISITES FOR WORK ON SECTION B, PIC TO VERIFY:

1. CONTAINMENT TENT SHALL BE POSTED AIRBORNE AND THE ANTE ROOM
 SHALL BE POSTED SCA PRIOR TO BREECHING TANK CONTAINMENT.
2. PLACE THE MDL #27 FLUKE DIGITAL TEMPERATURE INDICATOR
 THERMOCOUPLE MDL# T-80-150-U INSIDE & AGAINST THE SAMPLE
 PIG BODY FOR SAMPLES #3637 AND 3639 AT LEAST 3 MIN., PRIOR
 TO PLACING THE SAMPLE BOTTLE IN THE PIG. ON ATTACHMENT 1 OF
 THE WORK PLAN WTWP-94-004, REV.0/0, RECORD THE TEMPERATURE
 ON THE APROPRIATE SUPERNATE SAMPLING DATA SHEET, IN THE
 COMMENTS SECTION ON PAGE 2.

=====J-4a RESOLUTION/RETEST (W145)=====

*** INFORMATION ONLY ***

*** INFORMATION ONLY ***

=====J-4a RESOLUTION/RETEST (W145)=====

Page: 5

(Cont.)

08:15:56 16 MAR 1994

1. Document Number 2E-94-00064/W *GENERIC WORK ITEM*
Work Item Title +241 AP: TAKE LIQUID GRAB SAMPLES ON 108 AP

3. VERIFY THAT THE YELLOW LIGHT ON THE 271-AP CONTROL ROOM IS ILLUMINATED AND FLASHING. LIGHT IS TO REMAIN ON UNTILL POST JOB SURVEY VERIFIES RELEASE TO RADIOLOGICAL CONTROL AREA.

PIC VERIFY STEPS 1 - 3 ARE COMPLETE

DATE

SECTION B WORK SCOPE:

WHC-SD-WM-DP-065, REV. 0

- B.1 REMOVE THE SAMPLING PIPE CAP AT RISER 1 (NE).

- B.2 HPT VERIFY PROPER RADIOLOGICAL POSTING.

TANK 108-AP, RISER 1(NE):

HPT

DATE

- B.3 PERFORM PROCEDURE WTP-94-004, REV.0/0

- B.4 INSTALL THE RISER SAMPLING PIPE CAP AT RISER 1 (NE).

- B.5 PRIOR TO EXIT FROM CONTAINMENT TENT ANTE ROOM ENSURE A WHOLE BODY SURVEY IS PERFORMED.

- B.6 JOB COMPLETION AT RISER 1(NE):

PERFORM HOUSEKEEPING AT THE JOB SITE AND REQUEST HP SURVEY OF CONTAINMENT TENT AND OUTER BOUNDRY FOR RELEASE TO RCA STATUS.

HPT VERIFY

DATE

C. THE DATA REQUIRED FOR RISER 1(SE) IS AS FOLLOWS:

RISER #1(SE)

SHIPPING NUMBER	SAMPLE ELEVATION	SAMPLE TYPE	STRING LENGTH
R3640	180"	INORG/RAD (WHC)	384"
**R3641	180"	ORGANIC (PNL)	384"
R3911	144"	ORGANIC (WHC)	420"
**R3642	411"	SURFACE SAMPLE TOC\APPR (PNL)	153"

=====J-4a RESOLUTION/RETEST (W145)=====

*** INFORMATION ONLY ***

*** INFORMATION ONLY ***

=====J-4a RESOLUTION/RETEST (W145)=====

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(Cont.)

08:15:56 16 MAR 1994

1. Document Number 2E-94-00064/W *GENERIC WORK ITEM*
 Work Item Title +241 AP: TAKE LIQUID GRAB SAMPLES ON 108 AP
- =====

** R3645 204" ORGANIC (PNL) 360"

**NOTE: ALL SAMPLES GOING TO PNL REQUIRE THE SAMPLE PIG
 TEMPERATURE TO BE RECORDED ON THE SHIPPING INFORMATION
 PER THE SECTION C WORK PREREQUISITES LISTED BELOW.

PREREQUISITES FOR WORK ON SECTION C, PIC TO VERIFY:

1. CONTAINMENT TENT SHALL BE POSTED AIRBORNE AND THE ANTE ROOM SHALL BE POSTED SCA PRIOR TO BREECHING TANK CONTAINMENT.
2. PLACE THE MDL #27 FLUKE DIGITAL TEMPERATURE INDICATOR THERMOCOUPLE MDL# T-80-150-U INSIDE & AGAINST THE SAMPLE PIG BODY FOR SAMPLES #3641, 3642, & 3645 AT LEAST 3 MIN., PRIOR TO PLACING THE SAMPLE BOTTLE IN THE PIG. ON ATTACHMENT 1 OF THE WORK PLAN WTP-94-004, REV.0/0, RECORD THE TEMPERATURE ON THE APROPRIATE SUPERNATE SAMPLING DATA SHEET, IN THE COMMENTS SECTION ON PAGE 2.
3. VERIFY THAT THE YELLOW LIGHT ON THE 271-AP CONTROL ROOM IS ILLUMINATED AND FLASHING. LIGHT IS TO REMAIN ON UNTILL POST JOB SURVEY VERIFIES RELEASE TO RADIOLOGICAL CONTROL AREA.

 PIC VERIFY STEPS 1 - 3 ARE COMPLETE

 DATE

SECTION C WORK SCOPE:

- C.1 REMOVE THE SAMPLING PIPE CAP AT RISER 1 (SE).
- C.2 HPT VERIFY PROPER RADIOLOGICAL POSTING.

TANK 108-AP, RISER 1(SE): _____

 HPT

 DATE

- C.3 PERFORM PROCEDURE WTP-94-004, REV.0/0
- C.4 INSTALL THE RISER SAMPLING PIPE CAP AT RISER 1 (SE).
- C.5 PRIOR TO EXIT FROM CONTAINMENT TENT ANTE ROOM ENSURE A WHOLE BODY SURVEY IS PERFORMED.
- C.6 JOB COMPLETION AT RISER 1(SE):

PERFORM HOUSEKEEPING AT THE JOB SITE AND REQUEST HP SURVEY OF CONTAINMENT TENT AND OUTER BOUNDRY FOR RELEASE TO RCA STATUS.

=====J-4a RESOLUTION/RETEST (W145)=====

*** INFORMATION ONLY ***

*** INFORMATION ONLY ***

=====J-4a RESOLUTION/RETEST (W145)=====

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(Cont.)

08:15:56 16 MAR 1994

1. Document Number 2E-94-00064/W *GENERIC WORK ITEM*
 Work Item Title +241 AP: TAKE LIQUID GRAB SAMPLES ON 108 AP
- =====

HPT VERIFY

DATE

- D. PREPARE THE SAMPLE FIELD BLANKS PER WTP-94-004, REV.0/0,
 WITH THE FOLLOWING INFORMATION.

SHIPPING NUMBER	SAMPLE ELEVATION	SAMPLE TYPE	STRING LENGTH
R3643	---	INORG/RAD (WHC)	---
**R3644	---	ORGANIC (PNL)	---

- **NOTE: ALL SAMPLES GOING TO PNL REQUIRE THE SAMPLE PIG
 TEMPERATURE TO BE RECORDED ON THE SHIPPING INFORMATION
 PER THE SECTION C WORK PREREQUISITES LISTED BELOW.

- D.1 PLACE THE MDL #27 FLUKE DIGITAL TEMPERATURE INDICATOR
 THERMOCOUPLE MDL# T-80-150-U INSIDE & AGAINST THE SAMPLE
 PIG BODY FOR SAMPLE #3644 AT LEAST 3 MIN., PRIOR TO PLACING
 THE SAMPLE BOTTLE IN THE PIG. IN ATTACHMENT 1 OF THE WORK
 PLAN WTP-94-004, REV.0/0, RECORD THE TEMPERATURE ON THE
 APPROPRIATE SUPERNATE SAMPLING DATA SHEET, IN THE COMMENTS
 SECTION ON PAGE 2.

- D.2 PLACE THE FIELD BLANK SAMPLES IN A SECURE AREA INSIDE THE
 CONTAINMENT TENT. **

JOB COMPLETION AT 108-AP:

1. PIC/CRAFT MANAGER RECORD ON THE J-5 THAT THE JOBSITE HAS
 BEEN CLEANED AND ALL WASTE HAS BEEN PROPERLY CONTAINERIZED
 PER T0-100-052 FOR RADIOACTIVE/CONTAMINATED WASTE, OR
 WHC-IP-0842, SEC. 16.1, FOR NON-RADIOACTIVE, WASTE AS
 APPLICABLE.

2. OPERATIONS VERIFY, SIGN AND DATE THE J-5.
- =====

=====J-4a RESOLUTION/RETEST (W145)=====

*** INFORMATION ONLY ***

[1] From: George L Miller 3/22/94 4:27PM (2191 bytes: 35 ln)

To: John G Kristofzski

cc: George L Miller, R P Jr (Rob) Marshall

WHC-SD-WM-DP-065, REV. 0

Subject: 108-AP Sample Mix-up

----- Message Contents -----

John,

Today, at approximately 1330, I was in the sample receiving room observing the break-down of 108-AP samples from pigs into mini-pigs. At that time, four of the samples had already been received into the lab and were marked with the shipping numbers of R3632, R3634, R3636 and R3643. The first three were purported to be tank samples whereas the last sample was noted as being the field blank. It struck me as odd that every one of the bottles had a yellow-green color and that they all read approximately 100 MR according to the HPT. This was particularly the case because I personally obtained the bottle of Q-Water for the field blank (thus I had personal knowledge of the appearance of the Q-Water) and personally handed it to a man who is one of the sample collectors from tank farms on that project.

Approximately 30 minutes later, the final two 108-AP samples arrived, and they were quickly broken-down and also checked. We in the sample receiving room determined that the two new samples appeared physical identical to the previous four. I immediately got the phone number of the sample collection team manager, Bob Praznik, from the B-plant truck driver and phoned him with my discovery.

There were several phone exchanges that followed, including conversations with Praznik, Butch Hall, Brian Von Bargan and a phone message left on Clay Smith's answering machine.

Finally at approximately 1600, Butch Hall called to inform me that they were still in custody of our field blank (R3643) and that the wrong sample had indeed been shipped to us. The one we received was actually PNL's R3635. I was told by Praznik that we needed to send back the PNL sample and that they would send us the correct sample.

In a discussion with you John at approximately 1615, you stated that we could not ship any samples until the chain of custody issue was resolved.

George

[24] From: John G Kristofzski at ~WHC168 3/23/94 6:39AM (1305 bytes: 21 ln)

To: David R Bratzel at ~WHC268

Cc: George L Miller, R P Jr (Rob) Marshall, John L Deichman at ~WHC321,

Larry P Markel at ~WHC167, John G Kristofzski

WHC-SD-WM-DP-065, REV.0

Subject: 108-AP samples received but anomalies identified

----- Message Contents -----

Dave,

222-S received 108-AP samples over the past two days. Upon opening the shipping containers it was identified that at least two samples were mislabeled. Consistent with laboratory procedure the samples are on hold pending resolution with the shipper. The shipper (sampling crew) was notified of the anomalies last night and are working hard to resolve them.

As you are aware, the clock on these samples start when the last sample of the tank is taken which was 3/21/94 based on CofC's received to date. Delays in resolving these anomalies may have the potential to impact the laboratories ability to meeting the TPA mandated schedule. A full discussion of the discovery will be included in the narrative for this body of work should the samples be declared suitable for analysis.

If you have questions please contact George Miller of my staff on 373-4739.

john

[25] From: George L Miller at ~WHC168 3/23/94 7:49AM (2542 bytes: 36 ln)
To: Robert J Praznik at ~WHC340, Blinn L Jr Hall at ~WHC340
cc: John G Kristofzski, George L Miller, Robert C (Clay) Smith at ~WHC321,
Brian H Von Bargaen at ~WHC338, Elvis Q Le at ~WHC338, David R Bratze1 at
~WHC268, R P Jr (Rob) Marshall
Subject: 108-AP sample mix-up

----- Message Contents -----

Text item 1:

Please see attached

WHC-SD-WM-DP-065, REV.0

Text item 2:

Today, at approximately 1330, I was in the sample receiving room observing the break-down of 108-AP samples from pigs into mini-pigs. At that time, four of the samples had already been received into the lab and were marked with the shipping numbers of R3632, R3634, R3636 and R3643. The first three were purported to be tank samples whereas the last sample was noted as being the field blank. It struck me as odd that every one of the bottles had a yellow-green color and that they all read approximately 100 MR according to the HPT. This was particularly the case because I personally obtained the bottle of Q-Water for the field blank (thus I had personal knowledge of the appearance of the Q-Water) and personally handed it to a man who is one of the sample collectors from tank farms on that project.

Approximately 30 minutes later, the final two 108-AP samples arrived, and they were quickly broken-down and also checked. We in the sample receiving room determined that the two new samples appeared physical identical to the previous four. I immediately got the phone number of the sample collection team manager, Bob Praznik, from the B-plant truck driver and phoned him with my discovery.

There were several phone exchanges that followed, including conversations with Praznik, Butch Hall, Brian Von Bargan and a phone message left on Clay Smith's answering machine.

Finally at approximately 1600, Butch Hall called to inform me that they were still in custody of our field blank (R3643) and that the wrong sample had indeed been shipped to us. The one we received was actually PNL's R3635. I was told by Praznik that we needed to send back the PNL sample and that they would send us the correct sample.

In a discussion with you John at approximately 1615, you stated that we could not ship any samples until the chain of custody issue was resolved.

George

[26] From: John L Deichman at ~WHC321 3/23/94 9:46AM (907 bytes: 11 ln)
To: John G Kristofzski at ~WHC168, David R Bratzel at ~WHC268
cc: George L Miller at ~WHC168, R P Jr (Rob) Marshall at ~WHC168, Larry P Markel
at ~WHC167
Subject: 108-AP samples received but anomalies identified

----- Message Contents -----

John and Dave:

It is my understanding from ROB that the bottles themselves are not labeled and we are dependent on the box label. This procedure allows just the thing that happened. It will repeat. DAVE: suggest you work with crew to get some sort of labeling on the bottles. I am not suggesting any particular method. Just, if there was a mixup once, it can happen again and again. Please check out.

john deichman

WHC-SD-WM-DP-065, REV. 0

[27] From: George L Miller at ~WHC168 3/23/94 11:22AM (2050 bytes: 9 ln)
 To: John C Abercrombie at ~WHC32, Raymond (Ray) Akita, Paula P Bachelor,
 William W Baird at ~WHC169, Michael W (Mike) Barnes at ~WHC167, Mark A Beck,
 Tracey D Bolling at ~WHC169, Thomas H Bushaw, Stanley A Catlow,
 Charles A Clark at ~WHC169, Sandra L Cobb at ~WHC32, Michael A Cook at
 ~WHC167, Troy F Dale at ~WHC32, Scot L Fitzgerald, Lawrence L Fritts,
 Jann M Frye, Richard K (Keith) Fuller at ~WHC169, Keith J Jr Greenough at
 ~WHC167, Bertrand II Griffin at ~WHC32, Tara R Griffin at ~WHC169,
 Daniel R Hansen at ~WHC121, Don B Hardy at ~WHC28, Deborah L (Debbi) Hiller at
 ~WHC301, James R Jewett at ~WHC167, Roger A Jones, Ken K Kawabata,
 Paul F Kempf at ~WHC167, John G Kristofzski, Natalie M Lapiers at ~WHC169,
 Larry P Markel at ~WHC167, Sandra K McFarland at ~WHC167, Steven G Metcalf at
 ~WHC121, George L Miller, Donald E Nelson at ~WHC121, Samuel M Parong,
 John R Prilucik at ~WHC167, Robert W Schroeder at ~WHC169, Ruth E Skoda at
 ~WHC32, Jennifer L Slipper, Laurie D Sparks at ~WHC32, Daniel M Thornton at
 ~WHC32, Richard E Vogel at ~WHC32, Kim B Wehner at ~WHC121, Brian R Wels at
 ~WHC121

Subject: Stop work on 108-AP

----- Message Contents -----
 Due to problems with receiving incorrect samples from tank farms, all work on
 108-AP is to be suspended and the samples are to be isolated such as to prevent
 tampering.

When the issue is resolved, I will notify you to proceed with the work.

Thanks,

George L. Miller

WHC-SD-WM-DP-065, REV. 0

WHC-SD-WM-DP-065, REV.0

QUALITY ASSURANCE				
NONCONFORMANCE REPORT DISTRIBUTION				
FROM: TWRS QUALITY ENGINEERING		MSIN: S1-57	DATE: 3/25/94	
NCR#: 050650	QA LOG#: PQA-94-020	INITIATION, DISPOSITION OR CLOSURE (I,D,C):		
TO:	MSIN	I	D	C
Cognizant Engineer: E. Q. LE	R1-43		X	
COGNIZANT QA ENGINEER: H. K. ANANDA	S1-57		X	
Originator: R. J. PRAZNIK	S4-42		X	
QA Manager: A. J. FISHER	A4-79		X	
Cognizant QE Manager: D. C. BOARD	S1-57		X	
Facility Manager: D. W. HAMILTON	S4-42		X	
Safety: N/A				
ESQD: J. MCCOY	L4-86		X	
JCS Package: N/A				
q. c.: J. L. LOGSTON	S1-57		X	
Buyer (Procurement): N/A				
P.O. File (Procurement): N/A				
Vendor File (Procurement): N/A				
R. G. BROWN	S6-85		X	
B. L. HALL	S4-42		X	
D. G. HASTINGS	S5-04			
J. G. KRISTOFZSKI	T6-06		X	
G. L. MILLER	T6-06		X	
R. J. NICKLAS	R1-43		X	
TWRSQE FILE	S1-57		X	
QST Codes				
Subject:	Cause:	Contr. Factor:	PPG:	
Responsible Action Party:		Org Code:		

ORIGINAL COPY

HKA
3/25/94

Westinghouse Hanford Company		NONCONFORMANCE REPORT		1. Page <u>1</u>		2. Preprinted No. 050650																						
				of _____		QA Log No. PGA-94-030																						
3. P. O., W. O., or Job Control No. 2E-94-00064-W		4. System/End Use N/A		5. Item/Material Liquid Grab Samples		6. Dwg./Spec./Other No. H-2-90536																						
8. Program/Project/Other 241-AP-108		9. Safety Class 3-SQ		10. ASME Code Items ☐ Yes ☒ No (If yes, notify authorized inspector)																								
11. Supplier Name/Address N/A				12. Notification of Potential Occurrence Require ☐ Yes ☐ No																								
13. Code: Lot/Heat/Serial N/A		14. Lot Size N/A		15. Sample N/A		16. Qty. Acc. N/A																						
17. Inspection Criteria ☐ Dwg. ☐ Spec. ☐ Insp. Plan ☒ Other WTWP-94-004 R/O																												
18. Item 19. Description of Nonconformance (list serial no. where applicable) 22. Disposition, Justification, and Instructions																												
<div style="display: flex; justify-content: space-between;"> <div style="width: 50%;"> <p>Sampling #R3643 was designated to be the field blank for 222-S Lab and to be placed in PIG Shipping container TF-04. Supplement Sampling Data Sheet and Chain of Custody documentation was completed and reflected field sample.</p> <p>* When PIG shipping container TF-04 was opened at 222-S Lab, the PIG contained PNL sample #R3635 that was designated for PIG shipping container G-7. PIG G-7 was open and contained the Field Blank designated for 222-S Lab.</p> <p>Riser 1-W 108-AP</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Sample No.</th> <th>Destination</th> <th>PIG</th> </tr> </thead> <tbody> <tr> <td>#R3632</td> <td>222-S</td> <td>TF-7</td> </tr> <tr> <td>#R3633</td> <td>PNL</td> <td>TF-9</td> </tr> <tr> <td>#R3634</td> <td>222-S</td> <td>B-25</td> </tr> <tr> <td>* #R3635</td> <td>PNL</td> <td>G-7</td> </tr> <tr> <td>* #R3643</td> <td>222-S</td> <td>TF-4 Blank</td> </tr> <tr> <td>#R3644</td> <td>PNL</td> <td>G-9 Blank</td> </tr> </tbody> </table> </div> <div style="width: 45%;"> <p>Reject: 1) Disregard both the samples R3635 and R3643. Dispose these samples per procedure LO-100-105 and SO-170-002. Resample and identify it as R3643A. 2) Prepare a new field blank and identify it as R3643A. Initiate a new chain of custody showing that samples are for PNL (R3635A) and 222-S lab (R3643A). 3) Revise both the chain of custody document and the work package #2E-94-00064/W to indicate the action taken for the above samples.</p> </div> </div>								Sample No.	Destination	PIG	#R3632	222-S	TF-7	#R3633	PNL	TF-9	#R3634	222-S	B-25	* #R3635	PNL	G-7	* #R3643	222-S	TF-4 Blank	#R3644	PNL	G-9 Blank
Sample No.	Destination	PIG																										
#R3632	222-S	TF-7																										
#R3633	PNL	TF-9																										
#R3634	222-S	B-25																										
* #R3635	PNL	G-7																										
* #R3643	222-S	TF-4 Blank																										
#R3644	PNL	G-9 Blank																										
20. Originator's Signature <u>R. J. Praznik</u> Date <u>3-22-94</u>																												
23. Design Document Change Required? ☐ Yes, Doc. No. _____ ☒ No																												
21. Cognizant QA Manager's Signature <u>D. C. Board</u> Date <u>3/24/94</u>																												
24. Corrective Action Required? ☐ Yes, No. _____ ☒ No																												
25. Cognizant Engineer (E. G. <u>Board</u>) Date <u>3/24/94</u>		26. Technical Rep. Date _____		Signature/Org. _____ Date _____		Signature/Org. _____ Date _____																						
QA Engineer (H.K.Y. ANANDA) Date <u>3/25/94</u>		Signature/Org. _____ Date _____		Signature/Org. _____ Date _____		Signature/Org. _____ Date _____																						
27. <div style="display: flex; justify-content: space-between;"> <div> Accept _____ Reject _____ Follow on NCR _____ </div> <div> QA/C Personnel _____ Date _____ </div> </div>																												

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[28] From: Brian H Von Bargaen at ~WHC338 3/24/94 3:29PM (2482 bytes: 34 ln)
 To: Terry Y Hosaka at ~PNL89, Robert C (Clay) Smith at ~WHC321, George L Miller
 at ~WHC168, Mike D Guthrie, Paul G Johnson
 cc: James S Lee at ~WHC340, Ronald L Wright at ~WHC23
 Subject: 108-AP SAMPLES

----- Forwarded -----

From: Jamie R Turner at ~WHC338 3/24/94 3:24PM (2112 bytes: 34 ln)
 To: Dennis W Hamilton at ~WHC340
 cc: Elvis Q Le, Richard J (Dick) Nicklas, Richard E Raymond at ~WHC15,
 Clarence L Smith at ~WHC73, Brian H Von Bargaen
 Subject: 108-AP SAMPLES

----- Message Contents -----

WHC-SD-WM-DP-065, REV.0

Per our conversation, and contacts with PNL, I understand that you plan to ship the 108-AP samples to the PNL lab on swing shift this coming Monday, Tuesday, and Wednesday. This is acceptable to us with the following provisions:

1. The samples and blank which were misrouted to 222-S have been documented on an NCR. We plan to disposition the NCR by stating that the samples & blank cannot be used due to loss of chain-of-custody. Therefore, these samples will need to be repeated. (Sample R-3635 and blank R-3643)
2. The sample mentioned in 1. above was taken on Thursday, March 17, from riser #1W. The samples from this riser were the first ones taken, and represent our highest risk for exceeding holding time requirements. Therefore, to enhance our chances of success, to eliminate the potential cost of another sampling evolution and since an entry to this riser is already necessary, we request that both samples from this riser be repeated. (Sample R-3633 as well as R-3635)
3. To give PNL adequate time for sample extraction & analysis, the samples need to be shipped in the same order in which they were taken. Please use a first in - first out shipping strategy.

Thanks for your help. We can still reach success on this evolution if we keep working together. I look forward to meeting with you Monday afternoon to explore how we can do it better next time.

Dick Nicklas

DON'T SAY IT --- Write It!

DATE: March 25, 1994

TO: R. J. Nicklas

R1-43

FROM: Elvis Q. Le

Telephone: 3-4214

cc:

B. H. VonBargen

R1-43

R. E. Raymond

R2-54

WHC-SD-WM-DP-065, REV. 0

SUBJECT: Root Cause Analysis for 108-AP Organic Samples to PNL

1. Issue: A violation of RCRA protocol (SW-846 procedure) holding time was observed by PNL.

Discussion: Two samples (R3633 & R3635) were collected on Thursday, 3/17 and five samples were collected on Monday, 3/21. RCRA protocol (SW-846 procedure) requires PNL to comply with a ten calendar day holding time for Volatile Organic Analysis (VOA) and a five day for Semi Volatile Organic Analysis (SVOA). The holding time is defined from the day a sample is collected. PNL has expressed its inability to meet this holding time since the samples were decided to be delivered to PNL on Thursday, 3/24 and Friday, 3/25. As can be seen, the first two samples have already missed the holding time, and PNL has only one or two days to complete all the analyses for the last five samples which is impossible for PNL.

SW-846 is not required in the existing Waste Analysis Plan (WHC-SD-WM-EV-060). However, WHC has told WDOE that WHC will do its best to meet SW-846 requirement for the 108-AP samples. It was discovered that RCRA protocol (SW-846 procedure) was recently updated to permit PNL a 14 calendar day holding time.

Conclusion: The updated RCRA protocol (SW-846 procedure) of 14 calendar days holding time was forwarded to PNL. PNL is satisfied and indicated that it will meet the new holding time.

Recommendation: Tank Farm Environmental Engineering shall inform PNL of any new requirement or revision to RCRA protocol (SW-846 procedure).

To increase the probability to meet the new 14 day holding time, it would be wise to re-collect the sample R3633 due to its ease of resampling with the recollection of the sample R3635 (Ref. NCR 050650). This may also be considered as a cost-effective recommendation because PNL has asked WHC for an additional funds to compensate for their urgent preparation and performance of extraction for the sample R3633 to meet the new holding time requirement.

To increase the probability to meet the 14 day holding time requirement, organic samples shall be shipped to PNL prior to the delivery of inorganic samples to 222-S lab in future sampling.

WHC-SD-WM-DP-065, REV. 0

2. Issue: A nonconformance Report (NCR 050550) was issued against the Tank Farm Sampling Operations and has delayed the transportation of organic samples to PNL.

Discussion: Sample R3643 was designated to be the field blank for 222-S lab and to be placed in PIG shipping container TF-04. When PIG shipping container TF-04 was opened at 222-S lab, the PIG contained PNL sample R3635 which was designated for PIG shipping container G-7. PIG G-7 was opened and contained the field blank designated for 222-S lab.

Conclusion: The NCR 050650 was dispositioned on 3/24 to disregard both samples R3635 and R3643. The NCR instructs to dispose these samples per procedures LO-100-105 and SO-170-002. Resampling of new sample R3635A for sample R3635 and preparation of a new field blank R3643A for field blank sample R3643 are also instructed in the NCR.

Recommendation: As it was mentioned in item 1, sample R3633 should be also recollected as well as sample R3635 from riser #1W.

3. Issue: Refrigeration requirement for organic samples was violated.

Discussion: SW-846 procedure requires samples that for VOA and SVOA must be cooled to 4.5 degree Celsius after collection. Due to the requirements of the Safety Analysis Report for Packaging and Shipping (WHC-SD-MP-SARP-001, Rev. 1), the samples cannot be double-bagged and shipped in a cooler (i.e...ice chest) to PNL. PNL has recommended WHC ship these samples within 24 hrs after collection to compensate for the refrigeration requirement.

Conclusion: A cooling device to meet the SW-846 procedure is currently not available to Tank Farm Sampling Operations. A violation of this requirement is imminent and unavoidable. There is no added benefit to comply with PNL recommendation of 24 hrs delivery.

4. Issue: Transportation problem.

Discussion: A traffic problem was experienced when samples were going to be shipped to PNL. The estimated concentration of radioactive isotopes in the samples prior to the recent waste transfer from 102-AY to 108-AP was sent to Transportation of Hazardous Operations for road closures requirement. Based on these estimated concentrations, the samples would have less than 0.5 mR/hr and would require no road closure as long as each sample is in its own package. The dose rate levels measured by HPT for these organic samples indicate that samples have an average of 22mR/hr with window open and 8 mR/hr with window closed. The discrepancy of the dose rates has delayed the samples shipping to PNL a day due to the requirement of 24 hours in advance notification to implement road closure.

Conclusion: A correction was made to take the concentration of radioactive isotopes of the liquid waste transferred recently from 102-AY to 108-AP into account. A corrected concentration was sent to Transportation of Hazardous Operations to determine whether the road closure is required.

Recommendation: A road closure for shipping these samples to PNL is required based on the new estimated concentration. To avoid a similar problem in the future, the estimated concentration of radioactive isotopes of the tank should be updated a week before sampling event.

5. Issue: Weather condition was not identified for 108-AP sampling plan.

Discussion: Approximately a week delay of the sampling event occurred due to the presence of strong wind on three occasions. The sampling team went to the field and then decided to cancel the jobs due to wind condition.

Conclusion: 108-AP sampling was partially performed on Thursday 3/17 and the rest of the 108-AP sampling plan was postponed until Monday 3/21.

Recommendation: Weather information for sampling day should be obtained prior to a sampling event and a decision made on whether or not to sample at that time. The 15 MPH wind criteria should be reexamined.

6. Issue: Sampling event was inadequately prepared.

Discussion: A day delay was experienced when samples were released for shipment. The PIG shipping container was discovered by QC to not perfectly contain the sample.

Conclusion: The PIG shipping container problem was took a day to completely resolve.

Recommendation: Sample bottle and its PIG shipping container should be verified for a dry fit prior to a sample event.

7. Issue: WHC/PNL schedule problem

Discussion: PNL requests that samples should be shipped on Monday through Wednesday, Thursday at the latest as no staff is available on weekends. To ship samples on a backshift or weekend requires that WHC notify PNL 72 hours in advance so that PNL can provide necessary staff. Due to the uncertainty of completing field sampling and these time constraints, it is very difficult to coordinate shipping samples to PNL as planned.

Conclusion: All the samples will be delivered to PNL on Monday 3/28 and Tuesday 3/29.

Recommendation: Organic samples shall be planned and shipped to PNL prior to inorganic samples to 222-S lab. A solid plan of sampling event and transportation should be carefully prepared and well coordinated.

[32] From: Richard J (Dick) Nicklas at ~WHC338 3/31/94 1:04PM (1101 bytes: 24 ln)

To: George L Miller at ~WHC168

Subject: Request Program Approval to Proceed with 108-AP Analyses

WHC-SD-WM-DP-065, REV. 0

----- Message Contents -----

Dick,

Upon discovery of the 108-AP sample mis-identifications, I stopped 222-S laboratory's analyses of all 108-AP samples. Although Non-Conformance Report number 050650 directs remedial actions, it does not direct the laboratory to proceed with analyses of non-affected samples. We will comply with the instructions in NCR 050650 to dispose of the incorrectly labeled samples that are being held at the 222-S laboratory.

I request your approval to proceed with analyses of those 108-AP samples which are currently being held in the 222-S laboratory, which are not mis-identified, and that are not subject to NCR 050650.

Thanks for your help on this issue.

George

George,

In reply to your message of March 29, please proceed with the 108-AP analysis not affected by NCR 050650.

Dick

*** INFORMATION ONLY ***

=====J-7 WORK CHANGE NOTICE - Summary (W170)=====

Page: 1

13:41:34 10 MAY 1994

Document Number 2E-94-00064/W *GENERIC WORK ITEM*

Work Item Title +241 AP: TAKE LIQUID GRAB SAMPLES ON 108 AP

=====

Existing WCNs: 01, 02 and 03

=====

WHC-SD-WM-DP-065, REV. 0

=====J-7 WORK CHANGE NOTICE - Summary (W170)=====

*** INFORMATION ONLY ***

*** INFORMATION ONLY ***

=====J-7 WORK CHANGE NOTICE - Detail (W175)=====

Page: 1

13:41:48 10 MAY 1994

1. Document Number 2E-94-00064/W GENERIC WORK ITEM
Work Item Title +241 AP: TAKE LIQUID GRAB SAMPLES ON 108 AP

=====

	Signature	Date	Telephone No.
2. Originator	X MEIGS,JC	03/16/94	373-1130

3. WCN Number 01 Non-ADP WCN Number

WHC-SD-WM-DP-065, REV.0

4. Change Instructions

Page	Step/Para	Description
PG.3 OF J-4A	RISER #1(W)	DATA - CHANGE ELEVATION AND STRING LENGTH FOR SAMPLE SHIPPING NUMBERS AS FOLLOWS:

R3634	204"	INORG/RAD (WHC)	360"
-------	------	-----------------	------

**R3635	204"	ORGANIC (PNL)	360"
---------	------	---------------	------

PG.5 OF J-4A, RISER #1(SE) - CHANGE SAMPLE ELEVATION AND STRING LENGTH DATA FOR SAMPLE SHIPPING NUMBER **R3642, AND GIVE DIRECTIONS FOR OBTAINING THE SURFACE SAMPLE AS FOLLOWS:

**R3642	TBD PER THE NOTE BELOW.	SURFACE SAMPLE TOC/APPR (PNL)	336"
---------	----------------------------	----------------------------------	------

*****NOTE: THE SAMPLE BOTTLE IS TO BE LOWERED UNTIL THE WASTE IS CONTACTED, THEN LOWER AN ADDITIONAL 4" AND OBTAIN SAMPLE PER THE WORK PLAN WTP-94-004, REV.0/0.*****

5. Reason for Change

WRONG DATA SUPPLIED FOR THESE SAMPLES, FIRST TRY GOT DOME SPACE ONLY.

E. LE, JS LEE, B. JOHNS AND BL HALL APPROVALS WERE ALL PER TELECON/JC MEIGS.

6. Impact Level of Change/Approval Requirements -

7. Approval Signatures	Signature	Date
Cognizant Engineer	LE, EQ	03/16/94
Cognizant Manager	JOHNS, BR	03/16/94
Environmental Assurance	N/A	
Health/Safety Assurance	N/A	
Quality Assurance	N/A	
Operations	LEE, JS	03/16/94
PIC	HALL, BL	03/16/94
Other		

	Signature	Date	Telephone No.
8. Incorporated By	X MEIGS, JC	03/17/94	373-1130

=====J-7 WORK CHANGE NOTICE - Detail (W175)=====

*** INFORMATION ONLY ***

*** INFORMATION ONLY ***

=====J-7 WORK CHANGE NOTICE - Detail (W175)=====

Page: 2

13:41:48 10 MAY 1994

1. Document Number 2E-94-00064/W *GENERIC WORK ITEM*
Work Item Title +241 AP: TAKE LIQUID GRAB SAMPLES ON 108 AP

WHC-SD-WM-DP-065, REV. 0

=====J-7 WORK CHANGE NOTICE - Detail (W175)=====

*** INFORMATION ONLY ***

*** INFORMATION ONLY ***

=====J-7 WORK CHANGE NOTICE - Detail (W175)=====

Page: 1

13:42:07 10 MAY 1994

1. Document Number 2E-94-00064/W *GENERIC WORK ITEM*
Work Item Title +241 AP: TAKE LIQUID GRAB SAMPLES ON 108 AP

=====

2. Originator	Signature R LITTLE,JB	Date 05/09/94	Telephone No. 373-1130
---------------	--------------------------	------------------	---------------------------

3. WCN Number 02 Non-ADP WCN Number N/A

WHC-SD-WM-DP-065, REV.0

4. Change Instructions

Page	Step/Para	Description
PG. 7 OF J-4A.		AT COMPLETION OF STEP D.2 - DELETE THE REMAINING RESOLUTION AND ADD THE FOLLOWING RESOLUTION:

OBJECTIVE: RETAKE 2 SAMPLES AT RISER 1 W, PREPARE A NEW SAMPLE
BLANK, AND SHIP THE SAMPLE CONTAINED IN PIG #G-7 TO
222-S FOR DISPOSAL.

PREREQUISITES:

- 1} PERFORM ALL OF STEP 4.0 "PREREQUISITES" OF TANK FARM PLANT
OPERATING PROCEDURE # TO-080-065,CURRENT REVISION.

1.1} FOLLOWING IS THE DATA NEEDED FOR STEP 4.2 OF TO-080-065.

RISER # 1{W}				
SHIPPING	SAMPLE	SAMPLE	SHIP	STRING
NUMBER	ELEVATION	TYPE	TO	LENGTH
R3633-A	132"	ORGANIC {PNL}		432"
R3635-A	204"	ORGANIC {PNL}		360"

NOTE: ALL SAMPLES GOING TO PNL REQUIRE THE SAMPLE PIG TEMPERATURE
TO BE RECORDED ON THE SHIPPING DATA SHEETS.

1.2) ONE SAMPLE FIELD BLANK WILL BE REQUIRED PER TO-080-065
WITH THE FOLLOWING INFORMATION.

SHIPPING	SAMPLE	SAMPLE	SHIP	STRING
NUMBER	ELEVATION	TYPE	TO	LENGTH
R3643-A	---	(WHC)	222S	---

1.3} PLACE THE FIELD BLANK SAMPLE IN A SECURE AREA INSIDE THE
CONTAINMENT.

*NOTE: ALL SAMPLES GOING TO PNL REQUIRE THE SAMPLE PIG TEMPERATURE
TO BE RECORDED ON THE SUPERNATE DATA SHEET.**

1.4} PIC TO OBTAIN THE TEMPERATURE INDICATOR FROM JIM LEE AND
VERIFY IT IS AT THE JOB LOCATION AND READY FOR USE.

=====J-7 WORK CHANGE NOTICE - Detail (W175)=====

*** INFORMATION ONLY ***

*** INFORMATION ONLY ***

=====J-7 WORK CHANGE NOTICE - Detail (W175)=====

Page: 2

13:42:07 10 MAY 1994

1. Document Number 2E-94-00064/W GENERIC WORK ITEM
Work Item Title +241 AP: TAKE LIQUID GRAB SAMPLES ON 108 AP

WHC-SD-WM-DP-065, REV. 0

=====

FLUKE MDL #27 & TC # T-80-150-U AVAILABLE

PIC SIGN/DATE _____

- 1.5} PLACE THE MDL #27 FLUKE DIGITAL TEMPERATURE INDICATOR THERMOCOUPLE MDL# T-80-150-U INSIDE AND AGAINST THE SAMPLE PIG BODY FOR SAMPLES R3633-A AND R3635-A AND HOLD AT LEAST 3 MINUTES.
PRIOR TO PLACING THE SAMPLE BOTTLE IN THE PIG. ON ATTACHMENT 1 OF THE POP #TO-080-065, RECORD THE TEMPERATURE ON THE APPROPRIATE SUPERNATE SAMPLING DATA SHEET, IN THE COMMENTS SECTION ON PAGE 2.
- 1.6} ENSURE THAT THE SAMPLE BOTTLES HAVE A TEFLON CAP.
- 1.7} VERIFY THAT THE YELLOW LIGHT ON THE 271-AP CONTROL ROOM IS ILLUMINATED AND FLASHING. LIGHT IS TO REMAIN ON UNTIL POST JOB SURVEY VERIFIES RELEASE TO RADIOLOGICAL CONTROL AREA.

PIC VERIFY STEPS 2.6 AND 2.7 ARE COMPLETE _____ DATE _____

- 2} STEP 4.11 OF TO-080-065 IS N/A BECAUSE RISER CLOSURE IS VIA PIPE CAP.

WORK INSTRUCTIONS:

- 1.0} PERFORM TANK FARM PLANT OPERATING PROCEDURE # TO-080-065, CURRENT REVISION.
- 2.0} SHIP THE SAMPLE PRESENTLY CONTAINED IN PIG #G-7, LOCATED IN 108-AP FARM TO 222-S LABS (WHC) TO BE DISPOSED OF PER 222-S LAB PROCEDURES.
- 3.0} JOB COMPLETION.
 - 3.1} PIC/CRAFT MANAGER RECORD ON THE J-5 THAT THE JOBSITE HAS BEEN CLEANED AND ALL WASTE HAS BEEN PROPERLY CONTAINERIZED PER TO-100-052 FOR RADIOACTIVE/CONTAMINATED WASTE, OR WHC-IP-0842, SEC. 16.1, FOR NON-RADIOACTIVE, WASTE AS APPLICABLE.
 - 3.2} OPERATIONS VERIFY, SIGN AND DATE THE J-5.

5. Reason for Change

TO REPERFORM THIS GRAB SAMPLE ON 108 AP. REF.NCR # 50650

=====J-7 WORK CHANGE NOTICE - Detail (W175)=====

*** INFORMATION ONLY ***

*** INFORMATION ONLY ***

=====J-7 WORK CHANGE NOTICE - Detail (W175)=====

Page: 3

13:42:07 10 MAY 1994

1. Document Number 2E-94-00064/W *GENERIC WORK ITEM*
Work Item Title +241 AP: TAKE LIQUID GRAB SAMPLES ON 108 AP

NOTE: ON BLOCK 7 "ADDITIONAL APPROVALS" JIM S. LEE SIGNED FOR
PIC PER TELECON ON 05/09/94, JOHN B. LITTLE.

6. Impact Level of Change/Approval Requirements 4-

7. Approval Signatures	Signature	Date
Cognizant Engineer	X WHITE,KA	05/09/94
Cognizant Manager	X DODD,RA	05/09/94
Environmental Assurance	N/A	_____
Health/Safety Assurance	N/A	_____
Quality Assurance	N/A	_____
Operations	N/A	_____
PIC	LEE,JS	05/09/94
Other	N/A	_____

8. Incorporated By	Signature	Date	Telephone No.
	XHALL,BL	05/10/94	373-1483

WHC-SD-WM-DP-065, REV. 0

=====J-7 WORK CHANGE NOTICE - Detail (W175)=====

*** INFORMATION ONLY ***

[15] From: William I Winters at ~WHC142 4/11/94 8:12AM (890 bytes: 12 ln)
To: Gary L Dunford at ~WHC266
George L Miller at ~WHC168
Subject: Early Notification Tests

----- Message Contents -----

Gary:

George L. Miller is the lab's project coordinator for the evaporator. I suggest you have your engineer work with George to set this test up. Are you planning to do this before start-up? Are you just generating a false data set? Probably not enough time to generate a synthetic sample. I don't believe we can keep this a secret on this side when we use a fake data set. It will check out the limits in the computer. Is this your primary objective? The lab can then notify the proper personnel at the evaporator and you can test your procedures from there. Let me know if I can be of further assistance.

Bill Winters (373-1951)

WHC-SD-WM-DP-065, REV.0

[18] From: Gary L Dunford at ~WHC266 4/11/94 4:37PM (1016 bytes: 17 ln)
To: William I Winters at ~WHC142
cc: George L Miller at ~WHC168
Subject: Early Notification Tests

----- Message Contents -----

Gary:

George L. Miller is the lab's project coordinator for the evaporator. I suggest you have your engineer work with George to set this test up. Are you planning to do this before start-up? Are you just generating a false data set? Probably not enough time to generate a synthetic sample. I don't believe we can keep this a secret on this side when we use a fake data set. It will check out the limits in the computer. Is this your primary objective? The lab can then notify the proper personnel at the evaporator and you can test your procedures from there. Let me know if I can be of further assistance.

Bill Winters (373-1951)

Bill it will just be a false data set...before startup or during the
first week of operations

Gary

WHC-SD-WM-DP-065, REV. 0

[19] From: George L Miller at ~WHC168 4/12/94 7:23AM (1392 bytes: 22 ln)
To: Gary L Dunford at ~WHC266, William I Winters at ~WHC142
cc: George L Miller
Subject: Early Notification Tests

----- Message Contents -----
Gary, I would like to get started on this task as quickly as possible. Would you please put me into contact with your cog engineer for this project. I have several concerns that I would like to have addressed BEFORE the evaporator start-up. Thanks George L. Miller, 373-4739

Gary:

George L. Miller is the lab's project coordinator for the evaporator. I suggest you have your engineer work with George to set this test up. Are you planning to do this before start-up? Are you just generating a false data set? Probably not enough time to generate a synthetic sample. I don't believe we can keep this a secret on this side when we use a fake data set. It will check out the limits in the computer. Is this your primary objective? The lab can then notify the proper personnel at the evaporator and you can test your procedures from there. Let me know if I can be of further assistance.

Bill Winters (373-1951)

Bill it will just be a false data set...before startup or during the first week of operations

Gary

WHC-SD-WM-DP-065, REV. 0

[24] From: Tamalyn N Perry at ~WHC266 4/14/94 9:20AM (3674 bytes: 11 ln, 1 fl)
To: George L Miller at ~WHC168, Gary L Dunford
Receipt Requested
cc: Tamalyn N Perry
Subject: 242-A Feed Sample Point 54 from Gary Dunford
----- Message Contents -----

Text item 1:

George,

Gary Dunford asked me to send the attached file to you.

Please call him on 373-1150 once you have reviewed the document.

Thanks,

Tammy Perry for Gary Dunford

WHC-SD-WM-DP-065, REV. 0

WHC-SD-WM-DP-065, REV.0

DRILL TEST DATA SET APRIL 13, 1994
242-A FEED SAMPLE POINT 54, ROUTINE SET #1

DSC	325° F
pH	12.9
SpG	1.05
XH ₂ O	90%
% SOLIDS	<1%
AL	3.24×10^{-4} M
CL	4×10^{-6} M
F	6×10^{-3} M
Na	.218 M
NH ₃	.1 M
NO ₂	9.2×10^{-3} M
NO ₃	.045 M
OH	.078 M
PO ₄	1.9×10^{-3} M
SO ₄	3.9×10^{-3} M
TIC	8.5×10^{-3} M
TOC	.228 gm/l
Sr 90	2.6×10^{-4} μ ci/l
Cs 137	5×10^{-5} μ ci/l
Pu 239/240	1.7×10^{-2} μ ci/l
AM 241	1.0×10^2 μ ci/l

Westinghouse
Hanford Company

WHC-SD-WM-DP-065, REV. 0

Item #16
Internal
Memo

From: Waste Tank Upgrade Installation and Testing
Phone: 373-1150 R1-51
Date: April 18, 1994
Subject: LABORATORY NOTIFICATION TEST 242-A EVAPORATOR

7CH00-94-005

To: G. J. Miskho R2-12
W. E. Ross S5-07

cc: B. D. Biddle	S5-14	J. L. Lee	R2-36
T. F. Dale	T6-20	G. L. Miller	T6-06
J. E. Geary	S5-14	R. J. Nicklas	R1-43
M. D. Guthrie	R1-43	GLD File/LB	
P. F. Kempf	T6-20		

This letter is to inform you of the successful completion of a laboratory notification test for the 242-A evaporator. On April 15, 1994, a false set of data was fed into the laboratories; this data was compared to the existing "flags", and the notification of 242-A personnel that two values were out-of-range was completed. The Laboratories called the facility based on preliminary data, initiated reruns, and called 242-A again when the reruns were completed.

The first laboratory notification call, based on preliminary data, came to the at-the-controls operator who immediately transferred it to the shift manager. Since the evaporator was in the middle of startup, the shift manager discussed what his normal response would be (immediate evaluation/comparison of the data to OSD/OSRs limits) and assigned the shift engineer responsibility to evaluate the data. The shift engineer reviewed the data, pursued the proper reference material, and when the reruns were completed, provided guidance to the shift manager.

As part of preparing for this test Plant Engineering noted that the 242-A feed point in the sample schedule did not have a flag for Plutonium. Since the criticality limit for the 242-A feed is 5 times lower than the normal tank farm limit, it was decided that a flag is required. R. J. Nicklas, of Plant Engineering, is aware of this issue, and it is his organization's action.

As a good business practice the resources/references for the engineering work station in the 242-A control room should be evaluated.

The false data used will be appended to the letterbook copy on this letter. If you have any questions please call my office on 373-1150.

G. L. Dunford
Manager

pac

SAMPLING/CHAIN OF CUSTODY DATA

TANK FAF 1 PLANT OPERATING PROCEDURE

WHC-SD-WM-DP-065, REV. 0

COPY

CHAIN OF CUSTODY

Company Contact	WHC	Telephone	373-2142
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	Truck		
Shipped to:	222-5 lab		
SAMPLING INFORMATION			
Sample Collected by	B Z Hall	Date	3-17-94 Time: 10:31 AM
Sample Locations	241-AP-108	Custody Seal #	3666
Remarks			
Ice Chest or Sample Pkg. No.	PIG TF-7	Field Logbook and Page No.	N/A

SHIFT MANAGER REVIEW:

B Z Hall

DATE:

3-21-94

BLK

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
R 3632	N/A

CHAIN OF POSSESSION

Relinquished by: <i>B Z Hall</i>	Received by: <i>Mik Santy</i>	Date/Time: <i>3-21-94 BLK</i>
Relinquished by: <i>Mik Santy</i>	Received by: <i>Engineer (BLK)</i>	Date/Time: <i>3-21-94 1425</i>
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Document No.

TO-080-010

Rev/Mod

B-10

Page

29

TANK FAF 1 PLANT OPERATING PROCEDURE

WHC-SD-WM-DP-065, REV. 0

COPY

CHAIN OF CUSTODY

Company Contact	WHC	Telephone	373-2142
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	Truck		
Shipped to	222-S Lab		

SAMPLING INFORMATION

Sample Collected by	BZ Hall	Date	3-18-94	Time	10:56 AM
Sample Locations	241-AP-108	Custody Seal #	2629		
Remarks					
Ice Chest or Sample Pig No.	Pig B-25	Field Logbook and Page No.	N/A		

SHIFT MANAGER REVIEW:

BZ HallDATE: 3-18-94

BCL

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
R 3634	N/A

CHAIN OF POSSESSION

Relinquished by: <u>BZ Hall</u>	Received by: <u>Mike Hanley</u>	Date/Time: <u>3-21-94</u> <u>3-18-94</u> BCL
Relinquished by: <u>Mike Hanley</u>	Received by: <u>Raymond White</u>	Date/Time: <u>3-21-94 1425</u>
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Document No.	Rev/Mod	Page
TO-080-010	B-10	29

TANK FAF 1 PLANT OPERATING PROCEDURE

WHC-SD-WM-DP-065, REV. 0

COPY

CHAIN OF CUSTODY

Company Contact	WHC	Telephone	373-7751
Bill of Lading No.	NA	Offsite Property No.	NA
Method of Shipment	TRUCK		
Shipped to	222-S		
SAMPLING INFORMATION			
Sample Collected by	B. Hall	Date	3-21-94
		Time	0956 hr
Sample Locations	244-AP-108	Custody Seal #	2259
Remarks	NA		
Ice Chest or Sample Pkg No.	G-10	Field Logbook and Page No.	N/A

SHIFT MANAGER REVIEW:

[Signature]

DATE: 3-22-94

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
R3636	NA

CHAIN OF POSSESSION

Relinquished by: <i>[Signature]</i>	Received by: <i>[Signature]</i>	Date/Time: 1045 3-22-94
Relinquished by: <i>[Signature]</i>	Received by: <i>[Signature]</i>	Date/Time: 1148 3-22-94
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Document No.	Rev/Mod	Page
TO-080-010	B-10	29

TANK FAP 1 PLANT OPERATING PROCEDURE

WHC-SD-WM-DP-065, REV. 0

CHAIN OF CUSTODY

Company Contact	WHC	Telephone	373-7751
Bill of Lading No.	14	Offsite Property No.	14
Method of Shipment	TRUCK		
Shipped to	222-S		
SAMPLING INFORMATION			
Sample Collected by	B. Hall	Date	3-21-94 3-21-94 Time 10:12 AM
Sample Locations	241-AP-108	Custody Seal #	2272
Remarks			
Ice Chest or Sample Pkg No.	G-2	Field Logbook and Page No.	N/A

SHIFT MANAGER REVIEW: C. DwyerDATE: 3-22-94

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
R3638	14

CHAIN OF POSSESSION

Relinquished by: <u>C. Dwyer</u>	Received by: <u>M. H. Harty</u>	Date/Time: <u>1345 3-22-94</u>
Relinquished by: <u>M. H. Harty</u>	Received by: <u>N. Lewis</u>	Date/Time: <u>1415 3-22-94</u>
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

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TANK FARM PLANT OPERATING PROCEDURE

WHC-SD-WM-DP-065, REV. 0

COPY

CHAIN OF CUSTODY

Company Contact	WHC	Telephone	373-7751
Bill of Lading No.	NA	Offsite Property No.	NA
Method of Shipment	TRUCK		
Shipped to	222-S LAB		
SAMPLING INFORMATION			
Sample Collected by	B. HALL	Date	3-27-94
		Time	11:30am
Sample Locations	241-AP-108	Custody Seal #	
Remarks			
Ice Chest or Sample Pkg. No.	TF-3	Field Logbook and Page No.	N/A

SHIFT MANAGER REVIEW: B. HallDATE: 3-22-94

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
<u>R3640</u>	<u>NA</u>

CHAIN OF POSSESSION

Relinquished by: <u>B. Hall</u>	Received by: <u>Mr. Harty</u>	Date/Time: <u>1345 3-22-94</u>
Relinquished by: <u>Mr. Harty</u>	Received by: <u>Mr. Harty</u>	Date/Time: <u>1430 3-22-94</u>
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

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TANK FAP 1 PLANT OPERATING PROCEDURE

WHC-SD-WM-DP-065, REV. 0

COPY

CHAIN OF CUSTODY

Company Contact	WHC	Telephone	373-7751
Bill of Lading No.	MA	Offsite Property No.	MA
Method of Shipment	TRUCK		
Shipped to	222-S		

SAMPLING INFORMATION

Sample Collected by	B. Hall	Date	3-17-94	Time	11:11 AM
Sample Locations	241-AP-108	Custody Seal #	2271		
Remarks	FIELD BLANK				
Ice Chest or Sample Pkg. No.	TF-4	Field Logbook and Page No.	N/A		

SHIFT MANAGER REVIEW: [Signature]DATE: 3-22-94

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
R3643 V73 MA	

CHAIN OF POSSESSION

Relinquished by: <u>[Signature]</u>	Received by: <u>Muh Hardy</u>	Date/Time: 1045 3-22-94
Relinquished by: <u>Muh Hardy</u>	Received by: <u>Raymond White</u>	Date/Time: 1140 3-22-94
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Dumped down Hot Cell down 03-30-94
to be resampled - new tag will be generated

Witnessed: Gregory Wilson 3/30/94

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Westir use Hanford
Compa.,

CHAIN OF CUSTODY/

AMPLE ANALYSIS REQUEST

Page

1

Data Technology

Priority

Normal

Collector D.E. Melville	Company Contact WHC	Telephone No. 3-0257
Project Designation NA	Sampling Location 108-AP, Riser 1W	SAF No. NA
Ice Chest No. NA	Field Logbook No. NA	Method of Shipment Truck
Shipped To 222-5	Offsite Property No. NA	Bill of Lading/Air Bill No. NA

Possible Sample Hazards/Remarks Field blank 100 ml.	Preservative NA	Type of Container NA	No. of Container(s) NA	Volume NA
Special Handling and/or Storage NA				
SAMPLE ANALYSIS				
WHC-SD-WM-DP-065, REV. 0				

Sample No.	Matrix*	Date Sampled	Time Sampled	Sign/Print Names	Date/Time
R 3643-A	Liquid	6/29/94	0840	Received By [Signature]	6-29-94
				Received By [Signature]	10:00
				Received By [Signature]	10:30
				Received By [Signature]	10:30
				Received By	Date/Time

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

DISTRIBUTION: Original- Sample Yellow - Sampler

BC-6000-828 (12/92)

167

Westinghouse Hanford
Company

[illegible]

REQUEST FOR SPECIAL ANALYSES

REQUEST FOR SPECIAL ANALYSIS (RSA)						RSA No. 102 1850	
1. Sample Origin 108-AP		2. Date Submitted 3/16/94		4. Requester Name George L Miller		6. Charge Code/Work Package NIA 7F	
		3. Submitted By George L Miller		5. Requester Phone/MSIN 373-4739 /TG-06		7. Date Required 3/17/94 4/7/94	
8. Customer ID	Collected		9. Laboratory ID	12. Number of Samples 2	13. Volume of Samples Approx 100ml	14. Protocols Technology per ☐ None ☒ RCRA ☐ NQA-1 ☐ Other ☐ CERCLA	
	Date	Time					
108-AP-A			V 62				
108-AP-B			V 63				
WHC-SD-WM-DP-065, REV. 0				15. Sample Type ☐ Solid ☐ Soil ☐ Slurry ☐ Gas ☒ Water ☐ Waste ☐ Solution ☐ Sludge ☐ Oil ☐ Other (specify) _____			
				16. Storage Requirements ☒ None ☐ Specify _____			
				17. Process Knowledge/Known Listed Wastes ☐ Unknown ☒ Known (Please attach list) <u>Evaporator Feed (DST)</u> ☒ Previously submitted for this Project (Similar to 101-AP)			
10. Determination		11. Expected Range		18. Survey Dose Rate <u>S. L. Lasker</u> 46 125 mrem/hr HPT Signature			
Direct:							
<ul style="list-style-type: none"> PSC Appearance Specific Gravity Uranium - Fluorometric OH⁻ H₂ 				19. Disposition of Waste ☐ Return to Client/Location ☐ Dispose per 222-S Procedures ☒ Other <u>per TPP: WHC-SD-WM-TPP-048</u>			
Acid Digest:							
<ul style="list-style-type: none"> ICP AS Se 				20. Additional Information Sample A requires: { Sample, Sample Duplicate, Spike, Spike Duplicate Sample B requires: { Sample, Sample Duplicate Shipping # R3632 is Sample ID # 108-AP-A Shipping # R3634 is Sample ID # 108-AP-B V 60, V 64 Blank vial			
Water (Digest) Dilution:							
<ul style="list-style-type: none"> IC NH₄ CN TIC (Carbonate) 							
NH ₃							
21. Chain of Custody				22. Assigned Custodial Group (select one)			
☐ No Seal # 3665 (108-AP-A) ☒ Yes Number: Seal # 2639 (108-AP-B)				☐ PCL ☒ PSDU ☐ ENV ☐ Process			
23. Sample Received By: <u>P. White</u>				24. Laboratory Manager (if required)			
Date: <u>03-21-04</u> Time: <u>1425</u>				170			

ReRuns for acid digest for As se requested by Jeff 2/22

V65 - ~~8505~~
V66 - ~~8505~~
V67 - ~~8505~~
V67 - ~~8505~~
V68 - ~~8505~~
V68 - ~~8505~~
V69 - ~~8505~~
V69 - ~~8505~~

V60 - ~~8505~~
V61 - ~~8505~~
V62 - ~~8505~~
V62 - ~~8505~~
V62 - ~~8505~~
V62 - ~~8505~~
V63 - ~~8505~~
V63 - ~~8505~~

Lauri Sparks
5-25-99

RSA 1850

AD for V65-69 for As se

2 - V65-8505 LMCS & Cal

V60-63

2 Std

ReRuns

WHC-SD-WM-DP-065, REV. 0

BEST AVAILABLE COPY

[illegible]

WHC-SD-WM-DP-065, REV. 0

RSA
1851
ftr 2072

Run IC on
Direct analysis

BEST AVAILABLE COPY

REQUEST FOR SPECIAL ANALYSIS (RSA)					RSA No. 1852		
1. Sample Origin <i>Evaporator Candidate Feed Tank 108-AP (Field Blank)</i>		2. Date Submitted <i>3/16/94</i>		4. Requester Name <i>George L Miller</i>		6. Charge Code/Work Package <i>NIA7F</i>	
		3. Submitted By <i>George L Miller</i>		5. Requester Phone/MSIN <i>373-4739 / TG-06</i>		7. Date Required <i>3/17/94 4/7/94</i>	
8. Customer ID <i>108-AP-FB</i>		Collected Date: <i>3/16/94</i> Time: <i>—</i>		9. Laboratory ID <i>V73</i>		12. Number of Samples <i>1</i>	
				13. Volume of Samples <i>800 ml</i>		14. Protocols ☐ None ☒ RCRA <i>Technology per</i> ☐ NQA-1 ☐ Other ☐ CERCLA	
Comment: <i>This sample was misident- ified and shipped in error. On 3/22/94, a PNL sample from Riser 1W was received at 222-S labeled as R3643. This sample (received 3/22/94) was dumped in the Hot Cells. A replacement sample, the "real" Field Blank, R3643, was ordered to be recollected and shipped to 222-S with new Chain of Custody. Resampled: <i>06-36-94</i> <i>Sandra Cobb</i> <i>1030</i> <i>Locat #3782</i> </i>				15. Sample Type ☐ Solid ☐ Gas ☐ Solution ☐ Other (specify) _____ ☐ Soil ☒ Water ☐ Sludge ☐ Slurry ☐ Waste ☐ Oil 16. Storage Requirements ☒ None ☐ Specify _____ WHC-SD-WM-DP-065, REV. 0			
10. Determination Direct: - Uranium - Fluorometric - OH ⁻ - Hg Acid Digestion: - ICP - As - Se - GSA - AT - TB Water (Digest) Dilution: - IC - NH ₄ - CN - TIC				17. Process Knowledge/Known Listed Wastes ☐ Unknown ☒ Known (Please attach list) <i>Q-Water from 222-SF</i> ☒ Previously submitted for this Project (Same as 101-AP-FB) 18. Survey <div style="text-align: right;">Dose Rate <i>125 uR/hr</i></div> <div style="text-align: center;"> <i>[Signature]</i> HPT Signature <i>06-36-94 corrected</i> </div>			
11. Expected Range 21. Chain of Custody ☐ No ☒ Yes Number: <i>See above</i>				19. Disposition of Waste ☐ Return to Client/Location _____ ☐ Dispose per 222-S Procedures ☒ Other <i>per TPP: WHC-SD-WM-TPP-048</i> 20. Additional Information <i>Required Sample Analyses: { Sample Sample Duplicate</i> <i>Shipping # R3643A is Sample ID # 108-AP-FB</i> <i>This is the Field Blank</i>			
23. Sample Received By: <i>[Signature]</i> Date: <i>3-22-94</i> Time: <i>1140</i>				22. Assigned Custodial Group (select one) ☐ PCL ☒ POSU ☐ ENV ☐ Process 24. Laboratory Manager (if required) 174 Date: _____			

REQUEST FOR SPECIAL ANALYSIS (RSA)

RSA No.

1853

Sample Origin 108-AP		2. Date Submitted 3/16/94		4. Requester Name George L Miller		6. Charge Code/Work Package NIA7F	
		3. Submitted By George L Miller		5. Requester Phone/MSIN 373-4739/TG-06		7. Date Required 4/2/94	
8. Customer ID SKM 3-15-94 108-AP-COMP comp		Collected Date N/A		9. Laboratory ID SKM 3-18-94 N7377		12. Number of Samples 1	
				13. Volume of Samples 100 ml		14. Protocols Technology per ☐ None ☒ RCRA ☐ NQA-1 ☐ Other ☐ CERCLA	
				15. Sample Type ☐ Solid ☐ Soil ☐ Slurry ☐ Gas ☒ Water ☐ Waste ☐ Solution ☐ Sludge ☐ Oil ☐ Other (specify) _____			
				16. Storage Requirements ☒ None ☐ Specify _____			
				17. Process Knowledge/Known Listed Wastes ☐ Unknown ☒ Known (Please attach list) Evaporator Feed ☒ Previously submitted for this Project (Similar to 101-AP)			
10. Determination Direct: • Appearance • C-14 • I-129 • H-3 Acid Digest: • GEA • Pu-239/240 • Am-241 • Cm-244 • Np-237 • T-Alpha • T-Beta • Sr-90 • Tc-99 • Se-79		11. Expected Range		18. Survey S.N.C.L. HPT Signature		Dose Rate 100 mR/hr	
				19. Disposition of Waste ☐ Return to Client/Location _____ ☐ Dispose per 222-S Procedures ☒ Other Per TPP; WHC-SD-WM-TPP-048			
				20. Additional Information Sample 108-AP-COMP is to be generated as a composite (equal volumes) from Samples 108-AP-A, 108-AP-B, 108-AP-C, 108-AP-D and 108-AP-E 108-AP-COMP requires Sample, Sample Duplicate, Sample Spike and Spike Duplicate for C-14, I-129, H-3, Pu-239/240, Cm-244, Am-241, Np-237, AT, TB, Sr-90 and Tc-99. 108-AP-COMP requires Sample, Sample Duplicate for GEA and Se-79			
21. Chain of Custody ☐ No ☒ Yes Number: Internal (see Original Samples)				22. Assigned Custodial Group (select one) ☐ PCL ☒ PSDU ☐ ENV ☐ Process			
23. Sample Received By: Sandra Cobb Date: 04-06-94 Time: 0945				24. Laboratory Manager (if required) 175 Date: _____			

CALIBRATION DATA

DETECTOR: 18 POSITION: 2 DATE: 6/2/89
NUCLIDE: C060 HALF LIFE: .1925E 04 DAYS

STANDARD: 32840A4 .7048E 05 DPM/MOUNT AT 3/21/88
BACKGROUND: 5.0 COUNTS/MINUTE
COUNTS: 95552.
95030.
96367.
94943.

WHC-SD-WM-DP-065, REV. 0

COUNT TIME: 5 MINUTES
AVERAGE NET CPM = 19089.6

EFFICIENCY = (19089.6)EXP(LN2 X 464./ .1925E 04)/ .7048E 05

EFFICIENCY: .3201 +/- .00635

STANDARD: 32840B3 .1351E 06 DPM/MOUNT AT 3/21/88
BACKGROUND: 5.0 COUNTS/MINUTE
COUNTS: 179993.
179929.
180564.
179845.

COUNT TIME: 5 MINUTES
AVERAGE NET CPM = 36011.6

EFFICIENCY = (36011.6)EXP(LN2 X 464./ .1925E 04)/ .1351E 06

EFFICIENCY: .3150 +/- .00181

STANDARD: 32840C4 .2024E 06 DPM/MOUNT AT 3/21/88
BACKGROUND: 5.0 COUNTS/MINUTE
COUNTS: 266251.
266109.
266791.
262848.

COUNT TIME: 5 MINUTES
AVERAGE NET CPM = 53095.0

EFFICIENCY = (53095.0)EXP(LN2 X 464./ .1925E 04)/ .2024E 06

EFFICIENCY: .3100 +/- .00675

EFFICIENCY OF C060 ON DET 18 POS 2 IS .3151 +/- 1.6% ON 6/28/89

Last cal (5-3-88, Pg 77) .3174 ± 1.6%

$\frac{\text{new}}{\text{old}} = .9928$

R. Jones
10-4-94

OR: 18 POSITION: 5 DATE: 6/28/89
E: C060 HALF LIFE: .1925E 04 DAYS

RD: 32840A5 .7016E 05 DPM/MOUNT AT 3/21/88
OUND: 5.0 COUNTS/MINUTE
S: 80056.
79664.
81559.
79720.

WHC-SD-WM-DP-065, REV.0

TIME: 5 MINUTES
E NET CPM = 16045.0

ENCY = (16045.0)EXP(LN2 X 464./ .1925E 04)/ .7016E 05

ENCY: .2703 +/- .01109

RD: 32840B6 .1357E 06 DPM/MOUNT AT 3/21/88
OUND: 5.0 COUNTS/MINUTE
S: 159760.
162820.
161429.
163674.

TIME: 5 MINUTES
E NET CPM = 32379.2

ENCY = (32379.2)EXP(LN2 X 464./ .1925E 04)/ .1357E 06

ENCY: .2320 +/- .01057

RD: 32840C5 .2019E 06 DPM/MOUNT AT 3/21/88
OUND: 5.0 COUNTS/MINUTE
S: 234482.
235955.
237343.
236432.

TIME: 5 MINUTES
E NET CPM = 47205.9

ENCY = (47205.9)EXP(LN2 X 464./ .1925E 04)/ .2019E 06

ENCY: .2763 +/- .00507

ENCY OF C060 ON DET 13 POS 5 IS .2762 +/- 2.1% ON 6/28/89

Last cal (5-3-88, Pg 78) .2807 ± 1.4%

$\frac{\text{new}}{\text{old}} = .9840$

propane
10-4-94

DETECTOR: 18 POSITION: 2 DATE: 6/28/89
NUCLIDE: AM241 HALF LIFE: .1578E 06 DAYS

STANDARD: 36840A3 .6180E 05 DPM/MOUNT AT 4/ 4/88
BACKGROUND: .0 COUNTS/MINUTE
COUNTS: 67207.
66768.
67025.
66645.

WHC-SD-WM-DP-065, REV.0

COUNT TIME: 5 MINUTES
AVERAGE NET CPM = 13382.3

EFFICIENCY = (13382.3)EXP(LN2 X 450./ .1578E 06)/ .6180E 05

EFFICIENCY: .2170 +/- .00378

STANDARD: 36840B3 .1107E 06 DPM/MOUNT AT 4/ 4/83
BACKGROUND: .0 COUNTS/MINUTE
COUNTS: 115573.
116337.
116289.
116143.

COUNT TIME: 5 MINUTES
AVERAGE NET CPM = 23217.1

EFFICIENCY = (23217.1)EXP(LN2 X 450./ .1578E 06)/ .1107E 06

EFFICIENCY: .2101 +/- .00303

STANDARD: 36840C3 .1614E 06 DPM/MOUNT AT 4/ 4/88
BACKGROUND: .0 COUNTS/MINUTE
COUNTS: 162269.
162819.
162370.
161593.

COUNT TIME: 5 MINUTES
AVERAGE NET CPM = 32452.6

EFFICIENCY = (32452.6)EXP(LN2 X 450./ .1578E 06)/ .1614E 06

EFFICIENCY: .2015 +/- .00312

EFFICIENCY OF AM241 ON DET 18 POS 2 IS .2095 +/- 3.7% ON 6/28/89

Last cal (5-3-88, pg 80)

.2111 ± 3.4%

$\frac{\text{new}}{\text{old}} = .9924$

RH Jones
10-4-94

DETECTOR: 18 POSITION: 5 DATE: 6/28/89
SLIDE: AM241 HALF LIFE: .1578E 06 DAYS

STANDARD: 36840A6 .5947E 05 DPM/MOUNT AT 4/ 4/88
BACKGROUND: .0 COUNTS/MINUTE
COUNTS: 61627.
62404.
61970.
61272.

WHC-SD-WM-DP-065, REV.0

COUNT TIME: 5 MINUTES
AVERAGE NET CPM = 12363.7

EFFICIENCY = (12363.7)EXP(LN2 X 450./ .1578E 06)/ .5947E 05

EFFICIENCY: .2033 +/- .00782

STANDARD: 36840B6 .1098E 06 DPM/MOUNT AT 4/ 4/88
BACKGROUND: .0 COUNTS/MINUTE
COUNTS: 118582.
119217.
118566.
119430.

COUNT TIME: 5 MINUTES
AVERAGE NET CPM = 23789.8

EFFICIENCY = (23789.8)EXP(LN2 X 450./ .1578E 06)/ .1098E 06

EFFICIENCY: .2171 +/- .00371

STANDARD: 36840C5 .1601E 06 DPM/MOUNT AT 4/ 4/88
BACKGROUND: .0 COUNTS/MINUTE
COUNTS: 154322.
165699.
156216.
156175.

COUNT TIME: 5 MINUTES
AVERAGE NET CPM = 33120.7

EFFICIENCY = (33120.7)EXP(LN2 X 450./ .1578E 06)/ .1601E 06

EFFICIENCY: .2073 +/- .00535

EFFICIENCY OF AM241 ON DET 18 POS 5 IS .2109 +/- 2.6% ON 6/28/89

Last cal (5-3-88, pg 81) .2138 $\pm$ 5.8%

$\frac{\text{new}}{\text{old}} = .9864$

R. Jones
10-4-94

WHC-SD-WM-DP-065, REV. 0

DET #

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12

GENIE AREA #	PK	1	2	3	4	5	6	7	8	9	10	11	12
SCT/SHIFT	Np	80	151	149	146	151	149	151	150	148	148	147	150
EmB A/G	Pu	109	231	229	226	229	228	230	229	228	228	228	231
DATE	Am	136	303	301	297	302	300	302	301	301	301	300	303
8-1-94	Cm	160	371	369	365	369	369	370	369	370	370	369	372
GENIE AREA #	PK	1	2	3	4	5	6	7	8	9	10	11	12
SCT/SHIFT	Np	81	153	151	147	153	149	150	150	145	145	145	149
EmB A/G	Pu	109	232	231	227	230	227	230	229	226	226	226	229
DATE	Am	136	305	303	298	305	300	302	301	299	299	298	302
8-2-94	Cm	160	372	371	366	371	368	370	368	367	367	367	371
GENIE AREA #	PK	1	2	3	4	5	6	7	8	9	10	11	12
SCT/SHIFT	Np	80	150	149	147	153	148	150	150	147	147	147	149
EmB A/G	Pu	109	228	225	226	230	227	230	229	228	227	227	229
DATE	Am	136	301	301	297	303	300	302	301	301	300	299	302
8-3-94	Cm	160	368	368	365	369	368	369	368	370	368	368	371
GENIE AREA #	PK	1	2	3	4	5	6	7	8	9	10	11	12
SCT/SHIFT	Np	81	149	147	147	155	148	151	149	145	144	149	150
EmB A/G	Pu	109	227	227	226	231	228	230	220	226	225	225	230
DATE	Am	136	299	300	298	304	300	302	299	298	297	301	303
8-4-94	Cm	160	368	367	366	371	369	370	367	367	366	369	372
GENIE AREA #	PK	1	2	3	4	5	6	7	8	9	10	11	12
SCT/SHIFT	Np	80	149	153	148	152	147	153	152	147	146	147	148
EmB A/G	Pu	109	227	232	228	229	226	232	231	227	227	227	229
DATE	Am	135	300	304	299	301	299	305	302	300	299	300	301
8-5-94	Cm	160	367	372	367	368	366	372	370	369	368	368	370
GENIE AREA #	PK	1	2	3	4	5	6	7	8	9	10	11	12
SCT/SHIFT	Np	80	151	149	146	152	148	152	149	147	147	147	148
SM / B-G	Pu	109	229	228	226	231	228	231	229	228	227	228	229
DATE	Am	135	303	301	297	304	300	303	300	300	300	300	301
8-6-94	Cm	160	370	369	365	368	369	371	368	369	369	368	370

NOTE: Np (²³⁷Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
 Pu (²³⁹Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
 Am (²⁴¹Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
 Cm (²⁴⁴Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

DET #

1

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12

GENIE AEA #	PK	1	2	3	4	5	6	7	8	9	10	11	12
SCT/SHIFT R D/G	Np	80	144	152	151	152	146	141	140	141	143	148	149
	Pu	109	223	231	231	222	222	222	223	223	223	229	230
DATE 4-28-94	Am	135	295	304	302		294	294	295	295	302	302	302
	Cm	160	362	372	370		365	365	366	366	370	370	371
GENIE AEA #	PK	1	2	3	4	5	6	7	8	9	10	11	12
SCT/SHIFT R D/G	Np	80	144	151	151	152	147			151	151	148	148
	Pu	108	223	231	231	229	223			232	232	228	229
DATE 4-29-94	Am	135	295	304	302	302	293			306	305	301	301
	Cm	159	361	372	370	369	365			375	374	370	370
GENIE AEA #	PK	1	2	3	4	5	6	7	8	9	10	11	12
SCT/SHIFT C/G	Np	80	151	149	148	152	150	150	151	149	150	147	148
	Pu	109	229	228	228	230	221	229	230	230	231	228	229
DATE 4-30-94	Am	135	300	301	299	303	297	301	302	303	304	300	302
	Cm	160	368	369	368	371	369	369	370	373	373	369	370
GENIE AEA #	PK	1	2	3	4	5	6	7	8	9	10	11	12
SCT/SHIFT M/D days	Np	80	148	148	148	152	out	151	151	151	151	out	147
	Pu	109	227	227	228	229	out	230	230	232	232	out	228
DATE 5-1-94	Am	135	299	299	299	301	service	302	302	306	305	service	300
	Cm	160	367	369	367	370		370	370	375	374		367
GENIE AEA #	PK	1	2	3	4	5	6	7	8	9	10	11	12
SCT/SHIFT A/G C/G	Np	80	150	150	150	149	150	153	152	149	151	149	149
	Pu	109	228	230	230	229	226	231	231	230	232	229	229
DATE 5-2-94	Am	135	300	302	302	300	297	303	302	304	305	302	302
	Cm	160	367	369	370	369	370	371	370	373	374	371	371
GENIE AEA #	PK	1	2	3	4	5	6	7	8	9	10	11	12
SCT/SHIFT A/G C/G	Np	80	149	152	152	152	out	151	153	out of service			
	Pu	108	227	231	232	230	out	229	231				
DATE 5-3-94	Am	135	299	304	303	301	service	301	303				
	Cm	360	366	372	371	369	↓	369	371	↓	↓	↓	↓

NOTE: Np (²³⁷Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
 Pu (²³⁹Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
 Am (²⁴¹Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
 Cm (²⁴⁴Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

WHC-SD-WM-DP-065, REV. 0

WHC-SD-WM-DP-065, REV. 0

R. Jones
9-20-92

CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS: USING PROCEDURE LQ-508-002

DETECTOR No. 14
 RADIONUCLIDE: Co-60
 HALF LIFE: 1925
 COUNT TIME: 5
 CPM BKG: 8
 CPM 1" BKG: 8
 2", 5" STD TIME ZERO DATE (HD): 15883
 1" STD TIME ZERO DATE (HD): 16573
 DATE COUNTED (HD): 16973
 DATE COUNTED 1" (HD): 16973
 CALIBRATED BY: RA JONES HD 0 = 09/25/44

STANDARD ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
100B40A2	1	03/16/91		92989	92994	93035	93405
100B40B1	1	03/16/91		192627	192410	191919	193055
100B40C1	1	03/16/91		275186	275194	276467	277850
32B40A4	2	03/16/91		74167	73525	74735	74674
32B40B3	2	03/16/91		142004	142342	143294	142285
32B40C4	2	03/16/91		203583	203979	204919	204002
32B40A5	5	03/16/91		70819	71365	70294	70476
32B40B6	5	03/16/91		141064	141079	139685	142440
32B40C5	5	03/16/91		205623	206968	206535	205895

WHC-SD-WM-DP-065, REV. 0

STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
100B40A2	1"	67290	18613	1.15	21497	0.3195
100B40B1	1"	137800	38493	1.15	44456	0.3226
100B40C1	1"	199700	55227	1.15	63783	0.3194

AVERAGE, 1" = 0.3205 +/- @95% 0.0036 1.12 % ON 03/16/91

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
32B40A4	2"	70480	14847	1.48	21983	0.3119
32B40B3	2"	135100	28488	1.48	42181	0.3122
32B40C4	2"	202400	40816	1.48	60435	0.2986
AVERAGE, 2" =		0.3076 +/- @95%		0.0153	4.96 %	ON 03/16/91

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
32B40A5	5"	70160	14140	1.48	20936	0.2984
32B40B6	5"	135700	28205	1.48	41762	0.3078
32B40C5	5"	201900	41243	1.48	61067	0.3025
AVERAGE, 5" =		0.3029 +/- @95%		0.0092	3.03 %	ON 03/16/91

NEW EFFS FOR DET	14 Co-60	1" =	0.3205	2" =	0.3076
			5" =	0.3029	

WHC-SD-WM-DP-065, REV. 0

CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS: USING PROCEDURE LQ-508-002

DETECTOR No. 14

RADIONUCLIDE: Am-241
 HALF LIFE: 154497
 COUNT TIME: 5
 CPM BKG: 0.5

TIME ZERO DATE (HD): 15897

DATE COUNTED (HD): 16973

10-15-92

CALIBRATED BY: RA JONES HD 0 = 09/25/44

RA Jones

STANDARD ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
36B40A8	1	03/16/91		87483	87372	87925	88316
36B40B7	1	03/16/91		159352	158460	159108	159191
36B40C7	1	03/16/91		230843	230757	230921	232459
36B40A3	2	03/16/91		69454	69575	69518	69568
36B40B3	2	03/16/91		128127	127361	127118	127197
36B40C3	2	03/16/91		179974	179903	181057	180724
36B40A6	5	03/16/91		69515	69809	69580	69692
36B40B6	5	03/16/91		143043	143396	144729	141218
36B40C5	5	03/16/91		197772	197178	197963	197369

WHC-SD-WM-DP-065, REV. 0

STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A8	1"	60570	17554	1.00	17639	0.2912
36B40B7	1"	109900	31805	1.00	31959	0.2908
36B40C7	1"	159700	46249	1.00	46472	0.2910

AVERAGE, 1" = 0.2910 +/- @95% 0.0004 0.14 % ON 03/16/91

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A3	2"	61800	13905	1.00	13973	0.2261
36B40B3	2"	110700	25490	1.00	25613	0.2314
36B40C3	2"	161400	36082	1.00	36257	0.2246
AVERAGE, 2" =		0.2274 +/- @95%	0.0069	3.05 %	ON	03/16/91

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A6	5"	59470	13929	1.00	13997	0.2354
36B40B6	5"	109800	28619	1.00	28757	0.2619
36B40C5	5"	160100	39514	1.00	39705	0.2480
AVERAGE, 5" =		0.2484 +/- @95%	0.0260	10.48 %	ON	03/16/91

NEW EFFS FOR DET 14 Am-241 1" = 0.2910 2" = 0.2274

5" = 0.2484

CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS: USING PROCEDURE LQ-508-002

R. Jones
.27-93

DETECTOR NO.		13		TIME ZERO DATE (HD):		15897	
RADIONUCLIDE:		Am-241		DATE COUNTED (HD):		17655	
HALF LIFE:		154497 DAYS		DATE COUNTED (HD):		17655	
COUNT TIME:		5 MINUTES		DATE COUNTED (HD):		17655	
BACKGROUND:		0.4 CTS/MIN		DATE COUNTED (HD):		17655	
CALIBRATED BY:		RA JONES		HD 0 =		09/25/44	

STANDARD ID	SIZE	DATE	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
36B40A8	1"	01/26/93	91681	91625	91846	91975
36B40B7	1"	01/26/93	162879	162277	162160	163913
36B40C7	1"	01/26/93	235405	236017	235932	236684
36B40A3	2"	01/26/93	71378	70965	71118	71361
36B40B3	2"	01/26/93	130257	130024	129480	129640
36B40C3	2"	01/26/93	183090	181717	182673	182663
36B40A6	5"	01/26/93	71356	70882	71625	71307
36B40B6	5"	01/26/93	146902	145100	145724	146786
36B40C5	5"	01/26/93	199376	198941	198547	199737

STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A8	1"	60570	18356	1.01	18501	0.3055
36B40B7	1"	109900	32561	1.01	32819	0.2986
36B40C7	1"	159700	47202	1.01	47575	0.2979
AVERAGE, 1" =		0.3007	+/- @95	0.0082	2.72 %	ON 01/26/93
STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A3	2"	61800	14241	1.01	14353	0.2323
36B40B3	2"	110700	25970	1.01	26175	0.2365
36B40C3	2"	161400	36507	1.01	36796	0.2280
AVERAGE, 2" =		0.2322	+/- @95	0.0083	3.58 %	ON 01/26/93
STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A6	5"	59470	14258	1.01	14371	0.2417
36B40B6	5"	109800	29225	1.01	29457	0.2683
36B40C5	5"	160100	39830	1.01	40145	0.2507
AVERAGE, 5" =		0.2536	+/- @95	0.0265	10.46 %	ON 01/26/93

NEW EFFS FOR DET	13	Am-241	1" =	0.3007	2" =	0.2322
	ON 01/26/93		5" =	0.2536		

WHC-SD-WM-DP-065, REV. 0

CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS: USING PROCEDURE LQ-508-002

R. Jones
1-27-93

DETECTOR NO. 13		2" 5" STD		TIME ZERO DATE (HD)		15883	
RADIONUCLIDE: Co-60		1" STD		TIME ZERO DATE (HD)		18573	
HALF LIFE: 1925 DAYS				DATE COUNTED (HD)		17655	
COUNT TIME: 5 MINUTES				DATE 1" COUNTED (H)		17655	
BACKGROUND: 12 CTS/MIN				HD 0 =		09/26/44	
BACKGROUND, 1": 12 CTS/MIN							
CALIBRATED BY: RA JONES							
STANDAR ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
100B40A2	1"	01/26/93		78776	78863	79180	79256
100B40B1	1"	01/26/93		161690	162494	162024	162588
100B40C1	1"	01/26/93		232056	231970	231737	230508
32B40A4	2"	01/26/93		61020	60587	61283	61422
32B40B3	2"	01/26/93		118314	119060	118335	118367
32B40C4	2"	01/26/93		166802	166975	166850	167755
32B40A5	5"	01/26/93		60827	60175	60130	60192
32B40B6	5"	01/26/93		118775	119091	119506	118776
32B40C5	5"	01/26/93		176357	177402	175892	175740
STANDAR ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY	
100B40A2	1"	67290	15792	1.48	23315	0.3465	
100B40B1	1"	137800	32428	1.48	47876	0.3474	
100B40C1	1"	199700	46302	1.48	68359	0.3423	
AVERAGE, 1" =		0.3454	+/- @95	0.0053	1.55 %	ON	01/26/93
STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY	
32B40A4	2"	70480	12204	1.89	23099	0.3277	
32B40B3	2"	135100	23692	1.89	44844	0.3319	
32B40C4	2"	202400	33407	1.89	63233	0.3124	
AVERAGE, 2" =		0.3240	+/- @95	0.0201	6.21 %	ON	01/26/93
STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY	
32B40A5	5"	70160	12054	1.89	22816	0.3252	
32B40B6	5"	135700	23795	1.89	45040	0.3319	
32B40C5	5"	201900	35258	1.89	66735	0.3305	
AVERAGE, 5" =		0.3292	+/- @95	0.0069	2.11 %	ON	01/26/93
NEW EFFS FOR DET 13		Co-60	1" =	0.3454	2" =	0.3240	
ON 01/26/93			5" =	0.3292			

WHC-SD-WM-DP-065, REV. 0

CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS

13977

RADIONUCLIDE SR-90

HALF LIFE 10120

TIME ZERO (HD) 15883 ^{KL} 12/7/90

COUNT TIME 5 MINUTES

HANFORD DATE (HD) WHEN COUNTED 16838

DETECTOR NO. 12

BKG. 14 C/M

STANDARD ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
<u>48B16A</u>	<u>1</u>	<u>11/13/90</u>	<u>0900</u>	<u>81135</u>	<u>81996</u>	<u>80921</u>	<u>81317</u>
<u>48B16C</u>	<u>1</u>	<u>11/13/90</u>	<u>1015</u>	<u>107007</u>	<u>105775</u>	<u>106399</u>	<u>106091</u>
<u>48B16F</u>	<u>1</u>	<u>11/13/90</u>	<u>1100</u>	<u>206820</u>	<u>206394</u>	<u>206417</u>	<u>206448</u>
<u>48B16H</u>	<u>2</u>	<u>11/13/90</u>	<u>1310</u>	<u>61630</u>	<u>62519</u>	<u>62042</u>	<u>61866</u>
<u>48B16I</u>	<u>2</u>	<u>11/13/90</u>	<u>1355</u>	<u>101294</u>	<u>99364</u>	<u>100213</u>	<u>101181</u>
<u>48B16K</u>	<u>2</u>	<u>11/13/90</u>	<u>1500</u>	<u>191120</u>	<u>184970</u>	<u>194212</u>	<u>194124</u>

WHC-SD-WM-DP-065, REV. 0

GR Puluck

CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS: USING PROCEDURE LQ-508-002 ^{12/7/90}

DETECTOR No. 12

TIME ZERO DATE (HD): 13977

RADIONUCLIDE: SrY-90

HALF LIFE: 10120

DATE COUNTED (HD): 16850

COUNT TIME: 5

CPM BKG: 14

CALIBRATED BY: KL KOCHER HD 0 = 09/25/44

STANDARD ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
48B16A	1	11/13/90		81135	81996	80921	81317
48B16C	1	11/13/90		107007	105775	106399	106091
48B16F	1	11/13/90		206820	206394	206417	206448
48B16H	2	11/13/90		61630	62519	62042	61866
48B16I	2	11/13/90		101294	99364	100213	101181
48B16K	2	11/13/90		191120	184970	194212	194124

189

WHC-SD-WM-DP-065, REV. 0

GR Puluck
12/7/91

STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
48B16A	1"	39560	16254	1.22	19789	0.5002
48B16C	1"	62530	21250	1.22	25871	0.4137
48B16F	1"	104400	41290	1.22	50270	0.4815
AVERAGE, 1" =		0.4652 +/- @95%		0.0892	19.18 %	ON 11/13/90
STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
48B16H	2"	34580	12389	1.22	15083	0.4362
48B16I	2"	60690	20089	1.22	24457	0.4030
48B16K	2"	108600	38207	1.22	46516	0.4283
AVERAGE, 2" =		0.4225 +/- @95%		0.0340	8.05 %	ON 11/13/90
STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
	5"		0	1.22	0	ERR
	5"		0	1.22	0	ERR
	5"		0	1.22	0	ERR
AVERAGE, 5" =		ERR +/- @95%		ERR	ERR %	ON 11/13/90

NEW EFFS FOR DET 12 SrY-90 1" = 0.4652 2" = 0.4225

5" = ERR

5/21/89

~~03/18/89~~

~~A. Keller~~ 11/18/92

Det 12 Sr/Y-90 ratios

WHC-SD-WM-DP-065, REV. 0

1" SrY-90 EFF

0.5162

1" Sr-90 EFF

0.4912

1" Y-90 EFF

0.5412

2" SrY-90 EFF

0.4476

2" Sr-90 EFF

0.4233

2" Y-90 EFF

0.4719

$E_{sr} = .4912 / .5162 = 0.9516, 1"$

$E_y = .5412 / .5162 = 1.0484, 1"$

$E_{sr} = .4233 / .4476 = 0.9457, 2"$

$E_y = .4719 / .4476 = 1.0543, 2"$

RATIOS GENERATED USING
PROCEDURE LQ-508-005.

DATA IN LAB NOTEBOOK
RHO-QA-NB-47, VOL 5:
PAGES 32-36.

R. J. J. J.
11-18-92

WHC-SD-WM-DP-065, REV. 0

APC GEOMETRY STD 5816 (83-17)
 COUNTED ON APC # 1
 STD VALUE: 98530 D/M
 TIME ZERO: 01/29/90
 BKG: 10
 TODAY'S DATE: 08/18/92
 DECAY CORR'N: 2.552 YEARS
 NEW STD VALUE: 98127

R. J. Jones
 10-4-94

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
243204	5	48631	307	48938	0.4987
243913	5	48773	309	49082	0.5002
244771	5	48944	311	49256	0.5020
243758	5	48742	309	49050	0.4999
243766	5	48743	309	49052	0.4999
243637	5	48717	309	49026	0.4996
243514	5	48693	308	49001	0.4994
243765	5	48743	309	49052	0.4999
243849	5	48760	309	49069	0.5001
244044	5	48799	310	49108	0.5005

FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5020				
MIN	0.4987	48754	309	49063	0.5000

WHC-SD-WM-DP-065, REV. 0

APC GEOMETRY STD 5B16 (83.17)
 COUNTED ON APC # 3
 STD VALUE: 98530 D/M
 TIME ZERO: 01/29/90
 BKG: 9
 TODAY'S DATE: 08/19/92
 DECAY CORR'N: 2.554 YEARS
 NEW STD VALUE: 98127

R. Jones
 12/4/94

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242920	5	48575	307	48882	0.4981
242932	5	48577	307	48884	0.4982
242052	5	48401	305	48706	0.4964
243038	5	48599	307	48906	0.4984
242907	5	48572	307	48879	0.4981
242795	5	48550	306	48856	0.4979
243214	5	48634	307	48941	0.4988
243707	5	48732	309	49041	0.4998
242647	5	48520	306	48826	0.4976
241653	5	48322	304	48625	0.4955

FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.4998				
MIN	0.4955	48548	306	48855	0.4979

WHC-SD-WM-DP-065, REV.0

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 2
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/20/92
DECAY CORR'N: 2.557 YEARS

Referee
10-4-92

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242703	5	48531	306	48837	0.4977
243638	5	48718	309	49026	0.4996
243386	5	48667	308	48975	0.4991
243764	5	48743	309	49052	0.4999
244275	5	48845	310	49155	0.5009
244108	5	48812	310	49121	0.5006
244275	5	48845	310	49155	0.5009
243645	5	48719	309	49028	0.4996
243015	5	48593	307	48900	0.4983
244057	5	48801	310	49111	0.5005
243516	5	48693	308	49001	0.4994
243510	5	48692	308	49000	0.4994
243627	5	48715	309	49024	0.4996
243690	5	48728	309	49037	0.4997
243901	5	48770	309	49079	0.5002
244466	5	48883	311	49194	0.5013

FOR	16 TRIALS	AVG	AVG	AVG ²	AVG
MAX	0.5013				
MIN	0.4977	48735	309	49043	0.4998

2 AMF #5-79 on LS-5801 8-25-73
 USER: ID:LMCS C-14 PRESET TIME: 1.00 TUE 24 AUG 1993 12:58
 SAMPLE REPEAT: 1 CYCLE REPEAT: 1 SCR:N RS232:N
 #1: 1 AQC:Y QCF:N RCM:Y 2 PHASE MONITOR:Y POST CHK:N VIAL:6 VOLUME:1
 RCM-TIME: 0.10 INT:999.95
 CHANNEL 1-LL: 0 UL: 700 2SIGMA: 0.10 BKG SUB: 0.00 BKG 2SIG: 0.00 LSR: 0

SINGLE LABEL DPM SET UP ON 20 DEC 1991 13:34

UNKNOWN ID:C-14 UNKNOWN REPLICATES: 1
 UNKNOWN NORM FACTOR ISO1:Q 1.00000
 UNKNOWN UNITS ISO1:DPM
 UNKNOWN HALF LIFE CORRECTION:Y TO 10 NOV 1992 12:00
 INDIVIDUAL UNKNOWN NORM FACTORS:N BACKGROUND QUENCH CURVES:Y
 STANDARD ID:BECKMAN LOT 000322
 HALF LIFE(DAYS) ISO1: 2092825.
 STANDARD DPM ISO1: 158966.0

WHC-SD-WM-DP-065, REV.0

SAM	PDS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	2P	ERR
B1	**	1	1	35.00	33.81	1.00	1.37 160.0	1.95	**	

BACKGROUND QUENCH CURVES: CONSTANT

CHANNEL 1

QUENCH CURVE COEFFICIENTS

: 35.00000 B:0.00000000 C:0.00000000 D:0.000000000000

BACKGROUND QUENCH CURVE CORRELATION TABLE

BKG	H#	MEASURED CPM.	CALCULATED CPM.	PERCENT DIFF.	FLAG
1	160.0	35.00	35.00	0.00	

BACKGROUND QUENCH LIMITS LOW:0.000 HIGH:1000.
 TOTAL QUENCH LIMITS LOW:0.000 HIGH:253.7

SAM	PDS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	2P	ERR
S1	**	3	1	154235.00	0.51	1.00	2.99 -4.0	0.00		
ISO1 %EFF CH1:97.01										
S2	**	4	1	138167.00	0.54	1.00	4.53 177.0	0.00	**	
ISO1 %EFF CH1:86.90										
S3	**	5	1	133104.00	0.55	1.00	6.05 206.0	0.00		
ISO1 %EFF CH1:83.72										
1	**	6	1	148859.00	0.52	1.00	7.59 87.0	0.00		
ISO1 %EFF CH1:93.63										

SAM	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	2P	ERR
S5	** - 7	1	147173.00	0.52	1.00	9.13	107.0	0.00	**	
			ISO1 %EFF CH1:92.57							
S6	** - 8	1	119488.00	0.58	1.00	10.66	253.0	0.00	**	
			ISO1 %EFF CH1:75.15							
S7	** - 9	1	105897.00	0.61	1.00	12.18	299.0	0.00		
			ISO1 %EFF CH1:66.60							
S8	** - 10	1	151845.00	0.51	1.00	13.72	34.0	0.00		
			ISO1 %EFF CH1:95.51							
S9	** - 11	1	126737.00	0.56	1.00	15.25	230.0	0.00		
			ISO1 %EFF CH1:79.71							
S10	** - 12	1	142189.00	0.53	1.00	16.78	143.0	0.00	**	
			ISO1 %EFF CH1:89.43							

WHC-SD-WM-DP-065, REV.0

ISOTOPE 1 QUENCH STANDARDS

STANDARD	H#	%EFF CH1
1	-4.00	97.01
8	34.00	95.51
4	87.00	93.63
5	107.0	92.57
10	143.0	89.43
2	177.0	86.90
3	206.0	83.72
9	230.0	79.71
6	253.0	75.15
7	299.0	66.60

*¹⁴C on LS 5801**R. Jones
8-25-93*

QUENCH LIMITS LOW:0.000 HIGH:299.0

SL Calibration: 14C & Se 79

STANDARD COUNT

10 AUG 1993 16:03

Standard Curve Id: BECKMAN

Comment1: LS6000

Comment2: LA-508-121

14C DPM: 158966.0

WHC-SD-WM-DP-065, REV.0

Date of Standardization: 10 NOV 1992 00:00

H# Efficiency Curve Correlation Table

Quench Curve Coefficients

A: 4.568369

B: -0.000263

C: 0.0000010

D: -0.0000000124

STD. No.	H#	Measured Efficiency	Calculated Efficiency	Percent Difference	Flag
1	-4.5	96.15	96.50	0.4	
2	33.8	96.20	95.60	-0.6	
3	87.4	94.48	94.13	-0.4	
4	108.9	92.73	93.26	0.6	
5	146.6	90.79	91.11	0.4	
6	179.2	88.36	88.39	0.0	
7	207.3	85.38	85.29	-0.1	
8	233.5	81.82	81.73	-0.1	
9	258.7	77.98	77.67	-0.4	
10	297.5	70.05	70.25	0.3	

Quench Limits

Low: -4.5

High: 297.53

Reference
8-25-93

IC# Efficiency Curve Correlation Table

Quench Curve Coefficients

Lower A: 23.36768 B: 8.464923 C: -0.374750 D: 0.005800229

Upper A: 77.48353 B: 0.7727764 C: -0.010291 D: 0.00004410878

Joining Point: 21.10563

STD. No.	IC#	Measured Efficiency	Calculated Efficiency	Percent Difference	Flag
1	75.943	96.15	96.14	-0.0	
2	56.697	96.20	96.26	0.1	
3	37.151	94.48	94.25	-0.2	
4	31.483	92.73	92.99	0.3	
5	23.681	90.79	90.60	-0.2	
6	18.530	88.36	88.45	0.1	
7	15.013	85.38	85.61	0.3	
8	12.449	81.82	81.86	0.0	
9	10.445	77.98	77.51	-0.6	
10	8.056	70.05	70.27	0.3	

Quench Limits

Low: 8.056

High: 75.943

No Background Curve Stored

SL Calibration: 3H

STANDARD COUNT

10 AUG 1993 15:37

Standard Curve Id: BECKMAN

Comment1: LS-6000

Comment2: LA-508-121

3H DPM: 531082.0

WHC-SD-WM-DP-065, REV. 0

Date of Standardization: 20 MAY 1993 00:00

H# Efficiency Curve Correlation Table

Quench Curve Coefficients

A: 4.173221 B: -0.002324 C: -0.000017 D: -0.0000000055

STD. No.	H#	Measured Efficiency	Calculated Efficiency	Percent Difference	Flag
1	-4.3	65.63	65.56	-0.1	
2	35.3	58.37	58.53	0.3	
3	84.6	47.21	47.03	-0.4	
4	112.9	39.73	39.83	0.2	
5	146.0	31.45	31.55	0.3	
6	180.7	23.82	23.61	-0.9	
7	203.6	18.88	18.98	0.6	
8	226.9	14.93	14.88	-0.3	
9	248.2	11.63	11.67	0.4	
10	294.5	6.45	6.44	-0.1	

Quench Limits Low: -4.3 High: 294.48

IC# Efficiency Curve Correlation Table

Quench Curve Coefficients

Lower A: 346.2757 B: -385.9993 C: 140.4102 D: -16.20566
 Upper A: -68.96732 B: 37.68019 C: -3.685631 D: 0.1302736
 Joining Point: 2.940263

STD. No.	IC#	Measured Efficiency	Calculated Efficiency	Percent Difference	Flag
1	8.686	65.63	65.63	-0.0	
2	6.912	58.37	58.41	0.1	
3	5.344	47.21	47.02	-0.4	
4	4.667	39.73	39.85	0.3	
5	4.040	31.45	31.70	0.8	
6	3.507	23.82	23.46	-1.5	
7	3.251	18.88	19.05	0.9	
8	3.016	14.93	14.72	-1.4	
9	2.865	11.63	11.80	1.5	
10	2.562	6.45	6.45	-0.0	

Quench Limits Low: 2.562 High: 8.686

No Background Curve Stored

5-12-90 *Agree calibration ok.*

222-S COUNTING ROOM WESTINGHOUSE HANFORD

Refer to Page 3 of LA-508-603
 #16 is the temporary detector number
 for detector #6. Its calibration is
 the same as that of #6.

A. K. Dinkler

10/10/90

Calibration efficiency performed

5/21/90

Jg 11/2/92

CAL> EFF

MCA UNIT NUMBER (2):

ADC UNIT NUMBER (4.0):

DETECTOR NUMBER (12): 16

MCA MEMORY REGION (FULL):

DATE SPECTRUM COLLECTED: 18-MAY-90.

ILLEGAL DATE

DATE SPECTRUM COLLECTED: 18-MAY-90

TIME COLLECT STARTED: 12:00

GEOMETRY NUMBER (12): 1

GEOMETRY DESCRIPTION: 45B40-A

ACTIVITY UNITS (uci):

CROSSOVER ENERGY: 0

CALIBRATION SOURCE ENTRY OPTIONS:

TYPE A CARRIAGE RETURN FOR MANUAL ENTRY,

TYPE AN INTEGER (0-999) TO USE A SOURCE LIBRARY,

TYPE A PLUS SIGN BEFORE THE INTEGER (+0 - +999)

TO CREATE A SOURCE LIBRARY DURING MANUAL ENTRY.

OPTION: 16

45B40-A/WELL

DO YOU WANT TO ENTER ANY EFFICIENCY POINTS MANUALLY (NO): N

DIMENSIONAL UNITS OF STANDARD: EA

SIZE OF STANDARD IN EA: 1.00000

NUMBER OF POINTS: 6

ACTIVITY IN MICROCURIES [YES/NO]:

WHC-SD-WM-DP-065, REV. 0

PEAK

1

ENERGY: 39.600

ACTIVITY: 1.604200E+02

ACTIVITY ONE SIGMA: 0.000000E-01

HALF-LIFE: D5.84E9

DECAY TIME (0.000000E-01 MINS.): 6-JUN-88

TIME OF SOURCE CALIBRATION: 12:00

DECAY TIME: 1.023840E+06 MINS

EFFICIENCY = 5.214146E-01 (+- 1.229902E-03)

PEAK

2

ENERGY: 136.000

ACTIVITY: 8.863000E+01

ACTIVITY ONE SIGMA: 0.000000E-01

HALF-LIFE: D119.77

DECAY TIME (1.023840E+06 MINS.):

EFFICIENCY = 3.444963E-01 (+- 2.133579E-02)

PEAK

3

ENERGY: 176.290

ACTIVITY: 1.175000E+01

ACTIVITY ONE SIGMA: 0.000000E-01

HALF-LIFE: D1004.4

DECAY TIME (1.023840E+06 MINS.):

EFFICIENCY = 5.669897E-01 (+- 6.718306E-03)

PEAK

4

ENERGY: 427.000

ACTIVITY: 5.184000E+01
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D1004.4
DECAY TIME (1.023840E+06 MINS.):

WHC-SD-WM-DP-065, REV.0

EFFICIENCY = 1.204103E-01 (+- 1.266273E-03)

PEAK 5

ENERGY: 463.000
ACTIVITY: 1.814000E+01
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D1004.4
DECAY TIME (1.023840E+06 MINS.):

EFFICIENCY = 1.984882E-01 (+- 3.204850E-03)

PEAK 6

ENERGY: 600.770
ACTIVITY: 3.093000E+01
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D1004.4
DECAY TIME (1.023840E+06 MINS.):

EFFICIENCY = 8.347035E-02 (+- 1.300690E-03)

STEM EFFICIENCY COEFFICIENTS, PART 2

$G(EFF) = -4.273833E+01 + 2.446928E+01 * LOG(E) - 4.491113E+00 * LOG(E)^2$
 $+ 2.581028E-01 * LOG(E)^3$

L>

ID(12CHAR)TC 99 USER 5 THU 15 OCT 1992 09:58
 PRESET TIME(.01-999.99) 20.00 H#(0-10) 1 SCR(N/X:Y) N
 SAMPLE REPEAT(0-10) 1 AQC(Y/N) Y PROGRAM SUMMARY(Y/N) Y
 CYCLE REPEAT(1-10) 1 QCF(Y/N) N LSR: TIME(.1-999.95) 0.10 INT999.95
 232 OUTPUT(Y/N) N RCM(Y/N) Y RCM: TIME(.1-999.95) 0.10 INT999.95
 PHASE(Y/N) N

LS 5801

Rafone

10-15-92

COUNT CHANNELS(1.2.3) 1
 CHANNEL SETTINGS LL UL 2SIGMA BKG SUB BKG 2SIG LSR
 CHANNEL 1 150 800 0.10 0.00 0.00 0

DATA CALCULATION PROGRAM (SELECT ONE) 5
 1 CPM 2 COUNTS 3 SL % REF 4 DL % REF 5 SL DPM 6 DL DPM
 7 TL DPM 8 SL DIG INT 9 DL DIG INT 10 SL RIA
 PRINT FORMAT(1=STANDARD/2=SHORT/3=SELECT) 1

WHC-SD-WM-DP-065, REV. 0

SINGLE LABEL DPM SET UP ON 20 DEC 1991 (EDITED)

THU 15 OCT 1992 09:55

UNKNOWN ID(20CHAR)TC 99
 UNKNOWN REPLICATES(1-10) 1
 UNKNOWN NORM FACTOR(P/Q 7DIGITS) ISO1:Q 1.00000
 UNKNOWN UNITS(5CHAR) ISO1: DPM
 INDIVIDUAL UNKNOWN NORM FACTORS(Y/N)N
 HALF LIFE CORRECTION(Y/N)N

BACKGROUND QUENCH CURVES(Y/N)Y COUNT BACKGROUND SAMPLES(Y/N)Y
 STORE AND RE-USE THIS BACKGROUND COUNT(Y/N)N

STANDARD ID(20CHAR)131B28-A 1-10
 QUENCH LIMITS(5DIGITS)LOW:73.67 HIGH:207.7
 QUENCH MODE(S/H)H

QUENCH STANDARDS STORED

SET UP ON 20 DEC 1991(EDITED)

STANDARD ID(20CHAR)131B28-A 1-10

COUNT QUENCH STANDARDS(Y/N)N QUENCH MODE(S/H)H

IS01

STANDARD DPM(10DIGITS)

0.00000000

HALF LIFE. DAYS(N/10DIGITS)

N

REFERENCE DATE (DAY MON YEAR)

1 JAN 1983

(HOUR MIN)

00 00

WHC-SD-WM-DP-065, REV.0

QUENCH LIMITS(5DIGITS)LOW:73.67

HIGH:207.7

PLOT QUENCH CURVES(Y/N)N

EDIT OR RE-COUNT QUENCH STANDARDS(N=NO/E=EDIT/R=RE-COUNT)N

QUENCH STANDARDS FOR ISOTOPE 1

THU 15 OCT 1992 10:01

H#	EFF1	H#	EFF1
73.67	95.93	87.00	95.62
100.3	95.45	110.0	94.96
128.0	94.66	137.7	94.41
145.7	94.32	164.0	93.07
179.3	92.90	207.7	91.02

DELETE STANDARD(N/ H#)N

RE-ORDER(Y/N)N

DISPLAY QUENCH CURVE(Y/N)N

PLOT QUENCH CURVE(Y/N)N

L Calibration: TC99

STANDARD COUNT

22 NOV 1993 16:44

Standard Curve Id: TC99

Comment1: LS6000

Comment2: LA-568-121

TC99 DPM: 49604.00

Date of Standardization: 13 NOV 1993 12:00

WHC-SD-WM-DP-065, REV. 0

H# Efficiency Curve Correlation Table

Standard Curve Coefficients

A: 4.599736

B: -0.000390

C: 0.0000040

D: -0.000000127

TC C.	H#	Measured Efficiency	Calculated Efficiency	Percent Difference	Flag
1	90.8	96.32	96.47	0.2	
2	115.3	96.26	96.07	-0.2	
3	136.4	95.80	95.68	-0.1	
4	157.6	95.46	95.18	-0.3	
5	175.9	94.10	94.61	0.5	
6	193.5	93.90	93.91	0.0	
7	296.8	85.34	84.99	-0.4	
8	318.0	81.30	81.88	0.7	
9	720.5	81.81	81.47	-0.4	
10	345.6	77.54	77.53	-0.0	

H# Limits Low: 90.8 High: 345.65

IC# Efficiency Curve Correlation Table

Standard Curve Coefficients

A: 4.599736

B: -0.000390

C: 0.0000040

D: -0.000000127

E: 0.000000000

F: 0.000000000

G: 0.000000000

H: 0.000000000

I: 0.000000000

J: 0.000000000

K: 0.000000000

L: 0.000000000

M: 0.000000000

N: 0.000000000

O: 0.000000000

P: 0.000000000

Q: 0.000000000

R: 0.000000000

S: 0.000000000

T: 0.000000000

U: 0.000000000

V: 0.000000000

W: 0.000000000

X: 0.000000000

Y: 0.000000000

Z: 0.000000000

AA: 0.000000000

AB: 0.000000000

AC: 0.000000000

AD: 0.000000000

AE: 0.000000000

AF: 0.000000000

AG: 0.000000000

TC C.	IC#	Measured Efficiency	Calculated Efficiency	Percent Difference	Flag
1	69.448	96.32	96.24	-0.1	
2	58.375	96.26	96.35	0.1	
3	48.329	95.80	95.69	-0.1	
4	41.027	95.46	94.85	-0.7	
5	36.150	94.10	94.47	0.4	
6	32.048	93.90	94.20	0.3	
7	14.433	85.34	85.01	-0.4	
8	12.473	81.30	81.79	0.6	
9	12.229	81.81	81.34	-0.6	
10	10.400	77.54	77.72	0.2	

IC# Limits Low: 10.400 High: 69.448

5-12-90 *Agree calibration ok.*
 222-S COUNTING ROOM WESTINGHOUSE HANFORD

CAL> EFF
 MCA UNIT NUMBER (2):
 ADC UNIT NUMBER (4.0):
 DETECTOR NUMBER (12): 16
 MCA MEMORY REGION (FULL):
 DATE SPECTRUM COLLECTED: 18-MAY-90

ILLEGAL DATE

DATE SPECTRUM COLLECTED: 18-MAY-90

TIME COLLECT STARTED: 12:00

GEOMETRY NUMBER (12): 1

GEOMETRY DESCRIPTION: 45B40-A

ACTIVITY UNITS (uCi) :

CROSSOVER ENERGY: 0

CALIBRATION SOURCE ENTRY OPTIONS:

TYPE A CARRIAGE RETURN FOR MANUAL ENTRY,
 TYPE AN INTEGER (0-999) TO USE A SOURCE LIBRARY,
 TYPE A PLUS SIGN BEFORE THE INTEGER (+0 - +999)
 TO CREATE A SOURCE LIBRARY DURING MANUAL ENTRY.

OPTION: 16

45B40-A/WELL

DO YOU WANT TO ENTER ANY EFFICIENCY POINTS MANUALLY (NO): N

DIMENSIONAL UNITS OF STANDARD: EA

SIZE OF STANDARD IN EA : 1.00000

NUMBER OF POINTS: 6

ACTIVITY IN MICROCURIES [YES/NO]:

PEAK

1

ENERGY: 39.600

ACTIVITY: 1.604200E+02

ACTIVITY ONE SIGMA: 0.000000E-01

HALF-LIFE: D5.84E9

DECAY TIME (0.000000E-01 MINS.): 6-JUN-88

TIME OF SOURCE CALIBRATION: 12:00

DECAY TIME: 1.023840E+06 MINS

EFFICIENCY = 5.214146E-01 (+- 1.229902E-03)

PEAK

2

ENERGY: 136.000

ACTIVITY: 8.863000E+01

ACTIVITY ONE SIGMA: 0.000000E-01

HALF-LIFE: D119.77

DECAY TIME (1.023840E+06 MINS.):

EFFICIENCY = 3.444963E-01 (+- 2.133579E-02)

PEAK

3

ENERGY: 176.290

ACTIVITY: 1.175000E+01

ACTIVITY ONE SIGMA: 0.000000E-01

HALF-LIFE: D1004.4

DECAY TIME (1.023840E+06 MINS.):

EFFICIENCY = 5.669897E-01 (+- 6.718306E-03)

PEAK

4

ENERGY: 427.000

G&A to E-727 analysis

*Refer to Page 3 of LA-555-663
 #16 is the temporary detection number
 for detector #6 its calibration is
 the same as rear of #6*

A.K. Quinlan

12/10/90

*Calibration efficiency performed
 5/21/90*

July 12/92

ACTIVITY: 5.184000E+01
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D1004.4
DECAY TIME (1.023840E+06 MINS.):
EFFICIENCY = 1.204103E-01 (+- 1.266273E-03)

PEAK 5

ENERGY: 463.000
ACTIVITY: 1.814000E+01
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D1004.4
DECAY TIME (1.023840E+06 MINS.):
EFFICIENCY = 1.984882E-01 (+- 3.204850E-03)

WHC-SD-WM-DP-065, REV. 0

PEAK 6

ENERGY: 600.770
ACTIVITY: 3.093000E+01
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D1004.4
DECAY TIME (1.023840E+06 MINS.):
EFFICIENCY = 8.347035E-02 (+- 1.300690E-03)

SYSTEM EFFICIENCY COEFFICIENTS, PART 2

$$\text{LOG(EFF)} = -4.273833E+01 + 2.446928E+01 * \text{LOG(E)} - 4.491113E+00 * \text{LOG(E)}^2 \\ + 2.581028E-01 * \text{LOG(E)}^3$$

AL>

5-21-90 *Agnes calibration ok.*
222-S COUNTING ROOM WESTINGHOUSE HANFORD

CAL> EFF
MCA UNIT NUMBER (2):
ADC UNIT NUMBER (4.0):
DETECTOR NUMBER (12): 16
MCA MEMORY REGION (FULL):
DATE SPECTRUM COLLECTED: 18-MAY-90

ILLEGAL DATE

DATE SPECTRUM COLLECTED: 18-MAY-90
TIME COLLECT STARTED: 12:00
GEOMETRY NUMBER (12): 1
GEOMETRY DESCRIPTION: 45B40-A
ACTIVITY UNITS (uCi) :
CROSSOVER ENERGY: 0
CALIBRATION SOURCE ENTRY OPTIONS:

TYPE A CARRIAGE RETURN FOR MANUAL ENTRY,
TYPE AN INTEGER (0-999) TO USE A SOURCE LIBRARY,
TYPE A PLUS SIGN BEFORE THE INTEGER (+0 - +999)
TO CREATE A SOURCE LIBRARY DURING MANUAL ENTRY.

OPTION: 16

45B40-A/WELL

DO YOU WANT TO ENTER ANY EFFICIENCY POINTS MANUALLY (NO): N

DIMENSIONAL UNITS OF STANDARD: EA

SIZE OF STANDARD IN EA : 1.00000

NUMBER OF POINTS: 6

ACTIVITY IN MICROCURIES [YES/NO]:

WHC-SD-WM-DP-065, REV. 0

PEAK 1
ENERGY: 39.600
ACTIVITY: 1.604200E+02
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D5.84E9
DECAY TIME (0.000000E-01 MINS.): 6-JUN-88
TIME OF SOURCE CALIBRATION: 12:00
DECAY TIME: 1.023840E+06 MINS
EFFICIENCY = 5.214146E-01 (+- 1.229902E-03)

PEAK 2
ENERGY: 136.000
ACTIVITY: 8.863000E+01
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D119.77
DECAY TIME (1.023840E+06 MINS.):
EFFICIENCY = 3.444963E-01 (+- 2.133579E-02)

PEAK 3
ENERGY: 176.290
ACTIVITY: 1.175000E+01
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D1004.4
DECAY TIME (1.023840E+06 MINS.):
EFFICIENCY = 5.669897E-01 (+- 6.718306E-03)

PEAK 4
ENERGY: 427.000

GEA for I-129 analysis

*Refer to Page 3 of LA-505-603
#16 is the temporary detection number
for detection #6. Its calibration is
the same as that of #6.*

A. K. Quinlan

10/10/90

Calibration efficiency performed

5/21/90

Fig 11/2/92

ACTIVITY: 5.184000E+01
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D1004.4
DECAY TIME (1.023840E+06 MINS.):
EFFICIENCY = 1.204103E-01 (+- 1.266273E-03)

PEAK 5

ENERGY: 463.000

ACTIVITY: 1.814000E+01

ACTIVITY ONE SIGMA: 0.000000E-01

HALF-LIFE: D1004.4

DECAY TIME (1.023840E+06 MINS.):

EFFICIENCY = 1.984882E-01 (+- 3.204850E-03)

WHC-SD-WM-DP-065, REV.0

PEAK 6

ENERGY: 600.770

ACTIVITY: 3.093000E+01

ACTIVITY ONE SIGMA: 0.000000E-01

HALF-LIFE: D1004.4

DECAY TIME (1.023840E+06 MINS.):

EFFICIENCY = 8.347035E-02 (+- 1.300690E-03)

SYSTEM EFFICIENCY COEFFICIENTS, PART 2

$\text{LOG(EFF)} = -4.273833\text{E}+01 + 2.446928\text{E}+01 * \text{LOG(E)} - 4.491113\text{E}+00 * \text{LOG(E)}^2$
 $+ 2.581028\text{E}-01 * \text{LOG(E)}^3$

AL>

Configuration : SYSSYSDEVICE:[USER]EFF_GEA3_42.CNF;3
Analyses by : CALIBRATE V1.6,PEAK V16.3,PEAKEFF V2.2
Detector Name : GEA3 Energy Calib Time: 15-MAR-1994 10:28:40
Efficiency type : Spline Effncy Calib Time: 15-MAR-1994 10:28:40
Detector Geometry: Shelf :

Efficiency Calibration Report

Nbr	Energy (keV)	Measured Efficiency	Efficiency Error
1	59.54	5.5620E-03	1.5970E-04
2	88.03	2.0250E-02	7.4013E-04
3	122.06	2.8181E-02	7.0768E-04
4	165.85	2.7468E-02	7.4982E-04
5	391.69	1.4399E-02	7.0237E-04
6	513.99	1.1588E-02	3.4759E-04
7	661.65	9.3543E-03	2.1700E-04
8	898.02	7.1992E-03	2.8191E-04
9	1173.22	5.7183E-03	6.1521E-05
10	1332.49	5.1484E-03	5.4624E-05
11	1836.00	4.0255E-03	1.5360E-04

Approved by:

Approval Date: 3 / 15 / 94

WHC-SD-WM-DP-065, REV. 0

Spectrum : SYS\$SYSDEVICE:[USER]3G342.CNF;4
Calib Date: 11-MAR-1994 12:08
Detector :
Fit type : Spline

Geometry :

WHC-SD-WM-DP-065, REV.0

BEST AVAILABLE COPY

DIONEX METHOD PARAMETERS - MEL512.MET

Method Comment:

Column ID:

Analyst ID:

WHC-SD-WM-DP-065, REV. 0

System Parameters

```
System Name: system1/gpm
```

Number of Detectors.....	1
Run Time (minutes).....	8.00
Sampling Rate (seconds).....	0.20

Detector 1 Type..... CDM-1

```

Detector 1 real time plot scale maximum (uS )..... 8.0
                                         minimum..... -2.0

```

```

Save Data File.....: Yes

```

Data File Name: C:\DX\DATA\94093071.D01

```
-- DETECTOR 1 PARAMETERS --
```

Report Options

Create ASCII Report File.....	No
Print Report.....	Yes
Print All Components.....	No
Print Components Found.....	No
Print Missing Components.....	No
Print All Peaks.....	Yes
Print Unknown Peaks.....	No
Print Chromatogram.....	Yes
Autoscale Chromatogram Maximum.....	Yes
Autoscale Maximum Value Delay (minutes).....	0.0
Autoscale Chromatogram Minimum.....	Yes
Autoscale Minimum Value Delay (minutes).....	0.0
Fill Peaks with Color	Yes
Draw Grid Lines on Chromatogram.....	No
Show Component Fraction Numbers.....	No
Label with Peak Number.....	No
Label with Retention Times on Chromatogram.....	No
Label with Component Name.....	Yes
Format File Name: C:\DX\METHOD\DEFAULT.PRF	

Integration Parameters

Starting Peak Width (seconds).....	5.0
Peak Threshold	0.001
Peak Area Reject.....	200
Area Reject for Reference Peaks.....	200

Data Events

Time	Description
0.00	Start peak detection
0.72	Void volume treatment for this peak
0.95	Void volume treatment for this peak
1.65	Force baseline at start of all peaks

Calibration Parameters

Number Of Levels for Calibration.....	6
Force Calibration Curve Through Origin.....	No
Calibration Fit Type.....	Linear
Replace Or Average Calibrations.....	Replace
External or Internal Calibration.....	External
Calculate Unknowns by Area or Height.....	Area
Default Sample Volume.....	1.0
Default Dilution Factor.....	101.0
Default Response Factor for Unknown Peaks.....	0.0
Calibration Standard Volume	1.0
Internal Standard Amount in Samples	1.0
Amount Units	ug/ml

WHC-SD-WM-DP-065, REV. 0

Component Table -- Last Modified: 15:40 on Mon, 10 Oct 1994

Component # 1 fluoride Retention Time 1.11
Reference Comp. none Window Size 7.00 %

Amount = $K0 + K1 \cdot \text{Area}$

K0 = 8.47513E-002

K1 = 5.21494E-005

WHC-SD-WM-DP-065, REV.0

Level	Amount	Area	Height
1	1.20000E-001	1971	462
2	3.08000E-001	5080	1109
3	6.14000E-001	10152	2278
4	1.22000E+000	20537	4637
5	2.38000E+000	41944	9569
6	4.59000E+000	87595	18420

Component # 2 chloride Retention Time 1.65
Reference Comp. none Window Size 7.00 %

Amount = $K0 + K1 \cdot \text{Area}$

K0 = 1.43339E-001

K1 = 8.09663E-005

Level	Amount	Area	Height
1	1.70000E-001	1738	433
2	4.18000E-001	4268	987
3	8.12000E-001	8365	2076
4	1.65000E+000	17281	4209
5	3.23000E+000	35734	8616
6	6.22000E+000	76377	16686

Component # 3 nitrite Retention Time 2.02
Reference Comp. none Window Size 7.00 %

Amount = $K0 + K1 \cdot \text{Area}$

K0 = 3.30428E-001

K1 = 1.28414E-004

Level	Amount	Area	Height
1	1.08000E+000	7558	1518
2	2.69000E+000	19057	3711
3	5.36000E+000	37955	7885
4	1.06100E+001	78201	16291
5	2.08100E+001	159741	32086
6	4.00700E+001	309860	59920

Component # 4 nitrate
Reference Comp. none
Amount = K0 + K1*Area
K0 = 1.24350E+000
K1 = 1.23270E-004

Retention Time 3.43
Window Size 10.00 %

WHC-SD-WM-DP-065, REV.0

Level	Amount	Area	Height
1	1.38000E+000	8659	1216
2	3.45000E+000	21461	3013
3	6.86000E+000	44858	6095
4	1.35900E+001	93936	12424
5	2.66500E+001	195935	24243
6	5.13300E+001	412298	45509

Component # 5 phosphate
Reference Comp. none
Amount = K0 + K1*Area
K0 = 1.03436E+000
K1 = 2.74106E-004

Retention Time 5.22
Window Size 10.00 %

Level	Amount	Area	Height
1	1.20000E+000	3470	276
2	2.98000E+000	8744	694
3	5.93000E+000	17663	1419
4	1.17500E+001	36314	2956
5	2.30400E+001	76398	6236
6	4.43700E+001	160446	13019

Component # 6 sulfate
Reference Comp. none
Amount = K0 + K1*Area
K0 = 1.25350E+000
K1 = 9.77021E-005

Retention Time 7.08
Window Size 10.00 %

Level	Amount	Area	Height
1	1.41000E+000	11414	858
2	3.51000E+000	28188	2138
3	6.98000E+000	57280	4354
4	1.38200E+001	119896	9210
5	2.71200E+001	252351	19415
6	5.22200E+001	529202	39170

Group Table

Group 1 -

Timed Events File: C:\DX\METHOD\MEL.TE

Step	Time	Description
Init		CDM-1 AutoOffset Off
Init		CDM-1 Recorder Mark OFF
Init		CDM-1 Temp. Comp. = 1.7 / Deg C
Init		CDM-1 Recorder Range = .10.0 uS
Init		CDM-1 Cell ON

Step	Time	Description
Init		CHA Heater = 25 Deg. C
Init		Valve A OFF
Init		Valve B OFF
Init		Inject Valve OFF
Init		ACI Autosmp OFF
Init		ACI RLY 2 OFF
Init		ACI TTL 1 OFF
Init		ACI TTL 2 OFF
Init		ACI Regen ON
Init		GPM Start
Init		GPM Hold Gradient Clock
Init		GPM Reset ON
1	0.0	CDM-1 AutoOffset ON
1	0.0	GPM Reset OFF
2	0.1	CDM-1 AutoOffset Off
2	0.1	Inject Valve ON
2	0.1	Start Sampling
2	0.1	GPM Run Gradient Clock
3	2.0	CDM-1 AutoOffset ON
3	2.0	Inject Valve OFF
3	2.0	ACI Autosmp ON

Lo Pressure Limit = 50
Hi Pressure Limit = 2000
Eluent 1 - carb/bicarb
Eluent 2 - Eluant 2
Eluent 3 - Eluant 3
Eluent 4 - Eluant 4
V5 Off - Off
V5 On - On
V6 Off - Off
V6 On - On

Time	Flow	%1	%2	%3	%4	V5	V6	Comment
0.0	2.0	100	0	0	0	0	0	

Method: C:\DX\METHOD\MEL512.MET

Component: fluoride

Fit Type: Linear

$r^2 = 0.998207$

Amt = Resp * 5.215×10^{-5} + 0.08475

Resp = Amt * 1.918×10^4 + -1625

Standardization: External

Calibration: Area

WHC-SD-WM-DP-065, REV.0

Method: C:\DX\METHOD\MEL512.MET

Component: chloride

Fit Type: Linear

$r^2 = 0.997053$

Amt = Resp * 8.097×10^{-5} + 0.1433

Resp = Amt * 1.235×10^4 + -1770

Standardization: External

Calibration: Area

209.6

Method: C:\DX\METHOD\MEL512.MET

Component: nitrite

Fit Type: Linear

$r^2 = 0.999873$

Amt = Resp * 0.0001284 + 0.3304

Resp = Amt * 7787 + -2573

Standardization: External

Calibration: Area

WHC-SD-WM-DP-065, REV.0

Method: C:\DX\METHOD\MEL512.MET

Component: nitrate

Fit Type: Linear

$r^2 = 0.997921$

Amt = Resp * 0.0001233 + 1.243

Resp = Amt * 8112 + -1.009e+004

Standardization: External

Calibration: Area

209.7

Method: C:\DX\METHOD\MEL512.MET

Component: phosphate

Fit Type: Linear

$r^2 = 0.997822$

Amt = Resp * 0.0002741 + 1.034

Resp = Amt * 3648 + -3774

Standardization: External

Calibration: Area

WHC-SD-WM-DP-065, REV.0

Method: C:\DX\METHOD\MEL512.MET

Component: sulfate

Fit Type: Linear

$r^2 = 0.997911$

Amt = Resp * 9.77e-005 + 1.253

Resp = Amt * 1.024e+004 + -1.283e+004

Standardization: External

Calibration: Area

209.8

*Mel. Met Calibration 5/24/94
Reported 10/10/94*

DIONEX METHOD PARAMETERS - MEL524.MET

Method Comment:

Column ID:

Analyst ID:

WHC-SD-WM-DP-065, REV. 0

System Parameters

System Name: system1/gpm

Number of Detectors..... 1

Run Time (minutes)..... 8.00

Sampling Rate (seconds)..... 0.20

Detector 1 Type..... CDM-1

Detector 1 real time plot scale maximum (uS)..... 8.0
minimum..... -2.0

Save Data File..... Yes

Data File Name: C:\DX\DATA\94093071.D01

-- DETECTOR 1 PARAMETERS --

Report Options

Create ASCII Report File..... No

Print Report..... Yes

Print All Components..... No

Print Components Found..... No

Print Missing Components..... No

Print All Peaks..... Yes

Print Unknown Peaks..... No

Print Chromatogram..... Yes

Autoscale Chromatogram Maximum..... Yes

Autoscale Maximum Value Delay (minutes)..... 0.0

Autoscale Chromatogram Minimum..... Yes

Autoscale Minimum Value Delay (minutes)..... 0.0

Fill Peaks with Color Yes

Draw Grid Lines on Chromatogram..... No

Show Component Fraction Numbers..... No

Label with Peak Number..... No

Label with Retention Times on Chromatogram..... No

Label with Component Name..... Yes

Format File Name: C:\DX\METHOD\DEFAULT.PRF

Integration Parameters

Starting Peak Width (seconds)..... 5.0

Peak Threshold 0.001

Peak Area Reject..... 200

Area Reject for Reference Peaks..... 200

Data Events

Time	Description
0.00	Start peak detection
0.72	Void volume treatment for this peak
0.95	Void volume treatment for this peak
1.65	Force baseline at start of all peaks

Calibration Parameters

Number Of Levels for Calibration.....	6
Force Calibration Curve Through Origin.....	No
Calibration Fit Type.....	Linear
Replace Or Average Calibrations.....	Replace
External or Internal Calibration.....	External
Calculate Unknowns by Area or Height.....	Area
Default Sample Volume.....	1.0
Default Dilution Factor.....	101.0
Default Response Factor for Unknown Peaks.....	0.0
Calibration Standard Volume	1.0
Internal Standard Amount in Samples	1.0
Amount Units	ug/ml

WHC-SD-WM-DP-065, REV. 0

Component Table -- Last Modified: 15:51 on Mon, 10 Oct 1994

Component # 1 fluoride Retention Time 1.11
Reference Comp. none Window Size 7.00 %

Amount = $K0 + K1 \cdot \text{Area}$

K0 = 6.34492E-002

K1 = 5.19647E-005

WHC-SD-WM-DP-065, REV. 0

Level	Amount	Area	Height
1	1.20000E-001	2054	462
2	3.08000E-001	5033	1137
3	6.14000E-001	10613	2361
4	1.22000E+000	21339	4838
5	2.38000E+000	43446	9714
6	4.59000E+000	87848	19980

Component # 2 chloride Retention Time 1.65
Reference Comp. none Window Size 7.00 %

Amount = $K0 + K1 \cdot \text{Area}$

K0 = 1.09599E-001

K1 = 8.01202E-005

Level	Amount	Area	Height
1	1.70000E-001	1601	391
2	4.18000E-001	4216	1057
3	8.12000E-001	8856	2054
4	1.65000E+000	17754	4364
5	3.23000E+000	38697	8896
6	6.22000E+000	76684	17619

Component # 3 nitrite Retention Time 2.02
Reference Comp. none Window Size 7.00 %

Amount = $K0 + K1 \cdot \text{Area}$

K0 = 4.90613E-001

K1 = 1.23629E-004

Level	Amount	Area	Height
1	1.08000E+000	7300	1488
2	2.69000E+000	18866	3778
3	5.36000E+000	39549	8031
4	1.06100E+001	79857	16067
5	2.08100E+001	160131	33162
6	4.00700E+001	322598	61401

Component # 4 nitrate
Reference Comp. none
Amount = K0 + K1*Area
K0 = 1.47382E+000
K1 = 1.15975E-004

Retention Time 3.43
Window Size 10.00 %

WHC-SD-WM-DP-065, REV.0

Level	Amount	Area	Height
1	1.38000E+000	8474	1236
2	3.45000E+000	21803	3083
3	6.86000E+000	46201	6593
4	1.35900E+001	94437	13086
5	2.66500E+001	206557	26225
6	5.13300E+001	436646	49614

Component # 5 phosphate
Reference Comp. none
Amount = K0 + K1*Area
K0 = 1.20427E+000
K1 = 2.59682E-004

Retention Time 5.22
Window Size 10.00 %

Level	Amount	Area	Height
1	1.20000E+000	3367	277
2	2.98000E+000	8903	712
3	5.93000E+000	18752	1500
4	1.17500E+001	37188	3030
5	2.30400E+001	78331	6474
6	4.43700E+001	169401	13684

Component # 6 sulfate
Reference Comp. none
Amount = K0 + K1*Area
K0 = 1.43283E+000
K1 = 9.40371E-005

Retention Time 7.08
Window Size 10.00 %

Level	Amount	Area	Height
1	1.41000E+000	11070	842
2	3.51000E+000	28331	2155
3	6.98000E+000	58988	4522
4	1.38200E+001	120400	9286
5	2.71200E+001	257782	19848
6	5.22200E+001	549227	40755

Group Table

Group 1 -

Timed Events File: C:\DX\METHOD\MEL.TE

Step	Time	Description
Init		CDM-1 AutoOffset Off
Init		CDM-1 Recorder Mark OFF
Init		CDM-1 Temp. Comp. = 1.7 / Deg C
Init		CDM-1 Recorder Range = 10.0 uS
Init		CDM-1 Cell ON

20912

Timed Events File: C:\DX\METHOD\MEL.TE

Step	Time	Description
------	------	-------------

Init		CHA Heater = 25 Deg. C
Init		Valve A OFF
Init		Valve B OFF
Init		Inject Valve OFF
Init		ACI Autosmp OFF
Init		ACI RLY 2 OFF
Init		ACI TTL 1 OFF
Init		ACI TTL 2 OFF
Init		ACI Regen ON
Init		GPM Start
Init		GPM Hold Gradient Clock
Init		GPM Reset ON
1	0.0	CDM-1 AutoOffset ON
1	0.0	GPM Reset OFF
2	0.1	CDM-1 AutoOffset Off
2	0.1	Inject Valve ON
2	0.1	Start Sampling
2	0.1	GPM Run Gradient Clock
3	2.0	CDM-1 AutoOffset ON
3	2.0	Inject Valve OFF
3	2.0	ACI Autosmp ON

WHC-SD-WM-DP-065, REV.0

Lo Pressure Limit = 50
 Hi Pressure Limit = 2000
 Eluent 1 - carb/bicarb
 Eluent 2 - Eluant 2
 Eluent 3 - Eluant 3
 Eluent 4 - Eluant 4
 V5 Off - Off
 V5 On - On
 V6 Off - Off
 V6 On - On

Time	Flow	%1	%2	%3	%4	V5	V6	Comment
0.0	2.0	100	0	0	0	0	0	

Method: C:\DX\METHOD\MEL524.MET

Component: fluoride

Fit Type: Linear

$r^2 = 0.999309$

Amt = Resp * $5.196e-005$ + 0.06345

Resp = Amt * $1.924e+004$ + -1221

Standardization: External

Calibration: Area

WHC-SD-WM-DP-065, REV. 0

Method: C:\DX\METHOD\MEL524.MET

Component: chloride

Fit Type: Linear

$r^2 = 0.999214$

Amt = Resp * $8.012e-005$ + 0.1096

Resp = Amt * $1.248e+004$ + -1368

Standardization: External

Calibration: Area

20914

Method: C:\DX\METHOD\MEL524.MET

Component: nitrite

Fit Type: Linear

$r^2 = 0.999510$

Amt = Resp * 0.0001236 + 0.4906

Resp = Amt * 8089 + -3968

Standardization: External

Calibration: Area

WHC-SD-WM-DP-065, REV.0

Method: C:\DX\METHOD\MEL524.MET

Component: nitrate

Fit Type: Linear

$r^2 = 0.997285$

Amt = Resp * 0.000116 + 1.474

Resp = Amt * 8623 + -1.271e+004

Standardization: External

Calibration: Area

20915

Method: C:\DX\METHOD\MEL524.MET

Component: phosphate

Fit Type: Linear

$r^2 = 0.996469$

Amt = Resp * 0.0002597 + 1.204

Resp = Amt * 3851 + -4637

Standardization: External

Calibration: Area

WHC-SD-WM-DP-065, REV.0

Method: C:\DX\METHOD\MEL524.MET

Component: sulfate

Fit Type: Linear

$r^2 = 0.997100$

Amt = Resp * 9.404e-005 + 1.433

Resp = Amt * 1.063e+004 + -1.524e+004

Standardization: External

Calibration: Area

20916

RAW ANALYTICAL DATA

SAMPLE PREPARATIONS

CA
11

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch 2937

Lab Segment Serial No.

V-62, 63

Customer ID:

108 APA 4.1

Analysis:

ACD DGST

Sample Prep:

Prep

Instrument:

NA

Procedure/ Rev:

LA-200 LS A-3

Technologist:

W. J. Smith

Date:

4-14-94

Starting Time:

0.00

Temperature

95°C

Ending Time:

1.00

Chemist:

B. Griffin

Comments:

LMH 10-04-94

	Description	Lab ID
1	STD (ICP)	V-62-3505
2	STD (As/Se)	V-62-3505
3	PLB	V-62-3505
4	SAM	V-62-3505
5	DLP	V-62-3505
6	STD (TIP)	V-62-3505
7	STD DLP (ICP)	V-62-3505
8	STD (As/Se)	V-62-3505
9	STD (As/Se) A-150	V-62-3505
10	SAM	V-62-3505

	Description	Lab ID
11	DLP	V-62-3505
12		
13		
14		
15		
16		
17		
18		
19	V-62-3505 LMH 10-04-94	
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
1	13MWHC1201		13MWHC1201	
2	13MWHC201		13MWHC201	8212
3	301239B			
4	34211A			
				212

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH SUMMARY SHEET					
METHOD:		DATE START:		TIME START:	
PREPARED BY:		DATE COMPLETE:		TIME COMPLETE:	
SPL NAME	SPL ID	g/L or DF RESULT	g or mL SAMPLE SIZE	mL FINAL VOL.	STD, SPL, DUP, SPK REMARKS
11/15/00	V. 1-200	1	5	50	50ml test vol
11/15/00	V. 1-200	4	12.5	50	12.5ml test vol
11/15/00	V. 1-200	-	-	50	50ml test vol
11/15/00	V. 1-200	5	10	50	10ml test vol
11/15/00	V. 1-200	5	10	50	10ml test vol
11/15/00	V. 1-200	10	5	50	5ml test vol
11/15/00	V. 1-200	10	5	50	5ml test vol
11/15/00	V. 1-200	4	12.5	50	12.5ml test vol
11/15/00	V. 1-200	4	12.5	50	12.5ml test vol
11/15/00	V. 1-200	5	10	50	10ml test vol
11/15/00	V. 1-200	5	10	50	10ml test vol
<p><i>[Handwritten signature and date 11-17-99]</i></p>					

NARRATIVE: ☒ NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
 LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Batch 2987

Serial No V 60.-8505	Sample Point 108-AP	Date 3-18-94	Time Issued 8:26	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size <i>5 ml of each, 50 ml</i>			Customer ID STD	
Remarks, Calculations, Results <i>for ICP</i> LMCS ID <i>WHC-1, LHMKING</i> LMCS ID <i>WHC-2/L3MW11201</i> LMCS ID <i>514-20/301301</i> STD VOL <i>5 ml of each</i> VOLUME ON COMPLETION <i>50 ml</i> $DF = \frac{50 \text{ ml}}{5 \text{ ml}} = 10$				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-14-94	Time Completed 1400	Lab Unit Mgr <i>Rakete</i> <i>Bertrand Griffin II</i>		

Serial No V 60.-8505	Sample Point 108-AP	Date 3-18-94	Time Issued 8:26	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size			Customer ID STD	
Remarks, Calculations, Results LMCS ID <i>34011A, 12/5</i> LMCS ID _____ LMCS ID _____ STD VOL <i>12.5 ml</i> VOLUME ON COMPLETION <i>50 ml</i> $DF = \frac{50 \text{ ml}}{12.5 \text{ ml}} = (4)$ <i>41494</i>				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-14-94	Time Completed 1400	Lab Unit Mgr <i>Rakete</i> <i>Bertrand Griffin II</i>		

4-19-94
AKM [Signature]

54-5800-061 (P. 10, 27)

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Serial No	Sample Point	Date	Time Issued	Priority				
V 61.-8605	108-AP	3-18-94	8:27	26				
Determination	Method Standard	Result Units	Charge Code	Reruns				
ACD DGST	LA-505-158	NONE	N1A7F	0				
Sample Size	Customer ID							
50 ml	BLANK							
Remarks Calculations Results								
REAGENT BLANK VOLUME ON COMPLETION 50ml								
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5				
<i>A. N. [Signature]</i>								
Hrs	Hrs	Hrs	Hrs	Hrs				
		<i>Pakita</i>						
Date	Time Completed	Lab Unit Mgr						
4-14-94	1400	<i>Bethand Buffin</i>	4-19-94 <i>AKM [Signature]</i>					

Serial No	Sample Point	Date	Time Issued	Priority				
V 62.-8005	108-AP	3-18-94	8:28	26				
Determination	Method Standard	Result Units	Charge Code	Reruns				
ACD DGST	LA-505-158	DF	N1A7F	0				
Sample Size	Customer ID							
10 ml → 50 ml (ICP)	108-AP-A							
Remarks Calculations Results (STD 1)								
DUP SPIKED SAMPLE VOLUME 10 ml SPIKE ID WHC1 & WHC2 SPIKE VOL 5 ml of each VOLUME ON COMPLETION 50 ml $DF = \frac{50 \text{ ml}}{10 \text{ ml}} = (5) = (10)$ 114.5 ml								
(STD 2) 5M-20 5 ml → 50 ml $\frac{50 \text{ ml}}{5 \text{ ml}} = 10 = DF$ 4-14-94 (SAM. CALC. & LOT #s on back)								
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5				
<i>A. N. [Signature]</i>								
Hrs	Hrs	Hrs	Hrs	Hrs				
		<i>Pakita</i>						
Date	Time Completed	Lab Unit Mgr						
4-14-94	1400	<i>Bethand Buffin</i>	4-19-94 <i>AKM [Signature]</i>					

WHC-SD-WM-DP-065, REV. 0
ACID DIGESTION ANALYSIS

SAMPLE CALCULATION
 $D.F. = \frac{50 \text{ ml}}{10 \text{ ml}} = (5)$

V62.-8005

NOTE

LOT #3 for spikes:

WHC-1 / L3MWHC1U10

WHC-2 / L3MWHC1U

SM-20 / 301239B

Serial No V 62.-8005	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 10ml → 50ml (As/Se)			Customer ID 108-AP-A	
<p>Remarks, Calculations, Results</p> <p>DUP SPIKED SAMPLE VOLUME 12.5 ml of spike SPIKE ID 34011-A SPIKE VOL 12.5 ml VOLUME ON COMPLETION 0.0506/50ml <u>CALCULATION</u> $D.F. = \frac{50 \text{ ml}}{12.5 \text{ ml}} = (4)$</p> <p><u>SAMPLE CALC</u> $D.F. = \frac{50 \text{ ml}}{10 \text{ ml}} = (5)$</p>				
Analyst - 1 Standard	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-14-94	Time Completed 1400	Lab Unit Mgr Rakita	4-19-94 AKM	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Serial No V 62.-8705	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 10 ml > 50 ml			Customer ID 108-AP-A	
Remarks Calculations Results SAMPLE SAMPLE VOL 10 ml VOLUME ON COMPLETION 50 ml $DF = \frac{50 \text{ ml}}{10 \text{ ml}} = (5)$				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-14-94	Time Completed 1:00	Lab Unit Mgr <i>[Signature]</i> 4-19-94 <i>[Signature]</i>		

Serial No V 62.-8805	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 10 ml > 50 ml			Customer ID 108-AP-A	
Remarks Calculations Results DUPLICATE SAMPLE DUPLICATE VOL 10 ml VOLUME ON COMPLETION 50 ml $DF = \frac{50 \text{ ml}}{10 \text{ ml}} = (5)$				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-14-94	Time Completed 1:00	Lab Unit Mgr <i>[Signature]</i> 4-18-94 <i>[Signature]</i>		

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Serial No V 62.-8905	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 10ml → 50ml (ICP)			Customer ID 108-AP-A	
Remarks, Calculations, Results				
<p>STID 1</p> <p>SPIKED SAMPLE VOLUME 10ml SPIKE ID WHC 1 AND WHC 2 SPIKE VOL 5ml of each VOLUME ON COMPLETION 50ml CALCULATION $D.F. = \frac{50ml}{5ml} = 10$</p>		<p>STID 2</p> <p>SM-20 5ml → 50ml $\frac{50ml}{5ml} = (DF = 10)$</p> <p>SAMPLE CALC. on back</p>		
Analyst - 1 A. McCloud Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-14-94	Time Completed 1400	Lab Unit Mgr B. Ruffin	4-18-94 OK M. G. G.	

54-6800-061 (R-10-83)

SAMPLE CALC

$$D.F. = \frac{50ml}{10ml} = 5$$

V62.8905

NOTE

LOT # 5

WHC-1/ L3MWHC1J10

WHC-2/ L3MWHC2J1

SM-20/301239B

WHC-SD-WM-DP-065, REV.0

ACID DIGESTION ANALYSIS

Serial No V 62.-8905	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 10ml → 50ml (AS/Se)			Customer ID 108-AP-A	
Remarks Calculations Results <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> SPIKED SAMPLE VOLUME 10ml SPIKE ID 34811-A SPIKE VOL 12.5ml VOLUME ON COMPLETION 50ml CALCULATION: $D.F. = \frac{50ml}{12.5ml} = (4)$ </div> <div style="width: 45%;"> SAMPLE CALC $D.F. = \frac{50ml}{10ml} = (5)$ </div> </div>				
Analyst - 1 <i>A. H. H. H. H.</i> Hrs	Analyst - 2 <i>A. H. H. H. H.</i> Hrs	Analyst - 3 <i>Rakita</i> Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-14-94	Time Completed 1400	Lab Unit Mgr <i>Bertrand Griffin II</i>	4-19-94 <i>AKM Gasline</i>	

Serial No V 63.-8705	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 10ml → 50ml			Customer ID 108-AP-B	
Remarks Calculations Results <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> SAMPLE SAMPLE VOL 10ml VOLUME ON COMPLETION 50ml CALCULATION: $D.F. = \frac{50ml}{10ml} = (5)$ </div> <div style="width: 45%;"> SAMPLE CALC $D.F. = \frac{50ml}{10ml} = (5)$ </div> </div>				
Analyst - 1 <i>A. H. H. H. H.</i> Hrs	Analyst - 2 <i>A. H. H. H. H.</i> Hrs	Analyst - 3 <i>Rakita</i> Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-14-94	Time Completed 1400	Lab Unit Mgr <i>Bertrand Griffin II</i>	4-19-94 <i>AKM Gasline</i>	

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Serial No V 63.-8805	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination ACD DGST	Method Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 10ml → 50ml			Customer ID 108-AP-B	
Remarks, Calculations, Results DUPLICATE SAMPLE DUPLICATE VOL 10ml VOLUME ON COMPLETION 0500/50ml $D.F. = \frac{50ml}{10ml} = (5)$				
Analyst - 1 <i>J. M. Standley</i> Hrs	Analyst - 2 Hrs	Analyst - 3 <i>P. R. R. R.</i> Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-14-94	Time Completed 1400	Lab Unit Mgr <i>Betha Griffin</i> 4-14-94 <i>M. J. M. J.</i>		

54-6800-061 (R-10-83)

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.

V62-V63

Customer ID: A-108-04-94

108-AP-A, 108-AP-B

Analysis:

Acid Digest

Sample Prep:

Direct

Instrument: N/A 10-04-94

Procedure/ Rev: LA-505-158/A-3

Technologist: Bill Syth

Date: 6-20-94

Starting Time: 1000

Temperature 95°C

Ending Time: 1530

300 6-21-94

Chemist: B. B. H.

Comments: There was not sufficient sample, V62, to digest for the sample, duplicate, spike & spike duplicate.

	Description	Lab ID
1	LMCS 4s/Se	V60-8505
2	As Cal. Std	V60-8505
3	Blank	V61-8605
4	Sample	V62-8705
5	Duplicate	V62-8805
6	Spike	V62-8905
7	Spike Duplicate	V62-8005
8	Sample	V63-8705
9	Duplicate	V63-8805
10		

	Description	Lab ID
11		
12		
13		
14		
15	BEST AVAILABLE COPY	
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS (4s/Se)	38N114/12.5mL			50 mL
As Cal. Std.	33N11E/25mL			25 mL

0A

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH SUMMARY SHEET					
Rerun # 1		DATE START: 6-20-94		TIME START: 1000	
METHOD: LA-505-158/A-3		DATE COMPLETE: 6-20-94		TIME COMPLETE: 1530	
PREPARED BY: Bill Syth					
SPL NAME	SPL ID	g/L or DF RESULT	g or (mL) SAMPLE SIZE	mL FINAL VOL.	STD, SPL, DUP, SPK REMARKS
LMCS As/Se	V60-8505	4	12.5	50	12.5mL → 50mL (38NII 4)
As Cal Std	V60-8505	1	25	25	25mL → 25mL (33NIE)
Blank	V61-8605	—	—	50	50mL total volume
Sample	V62-8705	insufficient	sample		
Duplicate	V62-8805	insufficient	sample		
Sample Spk	V62-8905	insufficient	sample		
Spike Dup	V62-8005	insufficient	sample		
Sample	V63-8705	10	5	50	5mL → 50mL
Duplicate	V63-8805	10	5	50	5mL → 50mL
<p><i>Bertand Simpson II</i></p> <p><i>6-21-94</i></p>					

NARRATIVE: ☐ NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
☐ LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

There was insufficient sample to digest V62 for the sample, duplicate, spike + spike duplicate.

Bertand Simpson II

6-21-94

ACID DIGESTION ANALYSIS

Batch 3558

Serial No V 60.-8505	Sample Point 108-AP	Date 3-18-94	Time Issued 8:26	Priority 26
Determination ACD DGST	Method-Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns J
Sample Size <i>12.5 ml into 50 ml</i>			Customer ID STD	
Remarks Calculations Results <div style="display: flex; justify-content: space-between;"> <div> LMCS ID <u>38N11A</u> LMCS ID _____ LMCS ID _____ STD VOL <u>12.5 mL</u> VOLUME ON COMPLETION <u>50 mL</u> </div> <div> <u>AS, Se</u> $D.F. = \frac{50 \text{ mL}}{12.5 \text{ mL}} = 4$ </div> </div>				
<i>Bill Syth</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6-20-94	Time Completed 1530	Lab Unit Mgr <i>6-21-94</i> <i>Bertrand Griffin II</i> <i>RC Jones</i>		

Serial No V 60.-8505	Sample Point 108-AP	Date 3-18-94	Time Issued 8:26	Priority 26
Determination ACD DGST	Method-Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns J
Sample Size <i>25 ml into 25 ml</i>			Customer ID STD	
Remarks Calculations Results <div style="display: flex; justify-content: space-between;"> <div> LMCS ID <u>33N11E</u> LMCS ID _____ LMCS ID _____ STD VOL <u>25 mL</u> VOLUME ON COMPLETION <u>25 mL</u> </div> <div> <u>AS cal std</u> $D.F. = \frac{25 \text{ mL}}{25 \text{ mL}} = 1$ </div> </div>				
<i>Bill Syth</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6-20-94	Time Completed 1530	Lab Unit Mgr <i>6-21-94</i> <i>Bertrand Griffin II</i> <i>RC Jones</i>		

ACID DIGESTION ANALYSIS

Serial No V 61.-8605	Sample Point 108-AP	Date 3-18-94	Time Issued 8:27	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units NONE	Charge Code N1A7F	Reruns 1
Sample Size 6/20/94 12.5 ml to 50 ml 50 mL total vol.			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK VOLUME ON COMPLETION 50 mL As, Se				
Analyst - 1 Bill Syth	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6-20-94	Time Completed	Lab Unit Mgr 6-21-94 Bertrand Griffin II	RC Jones	

Serial No V 62.-8705	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 1
Sample Size 5 mL → 50 mL			Customer ID 108-AP-A	
Remarks, Calculations, Results SAMPLE SAMPLE VOL 5 mL VOLUME ON COMPLETION 50 mL As, Se BDI 6-21-94 $DF = \frac{50 \text{ mL}}{5 \text{ mL}} = 10$ insufficient sample				
Analyst - 1 Bill Syth	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6-20-94	Time Completed	Lab Unit Mgr 6-21-94 Bertrand Griffin II	RC Jones	

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Serial No V 62.-8805	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 1
Sample Size ? 5 mL → 50 mL			Customer ID 108-AP-A	
Remarks Calculations Results DUPLICATE SAMPLE <i>As, Se</i> DUPLICATE VOL <i>5 mL</i> <i>BDI 6-21-94</i> VOLUME ON COMPLETION <i>50 mL</i> <i>D.F. = $\frac{50 \text{ mL}}{5 \text{ mL}} = 10$</i> <i>Bill Syth Insufficient Sample</i>				
Analyst - 1 <i>J</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date <i>6-20-94</i>	Time Completed	Lab Unit Mgr <i>6-21-94</i> <i>Bethand Buffin II</i> <i>L.C. Jones</i>		

Serial No V 62.-8805	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 1
Sample Size ? <i>Insufficient Sample</i>			Customer ID 108-AP-A	
Remarks Calculations Results SPIKED SAMPLE <i>As, Se</i> VOLUME _____ SPIKE ID _____ SPIKE VOL _____ VOLUME ON COMPLETION _____ <i>Bill Syth</i>				
Analyst - 1 <i>J</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date <i>6-20-94</i>	Time Completed	Lab Unit Mgr <i>6-21-94</i> <i>Bethand Buffin II</i> <i>L.C. Jones</i>		

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Serial No V 62.-8005	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 1
Sample Size ? <i>Insufficient Sample</i>			Customer ID 108-AP-A	
Remarks, Calculations, Results <p style="text-align: right;"><i>As, Se</i></p> <p>DUP SPIKED SAMPLE</p> <p>VOLUME _____</p> <p>SPIKE ID _____</p> <p>SPIKE VOL _____</p> <p>VOLUME ON _____</p> <p>COMPLETION _____</p> <p><i>Bill Syth</i></p>				
Analyst - 1 <i>Bill Syth</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6-20-94	Time Completed	Lab Unit Mgr <i>Bernard Duff II</i>	6-21-94 <i>LC Jones</i>	

Serial No V 63.-8705	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 1
Sample Size ? <i>5mL → 50mL</i>			Customer ID 108-AP-B	
Remarks, Calculations, Results <p style="text-align: right;"><i>As, Se</i></p> <p>SAMPLE</p> <p>SAMPLE VOL <i>5mL</i></p> <p>VOLUME ON <i>50mL</i></p> <p>COMPLETION _____</p> <p><i>D.F. = $\frac{50mL}{5mL} = 10$</i></p> <p><i>Bill Syth</i></p>				
Analyst - 1 <i>Bill Syth</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6-20-94	Time Completed	Lab Unit Mgr <i>Bernard Duff II</i>	6-21-94 <i>LC Jones</i>	

ACID DIGESTION ANALYSIS

Serial No V 63.-3805	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 1
Sample Size ? 5mL → 50mL			Customer ID 108-AP-B	
Remarks Calculations Results DUPLICATE SAMPLE <i>As, Se</i> DUPLICATE VOL <u>5mL</u> VOLUME ON COMPLETION <u>50mL</u> $D.F. = \frac{50mL}{5mL} = 10$ <i>Bill Syth</i>				
Analyst - 1 <i>Bill Syth</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6-20-94	Time Completed	Lab Unit Mgr <i>Bertie L. H. II</i>	6-21-94 <i>Re Jones</i>	

ANALYTICAL BATCH

Lab Segment Serial No.

V 67, 68, 69

Customer ID:

105 A P C D 8 1

Analysis:

And David

Sample Prep:

Due to

Instrument:

NA

Procedure/ Rev:

1. 1. 1. 1. 1.

Technologist:

Small

Date:

9 17 - 11

Starting Time:

(37.3')

Temperature

7. 11

Ending Time:

[Faint handwritten notes]

Chemist:

13 (11.11.11)

Comments:

	Description	Lab ID
1	Ag / ICP	V-19-3505
2	Ag / Ag / Se	V-20-3505
3	Ag / Ag	V-21-3505
4	Ag / Ag	V-22-3505
5	Ag / Ag	V-23-3505
6	Ag / Ag	V-24-3505
7	Ag / Ag	V-25-3505
8	Ag / Ag	V-26-3505
9	Ag / Ag	V-27-3505
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	-Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
Wilk' 30	20-12-5-13 -	20-12-5-13	E-41-2	
Wilk' 1	1-10-16-19-10	1-10-16-19-10	E-41-1	
Wilk' 2	1-10-16-19-10	1-10-16-19-10		
A-52	34N-1-B-(17.5 mL)			
				228

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-505 158 A 3 DATE START: 4-17-94 TIME START: 6:15
 PREPARED BY: [Signature] DATE COMPLETE: 4-17-94 TIME COMPLETE: 6:40

SPL NAME	SPL ID	g/L or DF	g or mL	mL	STD. SPL. DUP. SPK
RESULT	SAMPLE SIZE	FINAL VOL.	REMARKS		
211	V-5 2505	10	5	50	
211	V-5 2505	10	5	50	
211	V-6 2505	5	10	50	
211	V-7 2505	5	10	50	
211	V-8 2505	5	10	50	
211	V-9 2505	5	10	50	
211	V-10 2505	5	10	50	
211	V-11 2505	5	10	50	
211	V-12 2505	5	10	50	
211	V-13 2505	5	10	50	

STD'S USED:
 Bottle 1 - WILCO 1
 Bottle 2 - WILCO 2
 Bottle 3 - WILCO 3
 Bottle 4 - WILCO 4
 Bottle 5 - WILCO 5
 Bottle 6 - WILCO 6
 Bottle 7 - WILCO 7
 Bottle 8 - WILCO 8
 Bottle 9 - WILCO 9
 Bottle 10 - WILCO 10
 Bottle 11 - WILCO 11
 Bottle 12 - WILCO 12
 Bottle 13 - WILCO 13
 Bottle 14 - WILCO 14
 Bottle 15 - WILCO 15
 Bottle 16 - WILCO 16
 Bottle 17 - WILCO 17
 Bottle 18 - WILCO 18
 Bottle 19 - WILCO 19
 Bottle 20 - WILCO 20

NARRATIVE: ☒ NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
 LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Serial No	Sample Point	Date	Time Issued	Priority
V 65.-8505	108-AP	3-18-94	9:37	26
Determination	Method-Standard	Result Units	Charge Code	Reruns
ACD DGST	LA-505-158	DF	N1A7F	0
Sample Size	Customer ID			
5 mL → 50 mL	STD ICP			
<p>Remarks Calculations, Results</p> <p>LMCS ID <u>L3MWHC1N110</u> LMCS ID <u>L3MWH2N11</u> LMCS ID _____ STD VOL <u>5 mL of each</u> VOLUME ON COMPLETION <u>50 mL</u> CALCULATION: $DF = \frac{50 \text{ mL}}{5 \text{ mL}} = 10$</p> <p>Bottle 1</p>				
<p>5M-20 3C1239B 5 mL in 50 mL DF = $\frac{50 \text{ mL}}{5 \text{ mL}} = 10$</p> <p>Bottle 2</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>[Signature]</i>				
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
4-17-94	0900	<i>[Signature]</i>	4-20-94 <i>[Signature]</i>	

Serial No	Sample Point	Date	Time Issued	Priority
V 65.-8505	108-AP	3-18-94	9:37	26
Determination	Method-Standard	Result Units	Charge Code	Reruns
ACD DGST	LA-505-158	DF	N1A7F	0
Sample Size	Customer ID			
12.5 mL → 50 mL	STD As/Sc			
<p>Remarks Calculations Results</p> <p>LMCS ID <u>34N11-B</u> LMCS ID _____ LMCS ID _____ STD VOL <u>12.5 mL</u> VOLUME ON COMPLETION <u>50 mL</u> CALCULATION: $DF = \frac{50 \text{ mL}}{12.5 \text{ mL}} = 4$</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>[Signature]</i>				
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
4-17-94	0900	<i>[Signature]</i>	4-20-94 <i>[Signature]</i>	

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Serial No	V 66.-8605	Sample Point	108-AP	Date	3-18-94	Time Issued	9:38	Priority	26
Determination	ACD DGST	Method-Standard	LA-505-158	Result Units	NONE	Charge Code	N1A7F	Reruns	0
Sample Size	50 ml total volume					Customer ID	BLANK		
Remarks Calculations Results REAGENT BLANK VOLUME ON COMPLETION <u>50ml</u>									
Analyst - 1	Analyst - 2		Analyst - 3		Analyst - 4		Analyst - 5		
Hrs	Hrs		Hrs		Hrs		Hrs		
Date	4-17-94	Time Completed	0900	Lab Unit Mgr	4-20-94 Bertrand Griffin II K M Farwell				

Serial No	V 67.-8705	Sample Point	108-AP	Date	3-18-94	Time Issued	9:39	Priority	26
Determination	ACD DGST	Method-Standard	LA-505-158	Result Units	DF	Charge Code	N1A7F	Reruns	0
Sample Size	10 ml → 50 ml					Customer ID	108-AP-C		
Remarks Calculations Results SAMPLE SAMPLE VOL <u>10 ml</u> D.F. = $\frac{50 \text{ ml}}{10 \text{ ml}} = 5$ VOLUME ON COMPLETION <u>50 ml</u>									
Analyst - 1	Analyst - 2		Analyst - 3		Analyst - 4		Analyst - 5		
Hrs	Hrs		Hrs		Hrs		Hrs		
Date	4-17-94	Time Completed	0900	Lab Unit Mgr	4-20-94 Bertrand Griffin II K M Farwell				

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Serial No V 67.-8805	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination ACD DGST	Method-Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 10 ml → 50 ml			Customer ID 108-AP-C	
Remarks Calculations, Results DUPLICATE SAMPLE DUPLICATE VOL 10 ml VOLUME ON COMPLETION 50 ml $DF = \frac{50 \text{ ml}}{10 \text{ ml}} = 5$				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-17-94	Time Completed 0900	Lab Unit Mgr <i>[Signature]</i>	4-20-94 <i>[Signature]</i>	

Serial No V 68.-8705	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination ACD DGST	Method-Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 10 ml → 50 ml			Customer ID 108-AP-D	
Remarks Calculations, Results SAMPLE SAMPLE VOL 10 ml VOLUME ON COMPLETION 50 ml $D.F. = \frac{50 \text{ ml}}{10 \text{ ml}} = 5$				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-17-94	Time Completed 0900	Lab Unit Mgr <i>[Signature]</i>	4-20-94 <i>[Signature]</i>	

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Serial No V 68.-8805	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination ACD DGST	Method Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 10mL → 50mL			Customer ID 108-AP-D	
Remarks Calculations Results DUPLICATE SAMPLE DUPLICATE VOL 10mL $\frac{50mL}{10mL} = 5$ VOLUME ON COMPLETION 50mL				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-7-94	Time Completed 0900	Lab Unit Mgr <i>[Signature]</i>	4-20-94 <i>[Signature]</i>	

Serial No V 69.-8705	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination ACD DGST	Method Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 10mL → 50mL			Customer ID 108-AP-E	
Remarks Calculations Results SAMPLE SAMPLE VOL 10mL $DF = \frac{50mL}{10mL} = 5$ VOLUME ON COMPLETION 50mL				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-17-94	Time Completed 0900	Lab Unit Mgr <i>[Signature]</i>	4-20-94 <i>[Signature]</i>	

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Serial No V 69.-8805	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 10mL → 50mL			Customer ID 108-AP-E	
Remarks, Calculations, Results DUPLICATE SAMPLE DUPLICATE VOL 10mL VOLUME ON COMPLETION 50mL DF $\frac{50mL}{10mL} = 5$				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-17-94	Time Completed 0900	Lab Unit Mgr <i>[Signature]</i> 4-20-94 <i>[Signature]</i>		

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50

WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No. V-67, V-68, V-69	Customer ID: 108-AP-C,D & E
Analysis: ACD DGST	Sample Prep: DIRECT

NA

Technologist: LH STANDLEY

Starting Time: 0800

Ending Time: 1300

Chemist: B. GRIFFIN II

Comments: BATCH 3559

	Description	Lab ID
1	STD	V65 -8505
2	STD	V65 -8505
3	BLK	V66 -8605
4	SAM	V67 -8705
5	DUP	V67 -8805
6	SAM	V68 -8705
7	DUP	V68 -8805
8	SAM	V69 -8705
9	DUP	V69 -8805
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

[illegible]

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WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH SUMMARY SHEET					
METHOD . LA-505-158/A-3		RERUN# 2	ANALYSIS START DATE 6-4-94		
PREPARED BY LH STANDLEY			SUMMARY DATE 6-4-94		
SAMPLE POINT 108-AP		TIME START 0800	TIME COMPLETE 1300		
SPL ID	SERIAL NO	RESULT #1	G OR ML ->	MLS	COMMENTS
STD	V65 -8505	DF = 1	25ml	25	25ml -> 25ml 33N11-D / AS CAL STD
STD	V65 -8505	DF =3.9683	12.6ml ->	50	12.6ml -> 50ml 34N11-E / AS/SE
BLK	V66 -8605	-	-	50	TOTAL VOLUME: 50ml
SAM	V67 -8705	DF = 10	5ml	50	5ml -> 50ml
DUP	V67 -8805	DF = 10	5ml	50	5ml -> 50ml
SAM	V68 -8705	DF = 10	5ml	50	5ml -> 50ml
DUP	V68 -8805	DF = 10	5ml	50	5ml -> 50ml
SAM	V69 -8705	DF = 10	5ml	50	5ml -> 50ml
DUP	V69 -8805	DF = 10	5ml	50	5ml -> 50ml

6-8-94					

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NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE -- LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH

1. MEASURED THE mls ON THE STD: 34N11-E AND GOT 12.6g INSTEAD OF 12.5g. UNDER CHEMIST REQUEST I CONVERTED THE GRAMS TO mls AND USED 12.6ml FOR STD SIZE OR VOLUME. THIS GAVE US A COMPLICATED LOOKING DILUTION FACTOR BUT GIVES THE CHEMIST A MORE ACCURATE RESULT.

 6-8-94

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Batch 3559

Serial No V 65.-8505	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority CG
Determination ACD DGST	Method-Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 1
Sample Size ? <i>12.6 ml → 50 ml</i>			Customer ID STD	
Remarks Calculations Results LMCS ID <i>34M1-E</i> <i>As, sc</i> LMCS ID _____ LMCS ID _____ STD VOL <i>12.6 ml</i> VOLUME ON COMPLETION <i>50 ml</i> $\text{DF} = \frac{50 \text{ ml}}{12.6 \text{ ml}} = (3.9683)$				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 6-4-94		Time Completed 1300		
		Lab Unit Mgr <i>Barthand Griffin II</i>		

Serial No V 65.-8505	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority CG
Determination ACD DGST	Method-Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 2
Sample Size ? <i>25 ml → 25 ml</i>			Customer ID STD	
Remarks Calculations Results LMCS ID <i>33M11-D</i> <i>As calstd</i> LMCS ID _____ LMCS ID _____ STD VOL <i>25 ml</i> VOLUME ON COMPLETION <i>25 ml</i> $\text{DF} = 1$				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 6-4-94		Time Completed 1300		
		Lab Unit Mgr <i>Barthand Griffin II</i>		

ACID DIGESTION ANALYSIS

Serial No V 66.-8605	Sample Point 108-AP	Date 3-18-94	Time Issued 9:38	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units NONE	Charge Code N1A7F	Reruns 1
Sample Size ? <u>50ml</u>			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK VOLUME ON COMPLETION <u>50ml</u> <i>As, Sc</i>				
Analyst - 1 <i>S. H. [Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 6-4-94	Time Completed 1300	Lab Unit Mgr <i>Bertand Griffin II</i>		

Serial No V 67.-8705	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 1
Sample Size ? <u>5ml → 50ml</u>			Customer ID 108-AP-C	
Remarks Calculations Results SAMPLE SAMPLE VOL <u>5ml</u> D.F. $\frac{50ml}{5ml} = 10$ VOLUME ON COMPLETION <u>50ml</u> <i>As, Sc</i>				
Analyst - 1 <i>S. H. [Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 6-4-94	Time Completed 1300	Lab Unit Mgr <i>Bertand Griffin II</i>		

ACID DIGESTION ANALYSIS

Serial No V 67.-8805	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 1
Sample Size ? <u>5 ml → 50 ml</u>			Customer ID 108-AP-C	
Remarks Calculations Results DUPLICATE SAMPLE <u>As, Se</u> DUPLICATE VOL <u>5 ml</u> <u>DF = $\frac{50 \text{ ml}}{5 \text{ ml}} = (10)$</u> VOLUME ON COMPLETION <u>50 ml</u>				
Analyst - 1 <u>[Signature]</u> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 6-4-94	Time Completed 1300	Lab Unit Mgr <u>[Signature]</u>		

Serial No V 68.-8705	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 1
Sample Size ? <u>5 ml → 50 ml</u>			Customer ID 108-AP-D	
Remarks Calculations Results SAMPLE <u>As, Se</u> SAMPLE VOL <u>5 ml</u> <u>> DF = $\frac{50 \text{ ml}}{5 \text{ ml}} = (10)$</u> VOLUME ON COMPLETION <u>50 ml</u>				
Analyst - 1 <u>[Signature]</u> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 6-4-94	Time Completed 1300	Lab Unit Mgr <u>[Signature]</u>		

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Serial No V 68.-8805	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 1
Sample Size ? 5ml → 50ml			Customer ID 108-AP-D	
Remarks, Calculations, Results DUPLICATE SAMPLE <i>As, Se</i> DUPLICATE VOL <u>5ml</u> VOLUME ON COMPLETION <u>50ml</u> $> DF = \frac{50ml}{5ml} = (10)$				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 6-4-94	Time Completed 1300	Lab Unit Mgr <i>Bertrand Griffin II</i>		

Serial No V 69.-8705	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 1
Sample Size ? 5ml → 50ml			Customer ID 108-AP-E	
Remarks, Calculations, Results SAMPLE <i>As, Se</i> SAMPLE VOL <u>5ml</u> VOLUME ON COMPLETION <u>50ml</u> $DF = \frac{50ml}{5ml} = 10$				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 6-4-94	Time Completed 1300	Lab Unit Mgr <i>Bertrand Griffin II</i>		

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Serial No V 69.-8805	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination ACD DGST	Method/Standard LA-505-153	Result Units DF	Charge Code N1A7F	Reruns 1
Sample Size ? <u>5 mL → 50 mL</u>			Customer ID 108-AP-E	
Remarks Calculations Results DUPLICATE SAMPLE <u>As, Se</u> DUPLICATE VOL <u>5 mL</u> VOLUME ON COMPLETION <u>50 mL</u> D.F. $\frac{50 \text{ mL}}{5 \text{ mL}} = 10$				
Analyst - 1 <u>A. K. V. Allen</u> Hrs	Analyst - 2 Hrs	Analyst - 3 <u>Caketa</u> Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 6-4-94	Time Completed 1300	Lab Unit Mgr <u>Bernard Duffin II</u>	<u>[Signature]</u>	

54-6800-061 (R-10 83)

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY
ANALYTICAL BATCH

WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No. V-73	Customer ID: 108AP FLDBLK
Analysis: ACD DGST	Sample Prep: DIRECT

Instrument: SN FC4495	Procedure/ Rev: LA-505-158/A-3
Technologist: LH STANDLEY	Date: 7-18-94
Starting Time: 0730	Temperature 95 C
Ending Time: 0930	Chemist: B. GRIFFIN II

Comments: _____

BATCH#3019

	Description	Lab ID		Description	Lab ID
1	STD* (ICP)	V 71 8505	11		
2	STD (AS/SE)	V-71 8505	12		
3	BLK	V-72 8605	13		
4	SAM	V-73 8705	14		
5	DUP	V-73 8805	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
WHC-1 & WHC-2	G3MWHC1N10G2.5ml	L3MWHC2N1 2.5ml		50ml
Zn,V,U,Co,Cu	46N10-A 2.5ml			50ml
AS/SE	38N11-A 12.5ml			50ml
				242

ANALYTICAL BATCH SUMMARY SHEET					
METHOD LA-505-158/A-3		RERUN# 0		ANALYSIS START DATE 7-18-94	
PREPARED BY LH STANDLEY			SUMMARY DATE 7-18-94		
SAMPLE 108AP/FLDBLK		TIME START 0730		TIME COMPLETE 0930	
POINT					
SPL ID	SERIAL NO	RESULT #1	G OR ML ->	MLS	COMMENTS
STD	V-71 8505	DF=20	2.5ML	50	2.5ML -> 50ML WHC-1/G3MWHC1N10G WHC-2/L3MWHC2N1 46N10-A
STD	V-71 8505	DF=4	12.5 ML	50	12.5ML -> 50ML 38N11-A
BLK	V-72 8605	NA 3ml 10-04-94	NA 3ml 10-04-94	50	TOTAL VOLUME: 50ML
SAM	V-73 8705	DF=10	5ML	50	5ML -> 50ML
DUP	V-73 8705	DF=10	5ML	50	5ML -> 50ML
<div style="position: absolute; bottom: 10px; left: 10px; font-family: cursive;"> Standley 7-18-94 </div>

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ACID DIGESTION ANALYSIS

Batch 3019

Serial No V 71.-8505	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 4	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 2.5 ml of each 50ml			Customer ID STD	
Remarks Calculations Results LMCS ID 46N10-A/25 V, Cu, Co, U LMCS ID G3MWHC1010G/WHC1 LMCS ID L3MWHC201/WHC2 STD VOL 2.5 ml VOLUME ON COMPLETION 50 ml $D.F. = \frac{50ml}{2.5ml} = 20$				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7-18-94	Time Completed 0930	Lab Unit Mgr Bertrand Giffin II 7-18-94		

Serial No V 71.-8505	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 4	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 12.5 ml → 50 ml			Customer ID STD	
Remarks Calculations Results LMCS ID 38N11-A LMCS ID LMCS ID STD VOL 12.5 ml VOLUME ON COMPLETION 50 ml $D.F. = \frac{50ml}{12.5ml} = 4$				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7-18-94	Time Completed 0930	Lab Unit Mgr Bertrand Giffin II 7-18-94		

ACID DIGESTION ANALYSIS

Serial No	Sample Point	Date	Time Issued	Priority
V 72.-8605	108AP FLDBLK	3-18-94	11:15	26
Determination	Method Standard	Result Units	Charge Code	Reruns
ACD DGST	LA-505-158	NONE	N1A7F	0
Sample Size			Customer ID	
50ml			BLANK	
Remarks Calculations Results				
REAGENT BLANK VOLUME ON COMPLETION 50ml				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>[Signature]</i>				
Hrs	Hrs	Hrs	Hrs	Hrs
		<i>Pakito</i>		
Date	Time Completed	Lab Unit Mgr	7-18-94	
7-18-94	0930	<i>Bertrand Griffin II</i>	<i>AKM Gared</i>	

Serial No	Sample Point	Date	Time Issued	Priority
V 73.-8705	108AP FLDBLK	3-18-94	11:22	26
Determination	Method Standard	Result Units	Charge Code	Reruns
ACD DGST	LA-505-158	DF	N1A7F	0
Sample Size			Customer ID	
5ml → 50ml			108AP-FB	
Remarks Calculations Results				
SAMPLE SAMPLE VOL 5ml VOLUME ON COMPLETION 50ml				
$DF = \frac{50ml}{5ml} = 10$				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>[Signature]</i>				
Hrs	Hrs	Hrs	Hrs	Hrs
		<i>Pakito</i>		
Date	Time Completed	Lab Unit Mgr	7-18-94	
7-18-94	0930	<i>Bertrand Griffin II</i>	<i>AKM Gared</i>	

ACID DIGESTION ANALYSIS

Serial No	Sample Point	Date	Time Issued	Priority			
V 73.-8805	108AP FLDBLK	3-18-94	11:22	26			
Determination	Method/Standard	Result Units	Charge Code	Reruns			
ACD DGST	LA-505-158	DF	N1A7F	0			
Sample Size	Customer ID						
5 ml → 50 ml	108AP-FB						
Remarks, Calculations, Results							
DUPLICATE SAMPLE DUPLICATE VOL 5 ml DF: $\frac{50 \text{ ml}}{5 \text{ ml}} = 10$ VOLUME ON COMPLETION 50 ml							
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5			
<i>[Signature]</i>							
Hrs	Hrs	Hrs	Hrs	Hrs			
		<i>[Signature]</i>					
Date	Time Completed	Lab Unit Mgr					
7-18-94	0930	Bertrand Duffin II	7-18-94 <i>[Signature]</i>				

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

CP
11

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch 3024

Lao Segment Serial No.

✓ 77

Customer ID:

CCMP

Analysis:

Act Dyst

Sample Prep:

Direct

Instrument:

1A

Procedure/ Rev:

LA-100-100-A

Technologist:

1/1/2000

Date:

4-17-94

Starting Time:

0900

Temperature

95°C

Ending Time:

0900

Chemist:

B. Gullfin II

Comments:

1 Run in 2 vials low amount of sample left for V 77.

	Description	Lab ID
1	1A	✓ 77
2	1A	✓ 77
3	1A	✓ 77
4	1A	✓ 77
5	1A	✓ 77
6	1A DLP	✓ 77
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
1A	134 WIC 1/2 (10)		100 WIC 1/2	100
1A	134 WIC 2 (10)			100
1A	301234 B (10)		2nd 1.4H	100
				247

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH SUMMARY SHEET					
METHOD: <u>Heaton H C</u>		DATE START: <u>4-17-94</u>		TIME START: <u>6:50</u>	
PREPARED BY: <u>[Signature]</u>		DATE COMPLETE: <u>4-17-94</u>		TIME COMPLETE: <u>6:00</u>	
SPL NAME	SPL ID	g/L or DF RESULT	g or mL SAMPLE SIZE	mL FINAL VOL.	STD, SPL, DUP, SPK REMARKS
STB	V-75 3205	10	5	50	
BLK	V-76 3205	-		50	
AM	V-77 3205	5	10	50	
DDP	V-77 3205	5	10	50	
PHK	V-77 3205	4.8	10	10	
DDP	V-77 3205	4.8	10	10	
<div style="display: flex; justify-content: space-between;"> <div> <p><u>[Signature]</u></p> <p><u>4-17-94</u></p> </div> <div> <p><u>[Signature]</u></p> <p><u>4-17-94</u></p> </div> </div>					

NARRATIVE: ☒ NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
 LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

Except that I got low on
 samples after sample 10, plant
 was puffed.

Estimated 2.5 g/L

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Batch 3029

Serial No V 75.-8505		Sample Point 108-AP		Date 3-18-94	Time Issued 12: 3	Priority 26
Determination ACD DGST		Method Standard LA-505-158		Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size <i>5 ml → 50 ml</i>					Customer ID STD (ICP)	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Remarks Calculations Results</p> <p>LMCS ID <i>13MWHC1810</i></p> <p>LMCS ID <i>13MWHC201</i></p> <p>LMCS ID <i>13MWHC201</i></p> <p>STD VOL <i>5 ml of each</i></p> <p>VOLUME ON COMPLETION <i>50 ml</i></p> <p>CALCULATION: <i>50 ml</i> <i>(Bottle:1) D.F. = 5 ml = 10</i></p> </div> <div style="width: 50%;"> <p><i>SM-20</i> <i>301239B</i></p> <p><i>5 ml in</i> <i>50 ml</i></p> <p><i>DF = 50 ml / 5 ml = 10</i></p> <p><i>(Bottle:2)</i></p> </div> </div>						
Analyst - 1 <i>[Signature]</i>		Analyst - 2		Analyst - 3		Analyst - 4
Hrs		Hrs		Hrs		Hrs
Date 4-17-94		Time Completed 0900		Lab Unit Mgr <i>Bertrand Griffin II</i>		4-20-94 <i>OK M. Y. [Signature]</i>

Serial No V 76.-8605		Sample Point 108-AP		Date 3-18-94	Time Issued 12: 6	Priority 26
Determination ACD DGST		Method Standard LA-505-158		Result Units NONE	Charge Code N1A7F	Reruns 0
Sample Size <i>50 ml total Volume</i>					Customer ID BLANK	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Remarks Calculations Results</p> <p>REAGENT BLANK</p> <p>VOLUME ON COMPLETION <i>50 ml</i></p> </div> <div style="width: 50%;"></div> </div>						
Analyst - 1		Analyst - 2		Analyst - 3		Analyst - 4
Hrs		Hrs		Hrs		Hrs
Date 4-17-94		Time Completed 0900		Lab Unit Mgr <i>Bertrand Griffin II</i>		4-20-94 <i>OK M. Y. [Signature]</i>

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Serial No V 77.-8705	Sample Point 108-AP	Date 3-18-94	Time Issued 12:26	Priority 26
Determination ACD DGST	Method-Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 10ml → 50ml			Customer ID COMP	
Remarks, Calculations, Results <p>SAMPLE</p> <p>SAMPLE VOL 10ml DF = $\frac{50ml}{10ml} = 5$</p> <p>VOLUME ON COMPLETION 50ml</p>				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-17-94	Time Completed 0900	Lab Unit Mgr <i>[Signature]</i> 4-20-94		

Serial No V 77.-8805	Sample Point 108-AP	Date 3-18-94	Time Issued 12:26	Priority 26
Determination ACD DGST	Method-Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 10ml → 50ml			Customer ID COMP	
Remarks, Calculations, Results <p>DUPLICATE SAMPLE</p> <p>DUPLICATE VOL 10ml DF = $\frac{50ml}{10ml} = 5$</p> <p>VOLUME ON COMPLETION 50ml</p>				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-17-94	Time Completed 0900	Lab Unit Mgr <i>[Signature]</i> 4-20-94		

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Serial No V 77.-8005	Sample Point 108-AP	Date 3-18-94	Time Issued 12:26	Priority 26
Determination ACD DGST	Method: Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 2.5 → 10 ml			Customer ID COMP	
Remarks, Calculations Results CALC. & LOT # / SEE Backside. DUP SPIKED SAMPLE VOLUME <u>2.5 ml</u> SPIKE ID <u>WHC1 & WHC2</u> SPIKE VOL <u>1 ml</u> VOLUME ON <u>10 ml</u> COMPLETION (Bottle: 1) (Bottle 2) (NOTE: Ending Volume had to be brought down due to I.S.)				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-17-94	Time Completed 0900	Lab Unit Mgr <i>[Signature]</i>	4-20-94 <i>[Signature]</i>	

CALC. FOR SAMPLE: V 77-8005

$$D.F. = \frac{10 \text{ ml}}{2.5 \text{ ml}} = 4$$

CALC. FOR BOTH SPIKES:

$$D.F. = \frac{10 \text{ ml}}{1 \text{ ml}} = 10$$

SPIKES USED:

WHC1 / L3MWHC1N10

WHC2 / L3MWHC2N1

SM-20 / 30123-1B

WHC-SD-WM-DP-065, REV. 0

ACID DIGESTION ANALYSIS

Serial No V 77.-8905	Sample Point 108-AP	Date 3-18-94	Time Issued 12:26	Priority 26
Determination ACD DGST	Method/Standard LA-505-158	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 2.5 ml → 10ml			Customer ID COMP	
Remarks Calculations, Results SPIKED SAMPLE VOLUME <u>2.5ml</u> SPIKE ID <u>WHC-1 & WHC-2</u> SPIKE VOL <u>1ml</u> VOLUME ON <u>10ml</u> COMPLETION <u>10ml</u> (Bottle 1)				
CALCULATIONS & LOT # / See Back SM-20 1ml in 10ml (Bottle 2)				
NOTE: Ending Volume for spiked samples differs from Sam. & NOTE: Sam Dup. due to insufficient sample.				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-17-94	Time Completed 0900	Lab/Unit Mgr <i>[Signature]</i>	4-20-94 <i>[Signature]</i>	

54-6800-061 (R-10-83)

V77-8905

CALC. FOR SAMPLE:

$$D.F. = \frac{10ml}{2.5ml} = 4$$

CALC. FOR BOTH SPIKES:

$$D.F. = \frac{10ml}{1ml} = 10$$

SPIKES USED:

WHC1 / L3MWHC1N10
WHC2 / L3MWHC2N1

4-17-94
SM-20 / 301239B
JHO

6/12

ANALYTICAL BATCH

SP 108-17P

Roman C

$\sqrt{62}, \sqrt{63}$

108-AP-A, 108 AP-B

H₂O Dilution

Direct

— N/A ^{EMF}
09/29/94

Procedure/ Rev: LA-504-1C1/C2 10/2/94

L. M. Hustod

Date: 04/08/94

0800

Temperature 27.5 °C

1500

Chemist: B Griffin

Comments: H₂C Dilutions Done under Chemist Direction of
R. K. Fuller, 11/19/94

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
—	—	—	—	—
				253

Butch 2091

SP 165-171

METHOD:
4A-504-101

DATE START:

TIME START:

C1/C8/94

CSIC

PREPARED BY:

DATE COMPLETE:

TIME COMPLETE:

L.M. Husted

C4/C8/94f

1.500

~~Handwritten scribbles and numbers on lined paper.~~

254

WHC-SD-WM-DP-065, REV. 0

WATER DIGESTION ANALYSIS

Disc 2991

Serial No V 61.-7600	Sample Point 108-AP	Date 3-18-94	Time Issued 8:27	Priority 26
Determination H2O DGST	Method/Standard LA-504-101	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size <i>2.5 mL Test Vol.</i>			Customer ID BLANK	
Remarks Calculations Results REAGENT BLANK $DF = 1$ <i>Dr. Carl M. Husted</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date <i>01/08/94</i>	Time Completed	Lab Unit Mgr <i>Keith Fuller</i>	<i>[Signature]</i>	

54 6800-061 (R 10-83)

Serial No V 62.-7700	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination H2O DGST	Method/Standard LA-504-101	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size <i>5 mL → 25 mL</i>			Customer ID 108-AP-A	
Remarks Calculations Results JAR ID# GRAMS SAMPLE <i>5 mL</i> VOLUME ON COMPLETION <i>25 mL</i> $\frac{25 \text{ mL}}{5 \text{ mL}} = DF. 5$ <i>Dr. Carl M. Husted</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date <i>04/08/94</i>	Time Completed	Lab Unit Mgr <i>Keith Fuller</i>	<i>[Signature]</i>	

54 6800-061 (R 10-83)

WHC-SD-WM-DP-065, REV. 0

WATER DIGESTION ANALYSIS

Serial No V 62.-7800	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination H2O DGST	Method-Standard LA-504-101	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size <u>5mL</u> → <u>2.5mL</u>			Customer ID 108-AP-A	
Remarks, Calculations, Results DUPLICATE SAMPLE JAR ID# GRAMS SAMPLE <u>5mL</u> $\frac{25mL}{5mL} = D.F. 5$ VOLUME ON COMPLETION <u>2.5mL</u> <i>Dr. Ant. Maier, C.P.L. Husted</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 04/08/94	Time Completed	Lab Unit Mgr <i>Ruth Fuller</i> <i>Dr. Ant. Maier</i>		

54 0800-061 (R 10 83)

Serial No V 63.-7700	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination H2O DGST	Method-Standard LA-504-101	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size <u>5mL</u> → <u>2.5mL</u>			Customer ID 108-AP-B	
Remarks, Calculations, Results JAR ID# GRAMS SAMPLE <u>5mL</u> $\frac{25mL}{5mL} = D.F. 5$ VOLUME ON COMPLETION <u>2.5mL</u> <i>Dr. Ant. Maier, C.P.L. Husted</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 04/08/94	Time Completed	Lab Unit Mgr <i>Ruth Fuller</i> <i>Dr. Ant. Maier</i>		

54 0800-061 (R 10 83)

WATER DIGESTION ANALYSIS

54 GROSS (Vol 1 of 10 83)

222-S LABORATORY

ANALYTICAL BATCH

SP, ICS AFD

Return C

Instrument: <u>N/A</u> ^{empty} <u>5/1/94</u>	Procedure/ Rev: <u>LA-504-101/C</u> ^{LA-504-101} <u>5/1/94</u>
Technologist: <u>L.M. Husted</u>	Date: <u>04/08/94</u>
Starting Time: <u>0800</u>	Temperature <u>25°C</u>
Ending Time: <u>1500</u>	Chemist: <u>B. Griffin</u>

Comments: No Dilutions done under Chemist Direction of
R. K. Fuller - JMA 09/29/94

	Description	Lab ID		Description	Lab ID
1	BLK	V66.-7600	11		
2	Scamp	V67.-7700	12		
3	Scamp Day	V67.-7800	13		
4	Scamp	V68.-7700	14		
5	Scamp Day	V68.-7800	15		
6	Scamp	V69.-7700	16		
7	Scamp Day	V69.-7800	17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
—	—	—	—	—
				253

Boston Socy

ANALYTICAL BATCH SUMMARY SHEET					
METHOD:		DATE START:		TIME START:	
PREPARED BY:		DATE COMPLETE:		TIME COMPLETE:	
LA-504-101		04/08/94		0800	
L.M. Huston		04/08/94		1500	
SPL NAME	SPL ID	g/L or DF	g or mL	mL	STD, SPL, DUP, SPK
RESULT	SAMPLE SIZE	FINAL VOL.	REMARKS		
PLK	V66-7600	—	—	2.5 ml vol	2.5 ml 1st vol
Samp	V67-7700	5	5	2.5	5 ml + 2.5 ml
Samp Dup	V67-7800	5	5	2.5	5 ml + 2.5 ml
Samp	V68-7700	5	5	2.5	5 ml + 2.5 ml
Samp Dup	V68-7800	5	5	2.5	5 ml + 2.5 ml
Samp	V69-7700	5	5	2.5	5 ml + 2.5 ml
Samp Dup	V69-7800	5	5	2.5	5 ml + 2.5 ml

☒

253

WATER DIGESTION ANALYSIS

Data 3002

Serial No V 66.-7600	Sample Point 108-AP	Date 3-18-94	Time Issued 9:38	Priority 26
Determination H2O DGST	Method/Standard LA-504-101	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size <i>TOT. VOL = 25 mL</i>			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK <i>DF = 1</i>				
<i>Sec. Mgr. C. H. Husted</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date <i>04/08/94</i>	Time Completed	Lab Unit Mgr <i>Keith Fuller</i>	<i>[Signature]</i>	

54 6800-061 (R-10-83)

Serial No V 67.-7700	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination H2O DGST	Method/Standard LA-504-101	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size <i>5 mL → 25 mL</i>			Customer ID 108-AP-C	
Remarks, Calculations, Results JAR ID# GRAMS SAMPLE <i>5 mL</i> VOLUME ON COMPLETION <i>25 mL</i> $\frac{25 \text{ mL}}{5 \text{ mL}} \Rightarrow \text{DF } 5$				
<i>Sec. Mgr. C. H. Husted</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date <i>04/08/94</i>	Time Completed	Lab Unit Mgr <i>Keith Fuller</i>	<i>[Signature]</i>	

54 6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

WATER DIGESTION ANALYSIS

Serial No	Sample Point	Date	Time Issued	Priority
V 67.-7800	108-AP	3-18-94	9:39	26
Determination	Method-Standard	Result Units	Charge Code	Reruns
H2O DGST	LA-504-101	DF	N1A7F	0
Sample Size	Customer ID			
5 mL, 25 mL	108-AP-C			
Remarks Calculations Results DUPLICATE SAMPLE JAR ID# GRAMS SAMPLE <u>5 mL</u> $\frac{25 \text{ mL}}{5 \text{ mL}} = \text{D.F. } 5$ VOLUME ON COMPLETION <u>25 mL</u> <i>St Ann Marie Ch. Husted</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
04/04/94		<i>Rakita</i> <i>Keith Fuller</i>	<i>RLB</i>	

54 6800-061 (R 10-83)

Serial No	Sample Point	Date	Time Issued	Priority
V 68.-7700	108-AP	3-18-94	9:40	26
Determination	Method-Standard	Result Units	Charge Code	Reruns
H2O DGST	LA-504-101	DF	N1A7F	0
Sample Size	Customer ID			
5 mL, 25 mL	108-AP-D			
Remarks Calculations Results JAR ID# GRAMS SAMPLE <u>5 mL</u> $\frac{25 \text{ mL}}{5 \text{ mL}} = \text{D.F. } 5$ VOLUME ON COMPLETION <u>25 mL</u> <i>St Ann Marie Ch. Husted</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
04/08/94		<i>Rakita</i> <i>Keith Fuller</i>	<i>RLB</i>	

54 6800-061 (R 10-83)

WATER DIGESTION ANALYSIS

Serial No	Sample Point	Date	Time Issued	Priority
V 68.-7800	108-AP	3-18-94	9:40	26
Determination	Method-Standard	Result Units	Charge Code	Reruns
H2O DGST	LA-504-101	DF	N1A7F	0
Sample Size	Customer ID			
5 mL → 25 mL	108-AP-D			
Remarks, Calculations, Results DUPLICATE SAMPLE JAR ID# GRAMS SAMPLE <u>5 mL</u> $\frac{25 \text{ mL}}{5 \text{ mL}} = \text{DF} \cdot 5$ VOLUME ON COMPLETION <u>25 mL</u>				
<i>San Jose & Husted</i> Analyst - 1 Analyst - 2 Analyst - 3 Analyst - 4 Analyst - 5 Hrs Hrs Hrs Hrs Hrs Date <u>04/08/94</u> Time Completed Lab Unit Mgr <i>Pakite</i> <i>Keith Fuller</i> <i>[Signature]</i>				

54-6800-061 (R 10-83)

Serial No	Sample Point	Date	Time Issued	Priority
V 69.-7700	108-AP	3-18-94	9:42	26
Determination	Method-Standard	Result Units	Charge Code	Reruns
H2O DGST	LA-504-101	DF	N1A7F	0
Sample Size	Customer ID			
5 mL → 25 mL	108-AP-E			
Remarks, Calculations, Results JAR ID# GRAMS SAMPLE <u>5 mL</u> $\frac{25 \text{ mL}}{5 \text{ mL}} = \text{DF} \cdot 5$ VOLUME ON COMPLETION <u>25 mL</u>				
<i>San Jose & Husted</i> Analyst - 1 Analyst - 2 Analyst - 3 Analyst - 4 Analyst - 5 Hrs Hrs Hrs Hrs Hrs Date <u>04/08/94</u> Time Completed Lab Unit Mgr <i>Pakite</i> <i>Keith Fuller</i> <i>[Signature]</i>				

54-6800-061 (R 10-83)

WATER DIGESTION ANALYSIS

Serial No V 69.-7800	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination H2O DGST	Method-Standard LA-504-101	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size 5 mL 2.5 mL			Customer ID 108-AP-E	
Remarks Calculations Results DUPLICATE SAMPLE ^{sent to 04/08/94} JAR ID# 2.5 mL GRAMS SAMPLE 2.5 mL VOLUME ON COMPLETION <u>25 mL</u> $\frac{2.5 \text{ mL}}{5 \text{ mL}} = \text{NF} = 5$				
<i>Permit Maint. H. H. H. H. H.</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 07/08/94		Time Completed Lab Unit Mgr <i>Keith Fuller</i>		

54 6800-061 (R-10 83)

QA
45

WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No. V-73	Customer ID: 108AP FLDBLK
Analysis: H2O DGST	Sample Prep: DIRECT

Instrument: SN: F04495

Procedure/ Rev: LA-504-101/C-0

Technologist: LH STANDLEY

Date: 7-18-94

Starting Time: 0730

Temperature 25 C

Ending Time: 0930

Chemist: B. GRIFFIN II

Comments: BATCH#3014

	Description	Lab ID
1	BLK	V 72 7700
2	SAM	V-73 7700
3	DUP	V-73 7800
4		
5		
6		
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
				264

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH SUMMARY SHEET					
METHOD LA-504-101/C-0		RERUN# 0		ANALYSIS START DATE 7-18-94	
PREPARED BY LH STANDLEY			SUMMARY DATE 7-18-94		
SAMPLE 108AP/FLDBLK		TIME START 0730		TIME COMPLETE 0930	
POINT					
SPL ID	SERIAL NO	RESULT #1	G OR ML ->	MLS	COMMENTS
<i>Bertrand Griffin II</i>					
BLK	V-72 7600	NA <i>10-24-94</i>	NA <i>10-24-94</i>	50	TOTAL VOLUME: 50ML
SAM	V-73 7700	DF=10	5ML	50	5ML -> 50ML
DUP	V-73 7800	DF=10	5ML	50	5ML -> 50ML
<i>Bertrand Griffin II</i>					
<i>7-18-94</i>

NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE -- LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH

WATER DIGESTION ANALYSIS

Baker 3014

Serial No V 72.-7600	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 5	Priority 26
Determination H2O DGST	Method/Standard LA-504-101	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size <i>50ml</i>			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK <i>/COMPLETE</i>				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 7-18-94	Time Completed 0930	Lab Unit Mgr <i>Bertand Griffin II</i>	7-18-94 <i>AKM Yark U</i>	

54-6800-061 (R-10-83)

Serial No V 73.-7700	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination H2O DGST	Method/Standard LA-504-101	Result Units DF	Charge Code N1A7F	Reruns 0
Sample Size <i>5ml → 50ml</i>			Customer ID 108AP-FB	
Remarks, Calculations, Results JAR ID# GRAMS SAMPLE <i>5ml</i> VOLUME ON COMPLETION <i>50ml</i> $DF = \frac{50ml}{5ml} = 10$				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 7-18-94	Time Completed 0930	Lab Unit Mgr <i>Bertand Griffin II</i>	7-18-94 <i>AKM Yark U</i>	

54-6800-061 (R-10-83)

WATER DIGESTION ANALYSIS

Serial No	Sample Point	Date	Time Issued	Priority			
V 73.-7800	108AP FLDBLK	3-18-94	11:16	26			
Determination	Method/Standard	Result Units	Charge Code	Horuns			
H2O DGST	LA-504-101	DF	N1A7F	0			
Sample Size	Customer ID						
<u>5 ml → 50 ml</u>	108AP-FB						
Remarks, Calculations, Results							
DUPLICATE SAMPLE JAR ID# GRAMS SAMPLE <u>5 ml</u> $DF = \frac{50 ml}{5 ml} = 10$ VOLUME ON COMPLETION <u>50 ml</u>							
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5			
<i>[Signature]</i>							
Hrs	Hrs	Hrs	Hrs	Hrs			
Date	Time Completed	Lab Unit Mgr					
7-18-94	0930	<i>[Signature]</i>	7-18-94 <i>[Signature]</i>				

54-6800-061 (R-10 83)

WHC-SD-WM-DP-065, REV. 0

WATER DIGESTION ANALYSIS

Serial No V 62.-5000	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination COMMENT	Method/Standard XXXXXX	Result Units NONE	Charge Code N1A7F	Reruns 0
Sample Size			Customer ID 108-AP-A	
Remarks Calculations, Results GENERAL INFORMATION FOR THIS SAMPLE <div style="display: flex; justify-content: space-between;"> <div style="width: 40%;"> <p>V62-7700 sample } V62-7800 duplicate }</p> </div> <div style="width: 60%;"> <p><i>This comment is generated to document that sample V62 did not undergo a water digestion according to procedure LA-504-101. The water digestion extensions 77XX & 78XX were used to document the dilution factor only.</i></p> </div> </div>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date		Time Completed	Lab Unit Mgr <i>Keith Fuller</i>	

Serial No V 63.-5000	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination COMMENT	Method/Standard XXXXXX	Result Units NONE	Charge Code N1A7F	Reruns 0
Sample Size			Customer ID 108-AP-B	
Remarks Calculations, Results GENERAL INFORMATION FOR THIS SAMPLE <div style="display: flex; justify-content: space-between;"> <div style="width: 40%;"> <p>V-62 PK7 4/3/94 V-63-7700 sample } V-63 7800 duplicate }</p> </div> <div style="width: 60%;"> <p><i>This comment Card is generated to document that sample/duplicate V-63 did not undergo a water digestion according to procedure LA-504-101. The water digestion extensions 77XX and 78XX were used to document the dilution factor only.</i></p> </div> </div>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date		Time Completed	Lab Unit Mgr <i>Keith Fuller</i>	

WATER DIGESTION ANALYSIS

Serial No	Sample Point	Date	Time Issued	Priority
V 67.-5000	108-AP	3-18-94	9:39	26
Determination	Method-Standard	Result Units	Charge Code	Reruns
COMMENT	XXXXXX	NONE	N1A7F	0
Sample Size			Customer ID	
			108-AP-C	
Remarks Calculations Results GENERAL INFORMATION FOR THIS SAMPLE V-67-7700 } V-68-7800 }				
This comment card is generated to document that sample/duplicate V-67 did not undergo a water digestion according to procedure LA-504-101. The water digestion extensions 77XX + 7800 were used to document the dilution factor only.				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date		Time Completed	Lab Unit Mgr	
			Keith Fuller

Serial No	Sample Point	Date	Time Issued	Priority
V 68.-5000	108-AP	3-18-94	9:40	26
Determination	Method-Standard	Result Units	Charge Code	Reruns
COMMENT	XXXXXX	NONE	N1A7F	0
Sample Size			Customer ID	
			108-AP-D	
Remarks Calculations Results GENERAL INFORMATION FOR THIS SAMPLE V-68-7700 } V-68-7800 }				
This comment card is generated to document that sample/duplicate V-68 did not undergo a water digestion according to procedure LA-504-101. The water digestion extensions 77XX + 78XX were used to document the dilution factor only.				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date		Time Completed	Lab Unit Mgr	
			Keith Fuller

WHC-SD-WM-DP-065, REV.0

WATER DIGESTION ANALYSIS

Serial No V 69.-5000	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination COMMENT	Method/Standard XXXXXX	Result Units NONE	Charge Code N1A7F	Reruns 0
Sample Size			Customer ID 108-AP-E	
Remarks, Calculations Results GENERAL INFORMATION FOR THIS SAMPLE V-69-7700 V-69-7800 <i>May 10-04-94 LA 24-504-101. The water digestion extensions 77xx & 78xx were used to document the dilution factor only.</i> <i>This comment card is generated to document that sample/duplicate V-69 did not undergo a water digestion according to procedure.</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr <i>Keith Fuller</i>		

Serial No V 77.-5000	Sample Point 108-AP	Date 3-18-94	Time Issued 12:26	Priority 26																
Determination COMMENT	Method/Standard XXXXXX	Result Units NONE	Charge Code N1A7F	Reruns 0																
Sample Size			Customer ID COMP																	
Remarks, Calculations Results GENERAL INFORMATION FOR THIS SAMPLE 108-AP-COMP is a Composite of the following samples: <table border="0"> <tr> <td>108-AP-A</td> <td>V-62</td> <td>20 mls</td> <td rowspan="5">} Total volume of Composite sample is 100 mls.</td> </tr> <tr> <td>108-AP-B</td> <td>V-63</td> <td>20 mls</td> </tr> <tr> <td>108-AP-C</td> <td>V-67</td> <td>20 mls</td> </tr> <tr> <td>108-AP-D</td> <td>V-68</td> <td>20 mls</td> </tr> <tr> <td>108-AP-E</td> <td>V-69</td> <td>20 mls</td> </tr> </table>					108-AP-A	V-62	20 mls	} Total volume of Composite sample is 100 mls.	108-AP-B	V-63	20 mls	108-AP-C	V-67	20 mls	108-AP-D	V-68	20 mls	108-AP-E	V-69	20 mls
108-AP-A	V-62	20 mls	} Total volume of Composite sample is 100 mls.																	
108-AP-B	V-63	20 mls																		
108-AP-C	V-67	20 mls																		
108-AP-D	V-68	20 mls																		
108-AP-E	V-69	20 mls																		
Analyst - 1 <i>W. Stande</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5																
Hrs	Hrs	Hrs	Hrs	Hrs																
Date 4-6-94	Time Completed 1100	Lab Unit Mgr <i>Keith Fuller</i>																		

WHC-SD-WM-DP-065, REV. 0

PHYSICAL ANALYSES

$$C_3$$

ANALYTICAL BATCH

SP. 108. NP

Return 11C

V62, V63

108-AP-A, 108-AP-B

Analysis: APPR / CTR

DIRECT

— 143

Procedure/ Rev: 1A-549-151 E-1

L.M.E.H. Husted

Date: CH/CJ/94

~~C. V. 124~~ 132C

Temperature 25°C

14/1/15

Chemist: B. G. V. 112

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
—	—	—	—	—
				272

WHC-SD-WM-DP-065, REV. 0

APPEARANCE ANALYSIS - UNDIGESTED SAMPLE

Batch # 2981

Serial No V 62.-1001	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination APPR/OTR	Method/Standard LA-519-151	Result Units NONE	Charge Code N1A7F	Reruns 0
Sample Size			Customer ID 108-AP-A	
Remarks, Calculations, Results Sample or Tank ID? 108-AP - Pale Yellow 04/07/94 Color and Est Vol? Cream - 100mL Clarity? Clear Solids y/n NO Phases? 1 Phase - Liquid OTR or CPM? From 4 inches 8 m/hr was 04/07/94 OTR Jean Marie still tested				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 04/07/94	Time Completed 1445	Lab Unit Mgr Bertrand Griffin II R.C. Jones		

54 6800-061 (R-10-83)

Batch # 2981

Serial No V 63.-1001	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination APPR/OTR	Method/Standard LA-519-151	Result Units NONE	Charge Code N1A7F	Reruns 0
Sample Size			Customer ID 108-AP-B	
Remarks, Calculations, Results Sample or Tank ID? 108-AP Color and Est Vol? 100mL - Pale yellow Clarity? Clear Solids y/n Yes - small amount Phases? 1 Phase - Liquid OTR or CPM? OTR 4 inches above = 7 m/hr Jean Marie still tested				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 04/07/94	Time Completed 1445	Lab Unit Mgr Bertrand Griffin II R.C. Jones		

54 6800-061 (R-10-83)

Batch # 2996

OK
13

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

SP. 108-AP

Return 0

Lab Segment Serial No.

V67, V68, V69

Customer ID:

108-AP-C, 108-AP-D, 108-AP-E

Analysis:

APPR - QTR

Sample Prep:

Direct

Instrument:

11

Procedure/ Rev:

LA-519-151 E-1

Technologist:

L.M.E.H. Husted

Date:

01/07/94

Starting Time:

1320

Temperature

25°C

Ending Time:

1445

Chemist:

B. Griffin

Comments:

	Description	Lab ID
1	Sample	V67-1001
2	Sample	V68-1001
3	Sample	V69-1001
4		
5		
6		
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
—	—	—	—	—
				274

WHC-SD-WM-DP-065, REV. 0

APPEARANCE ANALYSIS - UNDIGESTED SAMPLE

BATCH 2996

Serial No V 67.-1001	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination APPR/OTR	Method/Standard LA-519-151	Result Units NONE	Charge Code N1A7F	Returns 0
Sample Size			Customer ID 108-AP-C	
Remarks Calculations Results Sample or Tank ID? 108AP Color and Est Vol? 100 mL - Pale Yellow Clarity? <i>clear</i> Solids y/n Yes - Small amount Phases? <i>1 Liquid</i> OTR or CPM? <i>OTR from 4" above = 7 ml/hr</i> <i>Sean Marie CH Husted</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date <i>04/01/94</i>		Time Completed 1445		
Lab Unit Mgr <i>Bertrand Griffin II</i>		<i>R.C. Jones</i>		

54 6800 061 (R 10-83)

BATCH 2996

Serial No V 68.-1001	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination APPR/OTR	Method/Standard LA-519-151	Result Units NONE	Charge Code N1A7F	Returns 0
Sample Size			Customer ID 108-AP-D	
Remarks Calculations Results Sample or Tank ID? 108-AP Color and Est Vol? 100 mL - Pale Yellow Clarity? <i>clear</i> Solids y/n <i>no</i> Phases? <i>1 Liquid</i> OTR or CPM? <i>OTR from 4" above = 7 ml/hr</i> <i>Sean Marie CH Husted</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date <i>04/01/94</i>		Time Completed 1445		
Lab Unit Mgr <i>Bertrand Griffin II</i>		<i>R.C. Jones</i>		

54 6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

APPEARANCE ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 69.-1001	108-AP	3-18-94	9:42	26
Determination	Method/Standard	Result Units	Charge Code	Reruns
APPR/OTR	LA-519-151	NONE	N1A7F	0
Sample Size			Customer ID	
			108-AP-E	
Remarks, Calculations, Results				
<p>Sample or Tank ID? 108-AP Color and Est Vol? 100mL - Pale Yellow Clarity? Clear Solids y/n Yes - Small amount Phases? 1 Light OTR or CPM? OTR From 4" above = 7 m/hr <i>LeAnne Moore C/H/Heated</i></p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
24/07/94	1445	<i>Robert</i> <i>Bertrand Griffin II</i> <i>R.C. Jones</i>		

222-S LABORATORY

S.P. 108-77P

Customer ID:

Sample Prep:

Procedure/ Rev: *L17-519 - 151 E-1*

Date: CH/C7/94

Temperature 25°C

Chemist: B Griffin

	Description	Lab ID
1	Sample	MTT-1001
2		
3		
4		
5		
6		
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
				277

WHC-SD-WM-DP-065, REV. 0

APPEARANCE ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 77.-1001	108-AP	3-18-94	SK 4:34	26
Determination	Method/Standard	Result Units	Charge Code	Reruns
APPR/OTR	LA-519-151	NONE	N1A7F	0
Sample Size			Customer ID	
			COMP	
Remarks, Calculations, Results				
<p>Sample or Tank ID? 108-AP COMP</p> <p>Color and Est Vol? 45 mL - Pale Yellow</p> <p>Clarity? Clear</p> <p>Solids y/n yes small amount</p> <p>Phases? 1 Liquid</p> <p>OTR or CPM? OTR FROM 4" above = 4 m/hr</p> <p>2 m/hr</p> <p>04/07/94</p> <p>John Maize & Co. Limited</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
04/07/94	1445	Bartrand Griffin II	R.C. Jones	

U.A.

WHC-SD-WM-DP-065, REV. 0

WHC-SD-WM-DP-065, REV. 0

DIFFERENTIAL SCANNING CALORIMETRY ANALYSIS - UNDIGESTED SAMPLE

RERUN *Batch 3247*

Serial No V 60.-5511	Sample Point 108-AP	Date 3-18-94	Time Issued 8:26	Priority 26
Determination DSC	Method/Standard LA-514-113	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size 6.68 mg			Customer ID STD	
Remarks, Calculations, Results R230 INDIUM STD#12N14A RESULT 28.8 g/g STD VAL 28.15 g/g %REC 19.2% <i>ROBBY WENDLAND</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-25-95	Time Completed 16:00	Lab Unit Mgr <i>Robb Wendland</i> <i>J.M. Faye</i>		

54-6800-061 (R-10-83)

RERUN

Serial No V 62.-5711	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination DSC	Method/Standard LA-514-113	Result Units EXOTHERMS	Charge Code N1A7F	Reruns 1
Sample Size 9.935 mg			Customer ID 108-AP-A	
Remarks, Calculations, Results No exotherm <i>ROBBY WENDLAND</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-25-94	Time Completed 16:00	Lab Unit Mgr <i>Robb Wendland</i> <i>J.M. Faye</i>		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

DIFFERENTIAL SCANNING CALORIMETRY ANALYSIS - UNDIGESTED SAMPLE

Serial No		Sample Point		Date	Time Issued	Priority
V 62.-5811		108-AP		3-18-94	8:28	26
Determination		Method/Standard		Result Units	Charge Code	Reruns
DSC		LA-514-113		EXOTHERMS	N1A7F	1
Sample Size					Customer ID	
9.824 mg					108-AP-A	
Remarks Calculations, Results						
No exotherm						
ROBBY WENDLAND						
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5		
Hrs	Hrs	Hrs	Hrs	Hrs		
Date	Time Completed	Lab Unit Mgr				
4-25-94	16:00	J.M. Lutz	[Signature]			

54-6800-061 (R 10-83)

IND STD
6.680 mg
Rate: 10.0 °C/min
File: 00088.001 DSC METTLER 24-Apr-94
Ident: 0.0 222-S Laboratory

SIGNATURE OF ANALYST/TECHNOLOGIST/ANALYST/VERIFIED/COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 33 TO 34.

DISCONT

Integration	
Delta H	192 mJ
	28.8 J/g
Peak	159.3°C
	-14.6 mW

File: 00089.001 DSC METTLER 24-Apr-94
Ident: 0.0 222-S Laboratory

Rate: 10.0 °C/min

V62
9.935 mg

exo >

V62

50. mW

°C

400.

300.

200.

100.

V62 DUP
9.824 mg

File: 00090.001 DSC METTLER 24-Apr-94
Ident: 0.0 222-S Laboratory

Rate: 10.0 °C/min

V62 DUP

exo >

50. mW

°C

400.

300.

200.

100.

WHC-SD-WM-DP-065, REV. 0

Batch 2982

GA

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. 9/29/94
V62-5711, V62-5811, V63-5711, V63-5811

Customer ID:

108-AP

Analysis:

DSC

Sample Prep:

Direct

Instrument: WC16134 - WC16129

Procedure/ Rev: 2A-514-113

AOB-0

Technologist: DAVID W. SMITH

Date: 4-11-94

Starting Time: 9:00

Temperature: N/A

Ending Time: 14:00

Chemist: ~~D. Heat~~ J. Faye

Comments:

V62 + its duplicate are not for rerun but the rest of the data is fine.
V62 + its duplicate did not both show the expected J114 imp water endotherm so it was necessary to rerun them.

	Description	Lab ID
1	LMCS V62-5711	12N14A
2	Sample	V-62-5711
3	Sample Dup	V-62-5811
4	Sample	V-63-5711
5	Sample Dup	V-63-5811
6		
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

OUT FOR RERUN

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	12N14A			
				285

WHC-SD-WM-DP-065, REV. 0
DIFFERENTIAL SCANNING CALORIMETRY ANALYSIS - UNDIGESTED SAMPLE

Batch 2982

Serial No	Sample Point	Date	Time Issued	Priority
V 60.-5511	108-AP	3-18-94	8:26	26
Determination	Method Standard	Result Units	Charge Code	Reruns
DSC	LA-514-113	% RECOVERY	N1A7F	0
Sample Size			Customer ID	
			STD	
Remarks Calculations Results R230 INDIUM STD# 12N144 RESULT 2.92 ^{E+1} STD VAL 2.845 ^{E+1} %REC 102.6%				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date		Time Completed		
4-11-94		0810		
Lab Unit Mgr				
J.M. Fudge				

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
V 62.-5711	108-AP	3-18-94	8:28	26
Determination	Method Standard	Result Units	Charge Code	Reruns
DSC	LA-514-113	EXOTHERMS	N1A7F	0
Sample Size			Customer ID	
9.177 mg			108-AP-A	
Remarks Calculations Results <div style="text-align: center; padding: 20px;"> NO EXO OUT FOR RERUN </div>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date		Time Completed		
4-11-94		1000		
Lab Unit Mgr				
J.M. Fudge				

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

DIFFERENTIAL SCANNING CALORIMETRY ANALYSIS - UNDIGESTED SAMPLE

Serial No V 62.-5811	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination DSC	Method/Standard LA-514-113	Result Units EXOTHERMS	Charge Code N1A7F	Reruns 0
Sample Size 9.432 mg			Customer ID 108-AP-A	
Remarks Calculations Results No Exotherm OUT FOR RERUN D. W. Smith				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-11-94	Time Completed 1100	Lab Unit Mgr J M Faye

54 6800-061 (R 10-83)

Serial No V 63.-5711	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination DSC	Method/Standard LA-514-113	Result Units EXOTHERMS	Charge Code N1A7F	Reruns 0
Sample Size 9.308 mg			Customer ID 108-AP-B	
Remarks Calculations Results No Exotherm D. W. Smith				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-11-94	Time Completed 1300	Lab Unit Mgr J M Faye

54 6800-061 (R 10-83)

WHC-SD-WM-DP-065, REV. 0

DIFFERENTIAL SCANNING CALORIMETRY ANALYSIS - UNDIGESTED SAMPLE

Serial No V 63.-5811	Sample Room 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination DSC	Method/Standard LA-514-113	Result Units EXOTHERMS	Charge Code N1A7F	Reruns 0
Sample Size 7.342 mg			Customer ID 108-AP-B	
Remarks Calculations, Results No Exotherm				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-11-94	Time Completed 1400	Lab Unit Mgr J. M. Faye

54 6800-061 (R-10-83)

DSC IND STD

6.690 mg

Rate: 10.0 °C/min

File: 00083.001

DSC METTLER

10-Apr-94

Ident: 0.0

222-S Laboratory

exo >

Integration

Delta H 135 mJ

29.2 J/g

Peak

158.8 °C

-15.6 mW

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 289 TO 293.

David M. Hays
9/24/94

°C

180.

160.

140.

120.

WHC-SD-WM-DP-065, REV. 0

V 62.-5711 108-AP
9.177 mg

Rate: 10.0 °C/min

File: 00084.001 DSC METTLER 10-Apr-94

Ident: 0.0 222-S Laboratory

WHC-SD-WM-DP-065, REV. 0

V 62.-5811 108-AP File: 00085.001 DSC METTLER 10-Apr-94
9.432 mg Rate: 10.0 °C/min Ident: 0.0 222-S Laboratory

WHC-SD-WM-DP-065, REV. 0

exo >

50. mW

V 62.-5811

100. 200. 300. 400. °C

V 63.-5711 108-AP
9.308 mg
File: 00086.001 DSC METTLER 10-Apr-94
Ident: 0.0 222-S Laboratory

Rate: 10.0 °C/min

exo >

50. mW

V 63.-5711

WHC-SD-WM-DP-065, REV. 0

°C

400.

300.

200.

100.

V 63.-5811 108-AP
7.342 mg
File: 00087.001 DSC METTLER 10-Apr-94
Ident: 0.0 222-S Laboratory

Rate: 10.0 °C/min

<exo>

50. mW

V 63.-5811

WHC-SD-WM-DP-065, REV. 0

°C

400.

300.

200.

100.

Batch 2997

QA

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. V-67-V69	Customer ID: 108-AP-E, 108-AP-D, 108-AP-C
Analysis: DSC	Sample Prep: Direct

Instrument: WC16134 / WC16129	Procedure/ Rev: LA. 514 - 113
Technologist: David W. Smith	Date: 4-8-94
Starting Time: 4-7-94 1000	Temperature: N/A
Ending Time: 4-8-94 1545	Chemist: D. HERT - J. Feye

Comments: _____

	Description	Lab ID		Description	Lab ID
1	LMCS	V-65-5511	11		
2	Sample	V-67-5811	12		
3	DUP	V-67-5711	13		
4	LMCS	5-7954-9230	14		
5	Sample	V-68-5711	15		
6	DUP	V-68-5811	16		
7	Sample	V-69-5711	17		
8	DUP	V-69-5811	18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	12N14A			
				294

WHC-SD-WM-DP-065, REV. 0

DIFFERENTIAL SCANNING CALORIMETRY ANALYSIS - UNDIGESTED SAMPLE

Batch 2997

Serial No V 65.-5511	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority 26
Determination DSC	Method/Standard LA-514-113	Result Units % RECOVERY	Charge Code N1A7F	Repeats 0
Sample Size <i>6.629 mg.</i>			Customer ID STD	
Remarks Calculations Results R230 INDIUM STD# 12N14A RESULT <i>29.5 g/g</i> STD VAL <i>28.45</i> %REC <i>96.4% 2 MF 4/10/94</i> <i>103.7%</i>
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date <i>4-7-94</i>		Time Completed <i>1010</i>		
Lab Unit Mgr <i>James M. Fuge</i>

54-6800-061 (R-10-83)

Serial No V 67.-5711	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination DSC	Method/Standard LA-514-113	Result Units EXOTHERMS	Charge Code N1A7F	Repeats 0
Sample Size <i>9.755 mg</i>			Customer ID 108-AP-C	
Remarks Calculations Results <i>no exotherm</i>
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date <i>4-7-94</i>		Time Completed <i>1300</i>		
Lab Unit Mgr <i>James M. Fuge</i>

54-6800-061 (R-10-83)

DIFFERENTIAL SCANNING CALORIMETRY ANALYSIS - UNDIGESTED SAMPLE

Serial No V 67.-5811	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination DSC	Method/Standard LA-514-113	Result Units EXOTHERMS	Charge Code N1A7F	Reruns 0
Sample Size 9.519mg			Customer ID 108-AP-C	
Remarks, Calculations, Results 710 exotherm				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-7-94	Time Completed 1100	Lab Unit Mgr

54 6800-061 (R-10-83)

Serial No S 7954.-9230	Sample Point SHIFT STD'S	Date 2-10-94	Time Issued 13:48	Priority 26
Determination DSC	Method/Standard LA-514-111	Result Units EXOTHERMS	Charge Code STD	Reruns 0
Sample Size 6.559mg			Customer ID	
Remarks, Calculations, Results S230 INDIUM STD# 120147 RESULT 27.6 g/g STD VAL 28.45 %REC 97.0%				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-8-94	Time Completed 900	Lab Unit Mgr

54 6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

DIFFERENTIAL SCANNING CALORIMETRY ANALYSIS - UNDIGESTED SAMPLE

Serial No V 68.-5711	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination DSC	Method/Standard LA-514-113	Result Units EXOTHERMS	Charge Code N1A7F	Reruns 0
Sample Size 9.247 mg			Customer ID 108-AP-D	
Remarks, Calculations, Results No exotherm				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-8-94	Time Completed 1130	Lab Unit Mgr

54 6800-061 (R-10-83)

Serial No V 68.-5811	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination DSC	Method/Standard LA-514-113	Result Units EXOTHERMS	Charge Code N1A7F	Reruns 0
Sample Size 9.950 mg			Customer ID 108-AP-D	
Remarks, Calculations, Results No exotherm				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-8-94	Time Completed 1305	Lab Unit Mgr

54 6800-061 (R-10-83)

DIFFERENTIAL SCANNING CALORIMETRY ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 69.-5711	108-AP	3-18-94	9:42	26
Determination	Method/Standard	Result Units	Charge Code	Repeats
DSC	LA-514-113	EXOTHERMS	N1A7F	0
Sample Size	Customer ID			
9.218mg	108-AP-E			
Remarks, Calculations, Results				
No exotherm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
4-8-94	1405

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
V 69.-5811	108-AP	3-18-94	9:42	26
Determination	Method/Standard	Result Units	Charge Code	Repeats
DSC	LA-514-113	EXOTHERMS	N1A7F	0
Sample Size	Customer ID			
8.416mg	108-AP-E			
Remarks, Calculations, Results				
No exotherm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
4-8-94	1530

54-6800-061 (R-10-83)

VG5. SS11

DSC IND STD

6.629 mg

Rate: 10.0 °C/min

File: 00075.001

DSC METTLER

06-Apr-94

Ident: 0.0 222-S Laboratory

EXOV

10. mW

WHC-SD-WM-DP-065, REV.0

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 288 TO 306.

Integration

Delta H 196 mJ

29.5 J/g

Peak 159.4 °C

-15.3 mX

120. 140. 160. 180. °C

CS2

S 7954. 9230

DSC IND STD

6.559 mg

Rate: 10.0 °C/min

File: 00078.001

DSC METTLER

07-Apr-94

Ident: 0.0

222-S Laboratory

WHC-SD-WM-DP-065, REV. 0

exo

10. mW

Integration
Delta H 181 mJ
27.6 J/g
Peak 159.4°C
-13.1 mW

°C

180.

160.

140.

120.

000

V 67.-5811 108-AP

9.519 mg

Rate: 10.0 °C/min

File: 00077.001 DSC METTLER 06-Apr-94

Ident: 0.0 222-S Laboratory

exo >

50. mW

V 67.- 5811

WHC-SD-WM-DP-065, REV. 0

°C

400.

300.

200.

100.

103

V 67.-5711 108-AP

9.755 mg

Rate: 10.0 °C/min

File: 00076.001 DSC METTLER 06-Apr-94
Ident: 0.0 222-S Laboratory

WHC-SD-WM-DP-065, REV. 0

exo >

50. mW

V 67.-5711

100. 200. 300. 400. °C

V 68.-5711 108-AP

9.247 mg

Rate: 10.0 °C/min

File: 00079.001 DSC METTLER 07-Apr-94

Ident: 0.0 222-S Laboratory

WHC-SD-WM-DP-065, REV. 0

exo >

50. mW

V 68.-5711 108-AP

303

100. 200. 300. 400. °C

V 68.-5811 108-AP-D

9.950 mg

Rate: 10.0 °C/min

File: 00080.001 DSC METTLER 07-Apr-94

Ident: 0.0 222-S Laboratory

exo >

50. mW

WHC-SD-WM-DP-065, REV. 0

V 68.-5811 108-AP-D

V 69.-5711 108-AP-E
9.218 mg
Rate: 10.0 °C/min
File: 00081.001 DSC METTLER 07-Apr-94
Ident: 0.0 222-S Laboratory

WHC-SD-WM-DP-065, REV. 0

V 69.-5811 108-AP-E
8.416 mg

File: 00082.001 DSC METTLER 07-Apr-94
Ident: 0.0 222-S Laboratory

Rate: 10.0 °C/min

<exo>

50. mW

WHC-SD-WM-DP-065, REV. 0

V 69.-5811 108-AP-E

°C

400.

300.

200.

100.

WHC-SD-WM-DP-065, REV. 0

[illegible][illegible]

NARRATIVE-LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH:

Robert W. Schroeder

5-2-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 80.-5506		Sample Point 108-AP		Date 3-18-94	Time Issued 8:26	Priority 26
Determination SPG		Method/Standard LA-510-112		Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 199.98					Customer ID STD	
Remarks Calculations Results S332 ZNCL2 STD# 26N14A RESULT 1.408 E0 g/mL STD VAL 1.417 E0 g/mL %REC 99.37 1. g 2.1433 2. g 2.1501 T 1.8618 T 1.8684 N. 0.2815 N. 0.2817 RWS-2-94 Analyst - 1: <i>Hollibaugh</i> Analyst - 2: Analyst - 3: Analyst - 4: Analyst - 5: <i>R.C. Jones</i> Date: 4-7-94 Time Completed: 0330 Lab Unit Mgr: <i>R.W. Schroeder</i> 4-7-94 54-6800-061 (R-10 83)						

WHC-SD-WM-DP-065, REV. 0

SPECIFIC GRAVITY : LA-510-112 (C-2)

Serial No.		STANDARD	REPLICATE
V60-5506	Gross Weight (W2)	2.1433	2.1501
Batch ID:	Tare Weight (W1)	1.8618	1.8684
2983	Weight of Solution (W2-W1)	0.2815	0.2817
Rerun No.	Volume of Solution μ L	199.9800	199.9800
0	Specific Gravity	1.4076	1.4086
Balance ID:	Specific Gravity (Average)	1.4081	
WA90787			
Calibration Date			
Analyst	Gross Weight (W2) = WL of vial + cap + cotton + solution		
A HOLLIBAUGH	Tare Weight (W1) = WL of vial + cap + cotton		
Date:			
04/07/94	Specific Gravity = $((W2-W1) * 1000 \mu\text{L}/\text{mL}) / (\text{Vol. of Solution } \mu\text{L} * 1.000 \text{ g}/\text{mL})$		

Specific Gravity Average =	1.408
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Data Entry by: <i>R.C. Jones</i>	Date: 09-Apr-94
Approved by: <i>R.W. Schroeder</i>	Date: 4-20-94

SPECIFIC GRAVITY ANALYSIS - UNDIGESTED SAMPLE

1. G. 2.1433

T. 1.8618

N. 0.2815

2. G. 2.1501

T. 1.8684

N. 0.2817

V60-5506

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

BATCH 2983

Serial No V 61.-5606	Sample Point 108-AP	Date 3-18-94	Time Issued 8:27	Priority 26
Determination SPG	Method/Standard LA-510-112	Result Units NONE	Charge Code N1A7F	Reruns 0
Sample Size 199.98			Customer ID BLANK	
Remarks Calculations, Results REAGENT BLANK 0.984 1.g. 2.0160 2.g. 2.0332 T. 1.8196 T. 1.8360 N. 0.1964 N. 0.1972				
Analyst - 1 <i>M. Hollibaugh</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4.7.94	Time Completed 0330	Lab Unit Mgr <i>R. C. Jones</i> 4-20-94 <i>R. C. Jones</i>		

54-6800-061 (R 10-83)

SPECIFIC GRAVITY : LA-510-112 (C-2)

Serial No		BLANK	REPLICATE
V61-5606	Gross Weight (W2)	2.0160	2.0332
Batch ID	Tare Weight (W1)	1.8196	1.8360
2983	Weight of Solution (W2-W1)	0.1964	0.1972
Rerun No	Volume of Solution µL	199.9800	199.9800
0	Specific Gravity	0.9821	0.9861
Balance ID	Specific Gravity (Average)	0.9841	
WA90787			
Calibration Date			
Analyst	Gross Weight (W2) = WL of vial + cap + cotton + solution		
A HOLLIBAUGH	Tare Weight (W1) = WL of vial + cap + cotton		
Date			
04/07/94	Specific Gravity = $(W2 - W1) \times 1000 \text{ µL/mL} / (\text{Vol. of Solution µL} \times 1.000 \text{ g/mL})$		

Specific Gravity Average =	0.984
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Data Entry by: <i>R. C. Jones</i>	Date: 09-Apr-94
Approved by: <i>R. C. Jones</i>	Date: 4-20-94

SPECIFIC GRAVITY ANALYSIS - UNDIGESTED SAMPLE

1. G. 2.0140

T. 1.8196

N. 0.1964

2. G. 2.0332

T. 1.8340

N. 0.1972

161-5606

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-5706		Sample Point 108-AP		Date 3-18-94		Time Issued 8:28		Priority 26	
Determination SPG		Method/Standard LA-510-112		Result Units NONE		Charge Code N1A7F		Reruns 0	
Sample Size 199.98						Customer ID 108-AP-A			
Remarks Calculations, Results <p style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</p> <p style="text-align: center;">0.992</p> <p style="text-align: center;">1. G. 1.9779 2. G. 2.0309 HH 9-29-94</p> <p style="text-align: center;">T. 1.7798 T. 1.8321</p> <p style="text-align: center;">N. 0.1981 N. 0.1988</p> <p><i>Handwritten signature: Amanda J. Hollibaugh</i></p>									
Analyst - 1 <i>Handwritten signature</i>		Analyst - 2		Analyst - 3		Analyst - 4		Analyst - 5	
Hrs		Hrs		Hrs		Hrs		Hrs	
Date 4.7.94		Time Completed 6330		Lab Unit Mgr <i>Handwritten signature: R. C. Jones</i>		4-20-94		<i>Handwritten signature: R. C. Jones</i>	

54-6800-061 (R-10-83)

SPECIFIC GRAVITY : LA-510-112 (C-2)

Serial No		SAMPLE	REPLICATE
V62-5706	Gross Weight (W2)	1.9779	2.0309
Batch ID	Tare Weight (W1)	1.7798	1.8321
2983	Weight of Solution (W2-W1)	0.1981	0.1988
Rerun No.	Volume of Solution µL	199.9800	199.9800
0	Specific Gravity	0.9906	0.9941
Balance ID:	Specific Gravity (Average)	0.9923	
WA90787			
Calibration Date			
Analyst	Gross Weight (W2) = WL of vial + cap + cotton + solution		
A HOLLIBAUGH	Tare Weight (W1) = WL of vial + cap + cotton		
Date:			
04/07/94	Specific Gravity = (W2-W1) * 1000 µL/mL / (Vol of Solution µL * 1.000 g/mL)		

Specific Gravity Average =	0.992
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Data Entry by: <i>Handwritten signature: R. C. Jones</i>	Date: 09-Apr-94
Approved by: <i>Handwritten signature: R. C. Jones</i>	Date: 4-20-94

SPECIFIC GRAVITY ANALYSIS - UNDIGESTED SAMPLE

1. G. 1.9779

T. 1.7798

N. 0.1981

2. G. 2.6309

T. 1.8321

N. 0.1988

✓ 62-5706

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

14 9-29-94
Batch 2983

Serial No V 62.-5806	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination SPG	Method/Standard LA-510-112	Result Units NONE	Charge Code N1A7F	Reruns 0
Sample Size 199.98			Customer ID 108-AP-A	
Remarks Calculations Results DUPLICATE SAMPLE WHC-SD-WM-DP-065, REV. 0 0.986 1. G. 2.0290 2. G. 1.9685 T. 1.8311 T. 1.7722 N. 0.1979 N. 0.1963				
Analyst - 1 <i>Shullibaugh</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-7-94	Time Completed 0330	Lab Unit Mgr <i>R. W. Schroeder</i>	4-20-94 <i>R. C. Jones</i>	

54-6800-061 (R-10 83)

SPECIFIC GRAVITY : LA-510-112 (C-2)

Serial No.		DUPLICATE	REPLICATE
V62-5806	Gross Weight (W2)	2.0290	1.9685
Batch ID	Tare Weight (W1)	1.8311	1.7722
2983	Weight of Solution (W2-W1)	0.1979	0.1963
Rerun No	Volume of Solution µL	199.9800	199.9800
0	Specific Gravity	0.9896	0.9816
Balance ID	Specific Gravity (Average)	0.9856	
WA90787			
Calibration Date			
Analyst	Gross Weight (W2) = WL of vial + cap + cotton + solution		
A HOLLIBAUGH	Tare Weight (W1) = WL of vial + cap + cotton		
Date			
04/07/94	Specific Gravity = ((W2-W1) * 1000 µL/mL) / (Vol. of Solution µL * 1.000 g/mL)		

Specific Gravity Average =	0.986
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Data Entry by: <i>R. C. Jones</i>	Date: 09-Apr-94
Approved by: <i>R. W. Schroeder</i>	Date: 4-20-94

SPECIFIC GRAVITY ANALYSIS - UNDIGESTED SAMPLE

1. G. 2.0290
T. 1.8311

N. 0.1979

2. G. 1.9685
T. 1.7722

N. 0.1963

Y62-5806

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

BATCH 2983

Serial No V 63.-5706	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination SPG	Method/Standard LA-510-112	Result Units NONE	Charge Code N1A7F	Reruns 0
Sample Size 199.98			Customer ID 108-AP-B	
Remarks Calculations Results WHC-SD-WM-DP-065, REV.0 <i>0.982</i> <i>1.G. 2.0177 2.G. 2.0357</i> <i>T. 1.8211 T. 1.8395</i> <i>N. 0.1966 N. 0.1962</i>				
Analyst - 1 <i>Stallbaugh</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-7-94	Time Completed 0.330	Lab Unit Mgr <i>Pakety</i> 4-19-94 <i>RW Schroeder</i> <i>RC Jones</i>		

54-6800-061 (R-10 83)

SPECIFIC GRAVITY : LA-510-112 (C-2)

Serial No.		SAMPLE	REPLICATE
V63-5706	Gross Weight (W2)	2.0177	2.0357
Batch ID	Tare Weight (W1)	1.8211	1.8395
2983	Weight of Solution (W2-W1)	0.1966	0.1962
Rerun No.	Volume of Solution µL	199.9800	199.9800
0	Specific Gravity	0.9831	0.9811
Balance ID:	Specific Gravity (Average)	0.9821	
WA90787			
Calibration Date			
Analyst	Gross Weight (W2) = Wt. of vial + cap + cotton + solution		
A HOLLIBAUGH	Tare Weight (W1) = Wt. of vial + cap + cotton		
Date:			
04/07/94	Specific Gravity = $(W2-W1) \times 1000 \mu\text{L/mL} / (\text{Vol. of Solution } \mu\text{L} \times 1.000 \text{ g/mL})$		

Specific Gravity Average =	0.982
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Data Entry by: <i>RC Jones</i>	Date: 09-Apr-94
Approved by: <i>RW Schroeder</i>	Date: 4-19-94

WHC-SD-WM-DP-065, REV. 0

SPECIFIC GRAVITY ANALYSIS - UNDIGESTED SAMPLE

1. G. 2.0177
T. 1.8211

N. 0.1966

2. G. 2.0357
T. 1.8395

N. 0.1962

✓ 63.5706

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 63.-5806		Sample Point 108-AP		Date 3-18-94	Time Issued 8:31	Priority 26
Determination SPG		Method/Standard LA-510-112		Result Units NONE	Charge Code N1A7F	Reruns 0
Sample Size 199.98					Customer ID 108-AP-B	
Remarks Calculations Results DUPLICATE SAMPLE WHC-SD-WM-DP-065, REV. 0 <div style="text-align: center;"> 0.991 $1.G. 2.0471 \quad 2.G. 2.0334$ $T. 1.8490 \quad T. 1.8353$ $N. 0.1981 \quad N. 0.1981$ </div>						
Analyst - 1 <i>Willoughby</i>		Analyst - 2		Analyst - 3		Analyst - 4
Hrs		Hrs		Hrs		Hrs
Date 4-7-94		Time Completed 1330		Lab Unit Mgr RW Schroeder		4-20-94 R.C. Jones

54-6800-061 (R-10-83)

SPECIFIC GRAVITY : LA-510-112 (C-2)

Serial No.		DUPLICATE	REPLICATE
V63-5806	Gross Weight (W2)	2.0471	2.0334
Batch ID	Tare Weight (W1)	1.8490	1.8353
2983	Weight of Solution (W2-W1)	0.1981	0.1981
Rerun No.	Volume of Solution μ L	199.9800	199.9800
0	Specific Gravity	0.9906	0.9906
Balance ID	Specific Gravity (Average)	0.9906	
WA90787			
Calibration Date			
Analyst	Gross Weight (W2) = WL of vial + cap + cotton + solution		
A HOLLIBAUGH	Tare Weight (W1) = WL of vial + cap + cotton		
Date			
04/07/94	Specific Gravity = $((W2-W1) * 1000 \mu\text{L}/\text{mL}) / (\text{Vol. of Solution } \mu\text{L} * 1.000 \text{ g}/\text{mL})$		

Specific Gravity Average =	0.991
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Data Entry by: <i>R.C. Jones</i>	Date: 09-Apr-94
Approved by: <i>RW Schroeder</i>	Date: 4-20-94

WHC-SD-WM-DP-065, REV. 0

SPECIFIC GRAVITY ANALYSIS - UNDIGESTED SAMPLE

$$\begin{array}{r} 1. G. 2.0471 \\ T. 1.8490 \\ \hline N. 0.1981 \end{array}$$

$$\begin{array}{r} 2. G. 2.0334 \\ T. 1.8353 \\ \hline \text{P.H.} \\ 4.7.94 N. 0.1981 \end{array}$$

Y63-5806

[illegible]

NARRATIVE-LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH:

4-18-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 65.-5506		Sample Point 108-AP		Date 3-18-94		Time Issued 9:37		Priority 26	
Determination SPG		Method-Standard LA-510-112		Result Units % RECOVERY		Charge Code N1A7F		Reruns 0	
Sample Size 199.98						Customer ID STD			
Remarks, Calculations Results S332 ZNCL2 STD# 26N10A RESULT 1.4034 STD VAL 1.4170g/mL%REC 99.04%									
WHC-SD-WM-DP-065, REV.0 Analyst - 1 Analyst - 2 Analyst - 3 Analyst - 4 Analyst - 5 Date Time Completed Lab Unit Mon 4-16-94 1005 RW Schroeder 4-18-94 DHonaker 4-10-94 DHonaker									

SPECIFIC GRAVITY : LA-510-112 (C-2)

Serial No		STANDARD	REPLICATE
V65.-5506	Gross Weight (W2)	2.1427	2.1232
Batch ID: 2998	Tare Weight (W1)	1.8619	1.8427
Rerun No: 0	Weight of Solution (W2-W1)	0.2808	0.2805
	Volume of Solution µL	199.9800	199.9800
	Specific Gravity	1.4041	1.4026
Balance ID: 10A90787	Specific Gravity (Average)	1.4034	
Calibration Date: 02/08/94			
Analyst: AJ HOLLIBAUGH	Gross Weight (W2) = WL of vial + cap + cotton + solution		
Date: 04/16/94	Tare Weight (W1) = WL of vial + cap + cotton		
	Specific Gravity = ((W2-W1) * 1000 µL/mL) / (Vol of Solution µL * 1.000 g/mL)		

Specific Gravity Average =	1.403
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Data Entry by: DHonaker	Date: 16-Apr-94
Approved by: RW Schroeder	Date: 4-18-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 66.-5606	Sample Point 108-AP	Date 3-18-94	Time Issued 9:38	Priority 26
Determination SPG	Method-Standard LA-510-112	Result Units NONE	Charge Code N1A7F	Reruns 0
Sample Size 199.98			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK <div style="display: flex; justify-content: space-around;"> <div> $\begin{array}{r} 2.0615 \\ 1.8654 \\ \hline 0.1961 \end{array}$ </div> <div> $\begin{array}{r} 2.0580 \\ 1.8631 \\ \hline 0.1943 \end{array}$ </div> </div>				
WHC-SD-WM-DP-065, REV. 0 Amanda J. .976 SPG Analyst - 1: <i>AJ Hollibaugh</i> Analyst - 2: <i>None</i> Analyst - 3: <i>None</i> Analyst - 4: <i>None</i> Analyst - 5: <i>None</i> Date: 4-16-94 Time Completed: 1005 Lab Unit Mgr: <i>RW Schroeder</i> <i>Jay Hammett</i>				

54-6800-061 (R-10-83)

SPECIFIC GRAVITY : LA-510-112 (C-2)

Serial No.		BLANK	REPLICATE
V66.-5606	Gross Weight (W2)	2.0615	2.0580
Batch ID	Tare Weight (W1)	1.8654	1.8637
2998	Weight of Solution (W2-W1)	0.1961	0.1943
Rerun No.	Volume of Solution μ L	199.9800	199.9800
0	Specific Gravity	0.9806	0.9716
Balance ID:	Specific Gravity (Average)	0.9761	
11A90787	<i>WH 9-29-94</i>		
Calibration Date			
02/08/94			
Analyst	Gross Weight (W2) = WL of vial + cap + cotton + solution		
AJ HOLLIBAUGH	Tare Weight (W1) = WL of vial + cap + cotton		
Date:			
04/16/94	Specific Gravity = $((W2-W1) \cdot 1000 \mu\text{L}/\text{mL}) / (\text{Vol. of Solution } \mu\text{L} \cdot 1.000 \text{ g/mL})$		

Specific Gravity Average =

0.976

Data Entry by: <i>Detonaker</i>	Date: 16-Apr-94
Approved by: <i>RW Schroeder</i>	Date: 4-18-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 67.-5706	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination SPG	Method-Standard LA-510-112	Result Units NONE	Charge Code N1A7F	Reruns 0
Sample Size 199.98			Customer ID 108-AP-C	
Remarks Calculations Results <div style="display: flex; justify-content: space-around;"> <div> $\begin{array}{r} 2.0242 \\ 1.8256 \\ \hline 0.1986 \end{array}$ </div> <div> $\begin{array}{r} 2.0575 \\ 1.8587 \\ \hline 0.1988 \end{array}$ </div> </div> <p>WHC-SD-WM-DP-065, REV.0</p> <p style="text-align: center;">.994 Sp6</p>				
Analyst - 1 <i>AJ Hollibaugh</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-16-94	Time Completed 1205	Lab Unit Mgr <i>RW Schroeder</i>	<i>4-18-94</i> <i>Jan H...</i>	

54 6800-061 (R-10 83)

SPECIFIC GRAVITY : LA-510-112 (C-2)

Serial No.		SAMPLE	REPLICATE
V67.-5706	Gross Weight (W2)	2.0242	2.0575
Batch ID:	Tare Weight (W1)	1.8256	1.8587
2998	Weight of Solution (W2-W1)	0.1986	0.1988
Rerun No.	Volume of Solution μ L	199.9800	199.9800
0	Specific Gravity	0.9931	0.9941
Balance ID:	Specific Gravity (Average)	0.9936	
W2A 90787	<i>4-19-94</i>		
Calibration Date			
02/08/94			
Analyst	Gross Weight (W2) = Wt. of vial + cap + cotton + solution		
AJ HOLLIBAUGH	Tare Weight (W1) = Wt. of vial + cap + cotton		
Date:			
04/16/94	Specific Gravity = $((W2-W1) * 1000 \mu\text{L}/\text{mL}) / (\text{Vol. of Solution } \mu\text{L} * 1.000 \text{ g}/\text{mL})$		

Specific Gravity Average =	0.994
----------------------------	-------

Data Entry by: <i>D. Honaker</i>	Date: 16-Apr-94
Approved by: <i>RW Schroeder</i>	Date: 4-18-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 67.-5806	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination SPG	Method Standard LA-510-112	Result Units NONE	Charge Code N1A7F	Reruns 0
Sample Size 199.98			Customer ID 108-AP-C	
Remarks, Calculations, Results DUPLICATE SAMPLE <div style="display: flex; justify-content: space-around;"> <div> 2.0900 1.8910 0.1990 </div> <div> 2.0556 1.8562 0.1994 </div> </div> <p>WHC-SD-WM-DP-065, REV.0</p> <p style="text-align: center;">.996 SpG</p> <p><i>Amara J.</i></p>				
Analyst - 1 <i>Hollibaugh</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-16-94	Time Completed 1005	Lab Unit Mgr <i>RW Schneider</i>	<i>4-18-94</i> <i>Jay Hamer</i>	

54-6800-061 (R-10-83)

SPECIFIC GRAVITY : LA-510-112 (C-2)

Serial No.		DUPLICATE	REPLICATE
V67.-5806	Gross Weight (W2)	2.0900	2.0556
Batch ID	Tare Weight (W1)	1.8910	1.8562
2998	Weight of Solution (W2-W1)	0.199	0.1994
Rerun No.	Volume of Solution μ L	199.9800	199.9800
0	Specific Gravity	0.9951	0.9971
Balance ID:	Specific Gravity (Average)	0.9961	
WA 90787	<i>24 9.29 94</i>		
Calibration Date			
02/08/94			
Analyst	Gross Weight (W2) = Wt. of vial + cap + cotton + solution		
AJ HOLLIBAUGH	Tare Weight (W1) = Wt. of vial + cap + cotton		
Date	Specific Gravity = $((W2-W1) \cdot 1000 \mu\text{L}/\text{mL}) / (\text{Vol of Solution } \mu\text{L} \cdot 1.000 \text{ g/mL})$		
04/16/94			

Specific Gravity Average =	0.996
----------------------------	-------

Data Entry by: <i>DeDoncker</i>	Date: 16-Apr-94
Approved by: <i>RW Schneider</i>	Date: 4-18-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 68.-5706	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination SPG	Method/Standard LA-510-112	Result Units NONE	Charge Code N1A7F	Reruns 0
Sample Size 199 98			Customer ID 108-AP-D	
Remarks Calculations, Results <div style="display: flex; justify-content: space-around;"> <div> <p>2.0450 1.8465 0.1985</p> </div> <div> <p>2.0606 1.8629 0.1977</p> </div> </div> <p style="text-align: center;">.991 SpG</p> <p><i>Amanda S. Hollibaugh</i></p>				
Analyst - 1 <i>Hollibaugh</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-16-94	Time Completed 1005	Lab Unit Mgr <i>RW Schroeder</i>	4-18-94 <i>Jay Hansen</i>	

54-6800-061 (R-10-83)

SPECIFIC GRAVITY : LA-510-112 (C-2)

Serial No.		SAMPLE	REPLICATE
V68.-5706	Gross Weight (W2)	2.0450	2.0606
Batch ID.	Tare Weight (W1)	1.8465	1.8629
2998	Weight of Solution (W2-W1)	0.1985	0.1977
Rerun No.	Volume of Solution μ L	199.9800	199.9800
0	Specific Gravity	0.9926	0.9886
Balance ID:	Specific Gravity (Average)	0.9906	
WA 90787	4-18-94		
Calibration Date			
02/08/94			
Analyst	Gross Weight (W2) = Wt. of vial + cap + cotton + solution		
AJ HOLLIBAUGH	Tare Weight (W1) = Wt. of vial + cap + cotton		
Date:	Specific Gravity = $((W2-W1) \cdot 1000 \mu\text{L}/\text{mL}) / (\text{Vol. of Solution } \mu\text{L} \cdot 1.000 \text{ g}/\text{mL})$		
04/16/94			

Specific Gravity Average =	0.991
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Data Entry by: <i>D. Honaker</i>	Date: 16-Apr-94
Approved by: <i>RW Schroeder</i>	Date: 4-18-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 68.-5806	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination SPG	Method-Standard LA-510-112	Result Units NONE	Charge Code N1A7F	Reruns 0
Sample Size 199.98			Customer ID 108-AP-D	
Remarks, Calculations, Results DUPLICATE SAMPLE <div style="display: flex; justify-content: space-around;"> <div> 2.0772 1.8800 0.1972 </div> <div> 2.0601 1.8629 0.1972 </div> </div>				
WHC-SD-WM-DP-065, REV.0 <div style="text-align: center;">*986 SpG</div>				
Analyst - 1 <i>Hollibaugh</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-16-94	Time Completed 1000	Lab Unit Mgr <i>RW Schroeder</i>	4-18-94 <i>Dary Hammet</i>	

54-6800-061 (R-10-83)

SPECIFIC GRAVITY : LA-510-112 (C-2)

Serial No.		DUPLICATE	REPLICATE
V68.-5806	Gross Weight (W2)	2.0772	2.0601
Batch ID:	Tare Weight (W1)	1.8800	1.8629
2998	Weight of Solution (W2-W1)	0.1972	0.1972
Rerun No.	Volume of Solution μ L	199.9800	199.9800
0	Specific Gravity	0.9861	0.9861
Balance ID:	Specific Gravity (Average)	0.9861	
WA90787	249.29-94		
Calibration Data			
02/08/94			
Analyst	Gross Weight (W2) = WL of vial + cap + cotton + solution		
AJ HOLLIBAUGH	Tare Weight (W1) = WL of vial + cap + cotton		
Date:			
04/16/94	Specific Gravity = $((W2-W1) * 1000 \mu\text{L}/\text{mL}) / (\text{Vol. of Solution } \mu\text{L} * 1.000 \text{ g}/\text{mL})$		

Specific Gravity Average =	0.986
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Data Entry by: <i>Stonaker</i>	Date: 16-Apr-94
Approved by: <i>RW Schroeder</i>	Date: 4-18-94

Form 1 Rev. 2 Page 1 of 1

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 69.-5706	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination SPG	Method-Standard LA-510-112	Result Units NONE	Charge Code N1A7F	Reruns 0
Sample Size 199.98			Customer ID 108-AP-E	
Remarks, Calculations, Results WHC-SD-WM-DP-065, REV.0 <div style="display: flex; justify-content: space-around;"> <div> $\begin{array}{r} 2.0591 \\ 1.8638 \\ \hline 0.1953 \end{array}$ </div> <div> $\begin{array}{r} 2.0505 \\ 1.8549 \\ \hline 0.1956 \end{array}$ </div> </div> <p style="text-align: center;">.977 SPG</p> <p style="text-align: center;">Amarda J. Hollibaugh</p>				
Analyst - 1 Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-16-94	Time Completed 1005	Lab Unit Mgr Rus Schneider	4-18-94 Amy Hammett	

54-6800-061 (R-10 83)

SPECIFIC GRAVITY : LA-510-112 (C-2)

Serial No.		SAMPLE	REPLICATE
V69.-5706	Gross Weight (W2)	2.0591	2.0505
Batch ID.	Tare Weight (W1)	1.8638	1.8549
2998	Weight of Solution (W2-W1)	0.1953	0.1956
Rerun No.	Volume of Solution μ L	199.9800	199.9800
0	Specific Gravity	0.9766	0.9781
Balance ID:	Specific Gravity (Average)	0.9773	
WA 90787	149.99		
Calibration Date			
02/08/94			
Analyst	Gross Weight (W2) = Wt. of vial + cap + cotton + solution		
AJ HOLLIBAUGH	Tare Weight (W1) = Wt. of vial + cap + cotton		
Date:			
04/16/94	Specific Gravity = $(W2-W1) \times 1000 \mu\text{L}/\text{mL} / (\text{Vol. of Solution } \mu\text{L} \times 1.000 \text{ g}/\text{mL})$		

Specific Gravity Average =	0.977
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Data Entry by: <i>D. H. H. H.</i>	Date: 16-Apr-94
Approved by: <i>Rus Schneider</i>	Date: 4-18-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 69.-5808	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination SPG	Method/Standard LA-510-112	Result Units NONE	Charge Code N1A7F	Reruns 0
Sample Size 149.98			Customer ID 108-AP-E	
Remarks, Calculations, Results DUPLICATE SAMPLE 2.0706 1.8748 0.1958 2.0435 1.8470 0.1965 0.981 SpG WHC-SD-WM-DP-065, REV. 0 Amanda J. Hollibaugh Analyst - 1 Analyst - 2 Analyst - 3 Analyst - 4 Analyst - 5 Date 4-16-94 Time Completed 1005 Lab Unit Mgr RW Schroeder 54-6800-061 (R-10-83)				

SPECIFIC GRAVITY : LA-510-112 (C-2)

Serial No.		DUPLICATE	REPLICATE
V69.-5806	Gross Weight (W2)	2.0706	2.0435
Batch ID:	Tare Weight (W1)	1.8748	1.8470
2998	Weight of Solution (W2-W1)	0.1958	0.1965
Rerun No.	Volume of Solution μ L	199.9800	199.9800
0	Specific Gravity	0.9791	0.9826
Balance ID:	Specific Gravity (Average)	0.9808	
WA 90787			
Calibration Date			
02/08/94			
Analyst	Gross Weight (W2) = Wt. of vial + cap + cotton + solution		
AJ HOLLIBAUGH	Tare Weight (W1) = Wt. of vial + cap + cotton		
Date:			
04/16/94	Specific Gravity = $((W2-W1) * 1000 \mu\text{L}/\text{mL}) / (\text{Vol. of Solution } \mu\text{L} * 1.000 \text{ g}/\text{mL})$		

Specific Gravity Average =

0.981

Data Entry by: *AJ Hollibaugh* Date: 16-Apr-94
 Approved by: *RW Schroeder* Date: 4-18-94

INORGANIC ANALYSES

QA
8

WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No. V-62,63	Customer ID: 108-AP-A,B
Analysis: IC	Sample Prep: DIRECT

Instrument: WC41533	Procedure/ Rev: LA 533-105/C-1
Technologist: R. WENDLAND	Date: 04/13/94
Starting Time: 7:06	Temperature 23.0* C
Ending Time: 10:57	Chemist: S. BOLLING

Comments: _____

	Description	Lab ID
1	LMCS	V60-5571
2	BLANK	V61-5671
3	SAMPLE	V62-5771
4	DUP	V62-5871
5	SPK	V62-5971
6	DUP SPK	V62-5071
7	SAMPLE	V63-5771
8	DUP	V63-5871
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

[illegible]

ANALYTICAL BATCH SUMMARY SHEET

METHOD:

LA-533-105-C1

DATE START:

4/13/94

PREPARED BY:

J.M. Lunge

DATE COMPLETE:

4/13/94

UNITS:			mg/ml	mg/ml				mg/ml	
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CTER
STD	V60	F	56.1				100.2	.1	
		Cl	25.5				100.7	.2	
35N9-E		NO ₂	532				101.3	1	
BLANK		NO ₃	598				103.5	1	
gmp 4/12/94		PO ₄	564				109.1	1	
		SO ₄	622				103.4	1	
							103.8 gmp		
Blank	V61	F	<.1						
		Cl	<.2						
		NO ₂	<1						
		NO ₃	<1						
		PO ₄	<1						
		SO ₄	<1						
							SPK	SPK dup	SPK RPT
	V62	F	48.4	54.2	51.3	11.3	142.2	109.3	1.9 26.2
		Cl	31.4	35.3	33.35	11.7	112.9	97.7	0.9 19.4
		NO ₂	1.20E3	1.11E3	1.165E3	7.8	84.5	112.7	15.6 28.6
		NO ₃	2.25E3	2.08E3	2.165E3	7.9	65.9	105.6	18.6 46.3
		PO ₄	94.4	102	98.2	7.7	98.3	91.3	2.7 7.4
		SO ₄	221	247	234	11.1	106.5	93.3	1.3 13.2
	V63	F	19.6	19.1	19.35	2.6			
		Cl	44.4	44.0	44.2	0.9			
		NO ₂	762	766	764	0.5			
		NO ₃	866	883	874.5	1.9			
		PO ₄	79.6	79.9	79.75	0.4			
		SO ₄	150	160	155	6.5			

BEST AVAILABLE COPY

NARRATIVE: ☐ NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
 LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

We are going to rerun V62 since the spike recovery for F was high and NO₃ was low. We will rerun the spike and spike duplicate as well.

J.M. Lunge

4/18/94

333

WHC-SD-WM-DP-065, REV. 0

ION CHROMATOGRAPHIC ANALYSIS - UNDIGESTED SAMPLE

Batch 2992

Serial No V 60.-5571	Sample Point 108-AP	Date 3-18-94	Time Issued 8:26	Priority 26																																			
Determination 1C	Method-Standard LA-533-105	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0																																			
Sample Size .100 - 10			Customer ID STD																																				
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Remarks</th> <th style="text-align: left;">Calculations</th> <th style="text-align: left;">Results</th> <th style="text-align: left;">ug/ml</th> <th style="text-align: left;">% Rec</th> </tr> </thead> <tbody> <tr> <td>EDP 974 F</td> <td></td> <td></td> <td>56.1</td> <td>100.2</td> </tr> <tr> <td>EDP 972 CL</td> <td></td> <td></td> <td>75.5</td> <td>100.7</td> </tr> <tr> <td>EDP 968 NO₂</td> <td></td> <td></td> <td>532</td> <td>101.3</td> </tr> <tr> <td>EDP 978 NO₃</td> <td></td> <td></td> <td>598</td> <td>103.5</td> </tr> <tr> <td>EDP 976 PO₄</td> <td></td> <td></td> <td>564</td> <td>109.1</td> </tr> <tr> <td>EDP 970 SO₄</td> <td></td> <td></td> <td>622</td> <td>103.8</td> </tr> </tbody> </table>					Remarks	Calculations	Results	ug/ml	% Rec	EDP 974 F			56.1	100.2	EDP 972 CL			75.5	100.7	EDP 968 NO ₂			532	101.3	EDP 978 NO ₃			598	103.5	EDP 976 PO ₄			564	109.1	EDP 970 SO ₄			622	103.8
Remarks	Calculations	Results	ug/ml	% Rec																																			
EDP 974 F			56.1	100.2																																			
EDP 972 CL			75.5	100.7																																			
EDP 968 NO ₂			532	101.3																																			
EDP 978 NO ₃			598	103.5																																			
EDP 976 PO ₄			564	109.1																																			
EDP 970 SO ₄			622	103.8																																			
<div style="position: relative; height: 100%;"> R ROBERT WENDLAND </div>																																							
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5																																			
Hrs	Hrs	Hrs	Hrs	Hrs																																			
<div style="position: relative; height: 100%;"> R ROBERT WENDLAND </div>																																							
Date 4/13/94	Time Completed 10:57	Lab Unit Mgr <i>Patricia</i>																																					

54-6800-061 (R-10-83)

Serial No V 61.-5671	Sample Point 108-AP	Date 3-18-94	Time Issued 8:27	Priority 26																												
Determination IC	Method-Standard LA-533-105	Result Units uG/ML	Charge Code N1A7F	Reruns 0																												
Sample Size Direct			Customer ID BLANK																													
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Remarks</th> <th style="text-align: left;">Calculations</th> <th style="text-align: left;">Results</th> <th style="text-align: left;">ug/ml</th> </tr> </thead> <tbody> <tr> <td>REAGENT BLANK</td> <td>F</td> <td></td> <td><.1</td> </tr> <tr> <td></td> <td>Cl</td> <td></td> <td><.2</td> </tr> <tr> <td></td> <td>NO₂</td> <td></td> <td><1</td> </tr> <tr> <td></td> <td>NO₃</td> <td></td> <td><1</td> </tr> <tr> <td></td> <td>PO₄</td> <td></td> <td><1</td> </tr> <tr> <td></td> <td>SO₄</td> <td></td> <td><1</td> </tr> </tbody> </table>					Remarks	Calculations	Results	ug/ml	REAGENT BLANK	F		<.1		Cl		<.2		NO ₂		<1		NO ₃		<1		PO ₄		<1		SO ₄		<1
Remarks	Calculations	Results	ug/ml																													
REAGENT BLANK	F		<.1																													
	Cl		<.2																													
	NO ₂		<1																													
	NO ₃		<1																													
	PO ₄		<1																													
	SO ₄		<1																													
<div style="position: relative; height: 100%;"> R ROBERT WENDLAND </div>																																
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5																												
Hrs	Hrs	Hrs	Hrs	Hrs																												
<div style="position: relative; height: 100%;"> R ROBERT WENDLAND </div>																																
Date 4/13/94	Time Completed 10:57	Lab Unit Mgr <i>Patricia</i>																														

54-6800-061 (R-10-83)

F1, NO₃ out for rerun.

WHC-SD-WM-DP-065, REV. 0

ION CHROMATOGRAPHIC ANALYSIS - UNDIGESTED SAMPLE

Serial No. V 62.-5071	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26																																			
Determination IC	Method-Standard LA-533-105	Result Units % RECOVERY	Charge Code N1A7F	Runs 0																																			
Sample Size .250-10, .250-10-1-10			Customer ID 108-AP-A																																				
<table border="1"> <thead> <tr> <th>Remarks</th> <th>Calculations</th> <th>Results</th> <th>% Rec</th> <th>% RPD</th> </tr> </thead> <tbody> <tr> <td>SAMPLE SPIKE</td> <td>F</td> <td></td> <td>109.3</td> <td>7.9 26.2</td> </tr> <tr> <td>DUPLICATE</td> <td>CI</td> <td></td> <td>97.7</td> <td>0.7 14.4</td> </tr> <tr> <td>SPIKE ID 35N9-E</td> <td>NO₂</td> <td></td> <td>112.7</td> <td>15.6 28.6</td> </tr> <tr> <td>SPIKE VOL .100</td> <td>NO₃</td> <td></td> <td>105.6</td> <td>18.6 46.3</td> </tr> <tr> <td></td> <td>PO₄</td> <td></td> <td>91.3</td> <td>2.7 7.1</td> </tr> <tr> <td></td> <td>SO₄</td> <td></td> <td>93.3</td> <td>1.3 13.2</td> </tr> </tbody> </table>					Remarks	Calculations	Results	% Rec	% RPD	SAMPLE SPIKE	F		109.3	7.9 26.2	DUPLICATE	CI		97.7	0.7 14.4	SPIKE ID 35N9-E	NO ₂		112.7	15.6 28.6	SPIKE VOL .100	NO ₃		105.6	18.6 46.3		PO ₄		91.3	2.7 7.1		SO ₄		93.3	1.3 13.2
Remarks	Calculations	Results	% Rec	% RPD																																			
SAMPLE SPIKE	F		109.3	7.9 26.2																																			
DUPLICATE	CI		97.7	0.7 14.4																																			
SPIKE ID 35N9-E	NO ₂		112.7	15.6 28.6																																			
SPIKE VOL .100	NO ₃		105.6	18.6 46.3																																			
	PO ₄		91.3	2.7 7.1																																			
	SO ₄		93.3	1.3 13.2																																			
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5																																			
hrs	hrs	hrs	hrs	hrs																																			
Date 4-13-94	Time Completed 10:57	<i>Sherry Bell</i> Lab Unit Mgr																																					

54-0000-061 (R 10 83)

$$F \quad \frac{78.675 - 54.188}{(1)(56)(41)} \times 10.25 \times 100 = 109.3\%$$

$$CI \quad \frac{64.657 - 35.333}{(1)(75)(41)} \times 10.25 \times 100 = 97.7\%$$

$$NO_2 \quad \frac{3530.042 - 1105.128}{(1)(525)(451)} \times 11 \times 100 = 112.7\%$$

$$NO_3 \quad \frac{4585.735 - 2083.322}{(1)(578)(451)} \times 11 \times 100 = 105.6\%$$

$$PO_4 \quad \frac{290.493 - 101.776}{(1)(517)(41)} \times 10.25 \times 100 = 91.3\%$$

$$SO_4 \quad \frac{470.245 - 246.753}{(1)(599)(41)} \times 10.25 \times 100 = 93.3\%$$

ION CHROMATOGRAPHIC ANALYSIS - UNDIGESTED SAMPLE

Serial No. V 62.-5771	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26																												
Determination IC	Method-Standard LA-533-105	Result Units uG/ML	Charge Code N1A7F	Reruns 0																												
Sample Size .250-10, .250-10-1-10			Customer ID 108-AP-A																													
Remarks Calculations Results <table> <tr> <td></td> <td>DF</td> <td>ug/ml</td> <td></td> </tr> <tr> <td>F</td> <td>41</td> <td>48.4</td> <td></td> </tr> <tr> <td>Cl</td> <td>41</td> <td>31.4</td> <td></td> </tr> <tr> <td>NO₂</td> <td>451</td> <td>1.20E3</td> <td></td> </tr> <tr> <td>NO₃</td> <td>451</td> <td>2.25E3</td> <td></td> </tr> <tr> <td>PO₄</td> <td>41</td> <td>44.4</td> <td></td> </tr> <tr> <td>SO₄</td> <td>41</td> <td>221</td> <td></td> </tr> </table> <p style="text-align: right;">F1, NO₃ out for rerun</p> <p>KEESY WENDLAND</p>						DF	ug/ml		F	41	48.4		Cl	41	31.4		NO ₂	451	1.20E3		NO ₃	451	2.25E3		PO ₄	41	44.4		SO ₄	41	221	
	DF	ug/ml																														
F	41	48.4																														
Cl	41	31.4																														
NO ₂	451	1.20E3																														
NO ₃	451	2.25E3																														
PO ₄	41	44.4																														
SO ₄	41	221																														
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5																												
Hrs	Hrs	Hrs	Hrs	Hrs																												
Date 4/13/94	Time Completed 10:57	Lab Unit Mgr <i>Sherry Bell</i>																														

54 6800-061 (R 10 83)

Serial No. V 62.-5871	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26																												
Determination IC	Method-Standard LA-533-105	Result Units uG/ML	Charge Code N1A7F	Reruns 0																												
Sample Size .250-10, .250-10-1-10			Customer ID 108-AP-A																													
Remarks Calculations Results <table> <tr> <td></td> <td>DF</td> <td>ug/ml</td> <td>RPD %</td> </tr> <tr> <td>DUPLICATE SAMPLE F</td> <td>41</td> <td>54.2</td> <td>11.3</td> </tr> <tr> <td>Cl</td> <td>41</td> <td>35.3</td> <td>11.7</td> </tr> <tr> <td>NO₂</td> <td>451</td> <td>1.11E3</td> <td>7.8</td> </tr> <tr> <td>NO₃</td> <td>451</td> <td>2.08E3</td> <td>7.9</td> </tr> <tr> <td>PO₄</td> <td>41</td> <td>102</td> <td>7.7</td> </tr> <tr> <td>SO₄</td> <td>41</td> <td>247</td> <td>11.1</td> </tr> </table> <p style="text-align: right;">F1, NO₃ out for rerun</p> <p>KEESY WENDLAND</p>						DF	ug/ml	RPD %	DUPLICATE SAMPLE F	41	54.2	11.3	Cl	41	35.3	11.7	NO ₂	451	1.11E3	7.8	NO ₃	451	2.08E3	7.9	PO ₄	41	102	7.7	SO ₄	41	247	11.1
	DF	ug/ml	RPD %																													
DUPLICATE SAMPLE F	41	54.2	11.3																													
Cl	41	35.3	11.7																													
NO ₂	451	1.11E3	7.8																													
NO ₃	451	2.08E3	7.9																													
PO ₄	41	102	7.7																													
SO ₄	41	247	11.1																													
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5																												
Hrs	Hrs	Hrs	Hrs	Hrs																												
Date 4/13/94	Time Completed 10:57	Lab Unit Mgr <i>Sherry Bell</i>																														

54 6800-061 (R 10 83)

WHC-SD-WM-DP-065, REV. 0

ION CHROMATOGRAPHIC ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V, 62.-5971	108-AP	3-18-94	8:28	26
Determination	Method Standard	Result Units	Charge Code	Remarks
IC	LA-533-105	% RECOVERY	N1A7F	0
Sample Size	Customer ID			
.250-10	.250-10-1-10			108-AP-A
Remarks, Calculations, Results				
SAMPLE SPIKED ID		F	% Rec	
SPIKE ID 35N9E		Cl	142.2	
SPIKE VOLUME .100			112.9	
		NO ₂	84.5	
		NO ₃	65.9	
		PO ₄	98.3	
		SO ₄	106.5	
RABBY WENDLAND		F, NO ₃ out for return		
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Mrs	Mrs	Mrs	Mrs	Mrs
Date	Time Completed	Lab Unit Mgr		
4-13-94	10:57	Stacey Polling	RWB	

$$F \quad \frac{80.207 - 48.362}{(1.100)(54)(41)} \times 100 = 142.2\%$$

V62-5971

$$Cl \quad \frac{65.277 - 31.419}{(1)(75)(41)} \times 10.25 \times 100 = 112.9\%$$

$$NO_2 \quad \frac{3019.957 - 1202.035}{(1)(525)(451)} \times 11 \times 100 = 84.5\%$$

$$NO_3 \quad \frac{3810.845 - 1845.827}{(1)(578)(451)} \times 11 \times 100 = 65.9\%$$

$$PO_4 \quad \frac{297.635 - 94.382}{(1)(577)(41)} \times 10.25 \times 100 = 98.3\%$$

$$SO_4 \quad \frac{476.468 - 221.204}{(1)(599)(41)} \times 10.25 \times 100 = 106.5\%$$

WHC-SD-WM-DP-065, REV.0

ION CHROMATOGRAPHIC ANALYSIS - UNDIGESTED SAMPLE

Serial No. V 63.-5771	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination IC	Method Standard LA-533-105	Result Units uG/ML	Charge Code N1A7F	Retruns 0
Sample Size .250-10			Customer ID 108-AP-B	
Remarks Calculations Results F 1.96E1 Cl 4.44E1 NO ₂ 7.42E2 NO ₃ 8.66E2 PO ₄ 7.96E1 SO ₄ 1.50E2 ROBBY WENDLAND F, NO ₃ out for rerun				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4/13/94	Time Completed 10:57	Lab Unit Mgr Shirley Bell RWB		

54 6800-061 (R 10-83)

Serial No. V 63.-5871	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination IC	Method Standard LA-533-105	Result Units uG/ML	Charge Code N1A7F	Retruns 0
Sample Size .250-10			Customer ID 108-AP-B	
Remarks Calculations Results DUPLICATE SAMPLE F 19.1 Cl 44.0 NO ₂ 766 NO ₃ 883 PO ₄ 79.9 SO ₄ 160 ROBBY WENDLAND F, NO ₃ out for rerun				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4/13/94	Time Completed 10:57	Lab Unit Mgr Shirley Bell RWB		

54 6800-061 (R 10-83)

WHC-SD-WM-DP-065, REV.0

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 339 TO 350.

Data Reprocessed On 04/13/1994 08:16:48

=====

Sample Name:	LMCS	✓ 60	4/18/94	Date:	04/13/1994 07:17:06
Data File :	C:\DX\DATA\94041301.D02				
Method :	C:\DX\METHOD\MEL.MET				
ACI Address:	1	System:	1	Inject#:	2
Analyst :		Column:		Detector:	CDM-1

=====

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	101	2190	5Hz	0.00	7.30		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.95		0.000	95	456	2	
2	1.12	fluoride	56.082	2012	9401	2	0.90
3	1.47		0.000	93	599	1	
4	1.73	chloride	75.524	1680	8108	1	2.37
5	2.10	nitrite	531.988	7344	41206	1	2.94
6	3.70	nitrate	597.607	4444	38631	1	1.09
7	5.07	phosphate	564.205	1282	16647	1	0.40
8	6.47	sulfate	621.657	3534	51424	1	0.94
Totals			2447.063	20485	166473		

File: 94041301.D02 Sample: LMCS

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WHC-SD-WM-DP-065, REV.0

Data Reprocessed On 04/13/1994 08:16:26

```

=====
Sample Name: BLK Val 034/18/94 Date: 04/13/1994 07:06:50
Data File : C:\DX\DATA\94041301.D01
Method : C:\DX\METHOD\MEL.MET
ACI Address: 1 System: 1 Inject#: 1 Detector: CDM-1
Analyst : Column:
=====
  
```

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2190	5Hz	0.00	7.30		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
Totals			0.000	0	0		

File: 94041301.D01 Sample: BLK

WHC-SD-WM-DP-065, REV.0

=====

Sample Name: V62	Date: 04/13/1994 09:22:51
Data File : C:\DX\DATA\94041311.D12	
Method : C:\DX\METHOD\MEL.MET	
ACI Address: 1 System: 1 Inject#: 12	Detector: CDM-1
Analyst :	Column:

=====

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	41	2190	5Hz	0.00	7.30		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.96		0.000	445	2234	2	
2	1.12	fluoride	48.362	3092	20891	2	0.30
3	1.72	chloride	31.419	1551	8333	1	1.78
4	2.09	nitrite	1044.410	34836	209641	1	2.45
5	3.54	nitrate	1845.827	33030	355711	1	-3.28
6	5.08	phosphate	94.382	350	4460	1	0.59
7	6.48	sulfate	221.206	2981	43599	1	1.09
Totals			3285.607	76285	644869		

File: 94041311.D12 Sample: V62

WHC-SD-WM-DP-065, REV.0

```

=====
: Sample Name: V62                               Date: 04/13/1994 09:34:54
: Data File  : C:\DX\DATA\94041311.D13
: Method     : C:\DX\METHOD\MEL.MET
: ACI Address: 1 System: 1 Inject#: 13           Detector: CDM-1
: Analyst    :                               Column:
=====
  
```

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	451	2190	5Hz	0.00	7.30		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.95		0.000	47	228	2	
2	1.12	fluoride	67.602	313	1941	2	0.90
3	1.72	chloride	67.507	181	871	1	1.78
4	2.08	nitrite	1202.035	3355	19516	2	1.96
5	3.67	nitrate	2248.409	3630	31077	2	0.27
6	5.09	phosphate	552.177	36	460	2	0.79
7	6.50	sulfate	720.531	307	4487	2	1.40
Totals			4858.261	7870	58581		

File: 94041311.D13 Sample: V62

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WHC-SD-WM-DP-065, REV.0

```

=====
Sample Name: V62      DUP                      Date: 04/13/1994 09:12:55
Data File  : C:\DX\DATA\94041311.D11
Method     : C:\DX\METHOD\MEL.MET
ACI Address: 1 System: 1 Inject#: 11          Detector:CDM-1
Analyst    :                      Column:
=====
  
```

```

=====
Calibration Volume Dilution Points Rate Start Stop Area Reject
=====
External          1          41    2103  5Hz   0.00  7.01         200
=====
  
```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.95		0.000	594	3073	2	
2	1.11	fluoride	54.188	3412	23506	2	0.00
3	1.71	chloride	35.333	1732	9488	1	1.13
4	2.09	nitrite	1198.228	40039	240914	1	2.45
5	3.52	nitrate	2138.961	36816	413686	1	-3.83
6	5.07	phosphate	101.776	398	5129	1	0.40
7	6.47	sulfate	246.753	3422	50017	1	0.94
Totals			3775.238	86412	745812		

File: 94041311.D11 Sample: V62 DUP

WHC-SD-WM-DP-065, REV. 0

```

=====
Sample Name: V62   DUP                               Date: 04/13/1994 08:57:20
Data File  : C:\DX\DATA\94041311.D09
Method     : C:\DX\METHOD\MEL.MET
ACI Address: 1   System: 1   Inject#: 9               Detector: CDM-1
Analyst    :                               Column:
=====
  
```

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	451	2190	5Hz	0.00	7.30		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
2	1.13	fluoride	58.599	284	1574	1	1.80
3	1.74	chloride	65.181	166	809	1	2.96
4	2.10	nitrite	1105.128	3194	17725	2	2.94
5	3.69	nitrate	2083.322	3305	28109	2	0.82
6	5.09	phosphate	533.530	30	307	2	0.79
7	6.50	sulfate	702.180	286	4068	2	1.40
Totals			4547.940	7266	52592		

File: 94041311.D09 Sample: V62 DUP

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WHC-SD-WM-DP-065, REV.0

```

=====
: Sample Name: V62      SPK                      Date: 04/13/1994 09:58:59
: Data File  : C:\DX\DATA\94041311.D15
: Method     : C:\DX\METHOD\MEL.MET
: ACI Address: 1 System: 1 Inject#: 15          Detector: CDM-1
: Analyst    :                      Column:
=====

```

```

-----
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1          41    2190   5Hz   0.00   7.30          200
-----

```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.96		0.000	542	2555	2	
2	1.12	fluoride	80.207	5803	35185	2	0.90
3	1.71	chloride	65.277	3366	18326	1	1.18
4	2.09	nitrite	1470.420	49379	296255	1	2.45
5	3.50	nitrate	2537.176	43644	492443	1	-4.37
6	5.06	phosphate	297.635	1730	22856	2	0.20
7	6.46	sulfate	476.468	7504	107720	2	0.78
Totals			4927.184	111967	975339		

File: 94041311.D15 Sample: V62 SPK

WHC-SD-WM-DP-065, REV.0

```

=====
: Sample Name: V62      SPK                      Date: 04/13/1994 10:09:58
: Data File   : C:\DX\DATA\94041311.D16
: Method      : C:\DX\METHOD\MEL.MET
: ACI Address: 1 System: 1 Inject#: 16          Detector: CDM-1
+Analyst     :                      Column:
=====
  
```

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	451	2190	5Hz	0.00	7.30		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.95		0.000	86	393	2	
2	1.12	fluoride	271.291	2102	10253	2	0.90
3	1.72	chloride	338.170	1650	8133	1	1.78
4	2.08	nitrite	3019.957	9306	53117	1	1.36
5	3.64	nitrate	3810.845	6906	59169	1	-0.55
6	5.08	phosphate	2353.356	1194	15281	1	0.59
7	6.49	sulfate	2712.496	3472	49976	1	1.25
Totals			12506.116	24714	196322		

File: 94041311.D16 Sample: V62 SPK

WHC-SD-WM-DP-065, REV.0

```

=====
: Sample Name: V62 DUP SPK                               Date: 04/13/1994 10:18:06
: Data File  : C:\DX\DATA\94041311.D17
: Method     : C:\DX\METHOD\MEL.MET
: ACI Address: 1 System: 1 Inject#: 17                    Detector: CDM-1
: Analyst    :                                           Column:
=====
  
```

```

=====
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1          41    2190   5Hz   0.00  7.30         200
=====
  
```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.95		0.000	511	2518	2	
2	1.12	fluoride	78.675	5676	34497	2	0.90
3	1.71	chloride	64.657	3328	18142	1	1.18
4	2.09	nitrite	1422.783	48342	286569	1	2.45
5	3.49	nitrate	2450.087	42190	475219	1	-4.64
6	5.07	phosphate	290.493	1706	22210	1	0.40
7	6.46	sulfate	470.245	7374	106157	1	0.76
Totals			4776.939	109126	945312		

File: 94041311.D17 Sample: V62 DUP SPK

```

=====
Sample Name: V62 DUP SPK                      Date: 04/13/1994 10:25:54
Data File  : C:\DX\DATA\94041311.D18
Method     : C:\DX\METHOD\MEL.MET
ACI Address: 1 System: 1 Inject#: 18          Detector: CDM-1
Analyst    :                               Column:
=====

```

```

=====
Calibration Volume Dilution Points Rate Start Stop Area Reject
=====
External           1           451   2190  5Hz   0.00  7.30          200
=====

```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.82		0.000	73	471	2	
2	0.94		0.000	185	982	2	
3	1.12	fluoride	267.477	2175	10097	1	0.90
4	1.72	chloride	340.618	1706	8199	1	1.78
5	2.08	nitrite	3530.042	11011	62545	1	1.96
6	3.62	nitrate	4585.735	8287	73102	1	-1.09
7	5.08	phosphate	2330.678	1169	15094	1	0.59
8	6.49	sulfate	2715.824	3515	50052	1	1.25
Totals			13770.376	28122	220542		

File: 94041311.D18 Sample: V62 DUP SPK

WHC-SD-WM-DP-065, REV.0

```

=====
Sample Name: V63                               Date: 04/13/1994 10:41:08
Data File  : C:\DX\DATA\94041311.D20
Method     : C:\DX\METHOD\MEL.MET
ACI Address: 1 System: 1 Inject#: 20           Detector: CDM-1
Analyst    :                               Column:
=====
  
```

```

=====
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1          41    2042  5Hz   0.00  6.80          200
=====
  
```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.95		0.000	313	1579	2	
2	1.11	fluoride	19.588	1626	7975	2	0.00
3	1.24		0.000	545	3289	2	
4	1.71	chloride	44.385	2354	12159	1	1.18
5	2.08	nitrite	761.778	26375	152179	1	1.96
6	3.57	nitrate	866.226	17391	161970	1	-2.46
7	5.08	phosphate	79.601	250	3122	1	0.59
8	6.49	sulfate	149.958	1858	25702	1	1.25
Totals			1921.535	50711	367975		

File: 94041311.D20 Sample: V63

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WHC-SD-WM-DP-065, REV. 0

```

=====
: Sample Name: V63                               Date: 04/13/1994 10:57:40
: Data File  : C:\DX\DATA\94041311.D22
: Method     : C:\DX\METHOD\MEL.MET
: ACI Address: 1 System: 1 Inject#: 22           Detector: CDM-1
: Analyst    :                               Column:
=====
  
```

```

=====
Calibration Volume Dilution Points Rate Start Stop Area Reject
=====
External          1          41    2190   5Hz   0.00   7.30         200
=====
  
```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.95		0.000	305	1580	2	
2	1.12	fluoride	19.133	1670	7771	2	0.90
3	1.24		0.000	539	3183	2	
4	1.71	chloride	43.982	2336	12040	1	1.18
5	2.08	nitrite	765.693	26907	152975	1	1.96
6	3.57	nitrate	882.587	17579	165206	1	-2.46
7	5.08	phosphate	79.913	250	3150	1	0.59
8	6.49	sulfate	159.885	1945	28196	1	1.25
Totals			1951.193	51532	374101		

File: 94041311.D22 Sample: V63

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No.

V-67,68,69

Customer ID:

108-AP-C,D,E

Analysis:

IC

Sample Prep:

DIRECT

Instrument: WC41533

Procedure/ Rev: LA 533-105/C-1

Technologist: R. WENDLAND

Date: 04/14/94

Starting Time: 7:07

Temperature 23.0* C

Ending Time: 13:15

Chemist: S. BOLLING

Comments: _____

	Description	Lab ID
1	LMCS	V65-5571
2	BLANK	V66-5671
3	SAMPLE	V67-5771
4	DUP	V67-5871
5	SAMPLE	V68-5771
6	DUP	V68-5871
7	SAMPLE	V69-5771
8	DUP	V69-5871
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	35N9-E			
				351

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-533-105-C1
 DATE START: 4/14/94
 PREPARED BY: J. M. Inye
 DATE COMPLETE: 4/14/94

UNITS:			µg/ml	µg/ml			µg/ml	
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	% CTER
STD	V65	F	56.3				100.5	.1
35N4-E		Cl	75.0				100	.2
BLANK		NO ₂	524				99.8	1
		NO ₃	595				102.9	1
		PO ₄	561				108.5	1
		SO ₄	618				103.2	1
Blank	V66	F	<1					
		Cl	<1					
		NO ₂	<1					
		NO ₃	<1					
		PO ₄	<1					
		SO ₄	<1					
	V67	F	42.9	51.2	47.05	17.6		
		Cl	27.3	31.4	29.35	14.0		
		NO ₂	962	1.03E3	996	6.8		
		NO ₃	1.24E3	1.94E3	1.89E3	5.3		
		PO ₄	90.3	98.4	94.35	8.6		
		SO ₄	204	228	216	11.1		
	V68	F	24.7	26.9	25.8	8.5		
		Cl	57.0	62.9	59.95	9.8		
		NO ₂	1.07E3	1.14E3	1.105E3	6.3		
		NO ₃	1.57E3	1.61E3	1.59E3	2.5		
		PO ₄	94.2	98.8	96.5	4.8		
		SO ₄	194	210	202	7.9		
	V69	F	26.0	27.6	26.8	6.0		
		Cl	56.4	62.1	59.25	4.6		
		NO ₂	969	1.10E3	1.0345E3	12.7		
		NO ₃	1.14E3	1.31E3	1.225E3	13.9		
		PO ₄	91.2	97.8	94.5	7.0		
		SO ₄	190	209	199.5	9.5		

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NARRATIVE: ☐ NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
☐ LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

In this batch there was organic acid interference with the F⁻ peak, making the F⁻ values possibly fairly high. V68 duplicate had an oxalate peak from a previous injection appear between nitrite and nitrate. JMI 4/18/94

WHC-SD-WM-DP-065, REV. 0

ION CHROMATOGRAPHIC ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 65.-5571	108-AP	3-18-94	9:37	26
Determination	Method-Standard	Result Units	Charge Code	Reruns
IC	LA-533-105	% RECOVERY	N1A7F	0
Sample Size	Customer ID			
.100 - 10 35 N9-E	STD			
Remarks Calculations Results <i>ug/ml</i> <i>% Rec</i> EDP 974 F <i>56.3</i> <i>100.5</i> EDP 972 CL <i>75.0</i> <i>100</i> EDP 968 NO2 <i>52.4</i> <i>99.8</i> EDP 978 NO3 <i>595</i> <i>102.9</i> EDP 976 PO4 <i>561</i> <i>108.5</i> EDP 970 SO4 <i>618</i> <i>103.2</i>				
<i>Rossy Wendland</i> Analyst - 1 Analyst - 2 Analyst - 3 Analyst - 4 Analyst - 5 Hrs Hrs Hrs Hrs Hrs Date 4/14/94 Time Completed 13:15 Lab Unit Mgr <i>J.M. Faye</i> <i>RH</i> 54 6800-061 (R 10 83)				

Serial No	Sample Point	Date	Time Issued	Priority
V 66.-5671	108-AP	3-18-94	9:38	26
Determination	Method-Standard	Result Units	Charge Code	Reruns
IC	LA-533-105	ug/ML	N1A7F	0
Sample Size	Customer ID			
Direct	BLANK			
Remarks Calculations Results <i>ug/ml</i> REAGENT BLANK F <i>2.1</i> Cl <i>2.2</i> NO2 <i><1</i> NO3 <i><1</i> PO4 <i><1</i> SO4 <i><1</i> <i>Rossy Wendland</i>				
Analyst - 1 Analyst - 2 Analyst - 3 Analyst - 4 Analyst - 5 Hrs Hrs Hrs Hrs Hrs Date 4/14/94 Time Completed 13:15 Lab Unit Mgr <i>Sherry Ballis</i> <i>RH</i> 54 6800 061 (R 10 83)				

WHC-SD-WM-DP-065, REV. 0

ION CHROMATOGRAPHIC ANALYSIS - UNDIGESTED SAMPLE

Serial No V 67.-5771	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26																					
Determination IC	Method/Standard LA-533-105	Result Units uG/ML	Charge Code N1A7F	Reruns 0																					
Sample Size .250-10 , .250-10-1-10			Customer ID 108-AP-C																						
Remarks, Calculations, Results <table border="1"> <thead> <tr> <th></th> <th>D.F</th> <th>ug/ml</th> </tr> </thead> <tbody> <tr> <td>F</td> <td>41</td> <td>42.9</td> </tr> <tr> <td>Cl</td> <td>41</td> <td>27.3</td> </tr> <tr> <td>NO₂</td> <td>451</td> <td>962</td> </tr> <tr> <td>NO₃</td> <td>451</td> <td>1.84E3</td> </tr> <tr> <td>PO₄</td> <td>41</td> <td>90.3</td> </tr> <tr> <td>SO₄</td> <td>41</td> <td>204</td> </tr> </tbody> </table> <p>9 MF 4/14/94</p> <p><i>Robby Wendland</i></p>						D.F	ug/ml	F	41	42.9	Cl	41	27.3	NO ₂	451	962	NO ₃	451	1.84E3	PO ₄	41	90.3	SO ₄	41	204
	D.F	ug/ml																							
F	41	42.9																							
Cl	41	27.3																							
NO ₂	451	962																							
NO ₃	451	1.84E3																							
PO ₄	41	90.3																							
SO ₄	41	204																							
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5																					
Hrs	Hrs	Hrs	Hrs	Hrs																					
Date 4/14/94	Time Completed 13:15	Lab Unit Mgr <i>Sperry</i>																							

54 6800-061 (R-10-83)

Serial No V 67.-5871	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26																												
Determination IC	Method/Standard LA-533-105	Result Units uG/ML	Charge Code N1A7F	Reruns 0																												
Sample Size .250-10 , .250-10-1-10			Customer ID 108-AP-C																													
Remarks, Calculations, Results <table border="1"> <thead> <tr> <th></th> <th>D.F</th> <th>ug/ml</th> <th>RPD%</th> </tr> </thead> <tbody> <tr> <td>DUPLICATE SAMPLE F</td> <td>41</td> <td>51.2</td> <td>17.6</td> </tr> <tr> <td>Cl</td> <td>41</td> <td>31.4</td> <td>14.0</td> </tr> <tr> <td>NO₂</td> <td>451</td> <td>1.03E3</td> <td>6.8</td> </tr> <tr> <td>NO₃</td> <td>451</td> <td>1.94E3</td> <td>5.3</td> </tr> <tr> <td>PO₄</td> <td>41</td> <td>98.4</td> <td>8.6</td> </tr> <tr> <td>SO₄</td> <td>41</td> <td>228</td> <td>11.1</td> </tr> </tbody> </table> <p><i>Robby Wendland</i></p>						D.F	ug/ml	RPD%	DUPLICATE SAMPLE F	41	51.2	17.6	Cl	41	31.4	14.0	NO ₂	451	1.03E3	6.8	NO ₃	451	1.94E3	5.3	PO ₄	41	98.4	8.6	SO ₄	41	228	11.1
	D.F	ug/ml	RPD%																													
DUPLICATE SAMPLE F	41	51.2	17.6																													
Cl	41	31.4	14.0																													
NO ₂	451	1.03E3	6.8																													
NO ₃	451	1.94E3	5.3																													
PO ₄	41	98.4	8.6																													
SO ₄	41	228	11.1																													
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5																												
Hrs	Hrs	Hrs	Hrs	Hrs																												
Date 4/14/94	Time Completed 13:15	Lab Unit Mgr <i>Sperry</i>																														

54 6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV.0

ION CHROMATOGRAPHIC ANALYSIS - UNDIGESTED SAMPLE

Serial No V 68.-5771	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26																												
Determination IC	Method-Standard LA-533-105	Result Units uG/ML	Charge Code N1A7F	Reruns 0																												
Sample Size .250-10, .250-10-1-10			Customer ID 108-AP-D																													
Remarks Calculations Results <table> <tr> <td></td> <td>DF</td> <td>ug/ml</td> <td></td> </tr> <tr> <td>F</td> <td>41</td> <td>204.7</td> <td></td> </tr> <tr> <td>Cl</td> <td>41</td> <td>57.0</td> <td></td> </tr> <tr> <td>NO₂</td> <td>451</td> <td>1.07E3</td> <td></td> </tr> <tr> <td>NO₃</td> <td>451</td> <td>1.67E3</td> <td></td> </tr> <tr> <td>PO₄</td> <td>41</td> <td>94.2</td> <td></td> </tr> <tr> <td>SO₄</td> <td>41</td> <td>194.5</td> <td></td> </tr> </table> <p>ROBBY WENDLAND 3/18/94</p>						DF	ug/ml		F	41	204.7		Cl	41	57.0		NO ₂	451	1.07E3		NO ₃	451	1.67E3		PO ₄	41	94.2		SO ₄	41	194.5	
	DF	ug/ml																														
F	41	204.7																														
Cl	41	57.0																														
NO ₂	451	1.07E3																														
NO ₃	451	1.67E3																														
PO ₄	41	94.2																														
SO ₄	41	194.5																														
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5																												
Hrs	Hrs	Hrs	Hrs	Hrs																												
Date 4-14-94	Time Completed 13:15	Lab Unit Mgr Pakita Sally Bell Ph B																														

54 6800-061 (R 10-83)

Serial No V 68.-5871	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26																												
Determination IC	Method-Standard LA-533-105	Result Units uG/ML	Charge Code N1A7F	Reruns 0																												
Sample Size .250-10, .250-10-1-10			Customer ID 108-AP-D																													
Remarks Calculations Results <table> <tr> <td>DUPLICATE SAMPLE</td> <td>DF</td> <td>ug/ml</td> <td>RPD</td> </tr> <tr> <td>F</td> <td>41</td> <td>26.9</td> <td>8.5</td> </tr> <tr> <td>Cl</td> <td>41</td> <td>62.9</td> <td>9.8</td> </tr> <tr> <td>NO₂</td> <td>451</td> <td>1.14E3</td> <td>6.3</td> </tr> <tr> <td>NO₃</td> <td>451</td> <td>1.61E3</td> <td>2.5</td> </tr> <tr> <td>PO₄</td> <td>41</td> <td>48.8</td> <td>4.8</td> </tr> <tr> <td>SO₄</td> <td>41</td> <td>210</td> <td>7.9</td> </tr> </table> <p>ROBBY WENDLAND</p>					DUPLICATE SAMPLE	DF	ug/ml	RPD	F	41	26.9	8.5	Cl	41	62.9	9.8	NO ₂	451	1.14E3	6.3	NO ₃	451	1.61E3	2.5	PO ₄	41	48.8	4.8	SO ₄	41	210	7.9
DUPLICATE SAMPLE	DF	ug/ml	RPD																													
F	41	26.9	8.5																													
Cl	41	62.9	9.8																													
NO ₂	451	1.14E3	6.3																													
NO ₃	451	1.61E3	2.5																													
PO ₄	41	48.8	4.8																													
SO ₄	41	210	7.9																													
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5																												
Hrs	Hrs	Hrs	Hrs	Hrs																												
Date 4/14/94	Time Completed 13:15	Lab Unit Mgr Pakita Sally Bell Ph B																														

54-6800 061 (R 10-83)

WHC-SD-WM-DP-065, REV. 0

ION CHROMATOGRAPHIC ANALYSIS - UNDIGESTED SAMPLE

Serial No V 69.-5771	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination IC	Method/Standard LA-533-105	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size .250-10			Customer ID 108-AP-E	
Remarks Calculations Results <div style="float: right; text-align: right;"> <u>ug/ml</u> F 26.0 Cl 56.4 NO₂ 964 NO₃ 1.14E3 PO₄ 91.2 SO₄ 190 <i>Robby Henderson</i> </div>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4/14/94	Time Completed 13:15	Lab Unit Mgr <i>Steve Balling</i>		

54-6800-061 (R 10-83)

Serial No V 69.-5871	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination IC	Method/Standard LA-533-105	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size .250-10			Customer ID 108-AP-E	
Remarks Calculations Results <div style="float: right; text-align: right;"> <u>ug/ml</u> F 27.6 Cl 62.1 NO₂ 1.10E3 NO₃ 1.31E3 PO₄ 97.8 SO₄ 209 <i>Robby Henderson</i> </div> <div style="float: right; text-align: right;"> <u>RPD%</u> 6.0 9.6 12.7 13.9 7.0 9.5 </div>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4/14/94	Time Completed 13:15	Lab Unit Mgr <i>Steve Balling</i>		

54-6800-061 (R 10-83)

WHC-SD-WM-DP-065, REV. 0

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 357 TO 368.

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Stacy Bell

=====

Sample Name: LMCS	V65	4/14/94	Date: 04/14/1994 07:07:23
Data File :	C:\DX\DATA\94041401.D04		
Method :	C:\DX\METHOD\MEL.MET		
ACI Address: 1	System: 1	Inject#: 4	Detector: CDM-1
Analyst :	Column:		

=====

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	101	2190	5Hz	0.00	7.30		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	El. Code	%Delta
1	0.96		0.000	70	318	2	
2	1.12	fluoride	56.346	1917	9450	1	0.90
3	1.74	chloride	74.998	1598	8045	1	2.96
4	2.11	nitrite	523.779	6866	40528	1	3.43
5	3.75	nitrate	595.448	4244	38458	1	2.46
6	5.05	phosphate	561.080	1248	16532	1	0.00
7	6.47	sulfate	617.572	3453	51007	1	0.94
Totals			2429.224	19396	164338		

File: 94041401.D04 Sample: LMCS

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===== *SDS 4/18/94* =====
: Sample Name: BLK *✓lele* Date: 04/14/1994 06:57:54
: Data File : C:\DX\DATA\94041401.D03
: Method : C:\DX\METHOD\MEL.MET
: ACI Address: 1 System: 1 Inject#: 3 Detector: CDM-1
: Analyst : Column:
=====

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2190	5Hz	0.00	7.30		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
Totals			0.000	0	0		

File: 94041401.D03 Sample: BLK

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=====
Sample Name: V67                               Date: 04/14/1994 07:59:06
Data File  : C:\DX\DATA\94041401.D09
Method     : C:\DX\METHOD\MEL.MET
ACL Address: 1 System: 1 Inject#: 9             Detector: CDM-1
Analyst    :                               Column:
=====
  
```

```

=====
Calibration Volume Dilution Points Rate Start Stop Area Reject
=====
External          1          41    2190  5Hz   0.00  7.30         200
=====
  
```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.96		0.000	392	1877	2	
2	1.12	fluoride	42.919	2662	18447	2	0.90
3	1.73	chloride	27.291	1339	7114	1	2.37
4	2.11	nitrite	947.628	30901	189964	1	3.43
5	3.60	nitrate	1655.196	28638	313009	1	-1.64
6	5.05	phosphate	90.309	306	4091	2	0.00
7	6.46	sulfate	203.864	2664	39243	2	0.78
Totals			2967.208	66902	578746		

File: 94041401.D09 Sample: V67

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```

=====
Sample Name: V67                               Date: 04/14/1994 07:33:41
Data File  : C:\DX\DATA\94041401.D06
Method     : C:\DX\METHOD\MEL.MET
ACI Address: 1 System: 1 Inject#: 6             Detector: CDM-1
Analyst    :                               Column:
=====

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=====
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1          451    2063  5Hz   0.00  6.87         200
=====

```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
2	1.12	fluoride	56.448	230	1486	2	0.90
3	1.74	chloride	60.329	140	678	1	2.96
4	2.11	nitrite	961.886	2559	15078	1	3.43
5	3.75	nitrate	1843.068	2719	23790	1	2.46
6	5.07	phosphate	528.083	26	262	1	0.40
7	6.48	sulfate	678.365	246	3525	1	1.09
Totals			4128.180	5919	44819		

File: 94041401.D06 Sample: V67

Jacly Bell
4/18/94

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RW

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=====
: Sample Name: V67 DUP 4-14-94                      Date: 04/14/1994 08:35:20
: Data File   : C:\DX\DATA\94041401.D12
: Method      : C:\DX\METHOD\MEL.MET
: ACl Address: 1 System: 1 Inject#: 12              Detector: CDM-1
: Analyst     :                                     Column:
=====

```

```

=====
Calibration Volume Dilution Points Rate Start Stop Area Reject
=====
External          1          41    2190  5Hz   0.00  7.30          200
=====

```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.96		0.000	506	2548	2	
2	1.12	fluoride	51.243	3178	22184	2	0.90
3	1.72	chloride	31.420	1554	8333	1	1.78
4	2.10	nitrite	1081.814	35549	217246	1	2.94
5	3.57	nitrate	1929.886	33165	372336	1	-1.46
6	5.05	phosphate	98.444	360	4827	1	0.00
7	6.45	sulfate	227.525	3073	45187	1	0.62
Totals			3420.332	77385	672660		

File: 94041401.D12 Sample: V67

Stacy *Ball's*
4/14/94

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Sample Name: V67 DUP A-14-94	Date: 04/14/1994 08:27:36
Data File : C:\DX\DATA\94041401.D11	
Method : C:\DX\METHOD\MEL.MET	
ACI Address: 1 System: 1 Inject#: 11	Detector: CDM-1
Analyst :	Column:

=====

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	451	2036	5Hz	0.00	6.78		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
2	1.13	fluoride	60.114	260	1636	2	1.30
3	1.74	chloride	62.319	149	732	1	2.96
4	2.11	nitrite	1030.463	2794	16345	1	3.43
5	3.73	nitrate	1941.253	2945	25555	2	1.91
6	5.06	phosphate	526.864	25	252	2	9.20
7	6.48	sulfate	675.287	249	3454	1	1.09
Totals			4296.299	6422	47974		

File: 94041401.D11 Sample: V67

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=====
: Sample Name: V68                                     Date: 04/14/1994 08:48:06
: Data File : C:\DX\DATA\94041401.D13
: Method : C:\DX\METHOD\MEL.MET
: ACI Address: 1 System: 1 Inject#: 13
: Analyst : Column:
: Detector: CDM-1
=====
```

```
-----
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External 1 41 2190 5Hz 0.00 7.30 200
-----
```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.96		0.000	410	1965	1	
2	1.12	fluoride	24.706	2148	10272	2	0.90
3	1.24		0.000	699	4481	2	
4	1.73	chloride	57.013	3076	15886	1	2.37
5	2.11	nitrite	1011.183	34325	202886	1	3.43
6	3.61	nitrate	1184.843	21876	224985	1	-1.37
7	5.06	phosphate	94.166	336	4440	1	0.20
8	6.45	sulfate	194.118	2507	36795	1	0.62
Totals			2566.029	65377	501711		

File: 94041401.D13 Sample: V68

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=====
: Sample Name: V68                               Date: 04/14/1994 10:11:50
: Data File   : C:\DX\DATA\94041401.D16
: Method      : C:\DX\METHOD\MEL.MET
: ACI Address: 1 System: 1 Inject#: 16           Detector: CDM-1
: Analyst     :                               Column:
=====

```

```

=====
Calibration Volume Dilution Points Rate Start Stop Area Reject
=====
External          1          451    2190   5Hz   0.00  7.30          200
=====

```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
2	1.13	fluoride	38.087	184	737	1	1.30
3	1.73	chloride	88.132	290	1424	1	2.37
4	2.10	nitrite	1070.072	2941	17077	2	2.94
5	2.92	oxalate	0.000	441	17195	2	
6	3.71	nitrate	1569.705	2125	18875	2	1.37
7	5.07	phosphate	1096.635	144	4940	2	0.40
8	6.50	sulfate	677.404	241	3503	2	1.40
Totals			4540.036	6366	63751		

File: 94041401.D16 Sample: V68

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=====
Sample Name: V68      DUP                      Date: 04/14/1994 09:08:13
Data File  : C:\DX\DATA\94041401.D15
Method     : C:\DX\METHOD\MEL.MET
ACI Address: 1 System: 1 Inject#: 15           Detector: CDM-1
Analyst    :                      Column:
=====
  
```

```

=====
Calibration Volume Dilution Points Rate Start Stop Area Reject
=====
External          1          41    2190  5Hz   0.00  7.30          200
=====
  
```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.96		0.000	427	1983	2	
2	1.12	fluoride	26.875	2358	11246	2	0.90
3	1.24		0.000	746	4730	2	
4	1.73	chloride	62.919	3395	17630	1	2.37
5	2.10	nitrite	1138.991	37392	228871	1	2.94
6	3.59	nitrate	1320.693	23952	251853	1	-1.91
7	5.05	phosphate	98.762	369	4856	1	0.00
8	6.45	sulfate	210.353	2787	40873	1	0.62
Totals			2858.593	71426	562041		

File: 94041401.D15 Sample: V68 DUP

Stacy Ballin
4/18/94

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```

=====
: Sample Name: V68      DUP                      Date: 04/14/1994 10:20:32
: Data File   : C:\DX\DATA\94041401.D17
: Method      : C:\DX\METHOD\MEL.MET
: ACl Address: 1 System: 1 Inject#: 17           Detector: CDM-1
: Analyst     :                      Column:
=====

```

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	451	2190	5Hz	0.00	7.30		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
2	1.12	fluoride	39.764	202	805	1	0.90
3	1.73	chloride	94.196	325	1587	1	2.37
4	2.09	nitrite	1142.139	3178	18409	1	2.45
5	3.70	nitrate	1609.025	2282	19582	2	1.09
6	5.08	phosphate	539.783	32	358	2	0.59
7	6.49	sulfate	690.754	266	3808	2	1.25
Totals			4115.661	6284	44549		

File: 94041401.D17 Sample: V68 DUP

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Sample Name: V69 Date: 04/14/1994 13:07:11
 Data File : C:\DX\DATA\94041401.D18
 Method : C:\DX\METHOD\MEL.MET
 ACI Address: 1 System: 1 Inject#: 18 Detector: CDM-1
 Analyst : Column:

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	41	2190	5Hz	0.00	7.30		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.95		0.000	485	2432	2	
2	1.12	fluoride	25.959	2192	10835	3	0.90
3	1.35		0.000	155	845	4	
4	1.72	chloride	56.418	3066	15711	1	1.78
5	2.09	nitrite	969.490	35416	194409	1	2.45
6	3.54	nitrate	1142.042	22596	216520	1	-5.28
7	5.08	phosphate	91.244	332	4176	1	0.59
8	6.49	sulfate	190.313	2490	35835	1	1.25
Totals			2475.466	66732	489767		

File: 94041401.D18 Sample: V69

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```

=====
Sample Name: V69      DUP                      Date: 04/14/1994 13:15:39
Data File  : C:\DX\DATA\94041401.D19
Method     : C:\DX\METHOD\MEL.MET
ACI Address: 1 System: 1 Inject#: 19           Detector: CDM-1
Analyst    :                      Column:
=====
  
```

```

-----
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1          41    2190  5Hz   0.00  7.30        200
  
```

***** Peak Report: All Peaks *****

Pk. Num	Ret. Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.09		0.000	126	1490	1	
2	0.95		0.000	484	2323	2	
3	1.12	fluoride	27.646	2484	11592	3	0.90
4	1.35		0.000	183	998	4	
5	1.72	chloride	62.121	3455	17394	1	1.78
6	2.08	nitrite	1100.907	38795	221128	1	1.96
7	3.52	nitrate	1309.518	25589	249842	1	-5.83
8	5.07	phosphate	97.791	373	4768	2	0.40
9	6.49	sulfate	209.265	2829	40600	2	1.25
Totals			2807.247	74316	549935		

File: 94041401.D19 Sample: V69 DUP

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.

V 73

Customer ID:

108AP-FB

Analysis:

IC

Sample Prep:

H2O DIGEST

Instrument: WB54428

Procedure/ Rev: LA-533-105 / C-2

Technologist: KL VOGEL

Date: 07/24/94

Starting Time: 1300

Temperature 23

Ending Time: 1500

Chemist: J. FRYE

Comments:

Kit ran replicates of these because of great variation between sample and duplicate. The replicates repeat well. There may be a sample non-homogeneity problem or contamination problem in prep of sample.

	Description	Lab ID
1	STD	V 71-7571
2	BLANK	V 72-7671
3	SAMPLE	V 73-7771
4	SAMPLE DUP	V 73-7871
5		
6		
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	44N9E / .100mL			

ANALYTICAL BATCH SUMMARY SHEET										
METHOD: LA-533-105-C-0			DATE START: 7/27/94							
PREPARED BY: <i>John M. Faye</i>			DATE COMPLETE: 7/27/94							
SPL NAME	SPL ID	UNITS:	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	%CT E
STO	V71		F	53.3				95.2	<1	
44.09E			CI	82.2				109.6	<12	
BLANK			NO ₂	540				101.9	<1	
QMF 7/27/94			NO ₂	581				100.5	<1	
			NO ₂	546				105.6	<1	
			SO ₄	1.21				103.7	<1	
Repeat 31K	V72		F	2.1	2.1					
			CI	2.2	2.2					
			NO ₂	2.1	2.1					
			NO ₂	1.44	1.51					
			PO ₄	2.1	2.1					
			SO ₄	1.49	1.50					
V73 77H			F	2.1	2.1			N/A		
QMF			CI	3.08E-1	8.7E-1			111.4%		
			NO ₂	<10	<10			N/A		
			NO ₂	2.08E1	1.41E1			35.0%		
			PO ₄	<10	<10			N/A		
			SO ₄	<10	<10			N/A		
V73			F	2.1	2.1			N/A		
Repeat			CI	3.20E-1	9.1E-1			111.4%		
			NO ₂	<10	<10			N/A		
			NO ₂	2.13E1	1.47E1			36.7%		
			PO ₄	<10	<10			N/A		
			SO ₄	<10	<10			N/A		
			RPD	CI=3.8%	CI=4.5%					
			Both	NO ₂ =2.4%	NO ₂ =0.7%					
			Replicate							

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NARRATIVE: ☐ NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
☐ LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH: 370

Because the sample and duplicate varied so greatly from each other, K+ ran replicates of each. The replicates repeat very well, but the sample and duplicate are quite different. There may be a problem with sample nonhomogeneity or with contamination during sample prep. 7/27/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3017

Serial No V 71.-7571	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 1	Priority 26																		
Determination IC	Method/Standard LA-533-105	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0																		
Sample Size 1,100-10			Customer ID STD																			
Remarks, Calculations, Results <div style="display: flex; justify-content: space-between;"> <div> <p><i>ug/ml</i></p> <p><i>% Rec</i></p> </div> <div> <p><i>44N9E</i></p> </div> </div> <table style="width: 100%; border-collapse: collapse;"> <tr> <td>EDP 974 F</td> <td><i>53.3</i></td> <td><i>95.3</i></td> </tr> <tr> <td>EDP 972 CL</td> <td><i>82.2</i></td> <td><i>109.6</i></td> </tr> <tr> <td>EDP 968 NO2</td> <td><i>540</i></td> <td><i>101.9</i></td> </tr> <tr> <td>EDP 978 NO3</td> <td><i>581</i></td> <td><i>100.5</i></td> </tr> <tr> <td>EDP 976 PO4</td> <td><i>546</i></td> <td><i>105.6</i></td> </tr> <tr> <td>EDP 970 SO4</td> <td><i>621</i></td> <td><i>103.7</i></td> </tr> </table>					EDP 974 F	<i>53.3</i>	<i>95.3</i>	EDP 972 CL	<i>82.2</i>	<i>109.6</i>	EDP 968 NO2	<i>540</i>	<i>101.9</i>	EDP 978 NO3	<i>581</i>	<i>100.5</i>	EDP 976 PO4	<i>546</i>	<i>105.6</i>	EDP 970 SO4	<i>621</i>	<i>103.7</i>
EDP 974 F	<i>53.3</i>	<i>95.3</i>																				
EDP 972 CL	<i>82.2</i>	<i>109.6</i>																				
EDP 968 NO2	<i>540</i>	<i>101.9</i>																				
EDP 978 NO3	<i>581</i>	<i>100.5</i>																				
EDP 976 PO4	<i>546</i>	<i>105.6</i>																				
EDP 970 SO4	<i>621</i>	<i>103.7</i>																				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs																		
Date 7/24/94	Time Completed 1148	Lab Unit Mgr <i>[Signature]</i>																				

WHC-SD-WM-DP-065, REV. 0

54-6800-061 (R-10-83)

ANION ANALYSIS ON DIONEX MODEL 4000i

LA-533-105, C_X DIRECT SAMPLES

2 g MF 10/3/94

	FLOURIDE	CHLORIDE	NITRITE	NITRATE	PHOSPHATE	SULFATE
Type	SAMPLE DATA (µg/ml)					
STD	5.33E+01 8.22E+01 5.40E+02 5.81E+02 5.46E+02 6.21E+02					
Work List	SAMPLE DILUTION FACTOR					
3017	101 101 101 101 101 101					
Test Code	DUPLICATE DATA (µg/ml)					
	DUPLICATE DILUTION FACTOR					
Matrix	SPIKE + SAMPLE (in µg/ml)					
LIQUID						
Sample #	VOLUME OF SPIKE (ml)					
V71-7571	SPIKE STOCK NUMBER					
Instrument Code	TOTAL VOLUME					
WB54428	SPIKE STD. (µg/ml)					
Analyst	Spike Recovery = $100 \times \frac{((\text{Spike} + \text{Sample}) - (\text{Sample})) \times (\text{Vol of Sample} \times \text{Dilution})}{((\text{Spike Vol}) \times (\text{Spike Std.}) \times (\text{Sample DF}))}$					
VOGEL	Note: (For spike recovery when the sample conc. is less than detection limit you do NOT subtract sample conc.)					
Date	Relative Percent Difference = $\frac{((\text{Sample} - \text{Duplicate}))}{((\text{Sample} + \text{Duplicate}) / 2)} \times 100$					
07/24/94	less than Values are Calculated from the Detection Limit * Dilution Factor					
Time	Spike Actual = Spike Found / Spike Recovery					
11:48						

RESULTS	SAMPLE	DUPLICATE	DUP RPD	SPIKE FOUND	SPIKE RECV'Y	SPIKE ACT.
FLOURIDE (µg/ml)	5.33E+01	<0.000	N/A	-5.33E+01	N/A	N/A
CHLORIDE (µg/ml)	8.22E+01	<0.000	N/A	-8.22E+01	N/A	N/A
NITRITE (µg/ml)	5.40E+02	<0.000	N/A	-5.40E+02	N/A	N/A
NITRATE (µg/ml)	5.81E+02	<0.000	N/A	-5.81E+02	N/A	N/A
PHOSPHATE (µg/ml)	5.46E+02	<0.000	N/A	-5.46E+02	N/A	N/A
SULFATE (µg/ml)	6.21E+02	<0.000	N/A	-6.21E+02	N/A	N/A

Data Entry by:	Date: 05-Aug-94
Approved by:	Date:

WHC-SD-WM-DP-065, REV. 0

ION CHROMATOGRAPHIC ANALYSIS - WATER DIGESTION

Serial No V 72.-7671	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 5	Priority 26
Determination IC	Method/Standard LA-533-105	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size Direct			Customer ID BLANK	
Remarks Calculations Results REAGENT BLANK <div style="display: flex; justify-content: space-around;"> <div> $\frac{\mu g}{ml}$ F 2.1 Cl 2.2 NO₂ <1 NO₃ 1.44 PO₄ <1 SO₄ 1.49 </div> <div> replicate 2.1 2.2 <1 1.51 <1 1.50 </div> </div>				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7/24/94	Time Completed 1201	Lab Unit Mgr <i>[Signature]</i>		

54 6800-061 (R 10-83)

Serial No V 73.-7771	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination IC	Method/Standard LA-533-105	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size Direct			Customer ID 108AP-FB	
Remarks Calculations Results DF=10 <div style="display: flex; justify-content: space-around;"> <div> $\frac{\mu g}{ml}$ F 21 Cl 3.08E-1 NO₂ <10 NO₃ 2.08E1 PO₄ <10 SO₄ <10 </div> <div> repeat run 21 3.20E-1 <10 2.13E1 <10 <10 </div> <div> $\frac{\mu g}{ml}$ Ave 3.14E-1 2.1E1 </div> </div>				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7/24/94	Time Completed 1341	Lab Unit Mgr <i>[Signature]</i>		

54 6800-061 (R 10-83)

WHC-SD-WM-DP-065, REV. 0

ION CHROMATOGRAPHIC ANALYSIS - WATER DIGESTION

Serial No Y 73.-7871	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination IC	Method-Standard LA-533-105	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size Direct			Customer ID 108AP-FB	
Remarks Calculations Results DUPLICATE SAMPLE F <i>avg</i> <i>avg</i> <i>avg</i> DF=10 C1 8.7E-1 9.1E-1 8.90E-1 NO ₂ <10 <10 NO ₃ 1.46E1 1.47E1 1.47E1 PO ₄ <10 <10 SO ₄ <10 <10				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 <i>[Signature]</i> Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 7/24/94	Time Completed 1348	Lab Unit Mgr <i>[Signature]</i>		

54 6800-061 (R-10 83)

Sample Name: LMCS
 Data File : C:\DX\DATA\94072401.D12
 Method : C:\DX\METHOD\MEL.MET
 L1 Address: 1 System: 1 Inject#: 12
 Analyst : Column:

Date: 07/17/1994 11:48:05

Detector: CDM-1

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	101	2040	5Hz	0.00	6.80		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.95		0.000	108	478	2	
2	1.11	fluoride	53.344	1852	8742	2	0.00
3	1.63	chloride	82.176	1975	9357	1	-2.40
4	1.93	nitrite	540.936	8338	41228	1	-3.50
5	2.83		0.000	4802	29351	1	
6	3.20	nitrate	581.055	5304	37656	1	0.00
7	4.68	phosphate	545.760	1219	15549	1	-2.09
8	5.85	sulfate	621.416	4035	51173	1	-2.34
Totals			2424.687	27634	193534		

File: 94072401.D12 Sample: LMCS

WHC-SD-WM-DP-065, REV.0

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 374 TO 376.

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374


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=====
Sample Name: V 72-7671                      Date: 07/17/1994 12:01:05
Data File  : C:\DX\DATA\94072401.D13
Method     : C:\DX\METHOD\MEL.MET
ACI Address: 1 System: 1 Inject#: 13        Detector: CDM-1
Analyst    :                               Column:
=====

```

```

-----
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1          1  2040  5Hz  0.00  6.80      200
-----

```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
2	3.24	nitrate	1.445	34	220	1	1.25
3	5.87	sulfate	1.492	43	507	1	-2.00
Totals			2.937	77	727		

File: 94072401.D13 Sample: V 72-7671

WHC-SD-WM-DP-065, REV.0

```

=====
Sample Name: V 72-7671                      Date: 07/17/1994 13:56:16
Data File  : C:\DX\DATA\94072401.D19
Method     : C:\DX\METHOD\MEL.MET
PCI Address: 1 System: 1 Inject#: 19         Detector: CDM-1
Analyst    :                               Column:
=====

```

```

-----
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1          1    2040  5Hz   0.00  6.80         200

```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
2	3.23	nitrate	1.505	114	740	1	0.94
3	5.88	sulfate	1.498	53	577	1	-1.84
Totals			3.003	167	1317

```

=====
Sample Name: V 73-7771                      Date: 07/17/1994 13:24:13
Data File  : C:\DX\DATA\94072401.D15
Method     : C:\DX\METHOD\MEL.MET
ACI Address: 1 System: 1 Inject#: 15         Detector: CDM-1
Analyst    :                               Column:
=====

```

```

-----
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1          1    2040   5Hz   0.00   6.80         200
-----

```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	1.42		0.000	55	673	1	
2	1.62	chloride	0.308	675	3032	1	-2.99
3	3.22	nitrate	2.080	837	5740	1	0.63
Totals			2.389	1567	9445		

File: 94072401.D15 Sample: V 73-7771

WHC-SD-WM-DP-065, REV.0

377

```

=====
Sample Name: V 73-7771                      Date: 07/17/1994 13:41:02
Data File  : C:\DX\DATA\94072401.D17
Method     : C:\DX\METHOD\MEL.MET
PCI Address: 1 System: 1 Inject#: 17         Detector: CDM-1
Analyst    :                               Column:
=====

```

```

-----
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1           1  2040  5Hz   0.00  6.80          200
-----

```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	1.42		0.000	54	666	1	
2	1.62	chloride	0.320	677	3175	1	-2.99
3	3.22	nitrate	2.127	889	6145	1	0.63
Totals			2.447	1620	9986		

File: 94072401.D17 Sample: V 73-7771

WHC-SD-WM-DP-065, REV. 0

```

=====
Sample Name: V 73-7871                      Date: 07/17/1994 13:33:10
Data File  : C:\DX\DATA\94072401.D16
Method     : C:\DX\METHOD\MEL.MET
ACI Address: 1   System: 1   Inject#: 16      Detector: CDM-1
Analyst    :                      Column:
=====

```

```

-----
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1          1   2040   5Hz   0.00  6.80          200
-----

```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	1.31		0.000	64	701	1	
2	1.63	chloride	0.087	59	255	1	-2.40
3	3.23	nitrate	1.457	50	325	1	0.94
Totals			1.544	172	1282		

File: 94072401.D16 Sample: V 73-7871

WHC-SD-WM-DP-065, REV. 0

```

=====
Sample Name: V 73-7871                      Date: 07/17/1994 13:48:42
Data File  : C:\DX\DATA\94072401.D18
Method     : C:\DX\METHOD\MEL.MET
EI Address: 1  System: 1  Inject#: 18        Detector: CDM-1
Analyst    :                               Column:
=====

```

```

-----
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1           1    2040   5Hz   0.00  6.80         200
-----

```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
2	1.62	chloride	0.091	70	308	1	-2.99
3	3.23	nitrate	1.468	64	419	1	0.94
Totals			1.559	134	727

THE FOLLOWING ANALYSES ARE INCLUDED IN THE DATA PACKAGE BUT THE RESULTS HAVE NOT BEEN REPORTED IN THE FINAL SUMMARY REPORTS.

CA
16

WESTINGHOUSE HANFORD COMPANY

WHC-SD-WM-DP-065, REV.0

222-S LABORATORY

ANALYTICAL BATCH

Bulch 322 4

Lab Segment Serial No. V-62,63	Customer ID: 108-AP-A,B
Analysis: IC	Sample Prep: DIRECT

Instrument: WC41533	Procedure/ Rev: LA 533-105/C-1
Technologist: R. WENDLAND	Date: 04/21/94
Starting Time: 07:40	Temperature 23.0* C
Ending Time: <i>10:37</i>	Chemist: S. BOLLING <i>J. Frye</i>

Comments: _____

	Description	Lab ID
1	LMCS	V60-5571
2	BLANK	V61-5671
3	SAMPLE	V62-5771
4	DUP	V62-5871
5	SAMPLE	V63-5771
6	DUP	V63-5871
7	SPK	V63-5971
8	SPK DUP	V63-5071
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15	DATA NOT USED IN PACKAGE	
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	35N9-E			

ANALYTICAL BATCH SUMMARY SHEET										
METHOD: <u>LA-533-105</u>			DATE START: <u>4/21/94</u>							
PREPARED BY: <u>J. M. Luge</u>			DATE COMPLETE: <u>4/21/94</u>							
UNITS:			mg/ml	mg/ml	mg/ml					
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPO%	%REC	DET LIM	%CT	ER
STD	V60	F	53.5				95.5	<1		
		Cl	73.3				97.7	<1.2		
35N9E		NO ₂	486				92.6	<1		
BLANK		NO ₃	560				99.5	<1		
JMF 4/21/94		PO ₄	514				99.5	<1		
		SO ₄	584				97.5	<1		
Blank	V61	F	2.1							
		Cl	2.2							
		NO ₂	<1							
		NO ₃	<1							
		PO ₄	<1							
		SO ₄	<1							
	V62	F	37.5	36.1	36.8	3.8				
		Cl	45.4	43.1	44.25	5.2				
		NO ₂	1.16E3	1.11E3	1.135E3	4.4				
		NO ₃	1.99E3	1.85E3	1.92E3	7.3				
		PO ₄	1.02E2	1.79E2	-	-				
		SO ₄	4.01E2	3.37E2	-	-				
			not measured							
	V63	F	25.6	25.6	25.6	0.0	55.8	62.1	10.7	
		Cl	59.6	57.9	58.75	2.9	89.0	115.0	25.5	
		NO ₂	1.01E3	1.02E3	1.015E3	1.0	106.5	147.3	32.2	
		NO ₃	1.18E3	1.15E3	1.165E3	1.6	104.2	169.5	47.7	
		PO ₄	99.2	not measured			86.0	-	-	
		SO ₄	2.08E2	not measured			84.7	-	-	

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NARRATIVE: ☐ NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
☐ LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

This is the second time this batch has been run. The standards look good. There is a matrix interference with F, probably organic acid. There is also an interference with NO₂ and NO₃. Not measured means the run was stopped and no data collected for that point. J. M. Luge 4/21/94

383

```

=====
Sample Name: LMCS                      Date: 04/21/1994 07:52:21
Data File  : C:\DX\DATA\94042101.D02
Method     : C:\DX\METHOD\MEL.MET
HI Address: 1 System: 1 Inject#: 2    Detector: CDM-1
Analyst    :                          Column:
=====

```

```

-----
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          .1          101    2190   5Hz   0.00  7.30          200
-----

```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.96		0.000	72	333	2	
2	1.12	fluoride	45.5% 53.508	1915	8727	2	0.00
3	1.49		0.000	37	213	1	
4	1.70	chloride	97.7% 73.252	1678	7357	1	0.59
5	2.04	nitrite	92.6% 486.259	7270	36529	1	0.49
6	3.48	nitrate	96.9% 560.098	4468	33606	1	4.19
7	5.09	phosphate	49.5% 514.466	1196	14898	2	0.59
8	6.47	sulfate	97.5% 583.790	3298	44883	2	0.62
Totals			2271.373	19936	146545		

File: 94042101.D02 Sample: LMCS

WHC-SD-WM-DP-065, REV.0

```

=====
Sample Name: BLK                                     Date: 04/21/1994 07:40:44
Data File  : C:\DX\DATA\94042101.D01
Method     : C:\DX\METHOD\MEL.MET
ACI Address: 1   System: 1   Inject#: 1             Detector: CDM-1
Analyst    :                                     Column:
=====

```

```

-----
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1          1   2190   5Hz   0.00  7.30         200
-----

```

***** Peak Report: All Peaks *****

```

-----
Pk.   Ret Component      Concentration      Height      Area   Bl. %Delta
Num   Time Name          ug/ml
-----
Totals                0.000                0          0
-----

```

File: 94042101.D01 Sample: BLK

WHC-SD-WM-DP-065, REV.0

```

=====
Sample Name: V62                               Date: 04/21/1994 10:11:36
Data File  : C:\DX\DATA\94042101.D10
Method     : C:\DX\METHOD\MEL.MET
ACI Address: 1 System: 1 Inject#: 10           Detector: CDM-1
Analyst    :                               Column:
=====

```

```

-----
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1          101   1216   5Hz   0.00  4.05          200

```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.96		0.000	224	975	1	
2	1.12	fluoride	37.456	1367	5577	1	0.00
3	1.69	chloride	45.439	823	3801	1	0.00
4	2.03	nitrite	1164.229	18777	93777	1	0.00
5	3.39	nitrate	1987.956	18585	152763	1	1.50
Totals			3235.080	39775	256893		

File: 94042101.D10 Sample: V62

WHC-SD-WM-DP-065, REV. 0

```

=====
Sample Name: V62  DUP                               Date: 04/21/1994 10:37:52
Data File  : C:\DX\DATA\94042101.D11
Method     : C:\DX\METHOD\MEL.MET
ACI Address: 1  System: 1  Inject#: 11              Detector: CDM-1
Analyst    :                               Column:
=====

```

```

-----
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1          101    2190   5Hz   0.00  7.30          200
-----

```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.96		0.000	213	924	1	
2	1.12	fluoride	36.098	1304	5310	1	0.00
3	1.68	chloride	43.131	768	3506	1	-0.59
4	2.03	nitrite	1109.895	17638	89189	1	0.00
5	3.40	nitrate	1850.372	17322	141281	1	1.80
6	5.10	phosphate	179.443	154	1813	1	0.79
7	6.48	sulfate	336.587	1336	18482	1	0.78
Totals			3555.525	38737	260505		

File: 94042101.D11 Sample: V62 DUP

WHC-SD-WM-DP-065, REV.0

```

=====
Sample Name: V63                               Date: 04/21/1994 08:43:32
Data File  : C:\DX\DATA\94042101.D06
Method     : C:\DX\METHOD\MEL.MET
SI Address: 1 System: 1 Inject#: 6             Detector: CDM-1
Analyst    :                               Column:
=====

```

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	41	2190	5Hz	0.00	7.30		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.15		0.000	226	3019	1	
2	0.95		0.000	450	2190	2	
3	1.11	fluoride	25.604	2287	10604	2	-0.89
4	1.24		0.000	734	3874	2	
5	1.69	chloride	59.619	3508	16767	1	0.00
6	2.04	nitrite	1012.452	39753	206072	1	0.49
7	3.39	nitrate	1175.346	26222	228487	1	1.50
8	5.08	phosphate	99.188	354	4347	2	0.40
9	6.46	sulfate	207.894	2690	37230	2	0.47
Totals			2580.103	76225	512591		

File: 94042101.D06 Sample: V63 WHC-SD-WM-DP-065, REV.0

```

=====
Sample Name: V63      DUP                      Date: 04/21/1994 08:31:57
Data File  : C:\DX\DATA\94042101.D05
Method     : C:\DX\METHOD\MEL.MET
ACI Address: 1  System: 1  Inject#: 5          Detector: CDM-1
Analyst    :                      Column:
=====

```

```

-----
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1          41    1199  5Hz   0.00  3.99          200
-----

```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.96		0.000	454	2134	2	
2	1.12	fluoride	25.588	2317	10596	2	0.00
3	1.24		0.000	719	3842	2	
4	1.69	chloride	57.864	3453	16214	1	0.00
5	2.04	nitrite	1016.210	39211	206854	1	0.49
6	3.39	nitrate	1149.191	25498	223111	1	1.50
Totals			2248.853	71652	462751		

File: 94042101.D05 Sample: V63 DUP

WHC-SD-WM-DP-065, REV.0

```

=====
Sample Name: V63   SPK                               Date: 04/21/1994 08:52:59
Data File  : C:\DX\DATA\94042101.D07
Method     : C:\DX\METHOD\MEL.MET
HI Address: 1   System: 1   Inject#: 7               Detector: CDM-1
Analyst    :                               Column:
=====

```

```

-----
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1          41    2190   5Hz   0.00  7.30          200

```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.95		0.000	449	1879	1	
2	1.11	fluoride	38.054	4190	16621	1	-0.89
3	1.68	chloride	86.322	5215	25176	1	-0.59
4	2.04	nitrite	1234.227	47583	252204	1	0.49
5	3.37	nitrate	1416.806	30883	278126	1	0.90
6	5.07	phosphate	276.957	1717	21452	2	0.20
7	6.44	sulfate	411.002	6645	90667	2	0.16
Totals			3463.368	96682	686125		

File: 94042101.D07 Sample: V63 SPK

WHC-SD-WM-DP-065, REV.0

```

=====
Sample Name: V63   SPK   DUP   RW   4-21-94   Date: 04/21/1994 09:57:57
Data File  : C:\DX\DATA\94042101.D09
Method     : C:\DX\METHOD\MEL.MET
ACI Address: 1   System: 1   Inject#: 9
Analyst    :                               Detector:CDM-1
Column:
=====

```

```

-----
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1          41    2190   5Hz   0.00   7.30          200
-----

```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.95		0.000	488	2090	1	
2	1.11	fluoride	39.458	4365	17300	1	-0.89
3	1.68	chloride	92.383	5755	27084	1	-0.59
4	2.03	nitrite	1334.256	49958	273012	1	0.00
5	3.34	nitrate	1541.601	33493	303780	1	0.00
6	5.07	phosphate	280.170	1744	21761	2	0.20
7	6.44	sulfate	430.596	6988	95822	2	0.16
Totals			3718.463	102791	740849		

File: 94042101.D09 Sample: V63 SPK

WHC-SD-WM-DP-065, REV.0

Serial No V 63.-5971	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination IC	Method-Standard LA-533-105	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 250-10			Customer ID 108-AP-B	
Remarks, Calculations, Results SAMPLE SPIKED ID F $\frac{38.1 - 25.6}{(41)(56)(.1)} \times 10.25 \times 100 = 55.8\%$ SPIKE ID 35N9E SPIKE VOLUME .100ml Cl 89.0% NO ₂ 106.5 PO ₄ 86.0 SO ₄ 84.7 ROBBY WENDLAND				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-21-94	Time Completed 10:37	Lab Unit Mgr Dakota	4-22-94 OK McFarland	

54 6800-061 (R 10-83)

Serial No V 63.-5071	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination IC	Method-Standard LA-533-105	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 250-10			Customer ID 108-AP-B	
Remarks, Calculations, Results SAMPLE SPIKE DUPLICATE F $\frac{39.5 - 25.6}{(41)(56)(.1)} \times 10.25 \times 100 = 55.8\%$ SPIKE ID 35N9E SPIKE VOL .100ml Cl 115.0% NO ₂ 147.3% NO ₃ $\frac{1541 - 1149}{(41)(578)(.1)} \times 10.25 \times 100 = 169.5\%$ ROBBY WENDLAND NO ₃ RPD = 47.5% F % RPD = 3.7% 6.21% 2 MF 4/21/94				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-21-94	Time Completed 10:37	Lab Unit Mgr Dakota	4-22-94 OK McFarland	

54 6800-061 (R 10-83)

WHC-SD-WM-DP-065, REV. 0

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Serial No V 62.-5771	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination IC	Method-Standard LA-533-105	Result Units uG/ML	Charge Code N1A7F	Reruns 1
Sample Size 100-10			Customer ID 108-AP-A	
Remarks Calculations, Results <div style="display: flex; justify-content: space-between;"> <div> <p><i>F</i> <i>37.5</i></p> <p><i>NO₃</i> <i>1.99E3</i></p> <p><i>CI</i> <i>45.4</i></p> <p><i>NO₂</i> <i>1.16E3</i></p> </div> <div> <p><i>PO₄ + SO₄ were not measured, run was stopped early.</i></p> <p><i>gmdye</i></p> </div> </div> <p><i>ROBBY WENDLAND</i></p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-21-94	Time Completed 10:37	Lab Unit Mgr <i>J.M. Lutz</i>	4-22-94 <i>K.M. [Signature]</i> 54-6800-061 (R-10-83)	

Serial No V 62.-5871	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination IC	Method-Standard LA-533-105	Result Units uG/ML	Charge Code N1A7F	Reruns 1
Sample Size 100-10			Customer ID 108-AP-A	
Remarks Calculations, Results <div style="display: flex; justify-content: space-between;"> <div> <p><i>PO₄ 1.79E2</i> <i>no RPD available</i></p> <p><i>SO₄ 3.37E2</i> <i>no RPD available</i></p> </div> <div> <p><i>F</i> <i>36.1</i></p> <p><i>NO₃</i> <i>1.85E3</i></p> <p><i>CI</i> <i>43.1</i></p> <p><i>NO₂</i> <i>1.11E3</i></p> </div> <div> <p><i>3.8</i></p> <p><i>7.3</i></p> <p><i>5.2</i></p> <p><i>4.4</i></p> </div> </div> <p><i>ROBBY WENDLAND</i></p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-21-94	Time Completed 10:37	Lab Unit Mgr <i>J.M. Lutz</i>	4-22-94 <i>K.M. [Signature]</i> 54-6800-061 (R-10-83)	

WHC-SD-WM-DP-065, REV. 0

Serial No V 60.-5571	Sample Point 108-AP	RERUN		Time Issued 3-18-94	Priority 26
Determination IC	Method-Standard LA-533-105	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1	
Sample Size 100-10			Customer ID STD		
Remarks Calculations Results EDP 974 F $\mu\text{g/ml}$ 53.5 95.5 EDP 972 CL 73.3 97.7 EDP 968 NO2 486 92.6 EDP 978 NO3 560 96.7 EDP 976 PO4 514 99.5 EDP 970 SO4 584 97.5 ROBBY WENDLAND					
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
Hrs	Hrs	Hrs	Hrs	4-22-94	
Date 4-21-94	Time Completed 10:37	Lab Unit Mgr John M. Lye	4-22-94 OK M. Lye		

54-6800-061 (R-10-83)

Serial No V 61.-5671	Sample Point 108-AP	RERUN		Time Issued 3-18-94	Priority 26
Determination IC	Method-Standard LA-533-105	Result Units $\mu\text{G/ML}$	Charge Code N1A7F	Reruns 1	
Sample Size DIRECT			Customer ID BLANK		
Remarks Calculations Results REAGENT BLANK $\mu\text{g/ml}$ 2.1 F 2.1 NO3 2.1 WHC-SD-WM-DP-065, REV. 0 ROBBY WENDLAND					
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
Hrs	Hrs	Hrs	Hrs	Hrs	
Date 4-21-94	Time Completed 10:37	Lab Unit Mgr John M. Lye	4-22-94 OK M. Lye		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

NH_3

66
07

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No. V - 61 TO V - 63	Customer ID: 108-AP-A , 108-AP-B
Analysis: NH3	Sample Prep: WATER DIGESTION

Instrument: <u>NA</u>	Procedure/ Rev: LA-631-001 / A-0
Technologist: KR MONTEITH	Date: 05/29/94
Starting Time: 08:00	Temperature 25
Ending Time: 15:30	Chemist: R.W. SCHRODER <u>Schroeder</u> <i>RWS 6-1-94</i>

Comments: _____

	Description	Lab ID
1	LMCS	V-60-5519
2	BLANK	V-61-7619
3	SAMPLE	V-62-7719
4	SAMPLE - DUP	V-62-7819
5	SAMPLE	V-63-7719
6	SAMPLE - DUP	V-63-7819
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	53N16F / 1.0 ML			

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH SUMMARY SHEET							
METHOD: LA-631-001		ANALYTE: NH3		ANALYSIS START DATE 5-29-94			
PREPARED BY: Rob Schroeder			SUMMARY DATE: 6-01-94				
PROJECT 108-AP		UNITS: ug NH3/mL		SAMPLE PREP: Water Dil. (5x)			
SPL ID	SERIAL NO	RESULT #1	RESULT #2	RPD%	% REC	DET LIM	DIG WT
STD	V 60-5519	4.99 E-02			97.9		
BLK	V 61-7619	<2.00				2.00	
108-AP	V 62-7719	13.12	9.50	32.0		2.00	
108-AP	V 63-7719	9.88	6.88	35.8		2.00

X

NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE -- LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH

Precision measurement is poor due to the low level of analyte present in sample. Sample results reported are minus the value of the preparation blank.

Robert W. Schroeder
6-1-94

WHC-SD-WM-DP-065, REV. 0
AMMONIA ANALYSIS - WATER DIGESTION

BATCH # 3567

Serial No V 60.-5519	Sample Point 108-AP	Date 3-18-94	Time Issued 8:26	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size 1 ML	RERUN		Customer ID STD	
Remarks Calculations Results S238 NH4Cl 34.0 STD 53N16F RESULT 0.0499 STD VAL 5.1 E-2 %REC 97.9				
Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-29-94	Time Completed	Lab Unit Mgr 5-31-94 RW Schroeder	54 6800-061 (R 10-83)	

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Serial No V 61.-7619	Sample Point 108-AP	Date 3-18-94	Time Issued 8:27	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units ug/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ML	RERUN		Customer ID BLANK	
Remarks Calculations Results PREP. BLANK .0519 $1.298 \Rightarrow 1.30 \mu\text{g/mL}$ < 2.00				
Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-29-94	Time Completed	Lab Unit Mgr 5-31-94 RW Schroeder	54 6800-061 (R 10-83)	

AMMONIA ANALYSIS - WATER DIGESTION

Serial No V 62.-7719	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Retuns 1
Sample Size 1 ML	RERUN			Customer ID 108-AP-A
Remarks, Calculations, Results <p style="text-align: right;">.157</p> <p style="text-align: center;"> $3.925 - 1.30 \text{ blank} = 2.625 \times \text{Dg. Fact.}^5$ $= 13.125 \text{ ugmL}$ </p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-29-94	Time Completed	Lab Unit Mgr 5-31-94

54 6800-061 (R 10-83)

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Serial No V 62.-7819	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Retuns 1
Sample Size 1 ML	RERUN			Customer ID 108-AP-A
Remarks, Calculations, Results <p style="text-align: right;">.128</p> <p style="text-align: center;"> $3.20 - 1.30 = 1.90 \times \text{DF.}^5$ $= 9.50 \text{ ugmL}$ </p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-29-94	Time Completed	Lab Unit Mgr 5-31-94

54 6800-061 (R 10-83)

AMMONIA ANALYSIS - WATER DIGESTION

Serial No V 63.-7719	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination NH3	Method-Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ML	RERUN		Customer ID 108-AP-B	
Remarks Calculations, Results $3.275 - 1.30 = 1.975 \times .5 = 9.875 \text{ ug/ml}$				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-29-94	Time Completed	Lab Unit Mgr 5-31-94

54-6800-061 (R-10-83)

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Serial No V 63.-7819	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination NH3	Method-Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ML	RERUN		Customer ID 108-AP-B	
Remarks Calculations, Results $2.675 - 1.30 = 1.375 \times .5 = 6.875 \text{ ug/ml}$				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-29-94	Time Completed	Lab Unit Mgr 5-31-94

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

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V-60

402

U-61

BEST AVAILABLE COPY

V-62

BEST AVAILABLE CCF

WHC-SD-WM-DP-065, REV. 0

V-62 Dup

BEST AVAILABLE COPY

BEST AVAILABLE COPY

V-6³

V-63-Dup

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10A
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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. V - 66 TO V - 69	Customer ID: 108-AP-C , 108-AP-D , 108-AP-E
Analysis: NH3	Sample Prep: WATER DIGESTION

Instrument: NA	Procedure/ Rev: LA-631-001 / A-0
Technologist: KR MONTEITH <i>[Signature]</i>	Date: 05/29/94
Starting Time: 08:00	Temperature 25
Ending Time: 15:30	Chemist: R.W. SCHROEDER <i>RWS 6-1-94</i> <i>Schroeder</i>

Comments: _____

BEST AVAILABLE COPY

	Description	Lab ID
1	LMCS	V-65-5519
2	BLANK	V-66-7619
3	SAMPLE	V-67-7719
4	SAMPLE - DUP	V-67-7819
5	SAMPLE	V-68-7719
6	SAMPLE - DUP	V-68-7819
7	SAMPLE	V-69-7719
8	SAMPLE - DUP	V-69-7819
9		
10		

	Description	Lab ID
11		
12		
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14		
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18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	53N16F / 1.0 ML			

103

WHC-SD-WM-DP-065, REV. 0

[illegible]

X

NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE -- LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH

Precision measurement is poor due to the low level of analyte present in sample. Sample results reported are minus the value of the preparation blank.

Robert W. Schroeder
5-31-94

WHC-SD-WM-DP-065, REV. 0

AMMONIA ANALYSIS - WATER DIGESTION

Batch 3568

Serial No V 65.-5519	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size 1 ML	RERUN			Customer ID STD
Remarks, Calculations, Results S238 NH4Cl 33.1 STD# 53N16F RESULT 0.0486 STD VAL 5.1E-2 %REC 95.3				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-29-94	Time Completed	Lab Unit Mgr 5-31-94

54 6800 061 (A-10-83)

BEST AVAILABLE COPY

Serial No V 66.-7619	Sample Point 108-AP	Date 3-18-94	Time Issued 9:38	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ML	RERUN			Customer ID BLANK
Remarks, Calculations, Results PREP BLANK $(0.0621)(25 D.F.) = 1.55 \text{ uG/mL} \times 5 D.F. = 7.75$ < 2.00 <p style="text-align: right;"> 5-29-94 0.0621 RWS 6-1-94 RWS 6-1-94 </p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-29-94	Time Completed	Lab Unit Mgr 5-31-94

54 6800 061 (A-10-83)

WHC-SD-WM-DP-065, REV. 0

AMMONIA ANALYSIS - WATER DIGESTION

Serial No V 67.-7719	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination NH3	Method-Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ML	RERUN		Customer ID 108-AP-C	
Remarks, Calculations, Results <div style="text-align: right;">.180</div> <div style="text-align: center;"> $4.50 - 1.55 \text{ blank} = 2.95 \text{ ug/mL}$ $\text{DF } 5 = 14.75$ </div>				
Analyst	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-29-94	Time Completed	Lab Unit Mgr 5-31-94 RW Schneider

54 6800-061 (R-10-83)

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Serial No V 67.-7819	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination NH3	Method-Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ML	RERUN		Customer ID 108-AP-C	
Remarks, Calculations, Results <div style="text-align: right;">.169</div> <div style="text-align: center;"> $4.225 - 1.55 = 2.68 \text{ ug/mL}$ $\text{DF } 5 = 13.40$ </div>				
Analyst	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-29-94	Time Completed	Lab Unit Mgr 5-31-94 RW Schneider

54 6800-061 (R-10-83)

AMMONIA ANALYSIS - WATER DIGESTION

Serial No V 68.-7719	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ML		Customer ID 108-AP-D		
Remarks, Calculations, Results <p style="text-align: right;">.0884</p> <p style="text-align: center;">$2.21 - 1.55 = 0.66 \text{ uG/ML} \cdot 5 = 3.30$</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-29-94	Time Completed	Lab Unit Mgr 5-31-94

54 6800-061 (A-10-83)

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Serial No V 68.-7819	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ML		Customer ID 108-AP-D		
Remarks, Calculations, Results <p style="text-align: right;">.0869</p> <p style="text-align: center;">$2.17 - 1.55 = 0.622 \text{ uG/ML} \cdot 5 = 3.11 \text{ uG/ML}$</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-29-94	Time Completed	Lab Unit Mgr 5-31-94

54-6800-061 (A-10-83)

WHC-SD-WM-DP-065, REV. 0

AMMONIA ANALYSIS - WATER DIGESTION

Serial No V 69.-7719	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ML			Customer ID 108-AP-E	
Remarks, Calculations, Results <p style="text-align: center;">RERUN</p> <p style="text-align: right;">.100</p> <p style="text-align: center;">$2.50 - 1.55 = 0.95 \text{ mg/mL} \cdot 5 = 4.75$</p>				
Analyst	Analyst	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-29-94	Time Completed	Lab Unit Mgr 5-31-94

54 6800 061 (R 10-83)

BEST AVAILABLE COPY

Serial No V 69.-7819	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ML			Customer ID 108-AP-E	
Remarks, Calculations, Results <p style="text-align: center;">RERUN</p> <p style="text-align: right;">.0895</p> <p style="text-align: center;">$2.24 - 1.55 = 0.69 \text{ mg/mL} \cdot 5 = 3.45$</p>				
Analyst	Analyst	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-29-94	Time Completed	Lab Unit Mgr 5-31-94

54-6800 061 (R 10-83)

BEST AVAILABLE COPY

V-65

BEST AVAILABLE COPY

V-66

BEST AVAILABLE COPY

V-67

V-67 Dup

BEST AVAILABLE COPY

BEST AVAILABLE COPY

V-68

BEST AVAILABLE COPY

U-68 Dup

BEST AVAILABLE COPY

V-69

WHC-SD-WM-DP-065, REV. 0

BEST AVAILABLE COPY

U-69 Dup
.0895

422

WESTINGHOUSE HANFORD COMPANY

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222-S LABORATORY
ANALYTICAL BATCH

WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No. V-73	Customer ID: 108-AP-FB
Analysis: NH3	Sample Prep: WATER DIGESTION

Instrument: <i>NA</i>	Procedure/ Rev: LA-631-001 / A-0
Technologist: KR MONTEITH <i>[Signature]</i>	Date: 09/03/94
Starting Time: 00:00	Temperature 25
Ending Time: 05:30	Chemist: R.W. SCHRODER <i>Schroeder</i> ^{RWS} 9-7-94

Comments: *Batch 4381*

	Description	Lab ID
1	LMCS	V-71-5519
2	BLANK	V-72-7619
3	SAMPLE	V-73-7719
4	SAMPLE - DUP	V-73-7819
5		
6		
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	77N16I / 1.0 ML			

WHC-SD-WM-DP-065, REV. 0

[illegible]

X

NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE -- LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH

Robert W. Schroeder
4-8-94

423

WHC-SD-WM-DP-065, REV. 0
AMMONIA ANALYSIS - WATER DIGESTION

RERUN *Batch 4381*

Serial No V 71.-5519	Sample Point LOBAP FLD BLK	Date 3-18-94	Time Issued 11: 4	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units % RECOVERY	Charge Code N1A7F	Reruns 3
Sample Size 1 ML			Customer ID STD	
Remarks, Calculations, Results S238 NH4Cl STD# 77N162 RESULT 5.30×10^{-2} STD VAL 5.10×10^{-2} ERRC 103.9 WRN 2952 $(36.1)(25/1\text{mL}) = 9.025 \times 10^{-2} \text{ mg/mL}$ $(9.025 \times 10^{-2} \text{ mg/mL}) / (1000)(17.03) = 5.30 \times 10^{-2} \text{ M}$				
Analyst <i>[Signature]</i>	Analyst - 2 <i>[Signature]</i>	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 9-3-94	Time Completed	Lab Unit 9-7-94	<i>[Signature]</i>	

54-6800-061 (R-10-83)

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RERUN

Serial No V 72.-7619	Sample Point LOBAP FLD BLK	Date 3-18-94	Time Issued 11:15	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 3
Sample Size 2.5 ML			Customer ID BLANK	
Remarks, Calculations, Results PREP BLANK $(.430)(25/2.5\text{mL}) = 4.30 \text{ mg/mL}$ $< 2.00 \text{ E+1 mg/mL}$				
Analyst <i>[Signature]</i>	Analyst - 2 <i>[Signature]</i>	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 9-3-94	Time Completed	Lab Unit 9-7-94	<i>[Signature]</i>	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0
AMMONIA ANALYSIS - WATER DIGESTION

RERUN				
Serial No V 73.-7719	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:22	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 3
Sample Size 2.5 ML			Customer ID 108AP-FB	
Remarks, Calculations, Results				
$(.122)(25/2.5\text{mL}) = 1.22 \text{ ug/mL}$ $< 2.00 \text{ ET } \overset{1 \text{ runs}}{9-7-94} \text{ ug/mL}$				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 9-3-94	Time Completed	Lab Unit 9-7-94

54 6800-061 (R-10-83)

BEST AVAILABLE COPY

RERUN				
Serial No V 73.-7819	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:22	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 3
Sample Size 2.5 ML			Customer ID 108AP-FB	
Remarks, Calculations, Results				
$(.0662)(25/2.5\text{mL}) = 6.62 \text{ E-01 ug/mL}$ $< 2.00 \text{ ET } \text{ug/mL}$				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 9-3-94	Time Completed	Lab Unit 9-7-94

54 6800-061 (R-10-83)

DOUBLE KNOWN ADDITION SELECTED
AT 13:48, 01-19-00

SAMPLE VOL= 25.000 AT 13:56, 01-19-00
ENTERED

EMF= 53.9 mV AT 13:58, 01-19-00

EMF= 53.8 mV AT 13:58, 01-19-00
ENTERED

STD CONC= 1000 AT 13:58, 01-19-00
ENTERED

STD VOL= .25000 AT 13:59, 01-19-00
ENTERED

EMF= 48.0 mV AT 13:59, 01-19-00

EMF= 48.0 mV AT 13:59, 01-19-00
ENTERED

STD VOL= 2.5000 AT 14:00, 01-19-00
ENTERED

EMF= 21.8 mV AT 14:01, 01-19-00

EMF= 21.8 mV AT 14:01, 01-19-00
ENTERED

1:NH3 SLOPE=-57.0 mV/DEC
AT 14:01, 01-19-00

1:NH3 CONC= 36.1

U-71

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WHC-SD-WM-DP-065, REV. 0

DEVICE KNOWN ADICTION SELECTED
AT 14:02. 01-19-00

SOURCE VOL = 25.000 AT 14:06. 01-19-00
ENTERED

EMF = 179.3 mV AT 14:11. 01-19-00

EMF = 179.1 mV AT 14:11. 01-19-00
ENTERED

STD CONC = 1.0 AT 14:11. 01-19-00
ENTERED

STD VOL = 125.000 AT 14:12. 01-19-00
ENTERED

EMF = 171.3 mV AT 14:13. 01-19-00

EMF = 171.3 mV AT 14:13. 01-19-00
ENTERED

STD VOL = 2.0000 AT 14:14. 01-19-00
ENTERED

EMF = 171.3 mV AT 14:16. 01-19-00

EMF = 171.3 mV AT 14:16. 01-19-00
ENTERED

KNOWN CAL. DATE 01-19-00
AT 14:16. 01-19-00

KNOWN CONC = 1.0

V-72

BEST AVAILABLE COPY

427

SAMPLE VOL= 25.000 AT 16:09, 01-19-00
ENTERED

WHC-SD-WM-DP-065, REV. 0

EMF= 209.2 mV AT 16:16, 01-19-00

EMF= 209.6 mV AT 16:16, 01-19-00

EMF= 209.9 mV AT 16:17, 01-19-00

EMF= 210.3 mV AT 16:18, 01-19-00

EMF= 210.5 mV AT 16:18, 01-19-00

EMF= 210.7 mV AT 16:19, 01-19-00

EMF= 210.8 mV AT 16:19, 01-19-00

EMF= 210.9 mV AT 16:20, 01-19-00

EMF= 211.0 mV AT 16:20, 01-19-00

EMF= 211.1 mV AT 16:21, 01-19-00

EMF= 211.1 mV AT 16:22, 01-19-00

EMF= 211.1 mV AT 16:22, 01-19-00

EMF= 211.2 mV AT 16:23, 01-19-00

EMF= 211.1 mV AT 16:23, 01-19-00
ENTERED

STD CONC= 10.0 AT 16:24, 01-19-00
ENTERED

STD VOL= .25000 AT 16:24, 01-19-00
ENTERED

EMF= 186.2 mV AT 16:28, 01-19-00

EMF= 186.0 mV AT 16:28, 01-19-00
ENTERED

STD VOL= 2.5000 AT 16:29, 01-19-00
ENTERED

EMF= 135.3 mV AT 16:31, 01-19-00

EMF= 135.1 mV AT 16:31, 01-19-00

~~EMF= 134.9 mV AT 16:31, 01-19-00~~

EMF= 134.9 mV AT 16:32, 01-19-00
ENTERED

.NH3 SLOPE=-63.5 mV/DEC
AT 16:32, 01-19-00

1:NH3 CONC= .0662

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V-73 - Dup

428

DOUBLE KNOWN ADDITION SELECTED
AT 14:16, 01-19-00

SAMPLE VOL= 25.000 AT 14:17, 01-19-00
ENTERED

EMF= 207.9 mV AT 14:23, 01-19-00

EMF= 208.1 mV AT 14:23, 01-19-00
ENTERED

STD CONC= 10.0 AT 14:23, 01-19-00
ENTERED

STD VOL= .25000 AT 14:23, 01-19-00
ENTERED

EMF= 190.4 mV AT 14:28, 01-19-00

EMF= 190.3 mV AT 14:28, 01-19-00
ENTERED

STD VOL= 2.5000 AT 14:28, 01-19-00
ENTERED

EMF= 141.7 mV AT 14:31, 01-19-00

EMF= 141.5 mV AT 14:31, 01-19-00
ENTERED

1:NH3 SLOPE=-69.8 mV/DEC
AT 14:31, 01-19-00

1:NH3 CONC= .122

U-73

BEST AVAILABLE COPY

THE FOLLOWING ANALYSES ARE INCLUDED IN THE DATA PACKAGE BUT THE RESULTS HAVE NOT BEEN REPORTED IN THE FINAL SUMMARY REPORTS.

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.

V - 61 TO V - 63

Customer ID:

108-AP-A , 108-AP-B

Analysis:

NH3

Sample Prep:

WATER DIGESTION

Instrument:

Procedure/ Rev: LA-631-001 / A-0

Technologist: KR MONTEITH

Date: 05/14/94

Starting Time: 00:00

Temperature 25

Ending Time: 04:00

Chemist: R.W. SCHRODER

Comments:

poor technique
the analyst needed to use a different standard.

OUT FOR RERUN

	Description	Lab ID
1	LMCS	V-60-5519
2	BLANK	V-61-7619
3	SAMPLE	V-62-7719
4	SAMPLE - DUP	V-62-7819
5	SAMPLE	V-63-7719
6	SAMPLE - DUP	V-63-7819
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
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19		
20		

**DATA
NOT USED
IN PACKAGE**

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	53N16F / 1.0 ML			

431

Batch 3338

Serial No	V 60.-5519	Sample Point	108-AP	Date	3-18-94	Time Issued	8:26	Priority	26
Determination	NH3	Method Standard	LA-631-001	Result Units	% RECOVERY	Charge Code	N1A7F	Reruns	0
Sample Size	OUT FOR RERUN					Customer ID	STD		
Remarks Calculations Results S238 NH4Cl 36.1 STD# 53N16F RESULT 5.299×10^{-2} STD VAL 5.1×10^{-2} %REC 103.9% $\frac{(36.1)(25)}{(17.03)(1000)}$									
Analyst 1	Analyst 2		Analyst 3	Analyst 4		Analyst 5			
Hrs		Hrs		Hrs		Hrs		Hrs	
Date	Time Completed		Lab Unit Mgr						
5-14-94			Rakita		Rakita				

WHC-SD-WM-DP-065, REV. 0

54 6800-061 (R-10 83)

Serial No	V 61.-7619	Sample Point	108-AP	Date	3-18-94	Time Issued	8:27	Priority	26
Determination	NH3	Method Standard	LA-631-001	Result Units	uG/ML	Charge Code	N1A7F	Reruns	0
Sample Size	1 mL					Customer ID	BLANK		
Remarks Calculations Results PREP BLANK .840 $(.840)(25) = 21 \text{ uG/ML}$ OUT FOR RERUN									
Analyst 1	Analyst 2		Analyst 3	Analyst 4		Analyst 5			
Hrs		Hrs		Hrs		Hrs		Hrs	
Date	Time Completed		Lab Unit Mgr						
5-14-94			Rakita		Rakita				

54 6800 061 (R 10 83)

Serial No V 62.-7719	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1 mL			Customer ID 108-AP-A	
Remarks, Calculations, Results <p style="text-align: right;">.330</p> <p>$(.330)(25) = 8.25 \text{ uG/mL}$ OUT FOR RERUN</p> <p style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-14-94	Time Completed	Lab Unit Mgr

54 6800-061 (R 10-83)

Serial No V 62.-7819	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1 mL			Customer ID 108-AP-A	
Remarks, Calculations, Results <p style="text-align: right;">.255</p> <p>$(.255)(25) = 6.375 \text{ uG/mL}$ OUT FOR RERUN</p> <p>DUPLICATE SAMPLE</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-14-94	Time Completed	Lab Unit Mgr

54 6800-061 (R 10-83)

Serial No V 63.-7719	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination NH3	Method-Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1 ML			Customer ID 108-AP-B	
Remarks Calculations Results <p style="text-align: right;">.201</p> <p>$(.201)(25) = 5.025 \text{ ug/mL}$</p> <p>WHC-SD-WM-DP-065, REV. 0 OUT FOR RERUN</p>				
Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-14-94	Time Completed	Lab Unit Mgr

54 6800-061 (R 10-83)

Serial No V 63.-7819	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination NH3	Method-Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1 ML			Customer ID 108-AP-B	
Remarks Calculations Results <p style="text-align: right;">.167</p> <p>DUPLICATE SAMPLE</p> <p>$(.167)(25) = 4.175 \text{ ug/mL}$</p> <p style="text-align: center;">OUT FOR RERUN</p>				
Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-14-94	Time Completed	Lab Unit Mgr

54 6800-061 (R 10-83)

WHC-SD-WM-DP-065, REV. 0

BEST AVAILABLE COPY

V-60

435

BEST AVAILABLE COPY

V-61

BEST AVAILABLE COPY

V-62

U-62-Dup

BEST AVAILABLE COPY

U-63

BEST AVAILABLE COPY

V-63 - Dup

BEST AVAILABLE COPY

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.

V - 66 TO V - 69

Customer ID:

108-AP-C , 108-AP-D , 108-AP-E

Analysis:

NH3

Sample Prep:

WATER DIGESTION

Instrument:

Procedure/ Rev: LA-631-001 / A-0

Technologist: KR MONTEITH

Date: 05/14/94

Starting Time: 04:00

Temperature 25

Ending Time: 07:30

Chemist: R.W. SCHRODER

Comments: *poor technique. the analyst needed to use a different standard.*

OUT FOR RERUN

	Description	Lab ID
1	LMCS	V-65-5519
2	BLANK	V-66-7619
3	SAMPLE	V-67-7719
4	SAMPLE - DUP	V-67-7819
5	SAMPLE	V-68-7719
6	SAMPLE - DUP	V-68-7819
7	SAMPLE	V-69-7719
8	SAMPLE - DUP	V-69-7819
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

DATA
NOT USED
IN PACKAGE

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	53N16F / 1.0 ML			

Batch 3339

Serial No V 65.-5519	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority 26
Determination NH3	Method-Standard LA-631-001	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size /mL			Customer ID STD	
Remarks Calculations Results S238 NH4Cl 35.4 STD# 53N16F RESULT 5.197×10^{-2} OUT FOR RERUN STD VAL 5.1×10^{-2} %REC 101.9 WHC-SD-WM-DP-065, REV.0 $\frac{(35.4)(25)}{(7.03)(1000)} =$				
Analyst - 1 <i>[Signature]</i>	Analyst - 2 <i>[Signature]</i>	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-14-94	Time Completed	Lab Unit Mgr 5-25-94 <i>RW Schroeder</i> <i>Dan Hammett</i>		

54 6800-061 (R-10 83)

Serial No V 66.-7619	Sample Point 108-AP	Date 3-18-94	Time Issued 9:38	Priority 26
Determination NH3	Method-Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size /mL			Customer ID BLANK	
Remarks Calculations Results PREP BLANK .775 $(.775)(25) = 19.375 \text{ uG/mL}$ OUT FOR RERUN				
Analyst - 1 <i>[Signature]</i>	Analyst - 2 <i>[Signature]</i>	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-14-94	Time Completed	Lab Unit Mgr <i>Rakda</i> <i>Dan Hammett</i>		

54 6800-061 (R-10 83)

Serial No V 67.-7719	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1 mL			Customer ID 108-AP-C	
Remarks. Calculations. Results WHC-SD-WM-DP-065, REV. 0 .245 $(.245)(25) = 6.125 \text{ ug/mL}$ OUT FOR RERUN				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-14-94	Time Completed	Lab Unit Mgr

54 6800-061 (R 10 83)

Serial No V 67.-7819	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1 mL			Customer ID 108-AP-C	
Remarks. Calculations. Results DUPLICATE SAMPLE .179 $(.179)(25) = 4.475 \text{ ug/mL}$ OUT FOR RERUN				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-14-94	Time Completed	Lab Unit Mgr

54 6800-061 (R 10 83)

Serial No V 68.-7719	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination NH3	Method: Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size /mL			Customer ID 108-AP-D	
Remarks Calculations Results <p style="text-align: right;">.104</p> <p>WHC-SD-WM-DP-065, REV. 0</p> <p>$(.104)(25) = 2.6 \text{ ug/mL}$</p> <p style="text-align: right;">OUT FOR RERUN</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-14-94	Time Completed	Lab Unit Mgr

54 6800-061 (R 10-83)

Serial No V 68.-7819	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination NH3	Method: Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size /mL			Customer ID 108-AP-D	
Remarks Calculations Results <p style="text-align: right;">.186</p> <p>DUPLICATE SAMPLE</p> <p>$(.186)(25) = 4.65 \text{ ug/mL}$</p> <p style="text-align: right;">OUT FOR RERUN</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-14-94	Time Completed	Lab Unit Mgr

54 6800-061 (R 10-83)

Serial No V 69.-7719	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size /mL			Customer ID 108-AP-E	
Remarks Calculations Results WHC-SD-WM-DP-065, REV. 0 $(.144)(25) = 3.6 \text{ ug/mL}$ OUT FOR RERUN .144				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-14-94	Time Completed	Lab Unit Mgr Raketa	54 6800-061 (R 10 83)	

Serial No V 69.-7819	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size /mL			Customer ID 108-AP-E	
Remarks Calculations Results DUPLICATE SAMPLE $(.120)(25) = 3.0 \text{ ug/mL}$ OUT FOR RERUN .120				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-14-94	Time Completed	Lab Unit Mgr Raketa	54 6800-061 (R 10 83)	

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V-65

1. The purpose of this document is to provide a summary of the results of the investigation conducted by the Health, Safety, and Environment Division (HSED) of the U.S. Environmental Protection Agency (EPA) regarding the potential health effects of exposure to the chemical in question.

2. The investigation was conducted in accordance with the procedures established by the HSED and the EPA, and the results are presented in this document.

3. The chemical in question is a known or suspected carcinogen, and exposure to it has been associated with an increased risk of developing certain types of cancer.

4. The results of the investigation indicate that exposure to the chemical at the levels studied did not result in any significant health effects.

5. However, it is important to note that the investigation was limited to the specific conditions and populations studied, and further research may be needed to fully understand the potential health effects of exposure to the chemical.

1. The purpose of this document is to provide a summary of the results of the investigation conducted by the Health, Safety, and Environment Division (HSED) of the U.S. Environmental Protection Agency (EPA) regarding the potential health effects of exposure to the chemical in question.

2. The investigation was conducted in accordance with the procedures established by the HSED and the EPA, and the results are presented in this document.

3. The chemical in question is a known or suspected carcinogen, and exposure to it has been associated with an increased risk of developing certain types of cancer.

4. The results of the investigation indicate that exposure to the chemical at the levels studied did not result in any significant health effects.

5. However, it is important to note that the investigation was limited to the specific conditions and populations studied, and further research may be needed to fully understand the potential health effects of exposure to the chemical.

V-66

BEST AVAILABLE COPY

REF: AVAILABLE DATA

.245

V-67

V-67-Dup

BEST AVAILABLE COPY

V-68

TEST AVAILABLE COPY

V-68-DUP

- EST. AVAILABLE COPY

V-69

TEST AVAILABLE ON

V-69-Dup

BEST AVAILABLE

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.
V-73Customer ID:
108-AP-FBAnalysis:
NH3Sample Prep:
WATER DIGESTION

Instrument:

Procedure/ Rev: LA-631-001 / A-0

Technologist: KR MONTEITH

Date: 08/31/94

Starting Time: 20:00

Temperature 25

Ending Time: 00:00

Chemist: R.W. SCHRODER

Comments: BATCH #4376

Use 100 ppm standard for standard additions

OUT FOR RERUN

	Description	Lab ID
1	LMCS	V-71-5519
2	BLANK	V-72-7619
3	SAMPLE	V-73-7719
4	SAMPLE - DUP	V-73-7819
5		
6		
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14	DATA NOT USED IN PACKAGE	
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	77N16I / 1.0 ML			

RERUN

4376

Serial No 71-0019	Sample Point LOCAL FLEET	Date 8-31-94	Time Issued 11:10	Priority RQ
Determination MR	Method-Standard LA-001-001	Result Units RECOVERY	Charge Code STATE	Reruns 1
Sample Size 1.00			Customer ID 1110	
Remarks Calculations, Results 77NIGI RECOVERY 0.0528 OUT FOR RERUN 5.10E-2M 103.5				
Analyst - 1 <i>[Signature]</i>	Analyst - 2 <i>[Signature]</i>	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-31-94	Time Completed	Lab Unit Mgr 9-1-94 <i>R. Schneider</i>	<i>[Signature]</i>	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

$$35.9 \cdot 25 = 897.5 / 17000 = 0.0528M$$

RERUN

Serial No 71-0019	Sample Point LOCAL FLEET	Date 8-31-94	Time Issued 11:10	Priority RQ
Determination MR	Method-Standard LA-001-001	Result Units UG/ML	Charge Code STATE	Reruns 1
Sample Size 1.00 ML			Customer ID 1110	
Remarks Calculations, Results D.F. = $25/2.5 = 10$ 0.896 $\cdot$ 10 D.F. = 8.96 μ g/mL $\cdot$ 10 Dig. D.F. = 89.6 OUT FOR RERUN D.L. = 20 μ g/mL				
Analyst - 1 <i>[Signature]</i>	Analyst - 2 <i>[Signature]</i>	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-31-94	Time Completed	Lab Unit Mgr 9-1-94 <i>R. Schneider</i>	<i>[Signature]</i>	

54-6800-061 (R-10-83)

RERUN

Serial No	Sample Point	Date	Time Issued	Priority
1000000000	1000000000	8-10-94	11:00	100
Determination	Method-Standard	Result Units	Charge Code	Reruns
1000	LA 001 001	000000	000000	10
Sample Size	Customer ID			
100000	1000000000			
Remarks Calculations Results				
<p>.256 · 10 D.F. · 10 Dig. Dil. F. = 25.6 $\mu\text{g/mL}$ OUT FOR RERUN D.L. = 20.0 $\mu\text{g/mL}$</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-31-94 Time Completed Lab Unit Mgr 9-1-94				
RW Schroeder				

54 6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

RERUN

Serial No	Sample Point	Date	Time Issued	Priority
1000000000	1000000000	8-10-94	11:00	100
Determination	Method-Standard	Result Units	Charge Code	Reruns
1000	LA 001 001	000000	000000	10
Sample Size	Customer ID			
100000	1000000000			
Remarks Calculations Results				
<p>.239 · 10 D.F. · 10 Dig Dil. F. = 23.9 $\mu\text{g/mL}$ OUT FOR RERUN</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-31-94 Time Completed Lab Unit Mgr 9-1-94				
RW Schroeder				

54 6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

SCHEMATIC KNOWN ADDITION SELECTED
AT 08:29, 01-17-00

SAMPLE VOL- 25.000 AT 08:31, 01-17-00
ENTERED

EMF- 10.2 mV AT 08:33, 01-17-00

EMF- 42.4 mV AT 08:33, 01-17-00

EMF- 12.5 mV AT 08:33, 01-17-00

EMF- 42.5 mV AT 08:34, 01-17-00
ENTERED

STD CONCEN- 10000 AT 08:34, 01-17-00
ENTERED

SAMPLE VOL- 125000 AT 08:35, 01-17-00
ENTERED

EMF- 10.2 mV AT 08:36, 01-17-00

EMF- 10.1 mV AT 08:36, 01-17-00

EMF- 10.1 mV AT 08:36, 01-17-00
ENTERED

SAMPLE VOL- 125000 AT 08:37, 01-17-00
ENTERED

EMF- 10.1 mV AT 08:37, 01-17-00

EMF- 10.2 mV AT 08:37, 01-17-00
ENTERED

SCHEMATIC KNOWN ADDITION SELECTED
AT 08:37, 01-17-00

SCHEMATIC KNOWN ADDITION SELECTED
AT 08:38, 01-17-00

WHC-SD-WM-DP-065, REV. 0

FILE NAME: ANIMATION SELECTED
DATE: 01-17-00

SYNOPSIS: 17.000 AT 09:02. 01-17-00
ENTERED

SYNOPSIS: 17.000 AT 09:05. 01-17-00

SYNOPSIS: 17.000 AT 09:05. 01-17-00
ENTERED

SYNOPSIS: 17.000 AT 09:06. 01-17-00
ENTERED

SYNOPSIS: 17.000 AT 09:07. 01-17-00
ENTERED

SYNOPSIS: 17.000 AT 09:07. 01-17-00

SYNOPSIS: 17.000 AT 09:08. 01-17-00
ENTERED

SYNOPSIS: 17.000 AT 09:08. 01-17-00
ENTERED

SYNOPSIS: 17.000 AT 09:09. 01-17-00

SYNOPSIS: 17.000 AT 09:10. 01-17-00

SYNOPSIS: 17.000 AT 09:11. 01-17-00
ENTERED

SYNOPSIS: 17.000 AT 09:12. 01-17-00
ENTERED

V-72

FILE NAME: ANIMATION SELECTED
DATE: 01-17-00

WHC-SD-WM-DP-065, REV. 0

SAMPLE VOL= 25.000 AT 09:11. 01-17-00
ENTERED

EMF= 159.2 mV AT 09:17. 01-17-00

EMF= 170.0 mV AT 09:17. 01-17-00

EMF= 170.2 mV AT 09:18. 01-17-00

EMF= 170.0 mV AT 09:18. 01-17-00

EMF= 170.9 mV AT 09:19. 01-17-00

EMF= 170.9 mV AT 09:20. 01-17-00

EMF= 170.9 mV AT 09:20. 01-17-00

EMF= 171.0 mV AT 09:20. 01-17-00

ENTERED

SAMPLE VOL= 100.000 AT 09:21. 01-17-00

ENTERED

VOL= 125000 AT 09:21. 01-17-00

ENTERED

EMF= 75.0 mV AT 09:23. 01-17-00

EMF= 75.0 mV AT 09:23. 01-17-00

ENTERED

STD VOL= 100.000 AT 09:23. 01-17-00

ENTERED

EMF= 161.4 mV AT 09:24. 01-17-00

EMF= 161.0 mV AT 09:25. 01-17-00

ENTERED

EMF= 161.0 mV AT 09:25. 01-17-00

ENTERED

EMF= 161.0 mV AT 09:25. 01-17-00

V-73

THESE MATERIALS ARE NOT TO BE USED
FOR THE PURPOSES OF THIS DOCUMENT

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V-73-A₄P

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY
ANALYTICAL BATCH

WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No.
V-73Customer ID:
108-AP-FBAnalysis:
NH3Sample Prep:
WATER DIGESTION

Instrument:

Procedure/ Rev: LA-631-001 / A-0

Technologist: JT KNIGHT

Date: 08/18/94

Starting Time: 12:00

Temperature 25

Ending Time: 15:30

Chemist: R.W. SCHRODER

Comments: BATCH #4239

OUT FOR RERUN

	Description	Lab ID
1	LMCS	V-71-5519
2	BLANK	V-72-7619
3	SAMPLE	V-73-7719
4	SAMPLE - DUP	V-73-7819
5		
6		
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

DATA
NOT USED
IN PACKAGE

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	77N16I / 1.0 ML			

WHC-SD-WM-DP-065, REV. 0

[illegible]

X

NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE -- LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH

Rabbi W. Schroeder
8-29-94

BATCH # 4239

Serial No V 71.-5519	Sample Point 10BAP FLDBLK	Date 3-18-94	Time Issued 11: 4	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size ? /ml	RERUN		Customer ID STD	
Remarks, Calculations, Results 5238 NH4Cl STD#77N16I RESULT 0.0478 M STD VAL 5.10E-2 M REEC 93.7 32.5 x 25 = 812.5 mg/mL NH3 OSCR # 6734 OUT FOR RERUN				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 <i>[Signature]</i> Hrs	Analyst - 5 <i>[Signature]</i> Hrs
Date 3/18/94	Time Completed	Lab Unit Mgr 8-29-94 <i>[Signature]</i>		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

Serial No V 72.-7619	Sample Point 10BAP FLDBLK	Date 3-18-94	Time Issued 11:15	Priority 26
Determination NH3	Method/Standard LA-631-001	Result Units uG/ML	Charge Code N1A7F	Reruns 1
Sample Size ? 2.5ml	RERUN		Customer ID BLANK	
Remarks, Calculations, Results PREP BLANK Digested 7/18/94 Detection Limit = $0.2 \cdot 10 \cdot 10 = 2.00E+1$ $< 2.00E+1 \text{ mg/mL}$ $0.0596 \times 10 \text{ D.F.} = 0.596 \text{ mg/mL} \times 10 \text{ D.F.}$ $= 5.96 \text{ mg/mL}$ OUT FOR RERUN				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 <i>[Signature]</i> Hrs	Analyst - 5 Hrs
Date 3/18/94	Time Completed	Lab Unit Mgr 8-29-94 <i>[Signature]</i>		

54-6800-061 (R-10-83)

Serial No V 73.-7719	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:22	Priority 26
Determination NIR3	Method-Standard LA-631-001	Result Units ug/ML	Charge Code N1A7F	Reruns 1
Sample Size 2.5ml		RERUN		Customer ID 108AP-FB
Remarks Calculations, Results $0.0530 \times 10.D.F. \times 10 D.D.F. = 5.30E+0 =$ <div style="border: 1px solid black; padding: 5px; display: inline-block;"> $< 2.00E+1 \text{ ug/mL}$ </div> OUT FOR RERUN				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 8/18/94	Time Completed	Lab Unit Mgr 8-29-94 <i>[Signature]</i>	<i>[Signature]</i>	

54-6800-061 (R 10-83)

WHC-SD-WM-DP-065, REV. 0

Serial No V 73. 7819	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:22	Priority 26
Determination NIR3	Method-Standard LA-631-001	Result Units ug/ML	Charge Code N1A7F	Reruns 1
Sample Size 2.5ml		RERUN		Customer ID 108AP-FB
Remarks Calculations, Results DUPLICATE SAMPLE OUT FOR RERUN $0.0395 \times 10 D.F. \times 10 D.D.F. = 3.95 =$ <div style="border: 1px solid black; padding: 5px; display: inline-block;"> $< 2.00E+1 \text{ ug/mL}$ </div>				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 8/18/94	Time Completed	Lab Unit Mgr 8-29-94 <i>[Signature]</i>	<i>[Signature]</i>	

54-6800-061 (R 10-83)

LS/Kidder
LMCS STD 77N/6I
DOUBLE KNOWN ADDITION SELECTED
AT 20:19, 01-03-00

WHC-SD-WM-DP-065, REV. 0

SAMPLE VOL= 25.000 AT 21:00, 01-03-00
ENTERED

EMF= 36.6 mV AT 21:01, 01-03-00

EMF= 36.4 mV AT 21:02, 01-03-00

EMF= 36.4 mV AT 21:02, 01-03-00

EMF= 36.4 mV AT 21:03, 01-03-00

EMF= 36.3 mV AT 21:03, 01-03-00
ENTERED

STD CONC= 10000 AT 21:05, 01-03-00
ENTERED

STD VOL= .25000 AT 21:05, 01-03-00
ENTERED

~~EMF= 1.4 mV AT 21:06, 01-03-00~~

EMF= 1.3 mV AT 21:07, 01-03-00

EMF= 1.4 mV AT 21:07, 01-03-00

EMF= 1.4 mV AT 21:07, 01-03-00
ENTERED

STD VOL= 2.5000 AT 21:09, 01-03-00
ENTERED

EMF=-49.9 mV AT 21:10, 01-03-00

EMF=-49.9 mV AT 21:10, 01-03-00
ENTERED

1:NH3 SLOPE=-57.6 mV/DEC
AT 21:10, 01-03-00

1:NH3 CONC= 32.5

DOUBLE KNOWN ADDITION SELECTED
AT 21:10, 01-03-00

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JS Wright
V72-7619

DOUBLE KNOWN ADDITION SELECTED
AT 01:46, 01-04-00

SAMPLE VOL= 25.000 AT 01:48, 01-04-00
ENTERED

EMF= 196.4 mV AT 01:54, 01-04-00

EMF= 196.7 mV AT 01:54, 01-04-00

EMF= 197.0 mV AT 01:55, 01-04-00

EMF= 197.2 mV AT 01:55, 01-04-00

EMF= 197.5 mV AT 01:56, 01-04-00

EMF= 197.7 mV AT 01:56, 01-04-00

EMF= 198.0 mV AT 01:57, 01-04-00

EMF= 198.1 mV AT 01:57, 01-04-00
ENTERED

STD CONC= 100 AT 01:57, 01-04-00
ENTERED

STD VOL= .25000 AT 01:57, 01-04-00
ENTERED

EMF= 125.2 mV AT 01:59, 01-04-00

EMF= 125.1 mV AT 01:59, 01-04-00
ENTERED

STD VOL= 2.5000 AT 02:00, 01-04-00
ENTERED

EMF= 68.0 mV AT 02:01, 01-04-00

EMF= 67.8 mV AT 02:02, 01-04-00
ENTERED

~~1:NH3 SLOPE=-58.6 mV/DEC~~
~~AT 02:02, 01-04-00~~

1:NH3 CONC= .0596

EMF= 199.9 mV AT 00:03, 01-04-00
EMF= 200.5 mV AT 00:03, 01-04-00
EMF= 200.8 mV AT 00:04, 01-04-00
EMF= 201.0 mV AT 00:04, 01-04-00
EMF= 201.3 mV AT 00:04, 01-04-00
EMF= 201.5 mV AT 00:05, 01-04-00
EMF= 201.7 mV AT 00:05, 01-04-00
EMF= 202.0 mV AT 00:06, 01-04-00
EMF= 202.2 mV AT 00:06, 01-04-00
EMF= 202.4 mV AT 00:07, 01-04-00
EMF= 202.5 mV AT 00:07, 01-04-00
EMF= 202.6 mV AT 00:08, 01-04-00
EMF= 202.7 mV AT 00:08, 01-04-00
EMF= 202.8 mV AT 00:08, 01-04-00
EMF= 202.8 mV AT 00:09, 01-04-00
EMF= 202.9 mV AT 00:09, 01-04-00
EMF= 203.0 mV AT 00:10, 01-04-00
EMF= 203.1 mV AT 00:10, 01-04-00
EMF= 203.2 mV AT 00:11, 01-04-00
EMF= 203.2 mV AT 00:12, 01-04-00
EMF= 203.4 mV AT 00:14, 01-04-00
EMF= 203.4 mV AT 00:16, 01-04-00
EMF= 203.5 mV AT 00:16, 01-04-00
EMF= 203.5 mV AT 00:17, 01-04-00
EMF= 203.5 mV AT 00:18, 01-04-00
EMF= 203.4 mV AT 00:19, 01-04-00
EMF= 203.4 mV AT 00:20, 01-04-00
EMF= 203.4 mV AT 00:21, 01-04-00
EMF= 203.3 mV AT 00:22, 01-04-00
EMF= 203.3 mV AT 00:22, 01-04-00
EMF= 203.3 mV AT 00:23, 01-04-00
EMF= 203.2 mV AT 00:24, 01-04-00
EMF= 203.1 mV AT 00:25, 01-04-00
EMF= 203.1 mV AT 00:26, 01-04-00
EMF= 203.2 mV AT 00:27, 01-04-00

102-1000
WHC-SD-WM-DP-065, REV. 0

BEST AVAILABLE COPY

EMF= 203.1 mV AT 00:25, 01-04-00

EMF= 203.1 mV AT 00:26, 01-04-00

EMF= 203.2 mV AT 00:27, 01-04-00

EMF= 203.2 mV AT 00:28, 01-04-00

EMF= 203.2 mV AT 00:29, 01-04-00

EMF= 203.2 mV AT 00:30, 01-04-00

EMF= 203.2 mV AT 00:31, 01-04-00

EMF= 203.2 mV AT 00:31, 01-04-00

EMF= 203.2 mV AT 00:32, 01-04-00

EMF= 203.2 mV AT 00:32, 01-04-00

EMF= 203.1 mV AT 00:34, 01-04-00

EMF= 203.1 mV AT 00:34, 01-04-00

EMF= 203.1 mV AT 00:35, 01-04-00

EMF= 203.1 mV AT 00:36, 01-04-00

EMF= 203.0 mV AT 00:36, 01-04-00
ENTERED

STD CONCN= 100 AT 00:36, 01-04-00
ENTERED

STD VOL= .25000 AT 00:36, 01-04-00
ENTERED

EMF= 203.0 mV AT 00:36, 01-04-00

EMF= 127.3 mV AT 00:39, 01-04-00

EMF= 127.1 mV AT 00:40, 01-04-00
ENTERED

DOUBLE KNOWN ADDITION SELECTED
AT 23:52, 01-03-00

SAMPLE VOL= 25.000 AT 23:56, 01-03-00
ENTERED

WHC-SD-WM-DP-065, REV. 0

BEST AVAILABLE COPY

for Lighter
173-7719

JS Ridgely
172-7619

BEST AVAILABLE COPY

WHC-SD-WM-DP-065, REV. 0

DOUBLE KNOWN ADDITION SELECTED
AT 01:46, 01-04-00

SAMPLE VOL= 25.000 AT 01:48, 01-04-00
ENTERED

EMF= 196.4 mV AT 01:54, 01-04-00

EMF= 196.7 mV AT 01:54, 01-04-00

EMF= 197.0 mV AT 01:55, 01-04-00

EMF= 197.2 mV AT 01:55, 01-04-00

EMF= 197.5 mV AT 01:56, 01-04-00

EMF= 197.7 mV AT 01:56, 01-04-00

EMF= 198.0 mV AT 01:57, 01-04-00

EMF= 198.1 mV AT 01:57, 01-04-00
ENTERED

STD CONCN= 100 AT 01:57, 01-04-00
ENTERED

STD VOL= .25000 AT 01:57, 01-04-00
ENTERED

EMF= 125.2 mV AT 01:59, 01-04-00

EMF= 125.1 mV AT 01:59, 01-04-00
ENTERED

STD VOL= 2.5000 AT 02:00, 01-04-00
ENTERED

EMF= 68.0 mV AT 02:01, 01-04-00

EMF= 67.8 mV AT 02:02, 01-04-00
ENTERED

~~1:NH3 SLOPE=-58.6 mV/DEC~~
AT 02:02, 01-04-00

1:NH3 CONCN= .0596

DOUBLE KNOWN ADDITION SELECTED
AT 00:43, 01-04-00

SAMPLE VOL= 25.000 AT 00:44, 01-04-00
ENTERED

WHC-SD-WM-DP-065, REV. 0

~~EMF= 206.9 mV AT 00:52, 01-04-00~~

EMF= 207.4 mV AT 00:52, 01-04-00

EMF= 207.8 mV AT 00:53, 01-04-00

EMF= 208.1 mV AT 00:53, 01-04-00

EMF= 208.5 mV AT 00:54, 01-04-00

EMF= 208.7 mV AT 00:54, 01-04-00

EMF= 208.8 mV AT 00:55, 01-04-00

EMF= 208.9 mV AT 00:55, 01-04-00

EMF= 209.1 mV AT 00:56, 01-04-00

EMF= 209.2 mV AT 00:56, 01-04-00

EMF= 209.4 mV AT 00:56, 01-04-00

EMF= 209.4 mV AT 00:56, 01-04-00

EMF= 209.6 mV AT 00:57, 01-04-00

EMF= 209.7 mV AT 00:57, 01-04-00

EMF= 209.8 mV AT 00:58, 01-04-00
ENTERED

STD CONC= 100 AT 00:59, 01-04-00
ENTERED

STD VOL= .25000 AT 00:59, 01-04-00
ENTERED

EMF= 126.7 mV AT 01:01, 01-04-00

EMF= 126.6 mV AT 01:01, 01-04-00
ENTERED

STD VOL= 2.5000 AT 01:02, 01-04-00
ENTERED

EMF= 68.8 mV AT 01:03, 01-04-00

EMF= 68.7 mV AT 01:03, 01-04-00
ENTERED

1:NH3 SLOPE=-58.8 mV/DEC
AT 01:04, 01-04-00

1:NH3 CONC= .0395

for Knight
173-7819

BEST AVAILABLE COPY

WHC-SD-WM-DP-065, REV. 0

NH_4

471

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.

V60, V61, V62, V63

Customer ID:

BLANK, 108-AP-A, 108-AP-B

Analysis:

NH4

Sample Prep:

WATER DIGEST

Instrument: AL10665, AL10696

Procedure/ Rev: LA-634-102, D-2

Technologist: DC DUNHAM

Date: 04/16/94

Starting Time: 0200

Temperature N/A

Ending Time: 0545

Chemist: R. SCHROEDER

Comments: BATCH #2995

	Description	Lab ID
1	LMCS STD	V60-7528
2	SAMPLE BLANK	V61-7628
3	SAMPLE	V62-7728
4	SAMPLE DUPLICATE	V62-7828
5	SAMPLE + SPIKE	V62-7928
6	SAMPLE DUPLICATE + SPIKE	V62-7028
7	SAMPLE	V63-7728
8	SAMPLE DUPLICATE	V63-7828
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS STD NH4CL	53N16-D / .250ml			
SPIKE NH4CL	53N16-D / .250ml			

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA 634-102 ANALYTE: NH₄ ANALYSIS START DATE: 4-16-94

PREPARED BY: Rob Schroeder SUMMARY DATE: 4-19-94

PROJECT: 108-AP UNITS: $\mu\text{g}/\text{mL}$ SAMPLE PREP: Direct / Digest Dilution

[illegible]

NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE-LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH:

Due to the notably high detection limit,
RWS 4-19-94
~~this batch will~~ we will attempt to reanalyze
using a different method, LA-631-001, ammonia
determination by ISE using a double increment
standard additions technique.

RW Schroeder
4-19-94

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

Serial No V 60.-7528		Sample Point 108-AP		Date 3-18-94	Time Issued 8:26	Priority 26	
Determination NH4	Method/Standard LA-634-102	Result Units % RECOVERY		Charge Code N1A7F	Reruns 0		
Sample Size .250 ml				Customer ID STD			
Remarks Calculations Results S235 NH4CL Blk = .090 STD#53N16-D RESULT 5.30E-2 M STD = .733 STD VAL 5.00-2 M %REC 106.00% HCl = .0206 M							
WHC-SD-WM-DP-065, REV.0							
Analyst - 1 <i>Daniel C Dunham</i>		Analyst - 2		Analyst - 3		Analyst - 4	
Hrs		Hrs		Hrs		Hrs 4-16-94	
Date 4-16-94		Time Completed 0545		Lab Unit Mgr <i>R. Schneider</i>		<i>D. Hough</i>	

54-6800-061 (R 10 83)

NH4 by KJELDAHL/LA-634-102 (D-2)

	STANDARD	DUPLICATE
Serial No	250	
V 60.-7528	0.0206	
Batch ID	90	
2995	733	
Rerun No	643	N/A
0	5.30E-02	N/A
Instrument	9.54E+02	N/A
AL10665,AL1069		
Analyst	NH4 IN M = ((NVOL)*(HCL M))/SS	
D C DUNHAM	Detection Limit = 40 µg*1000 µL/mL/SS µL	
Date		
04/16/94		

Detection Limit (µg/mL) = 160

	STANDARD	DUPLICATE
Conc. NH4 in Molarity =	5.30E-02	N/A
Concn NH4 in µg/mL	9.54E+02	N/A

Data Entry by:	<i>D. Hough</i>	Date:	16-Apr-94
Approved by:	<i>R. Schneider</i>	Date:	4-19-94

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

H₂O Digest DF

Serial No V 61.-7628	Sample Point 108-AP	Date 3-18-94	Time Issued 8:27	Priority 26
Determination NH4	Method/Standard LA-634-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size .250 ml			Customer ID BLANK	
Remarks, Calculations Results REAGENT BLANK <div style="text-align: right;"> Blk = .090 Sam = .096 HCl = .0206 M < 160 ug/mL WHC-SD-WM-DP-065, REV. 0 </div>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-16-94	Time Completed 0545	Lab Unit Mgr <i>4-19-94</i> <i>RW Schroeder</i>		

54-6800-061 (R-10-83)

NH4 by KJELDAHL/LA-634-102 (D-2)

		BLANK	DUPLICATE
Serial No.	Sample Size (uL) (SS)	250	
V61-7628	Titant - HCl in M (HCL M)	0.0206	
Batch ID	Vol. of HCl(Blank) (uL)	90	
2995	Vol. of HCl(Sample) (uL)	96	
Rerun No.	Net Vol uL (Sample-Blank) (NVOL)	6	N/A
0	Concn NH4 in M	4.94E-04	N/A
Instrument	Concn NH4 in ug/mL	8.90E+00	N/A
AL10665,AL1069			
Analyst	NH4 IN M = ((NVOL)*(HCL M))/SS		
DUNHAM	Detection Limit = 40 ug*1000 uL/mL/SS uL		
Date:			
04/16/94			

Detection Limit (ug/mL) = 160

	BLANK	DUPLICATE
Conc. NH4 in Molarity =	4.94E-04	N/A
Concn NH4 in ug/mL	<160	N/A

Reported Result is < Detection Limit

Data Entry by: <i>RW Schroeder</i>	Date: 17-Apr-94
Approved by: <i>RW Schroeder</i>	Date: 4-19-94

475

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

Serial No V 62.-7728		Sample Point 108-AP		Date 3-18-94	Time Issued 8:28	Priority 26
Determination NH4		Method/Standard LA-634-102		Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 250 ml.					Customer ID 108-AP-A	
Remarks Calculations Results Df = 5 < 800 ug/mL Blk = .090 Sam = .095 HCl = .0206M WHC-SD-WM-DP-065, REV. 0 David Dunham						
Analyst - 1		Analyst - 2		Analyst - 3		Analyst - 4
Hrs		Hrs		Hrs		Hrs
Date 4-16-94		Time Completed 0545		Lab Unit Mgr RW Schroeder		4-18-94

54-6800-061 (R-10 83)

NH4 by KJELDAHL/LA-634-102 (D-2)

		SAMPLE	DUPLICATE
Serial No	Sample Size (μL) (SS)	250	
V62-7728	Titrant - HCl in M. (HCL M)	0.0206	
Batch ID	Vol. of HCl(Blank) (μL)	90	
2995	Vol. of HCl(Sample) (μL)	95	
Rerun No	Net Vol.μL (Sample-Blank) (NVOL)	5	N/A
0	Concn NH4 in M	4.12E-04	N/A
Instrument	Concn NH4 in μg/mL	7.42E+00	N/A
AL10665,AL1069	D.F. = 5		
Analyst	NH4 IN M = ((NVOL)*(HCL M))/SS		
DUNHAM	Detection Limit = 40μg*1000μL/mL/SSμL		
Date			
04/16/94			

Detection Limit (μg/mL) = 800

	SAMPLE	DUPLICATE
Conc. NH4 in Molarity =	4.12E-04	N/A
Concn NH4 in μg/mL	< 800	N/A

Reported Result is < Detection Limit

Data Entry by:	Date:	17-Apr-94
Approved by:	Date:	4-19-94

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

H₂O Digest = 5 DF

Serial No V 62.-7828	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination NH4	Method/Standard LA-634-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size .250 ml			Customer ID 108-AP-A	
Remarks Calculations Results DUPLICATE SAMPLE <i>DF = 5</i> <div style="text-align: center;">< 800 µg/mL</div> <div style="text-align: right;"> <i>Blk = .090</i> <i>Sam = .096</i> <i>HCl = .0206M</i> </div> <div style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</div>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-16-94	Time Completed 0545	Lab Unit Mgr <i>4-19-94</i> <i>RW Schroeder</i>		

54-6800-061 (R-10-83)

NH4 by KJELDAHL/LA-634-102 (D-2)

		SAMPLE	DUPLICATE
Serial No.	Sample Size (µL) (SS)	250	
V62-7828	Titrant - HCl in M (HCL M)	0.0206	
Batch ID	Vol. of HCl(Blank) (µL)	90	
2995	Vol. of HCl(Sample) (µL)	96	
Rerun No.	Net Vol. µL (Sample-Blank) (NVOL)	6	N/A
0	Concn NH4 in M	4.94E-04	N/A
Instrument	Concn NH4 in µg/mL	8.90E+00	N/A
AL10665,AL1069			
Analyst:	NH4 IN M = ((NVOL)*(HCL M))/SS		
DUNHAM	Detection Limit = 40µg*1000µL/mL/SSµL		
Date:			
04/16/94			

D.F. = 5

Detection Limit (µg/mL) = 800 160 *RWS 4-19-94*

	SAMPLE	DUPLICATE
Conc. NH4 in Molarity =	4.94E-04	N/A
Concn NH4 in µg/mL	<u><800</u> <u><160</u>	N/A

Reported Result is < Detection Limit *RWS 4-19-94*

Data Entry by: <i>RWS</i>	Date: 17-Apr-94
Approved by: <i>RW Schroeder</i>	Date: 4-19-94

477

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

H₂O Digest = 5 DF

Serial No V 62.-7928	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination NH4	Method/Standard LA-634-102	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size .250 ml			Customer ID 108-AP-A	
Remarks Calculations Results SAMPLE SPIKED ID V62 Dup BIK = .090 SPIKE ID 53 N16-D Sam + Spike = .710 SPIKE VOLUME .250 ml HCl = .0206M WHC-SD-WM-DP-065, REV. 0 <div style="text-align: center; border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block;">101.4%</div>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-16-94	Time Completed 0545	Lab Unit Mgr <i>P. Schaefer</i> 4-19-94 <i>RW Schaefer</i>		

54 6800-061 (R-10-83)

BEST AVAILABLE COPY

NH4 by KJELDAHL/LA-634-102 (D-2)

		SAMPLE	SPIKE
Serial No.	Titrant - HCl in Molarity	0.0206	N/A
V62-7928	Vol of HCl(Blank) (μL)	90	N/A
Batch ID	Vol of HCl(Sample) (μL)	95	N/A
2995	Net Vol of HCl(Sample-Blank)(μL)	5	N/A
Rerun No.	Spike Vol (μL)	N/A	250
0	Concn. Spike in M	N/A	0.0500
Instrument	Vol(μL)of HCl(Sample+Sp.)	N/A	710
AL10665,AL10696	Net Vol(μL)of HCl(Sample+Sp.-Blk)	N/A	620
Analyst	Spike Recovery %	N/A	101.4
DUNHAM			
Date			
04/16/94			

SPIKE REC.=

$$\frac{[(\text{Net Vol HCl in } \mu\text{L of Sample} + \text{Spike}) * (\text{M HCl}) - (\text{Net Vol. HCl in } \mu\text{L of Samp}) * (\text{M HCl})]}{(\text{Concentration of Spike NH}_4 \text{ in M}) * (\text{Spike Volume in } \mu\text{L})} * 100$$

SPIKE REC. % =	101.4
----------------	-------

Data Entry by: <i>RW Schaefer</i>	Date: 17-Apr-94
Approved by: <i>RW Schaefer</i>	Date: 4-19-94

H₂O Digest = 5 DF

Serial No V 62.-7028	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination NH4	Method/Standard LA-634-102	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size .250 ml			Customer ID 108-AP-A	
Remarks, Calculations, Results SAMPLE SPIKE DUPLICATE SPIKE ID 53 N16-D SPIKE VOL .250 ml Blk = .090 Sam + Spike = .705 HCl = .0206 M <div style="text-align: center; border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;">100.4%</div>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-16-94	Time Completed 0545	Lab Unit Mgr <i>R. Schneider</i>	4-19-94 <i>[Signature]</i>	

54 6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

NH4 by KJELDAHL/LA-634-102 (D-2)

		SAMPLE	SPIKE
Serial No.	Titrant - HCl in Molarity	0.0206	N/A
V62-7028	Vol. of HCl(Blank) (μL)	90	N/A
Batch ID	Vol. of HCl(Sample) (μL)	96	N/A
2995	Net Vol. of HCl(Sample-Blank)(μL)	6	N/A
Rerun No.	Spike Vol. (μL)	N/A	250
0	Concn. Spike in M	N/A	0.0500
Instrument	Vol.(μL)of HCl(Sample+Sp.)	N/A	705
AL10665,AL10696	Net Vol.(μL)of HCl(Sample+Sp.-Blk)	N/A	615
Analyst:	Spike Recovery %	N/A	100.4
DUNHAM			
Date:			
04/16/94			

SPIKE REC.=

$$\frac{[(\text{Net Vol HCl in } \mu\text{L of Sample} + \text{Spike}) * (\text{M HCl}) - (\text{Net Vol. HCl in } \mu\text{L of Samp}) * (\text{M HCl})]}{[(\text{Concentration of Spike NH}_4 \text{ in M}) * (\text{Spike Volume in } \mu\text{L})] * 100}$$

SPIKE REC. % =	100.4
----------------	-------

Data Entry by: <i>[Signature]</i>	Date: 17-Apr-94
Approved by: <i>R. Schneider</i>	Date: 4-19-94

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

H₂O Digest = 5 DF

Serial No V 63.-7728	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination NH4	Method-Standard LA-634-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size .250 ml			Customer ID 108-AP-B	
Remarks Calculations, Results <div style="text-align: right;"> <i>Blk = .090</i> <i>Sam = .094</i> <i>HCl = .0206 M</i> </div> <div style="text-align: center;"> <i>< 800 ug/ml</i> WHC-SD-WM-DP-065, REV.0 </div> <div style="text-align: left;"> <i>David Dunham</i> </div>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-16-94	Time Completed 0545	Lab Unit Mgr <i>4-19-94</i> <i>RWS</i>		

54 6800-061 (R 10-83)

NH4 by KJELDAHL/LA-634-102 (D-2)

		SAMPLE	DUPLICATE
Serial No	Sample Size (µL) (SS)	250	
V63-7728	Titrant - HCl in M. (HCL M)	0.0206	
Batch ID	Vol. of HCl(Blank) (µL)	90	
2995	Vol. of HCl(Sample) (µL)	94	
Rerun No.	Net Vol.µL (Sample-Blank) (NVOL)	4	N/A
0	Concn NH4 in M	3.30E-04	N/A
Instrument	Concn NH4 in µg/mL	5.93E+00	N/A
AL10665,AL1069			
Analyst	NH4 IN M = ((NVOL)*(HCL M))/SS		
DUNHAM	Detection Limit = 40µg*1000µL/mL/SSµL		
Date			
04/16/94			

D.F. = 85
RWS
4-19-94

Detection Limit (µg/mL) = *800* *160*

RWS
4-19-94

	SAMPLE	DUPLICATE
Conc. NH4 in Molarity =	3.30E-04	N/A
Concn NH4 in µg/mL	<i>< 800</i> <i>160</i>	N/A

Reported Result is < Detection Limit

RWS
4-19-94

Data Entry by: <i>[Signature]</i>	Date: 17-Apr-94
Approved by: <i>RWS</i>	Date: 4-19-94

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

H₂O Digest = 5 DF

Serial No V 63.-7828	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination NH4	Method/Standard LA-634-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size .250 ml			Customer ID 108-AP-B	
Remarks, Calculations, Results DUPLICATE SAMPLE <div style="text-align: right;"><i>B/K = .090</i></div> <div style="text-align: right;"><i>Sam = .093</i></div> <div style="text-align: right;"><i>HCl = .0206M</i></div> <div style="text-align: center;"><i>< 800ug/mL</i></div> <div style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</div> <div style="text-align: left;"><i>Daniel Dunham</i></div>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-16-94	Time Completed 0545	Lab Unit Mgr <i>RW Schroeder</i>	<i>[Signature]</i>	

54-6800-061 (R-10-83)

NH4 by KJELDAHL/LA-634-102 (D-2)

		SAMPLE	DUPLICATE
Serial No	Sample Size (uL) (SS)	250	
V63-7828	Titrant - HCl in M. (HCL M)	0.0206	
Batch ID	Vol. of HCl(Blank) (uL)	90	
2995	Vol. of HCl(Sample) (uL)	93	
Rerun No.	Net Vol uL (Sample-Blank) (NVOL)	3	N/A
0	Concn NH4 in M	2.47E-04	N/A
Instrument	Concn NH4 in ug/mL	4.45E+00	N/A
AL10665,AL1069	<i>D.F. = 5</i> NH4 IN M = ((NVOL)*(HCL M))/SS Detection Limit = 40ug*1000uL/mL/SSuL		
Analyst:			
DUNHAM			
Date:			
04/16/94			

Detection Limit (ug/mL) = 800 160

RWS
4-19-94

	SAMPLE	DUPLICATE
Conc. NH4 in Molarity =	2.47E-04	N/A
Concn NH4 in ug/mL	<i>< 800</i> 160	N/A

Reported Result is < Detection Limit

RWS
4-19-94

Data Entry by:	<i>[Signature]</i>	Date:	17-Apr-94
Approved by:	<i>RW Schroeder</i>	Date:	4-19-94

3004 CA 2

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY
ANALYTICAL BATCH

WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No. V65-V69	Customer ID: 108-AP-C
Analysis: NH ₄	Sample Prep: WATER DIGEST

Instrument: AL10665	Procedure/ Rev: LA-634-102 D-2
Technologist: LT WESTON <i>[Signature]</i>	Date: 4-16-94
Starting Time: 1800 1800	Temperature: NA
Ending Time: 2245	Chemist: R. SCHROEDER

Comments: _____

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	V65-7628	11		
2	REAGENT BLANK	V66-7628	12		
3	SAMPLE	V67-7728	13		
4	SAMPLE - DUP	V67-7828	14		
5	SAMPLE	V68-7728	15		
6	SAMPLE - DUP	V68-7828	16		
7	SAMPLE	V69-7728	17		
8	SAMPLE - DUP	V69-7828	18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	53N16-A .250ml			

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA 634-102 ANALYTE: NH₄ ANALYSIS START DATE: 4-16-94

PREPARED BY: Rob Schroeder SUMMARY DATE: 4-19-94

PROJECT: 108AP UNITS: $\mu\text{g/mL}$ SAMPLE PREP: Direct / Digest dilution

[illegible]

NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE-LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH:

Due to the notably high detection limit, we will attempt to reanalyze using a different method, LA-631-001, ammonia determination by ISE using a double increment standard additions technique.

Rob. Schroder

453

4-19-94

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

DATCH #3004

Serial No V 65.-7528	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority 26
Determination NH4	Method-Standard LA-634-102	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 250 mL			Customer ID STD	
Remarks, Calculations, Results S235 NH4CL STD# 53N16.D RESULT 4.69×10^{-2} M STD VAL 5.00×10^{-2} %REC 93.8 WHC-SD-WM-DP-065, REV. 0 .0206 M HCL BIK .026 STD .595				
Analyst - 1 Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4.16.94	Time Completed 2245	Lab Unit Mgr 4-18-94 RW Schroeder		

54 6800-061 (R-10-83)

NH4 by KJELDAHL/LA-634-102 (D-2)

		STANDARD	DUPLICATE
Serial No.	Sample Size (μL) (SS)	250	
V65-7528	Titrant - HCl in M. (HCL M)	0.0206	
Batch ID	Vol. of HCl(Blank) (μL)	26	
3004	Vol. of HCl(Sample) (μL)	595	
Rein No.	Net Vol. μL (Sample-Blank) (NVOL)	569	N/A
0	Concn NH4 in M	4.69E-02	N/A
Instrument	Concn NH4 in μg/mL	8.44E+02	N/A
AL10665			
Analyst	NH4 IN M = ((NVOL)*(HCL M))/SS		
L.WESTON	Detection Limit = 40μg*1000μL/mL/SSμL		
Date			
04/16/94			

Detection Limit (μg/mL) = 160

	STANDARD	DUPLICATE
Conc. NH4 in Molarity =	4.69E-02	N/A
Concn NH4 in μg/mL	8.44E+02	N/A

Data Entry by: Date: 17-Apr-94
 Approved by: Date: 4-18-94

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

Serial No V 66.-7628	Sample Point 108-AP	Date 3-18-94	Time Issued 9:38	Priority 26
Determination NH4	Method/Standard LA-634-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size .250mL			Customer ID BLANK	
Remarks Calculations, Results REAGENT BLANK .0206 M HCl .03/ .03/ < 160 ug/ml WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>L. Weston</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-16-94	Time Completed 2245	Lab Unit Mgr <i>RW Schroeder</i>	4-18-94 <i>L. Weston</i>	

NH4 by KJELDAHL/LA-634-102 (D-2)

		BLANK	DUPLICATE
Serial No	Sample Size (uL) (SS)	250	
V66-7628	Titrant - HCl in M. (HCL M)	0.0206	
Batch ID	Vol of HCl(Blank) (uL)	31	
3004	Vol of HCl(Sample) (uL)	31	
Rerun No.	Net Vol uL (Sample-Blank) (NVOL)	0	N/A
0	Concn NH4 in M	0.00	N/A
Instrument	Concn NH4 in ug/mL	0.00	N/A
AL10665			
Analyst	$NH_4 \text{ IN M} = ((NVOL) * (HCL \text{ M})) / SS$		
L.WESTON	Detection Limit = 40 ug*1000 uL/mL/SS uL		
Date			
04/16/94			

Detection Limit (ug/mL) = 160

	BLANK	DUPLICATE
Conc. NH4 in Molarity =	0.00	N/A
Concn NH4 in ug/mL	<160	N/A

Data Entry by: <i>L. Weston</i>	Date: 17-Apr-94
Approved by: <i>RW Schroeder</i>	Date: 4-18-94

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

Serial No V 67.-7728	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination NH4	Method/Standard LA-634-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size .250mL			Customer ID 108-AP-C	
Remarks Calculations Results WHC-SD-WM-DP-065, REV.0 .0206 M HCl < 760 ug/mL ^{RWS} 4-19-94 BIK .31 < 800 ug/mL Samp .33				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 <i>[Signature]</i> Hrs	Analyst - 3 <i>[Signature]</i> Hrs	Analyst - 4 <i>[Signature]</i> Hrs	Analyst - 5 <i>[Signature]</i> Hrs
Date 4-16-94	Time Completed 2245	Lab Unit Mgr RW Schroeder	4-18-94 <i>[Signature]</i>	

NH4 by KJELDAHL/LA-634-102 (D-2)

		SAMPLE	DUPLICATE
Serial No.	Sample Size (uL) (SS)	250	
V67-7728	Titrant - HCl in M. (HCL M)	0.0206	
Batch ID	Vol of HCl(Blank) (uL)	31	
3004	Vol of HCl(Sample) (uL)	33	
Rerun No.	Net Vol uL (Sample-Blank) (NVOL)	2	N/A
0	Concn NH4 in M	1.65E-04	N/A
Instrument	Concn NH4 in ug/mL	2.97E+00	N/A
AL10665			
Analyst	$NH_4 \text{ IN M} = ((NVOL) \cdot (HCL \text{ M})) / SS$ $D.F. = 5$		
L.WESTON	Detection Limit = $40 \mu g \cdot 1000 \mu L / mL / SS \mu L$		
Date			
04/16/94			

Detection Limit (ug/mL) = 800 180

RWS
4-19-94

	SAMPLE	DUPLICATE
Conc. NH4 in Molarity =	1.65E-04	N/A
Concn NH4 in ug/mL	< 800	N/A

Reported Result is < Detection Limit

RWS
4-19-94

Data Entry by: <i>[Signature]</i>	Date: 17-Apr-94
Approved by: <i>[Signature]</i>	Date: 4-18-94

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

Serial No V 67.-7828	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination NH4	Method/Standard LA-634-102	Result Units uG/ML	Charge Code N1A7F-	Reruns 0
Sample Size .250mL			Customer ID 108-AP-C	
Remarks, Calculations, Results DUPLICATE SAMPLE .0206 M HCl BIK .022 Samp .022 RWS 4-19-94 < 160 ug/ml < 800 ug/ml WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 <i>[Signature]</i> Hrs	Analyst - 3 <i>[Signature]</i> Hrs	Analyst - 4 <i>[Signature]</i> Hrs	Analyst - 5 <i>[Signature]</i> Hrs
Date 4-16-94	Time Completed 2245	Lab Unit Mgr RWS 4-18-94	<i>[Signature]</i> 54-6800-061 (R-10-A7)	

NH4 by KJELDAHL/LA-634-102 (D-2)

		SAMPLE	DUPLICATE
Serial No.	Sample Size (uL) (SS)	250	
V67-7828	Titrant - HCl in M. (HCL M)	0.0206	
Batch ID	Vol. of HCl(Blank) (uL)	22	
3004	Vol. of HCl(Sample) (uL)	22	
Rerun No.	Net Vol.uL (Sample-Blank) (NVOL)	0	N/A
0	Concn NH4 in M	0.00	N/A
Instrument	Concn NH4 in ug/mL	0.00	N/A
AL10665			
Analyst	NH4 IN M = ((NVOL)*(HCL M))/SS		
L.WESTON	Detection Limit = 40ug*1000uL/mL/SSuL		
Date			
04/16/94			

D.F. = 5

Detection Limit (ug/mL) = 800 ~~160~~

RWS
4-19-94

	SAMPLE	DUPLICATE
Conc. NH4 in Molarity =	0.00	N/A
Concn NH4 in ug/mL	<800 160	N/A

RWS
4-19-94

Data Entry by: <i>[Signature]</i>	Date: 17-Apr-94
Approved by: <i>[Signature]</i>	Date: 4-18-94

437

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

Serial No V 68.-7728	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination NH4	Method/Standard LA-634-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size .250ml			Customer ID 108-AP-D	
Remarks Calculations Results <p style="text-align: center;">.0206 M HCl</p> <p><800 ug/mL BIK .029</p> <p><160 ug/mL Samp .029</p> <p style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</p>				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4.16.94	Time Completed 2245	Lab Unit Mgr <i>[Signature]</i> RW Schroeder	<i>[Signature]</i> Jay Hammed	

NH4 by KJELDAHL/LA-634-102 (D-2)

		SAMPLE	DUPLICATE
Serial No	Sample Size (µL) (SS)	250	
V68-7728	Titrant - HCl in M (HCL M)	0.0206	
Batch ID	Vol of HCl(Blank) (µL)	29	
3004	Vol of HCl(Sample) (µL)	29	
Rerun No	Net Vol µL (Sample-Blank) (NVOL)	0	N/A
0	Concn NH4 in M	0.00	N/A
Instrument	Concn NH4 in µg/mL	0.00	N/A
AL10665			
Analyst	D.F. = 5		
L.WESTON	NH4 IN M = ((NVOL)*(HCL M))/SS		
Date	Detection Limit = 40µg*1000µL/mL/SSµL		
04/16/94			

Detection Limit (µg/mL) = 800 160

RWS
4-19-94

	SAMPLE	DUPLICATE
Conc. NH4 in Molarity =	0.00	N/A
Concn NH4 in µg/mL	<800	N/A

RWS
4-19-94

Data Entry by: <i>[Signature]</i>	Date: 17-Apr-94
Approved by: <i>[Signature]</i>	Date: 4-18-94

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

Serial No V 68.-7828	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination NH4	Method/Standard LA-634-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size .250mL			Customer ID 108-AP-D	
Remarks, Calculations, Results DUPLICATE SAMPLE .0206 M HCl RWS 10-3-94 BIK .023 Samp .023 < 160 ug/mL < 800 ug/mL WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4.16.94	Time Completed 2245	Lab Unit Mgr <i>[Signature]</i> 4-18-94 RWSchneider <i>[Signature]</i>		

NH4 by KJELDAHL/LA-634-102 (D-2)

		SAMPLE	DUPLICATE
Serial No.	Sample Size (uL) (SS)	250	
V68-7828	Titrant - HCl in M (HCL M)	0.0206	
Batch ID	Vol. of HCl(Blank) (uL)	23	
3004	Vol. of HCl(Sample) (uL)	23	
Retun No.	Net Vol.uL (Sample-Blank) (NVOL)	0	N/A
0	Concn NH4 in M	0.00	N/A
Instrument	Concn NH4 in ug/mL	0.00	N/A
AL10665			
Analyst	$NH_4 \text{ IN M} = ((NVOL) \times (HCL \text{ M})) / SS$ $D.F. = 5$		
L.WESTON	Detection Limit = $40 \mu\text{g} \times 1000 \mu\text{L} / \text{mL} / SS \mu\text{L}$		
Date			
04/16/94			

Detection Limit (ug/mL) = 800 160

RWS
4-19-94

	SAMPLE	DUPLICATE
Conc. NH4 in Molarity =	0.00	N/A
Concn NH4 in ug/mL	< 800	< 160

RWS
4-19-94

Data Entry by: <i>[Signature]</i>	Date: 17-Apr-94
Approved by: <i>[Signature]</i>	Date: 4-18-94

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

Serial No V 69.-7728	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination NH4	Method/Standard LA-634-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size .250mL			Customer ID 108-AP-E	
Remarks Calculations, Results <p>WHC-SD-WM-DP-065, REV.0 RWS 160 ug/mL 4-19-94 BIK .025 <800 ug/mL Samp .025 .0206 M HCl</p>				
Analyst - <i>L. Weston</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4.16.94	Time Completed 2245	Lab Unit Mgr <i>R. Schneider</i>	4-18-94 <i>J. Hammond</i>	

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NH4 by KJELDAHL/LA-634-102 (D-2)

	SAMPLE	DUPLICATE
Serial No.	250	
V69-7728	0.0206	
Batch ID	25	
3004	25	
Retun No.	0	N/A
0	0.00	N/A
Instrument	0.00	N/A
AL10665		
Analyst:	D.F. = 5	
L.WESTON	NH4 IN M = ((NVOL)*(HCL M))/SS	
Date:	Detection Limit = 40ug*1000uL/mL/SSuL	
04/16/94		

Detection Limit (ug/mL) = 800 ~~160~~

RWS
4-19-94

	SAMPLE	DUPLICATE
Conc. NH4 in Molarity =	0.00	N/A
Concn NH4 in ug/mL	<800	<160 N/A

RWS
4-19-94

Data Entry by: <i>J. Hammond</i>	Date: 17-Apr-94
Approved by: <i>R. Schneider</i>	Date: 4-18-94

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

Serial No. V 69.-7828	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination NH4	Method/Standard LA-634-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size .250mL			Customer ID 108-AP-E	
Remarks, Calculations, Results DUPLICATE SAMPLE .0206 M HCl RWS 4-19-94 BIK .024 Samp .020 < 160 ug/mL < 800 ug/mL WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 <i>[Signature]</i> Hrs	Analyst - 3 <i>[Signature]</i> Hrs	Analyst - 4 <i>[Signature]</i> Hrs	Analyst - 5 <i>[Signature]</i> Hrs
Date 4-16-94	Time Completed 2245	Lab Unit Mgr RW Schroeder	Date 4-18-94 <i>[Signature]</i>	

NH4 by KJELDAHL/LA-634-102 (D-2)

		SAMPLE	DUPLICATE
Serial No.	Sample Size (uL) (SS)	250	
V69-7828	Titant - HCl in M. (HCL M)	0.0206	
Batch ID	Vol of HCl(Blank) (uL)	24	
3004	Vol of HCl(Sample) (uL)	20	
Rerun No.	Net Vol uL (Sample-Blank) (NVOL)	0.00	N/A
0	Concn NH4 in M	0.00	N/A
Instrument	Concn NH4 in ug/mL	0.00	N/A
AL10665			
Analyst	NH4 IN M = ((NVOL)*(HCL M))/SS		
L.WESTON	Detection Limit = 40ug*1000uL/mL/SSuL		
Date			
04/16/94			

D.F. = 5

Detection Limit (ug/mL) = 800 ~~160~~

RWS
4-19-94

	SAMPLE	DUPLICATE
Conc. NH4 in Molarity =	0.00	N/A
Concn NH4 in ug/mL	< 800 160	N/A

RWS
4-19-94

Data Entry by: <i>[Signature]</i>	Date: 17-Apr-94
Approved by: <i>[Signature]</i>	Date: 4-18-94

402

10A
9c

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No.
V72-V73

Customer ID:
108AP-FB

Analysis:
NH4

Sample Prep:
WATER DIGEST

Instrument: AL10665/AL10696

Procedure/ Rev: LA-634-102/D2

Technologist: DG GRIFFIN *DG Griffin*

Date: 07/22/94

Starting Time: 1600

Temperature 23 C

Ending Time: 1830

Chemist: R. SCHROEDER

Comments: BATCH #4053

	Description	Lab ID
1	LMCS STD	V71-7528
2	REAGENT BLANK	V72-7628
3	SAMPLE	V73-7728
4	SAMPLE DUP	V73-7828
5		
6		
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	77N16-E/.250ml			

[illegible]

NARRATIVE -- LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH
Sample is from a 10X water dilution. *Rw Schneider*
7-27-94

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

Serial No V 711-1000	Sample Point 1000P FID/MS	Date 7-22-94	Time Issued 11:11	Priority 1
Determination NH4	Method-Standard LA-054-102	Result Units % RECOVERY	Charge Code HEATH	Reruns 1
Sample Size 0.0206 M HCL			Customer ID	
Remarks Calculations Results STD 77N16-E RESULT 4.94E-02 M STD 1.719 ml STD Vol 5.100E-02 ml 96.9 WHC-SD-WM-DP-065, REV. 0 Analyst - 1 <i>D. Griffin</i> Analyst - 2 Analyst - 3 Analyst - 4 Analyst - 5 Hrs Hrs Hrs Hrs Hrs Date 7-22-94 Time Completed 1830 Lab Unit Mgr 7-21-94 <i>R. Schneider</i> <i>R. Jones</i>				

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NA AMMONIA (NH4) BY KJELDAHL

Type	Sample Size (mL) (SS)	STD
STD	Titrant - HCl in M. (HCL M)	0.250
Work List	Dilution Factor (DF)	0.0206
4053	Digest Dilution Factor (DDF)	1
Test Code	Vol. of HCl(Blank) (mL)	1
	Vol. of HCl(Sample) (mL)	0.120
Matrix	Net Vol. mL (Sample-Blank) (NVOL)	0.719
LIQUID	Concn NH4 in M	0.599
Sample #	Concn NH4 in µg/mL	4.94E-02
V71-7528		8.88E+02
Instrument Code	$NH_4 \text{ IN M} = ((NVOL) * (HCL \text{ M})) / (SS * (DF * DDF))$	
AL10665/AL10696	$NH_4 \text{ IN } \mu\text{g/mL} = NH_4 \text{ in M} * (18\text{g/mol}) * (10^6\mu\text{g/g}) * (1\text{L}/1000\text{mL})$	
Analyst	$\text{Detection Limit} = (40\mu\text{g} / SS(\text{mL})) * (DF * DDF)$	
D. GRIFFIN		
Date	Detection Limit (µg/mL) = 160	
7/22/94		
Time		
18:30		

v RESULTS v	STD
Conc. NH4 in Molarity =	4.94E-02
Concn NH4 in µg/mL	8.88E+02

Data Entry by: <i>R. Jones</i>	Date: 25-Jul-94
Approved by: <i>R. Schneider</i>	Date: 7-27-94

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

Serial No V 77-7628	Sample Point 106AP BLANK	Date 7-28-94	Time Issued 11: 5	Priority 26
Determination NH4	Method-Standard LA-004-102	Result Units ug/mL	Charge Code NIA/F	Reruns 1
Sample Size 7-20 94 /m/			Customer ID BLANK	
Remarks Calculations, Results PREP. BLANK RWS 7-27-94 < 400 ug/mL WHC-SD-WM-DP-065, REV. 0 0.0206 M HCL XOB Buffer				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7-22-94	Time Completed 1830	Lab Unit Mgr RWS 7-27-94	RWS 7-27-94 Bk 119 ml Bk 143 ml RWS 7-27-94	

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NA AMMONIA (NH4) BY KJELDAHL		BLANK
Type	Sample Size (mL) (SS)	1.000
BLANK	Filtrant - HCl in M. (HCL M)	0.0206
Work List	Dilution Factor (DF)	1
4053	Digest Dilution Factor (DDF)	10
Test Code	Vol. of HCl(Blank) (mL)	0.119
	Vol. of HCl(Sample) (mL)	0.143
Matrix	Net Vol. mL (Sample-Blank) (NVOL)	0.024
LIQUID	Concn NH4 in M	4.94E-03
Sample #	Concn NH4 in ug/mL	8.90E+01
V72-7628	$\text{NH}_4 \text{ IN M} = ((\text{NVOL}) * (\text{HCL M})) / (\text{SS} * (\text{DF} * \text{DDF}))$	
Instrument Code	$\text{NH}_4 \text{ IN ug/mL} = \text{NH}_4 \text{ in M} * (18\text{g/mol}) * (10e6\text{ug/g}) * (1\text{L}/1000\text{mL})$	
AL10665/AL10696	$\text{Detection Limit} = (40\text{ug} / \text{SS}(\text{mL})) * (\text{DF} * \text{DDF})$	
Analyst	$\text{Detection Limit (ug/mL)} = 400$	
D. GRIFFIN		
Date	7/22/94	
Time	18:30	
v RESULTS v		BLANK
Conc. NH4 in Molarity =		4.94E-03
Concn NH4 in ug/mL		<400

Data Entry by: RWS	Date: 25-Jul-94
Approved by: RWS	Date: 7-27-94

1075

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

Serial No V 73-7728	Sample Point 108AP FLDECK	Date 8-18-94	Time Issued 11:16	Priority 26
Determination NH4	Method-Standard LA-634-102	Result Units ug/mL	Charge Code N1A7F	Reruns 1
Sample Size 1 ml			Customer ID 108AP-FR	
Remarks Calculations Results <p>44 .119 ml V73 .123 ml 0.0206 M HCL WHC-SD-WM-DP-065, REV. 0 AB Buffer</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7-22-94	Time Completed 1830	Lab Unit Mgr 7-27-94 R. Schneider	R. Jones	

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NA AMMONIA (NH4) BY KJELDAHL

		SAMPLE
Type	Sample Size (mL) (SS)	1.000
SAMPLE	Titrant - HCl in M. (HCL M)	0.0206
Work List	Dilution Factor (DF)	1
4053	Digest Dilution Factor (DDF)	10
Test Code	Vol. of HCl(Blank) (mL)	0.119
	Vol. of HCl(Sample) (mL)	0.123
Matrix	Net Vol. mL (Sample-Blank) (NVOL)	0.004
LIQUID	Concn NH4 in M	8.24E-04
Sample #	Concn NH4 in ug/mL	1.48E+01
V73-7728		
Instrument Code	NH4 IN M = ((NVOL)*(HCL M))/SS*(DF*DDF)	
AL10665/AL10696	NH4 IN ug/mL = NH4 in M * (18g/mol) * (10e6ug/g) * (1L/1000mL)	
Analyst	Detection Limit = (40ug / SS(mL)) * (DF * DDF)	
D. GRIFFIN		
Date	Detection Limit (ug/mL) = 400	
7/22/94		
Time		
18:30		

v RESULTS v		SAMPLE
Conc. NH4 in Molarity =		8.24E-04
Concn NH4 in ug/mL		<400

Data Entry by:	R. Jones	Date:	25-Jul-94
Approved by:	R. Schneider	Date:	7-27-94

PLACE ANALYTICAL CARD IN BOX BELOW - DO NOT WRITE IN SPACE

Serial No V 73.-7828	Sample Point 105AP FLDBLK	Time Issued 3-18-94	Priority 20
Determination NH4	Method/Standard 1A-634-102	Result Units ug/mL	Charge Code NJA7F
Sample Size 1.00 mL	Customer ID 105AP-FB		
Remarks, Calculations, Results DUPLICATE SAMPLE 400 ug/mL 0.0206 M HCL WHC-SD-WM-DP-065, REV. 0 108 Griffin			
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4
Hrs	Hrs	Hrs	Hrs
Date 7-22-94	Time Completed 1.830	Lab Unit Mgr R. Schneider	

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NA AMMONIA (NH4) BY KJELDAHL		SAMPLE
Type	Sample Size (mL) (SS)	1.000
DUPLICATE	Filtrant - HCl in M. (HCL M)	0.0206
Work List	Dilution Factor (DF)	1
4053	Digest Dilution Factor (DDF)	10
Test Code	Vol. of HCl(Blank) (mL)	0.121
	Vol. of HCl(Sample) (mL)	0.130
Matrix	Net Vol. mL (Sample-Blank) (NVOL)	0.009
LIQUID	Concn NH4 in M	1.85E-03
Sample #	Concn NH4 in ug/mL	3.34E+01
V73-7828		
Instrument Code	$NH_4 \text{ IN M} = ((NVOL) \cdot (HCL \text{ M})) / (SS \cdot (DF \cdot DDF))$	
AL10665/AL10696	$NH_4 \text{ IN } \mu\text{g/mL} = NH_4 \text{ in M} \cdot (18\text{g/mol}) \cdot (10\text{e}6\mu\text{g/g}) \cdot (1\text{L}/1000\text{mL})$	
Analyst	Detection Limit = $(40\mu\text{g} / SS(\text{mL})) \cdot (DF \cdot DDF)$	
D. GRIFFIN		
Date	Detection Limit ($\mu\text{g/mL}$) = 400	
7/22/94		
Time		
18:30		
v RESULTS v		SAMPLE
Concn. NH4 in Molarity =		1.85E-03
Concn NH4 in $\mu\text{g/mL}$		<400

Data Entry by:	Date:	25-Jul-94
Approved by:	Date:	7-27-94

THE FOLLOWING ANALYSES ARE INCLUDED IN THE DATA PACKAGE BUT THE RESULTS HAVE NOT BEEN REPORTED IN THE FINAL SUMMARY REPORTS.

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. V71-V73	Customer ID: 108AP-FB
Analysis: NH ₄	Sample Prep: H ₂ O Digest

Instrument: AL 10696	Procedure/ Rev: LA-634-102/D2
Technologist: JACK Spellman	Date: 7-18-94
Starting Time: 1800	Temperature NA
Ending Time: 2000	Chemist: R. SCHROEDER

Comments:

ReRun - use 1 mL sample size for
blank and samples to increase sensitivity.
7-19-94 Rob Schroeder

	Description	Lab ID
1	STD	V71-7528
2	BLANK	V72-7628
3	SAMPLE	V73-7728
4	PUP.	V73-7828
5		
6		
7		
8		
9		
10		

	Description	Lab ID
11		
12	CUT FOR RERUN	
13		
14		
15		
16		
17		
18		
19		
20		

DATA
NOT USED
IN PACKAGE

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	77N16E / .250mL			

Serial No	Sample Point	Date	Time Issued	Priority
V 71.-7528	108AP FLDBLK	3-18-94	11: 1	26
Determination	Method/Standard	Result Units	Charge Code	Reruns
NH4	LA-634-102	% RECOVERY	N1A7F	0
Sample Size			Customer ID	
250 mL			STD	
Remarks Calculations, Results				
<p>S235 NH4CL BIK .116</p> <p>STD# 77N16E RESULT 4.98E-02M STD.720</p> <p>STD VAL 5,1000-2M%REC 47.6</p> <p>97.6 RWS 7-19-94</p> <p>INSK OUT FOR RERUN</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
7-8-94	1845	<p>Raketa</p> <p>RWS Schneider</p> <p>RWS</p>		

WHC-SD-WM-DP-065, REV. 0

NA AMMONIA (NH ₄) BY KJELDAHL		STD
Type	Sample Size (mL) (SS)	0.250
STD	Titrant - HCl in M. (HCl, M)	0.0206
Work List	Dilution Factor (DF)	1
3016	Digest Dilution Factor (DDF)	1
Test Code	Vol. of HCl(Blank) (mL)	0.116
	Vol. of HCl(Sample) (mL)	0.720
Matrix	Net Vol. mL (Sample-Blank) (NVOL)	0.604
LIQUID	Concn NH ₄ in M	4.98E-02
Sample #	Concn NH ₄ in µg/mL	8.96E+02
V71-7528		
Instrument Code	NH ₄ IN M = ((NVOL)*(HCL M))/SS*(DF*DDF)	
AL10696	NH ₄ IN µg/mL = NH ₄ in M * (18g/mol) * (10e6µg/g) * (1L/1000mL)	
Analyst	Detection Limit = (40 µg / SS(mL)) * (DF * DDF)	
J. SPELLMAN		
Date	Detection Limit (µg/mL) =	160
7/18/94		
Time		
18:45	v RESULTS v	STD
	Conc. NH ₄ in Molarity =	4.98E-02
	Concn NH ₄ in µg/mL	8.96E+02

Data Entry by: <i>R. C. Jones</i>	Date: 19-Jul-94
Approved by: <i>R. Schneider</i>	Date: 7-19-94

Serial No V 72.-7628	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 5	Priority 26
Determination NH4	Method/Standard LA-634-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size .250 mL			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK BLK.16 Sample.120 < 1600 ug/mL OUT FOR RERUN WHC-SD-WM-DP-065, REV. 0 <i>T. Spellman</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7-18-94	Time Completed 1900	Lab Unit Mgr 7-19-94 <i>R. W. Schroeder</i>	<i>R. W. Schroeder</i>	

54-6800-061 (R-10-83)

NA AMMONIA (NH4) BY KJELDAHL		BLANK
Type	Sample Size (mL) (SS)	0.250
BLANK	Titrant - HCl in M. (HCL M)	0.0206
Work List	Dilution Factor (DF)	1
3016	Digest Dilution Factor (DDF)	10
Test Code	Vol. of HCl(Blank) (mL)	0.116
	Vol. of HCl(Sample) (mL)	0.120
Matrix	Net Vol. mL (Sample-Blank) (NVOL)	0.004
LIQUID	Concn NH4 in M	3.30E-03
Sample #	Concn NH4 in ug/mL	5.93E+01
V72-7628		
Instrument Code	NH4 IN M = ((NVOL)*(HCL M))/SS*(DF*DDF)	
AL10696	NH4 IN ug/mL = NH4 in M * (18g/mol) * (10e6ug/g) * (1L/1000mL)	
Analyst	Detection Limit = (40ug / SS(mL)) * (DF * DDF)	
J. SPELLMAN		
Date	Detection Limit (ug/mL) = 1600	
7/18/94		
Time		
18:45		
v RESULTS v		BLANK
Conc. NH4 in Molarity =		3.30E-03
Concn NH4 in ug/mL		<1600

Data Entry by: <i>R. W. Schroeder</i>	Date: 19-Jul-94
Approved by: <i>R. W. Schroeder</i>	Date: 7-19-94

Serial No V 73.-7728	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination NH4	Method/Standard LA-634-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 500 mL			Customer ID 108AP-FB	
Remarks Calculations Results WHC-SD-WM-DP-065, REV. 0 0.0206 = HCl 800ug/mL Blk - 16 sample .116 OUT FOR RERUN J. Spellman				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7-18-94	Time Completed 1920	Lab Unit Mgr 7-19-94 R. W. Schroeder	54 6800-061 (R-10-83) R. W. Schroeder	

NA AMMONIA (NH4) BY KJELDAHL		SAMPLE
Type	Sample Size (mL) (SS)	0.500
SAMPLE	Titrant - HCl in M. (HCL M)	0.0206
Work List	Dilution Factor (DF)	1
3016	Digest Dilution Factor (DDF)	10
Test Code	Vol. of HCl(Blank) (mL)	0.116
	Vol. of HCl(Sample) (mL)	0.116
Matrix	Net Vol. mL (Sample-Blank) (NVOL)	0.000
LIQUID	Concn NH4 in M	0.00
Sample #	Concn NH4 in µg/mL	0.00
V73-7728		
Instrument Code	NH4 IN M = ((NVOL)*(HCL M))/SS*(DF*DDF)	
AL10696	NH4 IN µg/mL = NH4 in M * (18g/mol) * (10e6µg/g) * (1L/1000mL)	
Analyst	Detection Limit = (40µg / SS(mL)) * (DF * DDF)	
J. SPELLMAN		
Date	Detection Limit (µg/mL) = 800	
7/18/94		
Time		
18:45		
v RESULTS v		SAMPLE
Conc. NH4 in Molarity =		0.00
Concn NH4 in µg/mL		<800

Data Entry by: R. W. Schroeder	Date: 19-Jul-94
Approved by: R. W. Schroeder	Date: 7-19-94

Serial No V 73.-7828	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination NH4	Method/Standard LA-634-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size -500 uL .0206 M HCl			Customer ID 108AP-FB	
Remarks, Calculations, Results DUPLICATE SAMPLE WHC-SD-WM-DP-065, REV.0 < 800 uG/mL OUT FOR RERUN D.K. 116 Sample .118 JAW Spk				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7-18-94	Time Completed 1945	Lab Unit Mgr 7-19-94 R. W. Schroeder R. Jones		

54-6800-061 (R-10-83)

NA AMMONIA (NH4) BY KJELDAHL

		SAMPLE
Type	Sample Size (mL) (SS)	0.500
DUPLICATE	Titrant - HCl in M (HCL M)	0.0206
Work List	Dilution Factor (DF)	1
3016	Digest Dilution Factor (DDF)	10
Test Code	Vol. of HCl(Blank) (mL)	0.116
	Vol. of HCl(Sample) (mL)	0.118
Matrix	Net Vol. mL (Sample-Blank) (NVOL)	0.002
LIQUID	Concn NH4 in M	8.24E-04
Sample #	Concn NH4 in ug/mL	1.48E+01
V73-7828		
Instrument Code	NH4 IN M = ((NVOL)*(HCL M))/SS*(DF*DDF)	
AL10696	NH4 IN ug/mL = NH4 in M * (16g/mol) * (10e6ug/g) * (1L/1000mL)	
Analyst	Detection Limit = (40ug / SS(mL)) * (DF * DDF)	
J. SPELLMAN		
Date	Detection Limit (ug/mL) = 800	
7/18/94		
Time		
18:45		
v RESULTS v		SAMPLE
Conc. NH4 in Molarity =		8.24E-04
Concn NH4 in ug/mL		<800

Data Entry by: R. Jones	Date: 19-Jul-94
Approved by: R. W. Schroeder	Date: 7-19-94

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY
ANALYTICAL BATCH

WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No.

V62, V63

Customer ID:

108-AP-A, 108-AP-B

Analysis:

OH⁻

Sample Prep:

Direct

Instrument: AL10711

Procedure/ Rev: LA 211-102 / B-1

Technologist: Rob King

Date: 4-26-94

Starting Time: 1330

Temperature 20.0°C

Ending Time: 1530

Chemist: Rob Schroeder

Comments:

	Description	Lab ID
1	INITIAL LMCS CHECK STD	V60-5529
2	REAGENT BLANK	V61-5629
3	Sample	V62-5729
4	Sample Duplicate	V62-5829
5	Sample	V63-5729
6	Sample Duplicate	V63-5829
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	21N84 / .050ml			

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50

A-6000-HN1 103/771

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-211-102 ANALYTE: OH⁻ ANALYSIS START DATE: 4-26-94

PREPARED BY: Rob Schroeder SUMMARY DATE: 4-29-94

PROJECT: 108-AP UNITS: mg OH/mL SAMPLE PREP: Direct / Digest

[illegible]

NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE-LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH:

Due to a very limited supply of Sample, V62 was analyzed only once using a 0.500mL sample size. Sample V63 was analyzed at a larger sample size the second time to report greater sensitivity; however, it was not duplicated at the larger (1.0mL) sample size due to the limited supply of this sample. All results are reported in $\mu\text{g/mL}$ units except the standard which is reported in Molarity.

Robert W. Schroeder
4-29-94

535

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 2985

Serial No V 60.-5529	Sample Point 108-AP	Date 3-18-94	Time Issued 8:26	Priority 26
Determination OH	Method-Standard LA-211-102	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size .050 ml .1916 M HNO ₃			Customer ID STD	
Remarks Calculations. Results S273 ITS-OH STD# 21N8-A RESULT 9.695E-1 $\frac{(.253)(0.1916)}{.050} = 9.70 \text{ M}^{E-1}$ STD VAL 9.38E-1 %REC 103.4				
WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>Rob King</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4/26/94	Time Completed 1500	Lab Unit Mgr 4-27-94 <i>R. Schneider</i>		

54 6800-061 (R-10-83)

OH (AUTO): LA-211-102 (B-1)		STANDARD	DUPLICATE
Serial No	Sample Size (mL) SS	0.050	
V60-5529	Molarity of HNO ₃	0.1916	
Batch ID	mL of HNO ₃ in Titration	0.253	
2985	OH Molarity	9.69E-01	N/A
Rerun No	OH in µg/mL (PPM)	1.65E+04	N/A
0			
Instrument			
AL10711			
Analyst			
KING			
Date			
04/26/94			

OH Molarity = ((mL HNO₃)*(M HNO₃))/Sample Size in mL

OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))

	STANDARD	DUPLICATE
OH Molarity	9.69E-01	N/A
OH in µg/mL (PPM)	1.65E+04	N/A

Data Entry by: <i>[Signature]</i>	Date: 28-Apr-94
Approved by: <i>R. Schneider</i>	Date: 4-29-94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 61.-5629	Sample Point 108-AP	Date 3-18-94	Time Issued 8:27	Priority 26
Determination OH	Method Standard LA-211-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 3 ml			Customer ID BLANK	
Remarks Calculations Results REAGENT BLANK WHC-SD-WM-DP-065, REV. 0 $< 42 \mu\text{g OH/mL}$ <i>Mob King</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4/26/94	Time Completed 1455	Lab Unit Mgr 4-27-94 <i>Rw Schroeder</i>	<i>[Signature]</i>	

54-6800-061 (R-10 83)

OH (AUTO): LA-211-102 (B-1)		BLANK	DUPLICATE
Serial No	Sample Size (mL) SS	3.000	
V61-5629	Molarity of HNO3	0.1916	
Batch ID	mL of HNO3 in Titration	0.000	
2985	OH Molarity	0.00E+00	N/A
Rerun No	OH in $\mu\text{g/mL}$ (PPM)	0.00E+00	N/A
0			
Instrument			
AL10711	Detection Limit = 125 $\mu\text{g/SS}$		
Analyst			
KING	Detection Limit ($\mu\text{g/mL}$)	4.17E+01	
Date			
04/26/94			

OH Molarity = $((\text{mL HNO3}) * (\text{M HNO3})) / \text{Sample Size in mL}$

OH in $\mu\text{g/mL}$ = $(\text{OH MOLARITY}) * (17.0 \text{ g/mole}) * ((1000000 \mu\text{g/g}) / (1000 \text{ mL/L}))$

	BLANK	DUPLICATE
OH Molarity	0.00E+00	N/A
OH in $\mu\text{g/mL}$ (PPM)	<42	N/A

The Result is < Detection Limit

Data Entry by: <i>[Signature]</i>	Date: 28-Apr-94
Approved by: <i>Rw Schroeder</i>	Date: 4-29-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-5729	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination OH	Method/Standard LA-211-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 0,500 mL			Customer ID 108-AP-A	
Remarks Calculations, Results WHC-SD-WM-DP-065, REV. 0 <625 ug/mL RWS 4-29-94 <250 ug/mL <i>Rob King</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4/26/94	Time Completed 1520	Lab Unit Mgr RW Schneider	<i>[Signature]</i>	

54-6800-061 (R-10-83)

OH (AUTO): LA-211-102 (B-1)		SAMPLE	DUPLICATE
Serial No	Sample Size (mL) SS	0.500	
V62-5729	Molarity of HNO3	0.1916	
Batch ID	mL of HNO3 in Titration	0.021	
2985	OH Molarity	8.05E-03	N/A
Rerun No.	OH in µg/mL (PPM)	1.37E+02	N/A
0			
Instrument			
AL10711	Detection Limit = 125 µg/SS		
Analyst			
KING	Detection Limit (µg/mL)	2.50E+02	
Date			
04/26/94			

OH Molarity = ((mL HNO3)*(M HNO3))/Sample Size in mL

OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))

	SAMPLE	DUPLICATE
OH Molarity	8.05E-03	N/A
OH in µg/mL (PPM)	<250	N/A

The Result is < Detection Limit

Data Entry by: <i>[Signature]</i>	Date: 28-Apr-94
Approved by: RW Schneider	Date: 4-29-94

DETERMINATION OF HYDROXIDE ION IN SOLUTIONS - UNDIGESTED SAMPLE

V62-5729

11-1-36 15:10
100
121.17
119.17
9.00
1.221
2.23

11-1-36 15:11
100
121.17
119.17
9.00
1.221
2.23

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 63.-5729	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination OH	Method Standard LA-211-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 0.500 mL			Customer ID 108-AP-B	
Remarks Calculations Results <p style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</p> <p style="text-align: center;">< 62.5 ug/mL RWS 4-29-94</p> <p style="text-align: center;">< 250 ug/mL</p> <p><i>Rob King</i></p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4/26/94	Time Completed 1520	Lab Unit Mgr 4-27-94 <i>RW Schroeder</i>		

54-6800-061 (R-10-83)

OH (AUTO): LA-211-102 (B-1)		SAMPLE	DUPLICATE
Serial No	Sample Size (mL) SS	0.500	
V63-5729	Molarity of HNO3	0.1916	
Batch ID	mL of HNO3 in Titration	0.018	
2985	OH Molarity	6.90E-03	N/A
Rerun No	OH in ug/mL (PPM)	1.17E+02	N/A
0			
Instrument			
AL10711	Detection Limit = 125 ug/SS		
Analyst			
KING	Detection Limit (ug/mL)	2.50E+02	
Date			
04/26/94			

OH Molarity = ((mL HNO3)*(M HNO3))/Sample Size in mL

OH in ug/mL = (OH MOLARITY)*(17.0g/mole)*((1000000ug/g)/(1000mL/L))

	SAMPLE	DUPLICATE
OH Molarity	6.90E-03	N/A
OH in ug/mL (PPM)	< 250	N/A

The Result is < Detection Limit

Data Entry by: <i>RW Schroeder</i>	Date: 28-Apr-94
Approved by: <i>RW Schroeder</i>	Date: 4-29-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 63.-5829	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination OH	Method/Standard LA-211-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.000 mL			Customer ID 108-AP-B	
Remarks Calculations Results DUPLICATE SAMPLE WHC-SD-WM-DP-065, REV.0 < 125 ug/mL
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4/26/94	Time Completed 1520	Lab Unit Mgr RW Schroeder	4-27-94

54-6800-061 (R-10 83)

OH (AUTO): LA-211-102 (B-1)		SAMPLE	DUPLICATE
Serial No.	Sample Size (mL) SS	1.000	
V63-5829	Molarity of HNO3	0.1916	
Batch ID	mL of HNO3 in Titration	0.021	
2985	OH Molarity	4.02E-03	N/A
Rerun No.	OH in ug/mL (PPM)	6.84E+01	N/A
0			
Instrument			
AL10711	Detection Limit = 125ug/SS		
Analyst			
KING	Detection Limit (ug/mL)	1.25E+02	
Date			
04/26/94			

OH Molarity = ((mL HNO3)*(M HNO3))/Sample Size in mL

OH in ug/mL = (OH MOLARITY)*(17.0g/mole)*((1000000ug/g)/(1000mL/L))

	SAMPLE	DUPLICATE
OH Molarity	4.02E-03	N/A
OH in ug/mL (PPM)	< 125	N/A

The Result is < Detection Limit

Data Entry by:	Date: 28-Apr-94
Approved by: RW Schroeder	Date: 4-29-94

Form 1 Rev. 1.1 Page 1 of 1

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WHC-SD-WM-DP-065, REV. 0
 DETERMINATION OF HYDROXIDE ION IN SOLUTIONS - UNDIGESTED SAMPLE

V63-5829

DATE 4/15/82 TIME 15:30
 METHOD 100%
 ID#1 100%
 ID#2 100%
 ID#3 100%
 ID#4 100%
 ID#5 100%
 ID#6 100%
 ID#7 100%
 ID#8 100%
 ID#9 100%
 ID#10 100%
 ID#11 100%
 ID#12 100%
 ID#13 100%
 ID#14 100%
 ID#15 100%
 ID#16 100%
 ID#17 100%
 ID#18 100%
 ID#19 100%
 ID#20 100%
 ID#21 100%
 ID#22 100%
 ID#23 100%
 ID#24 100%
 ID#25 100%
 ID#26 100%
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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. V67, V68, V69	Customer ID: 108-AP-C, 108-AP-D, 108-AP-E
Analysis: OH	Sample Prep: UNDIGESTED DIRECT

Instrument: AL10666	Procedure/ Rev: LA-211-102 B-1
Technologist: Patrick J. McGeon PATRICK J. MCGEON	Date: 5/4/94
Starting Time: 13:00	Temperature NA
Ending Time: 15:15	Chemist: R. SCHARQEDER

Comments: _____

	Description	Lab ID		Description	Lab ID
1	LMCS	V65-5529	11		
2	REAGENT BLANK	V66-5629	12		
3	SAMPLE	V67-5729	13		
4	DUPLICATE SAMPLE	V67 KWS 10-4-94 V67-5829	14		
5	SAMPLE	V68-5729	15		
6	DUPLICATE SAMPLE	V68-5829	16		
7	SAMPLE	V69-5729	17		
8	DUPLICATE SAMPLE	V69-5829	18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	21N8-A/.050ML			

[illegible]

NARRATIVE-LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH:

Robert W. Schneider.
5-10-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3060

Serial No V 65.-5529	Sample Point 108-AP	RERUN		Time Issued 3-18-94	Priority 9:37 26
Determination OH	Method-Standard LA-211-102	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1	
Sample Size .050 ML			Customer ID STD		
Remarks Calculations Results \$273 ITS-OH STD# 2/18-A RESULT 9.27E-01 M. STD VAL 9.38E-01 M %REC 98.8 .1916 M HNO3 .242 ml <p style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</p>					
Analyst - 1 <i>P. McCown</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
Hrs	Hrs	Hrs	Hrs	Hrs	
Date 5/4/94	Time Completed 15:15	Lab Unit Mgr 5-10-94 <i>R. Schroeder</i>			
54-6800-061 (R-10-83)					

OH (AUTO): LA-211-102 (B-1)

		STANDARD	DUPLICATE
Serial No.	Sample Size (mL) SS	0.050	
V65-5529	Molarity of HNO3	0.1916	
Batch ID	mL of HNO3 in Titration	0.242	
3060	OH Molarity	9.27E-01	N/A
Rerun No.	OH in µg/mL (PPM)	1.58E+04	N/A
0			
Instrument			
AL10666			
Analyst:			
P McCOWN			
Date:			
05/04/94			

OH Molarity = ((mL HNO3)*(M HNO3))/Sample Size in mL

OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))

	STANDARD	DUPLICATE
OH Molarity	9.27E-01	N/A
OH in µg/mL (PPM)	1.58E+04	N/A

Data Entry by: <i>Jerry Hammett</i>	Date: 07-May-94
Approved by: <i>R. Schroeder</i>	Date: 5-10-94

DETERMINATION OF HYDROXIDE ION IN SOLUTIONS - UNDIGESTED SAMPLE

V65-5529

date 04-05-84 time 13:45
 GET pH 12.4 135
 10.41 8533
 10.41 .1916
 11.94
 7.00 pH
 EF1 .24 10.00
 EF2 .219 6.86
 STOP NO. RECORDED
 =====

date 04-05-84 time 13:46
 GET pH 12.4 135
 10.41 8533
 10.41 .1916
 11.94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 66.-5629		Sample Point 108-AP		Time Issued 3-18-94		Priority 26	
Determination OH		Method/Standard LA-211-102		Result Units uG/ML		Charge Code N1A7F	
Sample Size 3 mL ^{9 H₂O} + 1 ml BaCl ₂		Customer ID BLANK					
Remarks Calculations Results REAGENT BLANK .1916 M HNO ₃ WHC-SD-WM-DP-065, REV. 0 < 42 ug/ml .011m1							
Analyst - 1 <i>P. McCown</i>		Analyst - 2		Analyst - 3		Analyst - 4	
Hrs		Hrs		Hrs		Hrs	
Date 5/4/94		Time Completed 15:15		Lab Unit Mgr <i>R. Schneider</i>		5-10-94	
54-6800-061 (R-10-83)							

OH (AUTO): LA-211-102 (B-1)

		BLANK	DUPLICATE
Serial No.	Sample Size (mL) SS	3.000	
V66-5629	Molarity of HNO ₃	0.1916	
Batch ID	mL of HNO ₃ in Titration	0.00 0.041	RWS 5-10-94
3060	OH Molarity	0.00 7.03E-04	RWS 5-10-94 N/A
Rerun No.	OH in µg/mL (PPM)	0.00 1.19E+01	RWS 5-10-94 N/A
0			
Instrument			
AL10666	Detection Limit = 125µg/SS		
Analyst			
P McCOWN	Detection Limit (µg/mL)	4.17E+01	
Date			
05/04/94			

OH Molarity = ((mL HNO₃) * (M HNO₃)) / Sample Size in mL

OH in µg/mL = (OH MOLARITY) * (17.0g/mole) * ((1000000µg/g) / (1000mL/L))

	BLANK	DUPLICATE
OH Molarity	0.00 7.03E-04	RWS 5-10-94 N/A
OH in µg/mL (PPM)	<42	N/A

The Result is < Detection Limit

Data Entry by: <i>Janet Hammett</i>	Date: 07-May-94
Approved by: <i>R. Schneider</i>	Date: 5-10-94

DETERMINATION OF HYDROXIDE ION IN SOLUTIONS - UNDIGESTED SAMPLE

V66-5629

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calibration cor
date 94-25-10
pH(S) 1 10.10
pH(S) 2 7.25
t.cal. 21.2
slope(mV) 0.02
U1000 -1.2
electr. input 1
=====

Blank 3DML
date 94-25-10 time 10:39
CET pH 10.10
Ic.#1 95.0
Ic.#2 0.016
pH(141) 7.02
Vml pH
EP1 0.01 5.72
stop vml reached
=====

date 94-05-24 time 13:39
GET pH 11.4 134
.10ml/lit 2mm=1/dio
start .200 ml

2 8
1 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 67.-5729		Sample Point 108-AP		Time Issued 3-18-94		Priority 26	
Determination OH		Method/Standard LA-211-102		Result Units uG/ML		Charge Code N1A7F	
Sample Size .250 ML <i>RWS 5-10-94</i> 1.000ML + 1mL BaCl ₂		Customer ID 108-AP-C					
Remarks Calculations Results <i>.1916 M HNO₃</i> <i>.029 ml</i> WHC-SD-WM-DP-065, REV. 0 <i>< 125 ug/ml</i>							
Analyst - 1 <i>P. McCown</i>		Analyst - 2		Analyst - 3		Analyst - 4	
Hrs		Hrs		Hrs		Hrs	
Date 5/4/94		Time Completed 15:15		Lab Unit Mgr <i>RW Schroeder</i>		Signature <i>Jay Hammitt</i>	
64 6800-061 (R-10-83)							

OH (AUTO): LA-211-102 (B-1)		SAMPLE	DUPLICATE
Serial No	Sample Size (mL) SS	1.000	
V67-5729	Molarity of HNO ₃	0.1916	
Batch ID	mL of HNO ₃ in Titration	0.029 0.029	<i>RWS 5-10-94</i>
3060	OH Molarity	5.56E-03	N/A
Rerun No.	OH in µg/mL (PPM)	9.45E+01	N/A
0			
Instrument			
AL10666	Detection Limit = 125µg/SS		
Analyst			
P McCOWN	Detection Limit (µg/mL)	1.25E+02	
Date			
05/04/94			

OH Molarity = ((mL HNO₃)*(M HNO₃))/Sample Size in mL

OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))

	SAMPLE	DUPLICATE
OH Molarity	5.56E-03	N/A
OH in µg/mL (PPM)	<125	N/A

The Result is < Detection Limit

Data Entry by: <i>Jay Hammitt</i>	Date: 07-May-94
Approved by: <i>RW Schroeder</i>	Date: 5-10-94

WHC-SD-WM-DP-065, REV.0

DETERMINATION OF HYDROXIDE ION IN SOLUTIONS - UNDIGESTED SAMPLE

V67-5729

date 5-1-85-24 time 14:05
 CET #H 15 # 137
 Id.#1 67-5729
 Id.#2 .1916
 pH final 9.13
 Vol.1 pH
 EP1 .829 8.32
 EP2 .849 5.58
 Total Volume 1.000 ml
 Concentration

date 5-1-85-24 time 14:06
 CET #H 15 # 137
 Vol.1 pH
 EP1 .829 8.32
 EP2 .849 5.58
 Total Volume 1.000 ml
 Concentration

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	V 67.-5829	Sample Point	108-AP	Time Issued	3-18-94	Priority	26
Determination	OH	Method-Standard	LA-211-102	Result Units	uG/ML	Charge Code	N1A7F
Sample Size	250 ML ^{RWS} 5-194	1.000ML + 1.0ML BaCl ₂				Customer ID	108-AP-C
Remarks Calculations Results DUPLICATE SAMPLE .196 M HNO ₃ .03/ml < 125 mg/ml WHC-SD-WM-DP-065, REV. 0							
Analyst - 1	Analyst - 2		Analyst - 3		Analyst - 4		Analyst - 5
<i>P. McCown</i>							
Hrs	Hrs		Hrs		Hrs		Hrs
			<i>Rokku</i>				
Date	Time Completed		Lab Unit Mgr				
5/4/94	15:15		5-10-94		<i>Dan Hammett</i>		
54-6800-061 (R-10-83)							

OH (AUTO): LA-211-102 (B-1)		SAMPLE	DUPLICATE
Serial No	Sample Size (mL) SS	1.000	
V67-5829	Molarity of HNO ₃	0.1916	
Batch ID	mL of HNO ₃ in Titration	0.031	
3060	OH Molarity	5.94E-03	N/A
Rerun No.	OH in µg/mL (PPM)	1.01E+02	N/A
0			
Instrument			
AL10666	Detection Limit = 125µg/SS		
Analyst			
P McCOWN	Detection Limit (µg/mL)	1.25E+02	
Date			
05/04/94			

OH Molarity = ((mL HNO₃)*(M HNO₃))/Sample Size in mL

OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))

	SAMPLE	DUPLICATE
OH Molarity	5.94E-03	N/A
OH in µg/mL (PPM)	<125	N/A

The Result is < Detection Limit

Data Entry by:	<i>Dan Hammett</i>	Date:	07-May-94
Approved by:	<i>RW. Schroeder</i>	Date:	5-10-94

DETERMINATION OF HYDROXIDE ION IN SOLUTIONS - UNDIGESTED SAMPLE

V67-5829

date 5-20-84 time 14:13
 GET pH 12 # 138
 Id.#1 67-5829
 Id.#2 .1918
 pH(10ml) 8.12
 EP1 .031
 EP2 .101
 stop volt. recorded
 =====

date 5-20-84 time 14:31
 GET pH 12 # 139
 Id.#1 67-5829
 Id.#2 .1918
 pH(10ml) 11.12
 EP1 .031
 EP2 .101
 stop volt. recorded
 =====

date 5-20-84 time 14:13
 GET pH 12 # 138
 .10ml pH 8.12
 start V .200 ml

*.100 spike
 1.0ml Sample*
 date 5-20-84 time 14:31
 GET pH 12 # 139
 .10ml pH 11.12
 start V .200 ml

RWS 5-4-94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 68.-5729		Sample Point 108-AP		Time Issued 3-18-94		Priority 26	
Determination OH		Method/Standard LA-211-102		Result Units uG/ML		Charge Code N1A7F	
Sample Size 500 ML RWS 5-4-94 1.000mL + 1mL BaCl ₂		Customer ID 108-AP-D					
Remarks Calculations, Results <p>1. Aib HNO₃ .021mL</p> <p>WHC-SD-WM-DP-065, REV. 0</p> <p>< 125 ug/mL</p>							
Analyst - 1 P. McCown		Analyst - 2		Analyst - 3		Analyst - 4	
Hrs		Hrs		Hrs		Hrs	
Date 5/4/94		Time Completed 15:15		Lab Unit Mgr R. Schaefer		5-10-94 J. Hammitt	

54-6800-061 (R-10-83)

OH (AUTO): LA-211-102 (B-1)

		SAMPLE	DUPLICATE
Serial No.	Sample Size (mL) SS	1.000	
V68-5729	Molarity of HNO ₃	0.1916	
Batch ID	mL of HNO ₃ in Titration	0.021	
3060	OH Molarity	4.02E-03	N/A
Rerun No.	OH in µg/mL (PPM)	6.84E+01	N/A
0			
Instrument			
AL10666	Detection Limit = 125µg/SS		
Analyst:			
P McCOWN	Detection Limit (µg/mL)	1.25E+02	
Date:			
05/04/94			

OH Molarity = ((mL HNO₃)*(M HNO₃))/Sample Size in mL

OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))

	SAMPLE	DUPLICATE
OH Molarity	4.02E-03	N/A
OH in µg/mL (PPM)	<125	N/A

The Result is < Detection Limit

Data Entry by: J. Hammitt	Date: 07-May-94
Approved by: R. Schaefer	Date: 5-10-94

WHC-SD-WM-DP-065, REV. 0

DETERMINATION OF HYDROXIDE ION IN SOLUTIONS - UNDIGESTED SAMPLE

V68-5729

date 04-05-64 time 14:32
 GET pH 1.5 # 140
 Id.#1 68-5729
 Id.#2 .1916
 pH(in.0) 8.16
 V/ml pH
 0.1 .021 7.67
 stop vol. reached
 =====

date 04-05-64 time 14:32
 GET pH 1.5 # 140
 Id.#1 68-5729
 Id.#2 .1916
 stop vol. reached
 =====

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 68.-5829	Sample Point 108-AP	RERUN		Time Issued 8-18-94	Priority 9:40	26
Determination OH	Method-Standard LA-211-102	Result Units uG/ML	Charge Code N1A7F	Reruns 1		
Sample Size .500 ML <i>PWS 5-4-94</i> 1.000 ML + 1 ML BaCl ₂			Customer ID 108-AP-D			
Remarks Calculations, Results DUPLICATE SAMPLE <i>.1916 M HNO₃</i> WHC-SD-WM-DP-065, REV. 0 <i>< 125 ug/ml</i>						
Analyst - 1 <i>P. McCown</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5		
Hrs	Hrs	Hrs	Hrs	Hrs		
Date 5/4/94	Time Completed 15:15	Lab Unit Mgr <i>5-10-94</i> <i>R. Schroeder</i>				

54-6800-061 (R-10-83)

OH (AUTO): LA-211-102 (B-1)

		SAMPLE	DUPLICATE
Serial No.	Sample Size (mL) SS	1.000	
V68-5829	Molarity of HNO ₃	0.1916	
Batch ID	mL of HNO ₃ in Titration	0.000	
3060	OH Molarity	0.00E+00	N/A
Rerun No.	OH in µg/mL (PPM)	0.00E+00	N/A
0			
Instrument			
AL10666	Detection Limit = 125µg/SS		
Analyst:			
P McCOWN	Detection Limit (µg/mL)	1.25E+02	
Date:			
05/04/94			

OH Molarity = ((mL HNO₃)*(M HNO₃))/Sample Size in mL

OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))

	SAMPLE	DUPLICATE
OH Molarity	0.00E+00	N/A
OH in µg/mL (PPM)	<125	N/A

The Result is < Detection Limit

Data Entry by: <i>Dany Hymmer</i>	Date: 07-May-94
Approved by: <i>R. Schroeder</i>	Date: 5-10-94

DETERMINATION OF HYDROXIDE ION IN SOLUTIONS - UNDIGESTED SAMPLE

V68-5829

DATE: 01-25-84 TIME: 14:40
GET: 1.1 1.1 1.1
ID: #1 68-5829
ID: #2 1915
PR: 1.1 3.20
STOP: VOLT: REACH: 1
REACHED: 1

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5829

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 69.-5729		Sample Point 108-AP		Time Issued 3-18-94		Priority 9:42 26	
Determination OH		Method Standard LA-211-102		Result Units uG/ML		Charge Code N1A7F	
Sample Size RWS .500 ML 5-4-94 1.000ML + 1mL BaCL ₂		Customer ID 108-AP-E					
Remarks, Calculations Results <div style="text-align: center;"> <p>1.1916 M HNO₃ .016 ml</p> <p>WHC-SD-WM-DP-065, REV. 0</p> <p>< 125 mg/ml</p> </div>							
Analyst - 1 P. McCown		Analyst - 2		Analyst - 3		Analyst - 4	
Hrs		Hrs		Hrs		Hrs	
Date 5/4/94		Time Completed 15:15		Lab Unit Mgr RW Schroeder		5-10-94 J. Hammond	
54-6800-061 (R-10-83)							

OH (AUTO): LA-211-102 (B-1)		SAMPLE	DUPLICATE
Serial No.	Sample Size (mL) SS	1.000	
V69-5729	Molarity of HNO3	0.1916	
Batch ID	mL of HNO3 in Titration	0.016	
3060	OH Molarity	3.07E-03	N/A
Rerun No.	OH in µg/mL (PPM)	5.21E+01	N/A
0			
Instrument			
AL10666	Detection Limit = 125µg/SS		
Analyst:			
P McCOWN	Detection Limit (µg/mL)	1.25E+02	
Date:			
05/04/94			

OH Molarity = ((mL HNO3)*(M HNO3))/Sample Size in mL

OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))

	SAMPLE	DUPLICATE
OH Molarity	3.07E-03	N/A
OH in µg/mL (PPM)	< 125	N/A

The Result is < Detection Limit

Data Entry by: J. Hammond	Date: 07-May-94
Approved by: RW Schroeder	Date: 5-10-94

DETERMINATION OF HYDROXIDE ION IN SOLUTIONS - UNDIGESTED SAMPLE

V69-5729

Date 04-05-84 time 14:51
 GET pH 12 # 142
 ID.#1 69-5729
 ID.#2 .1916
 pH initial 8.34
 EP1 7.016 pH
 stop volt. reached
 =====

Date 04-05-84 time 14:55
 GET pH 12 # 142
 .10ml. 10ml. 10ml/dil
 3.0ml. 10ml. 10ml

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No					Sample Point		Time Issued		Priority
V 69.-5829					108-AP		3-18-94		26
Determination		Method/Standard		Result Units		Charge Code		Reruns	
OH		LA-211-102		uG/ML		N1A7F		1	
Sample Size								Customer ID	
.500 ML 1.000 mL + 1 mL BaCl ₂								108-AP-E	
Remarks, Calculations, Results									
DUPLICATE SAMPLE 1.1916 M HNO ₃ WHC-SD-WM-DP-065, REV. 0 < 125 ug/mL .017 ml									
Analyst - 1		Analyst - 2		Analyst - 3		Analyst - 4		Analyst - 5	
P. McLean									
Hrs		Hrs		Hrs		Hrs		Hrs	
Date		Time Completed		Lab Unit Mgr					
5/4/94		15:15		R. Schroeder		5-10-94			

54 6800-061 (R-10 83)

OH (AUTO): LA-211-102 (B-1)

		SAMPLE	DUPLICATE
Serial No.	Sample Size (mL) SS	1.000	
V69-5829	Molarity of HNO ₃	0.1916	
Batch ID	mL of HNO ₃ in Titration	0.017	
3060	OH Molarity	3.26E-03	N/A
Rerun No.	OH in µg/mL (PPM)	5.54E+01	N/A
0			
Instrument			
AL10666	Detection Limit = 125µg/SS		
Analyst:			
P McCOWN	Detection Limit (µg/mL)	1.25E+02	
Date:			
05/04/94			

OH Molarity = ((mL HNO₃) * (M HNO₃)) / Sample Size in mL

OH in µg/mL = (OH MOLARITY) * (17.0g/mole) * ((1000000µg/g) / (1000mL/L))

	SAMPLE	DUPLICATE
OH Molarity	3.26E-03	N/A
OH in µg/mL (PPM)	< 125	N/A

The Result is < Detection Limit

Data Entry by: <i>[Signature]</i>	Date: 07-May-94
Approved by: <i>[Signature]</i>	Date: 5-10-94

WHC-SD-WM-DP-065, REV. 0
DETERMINATION OF HYDROXIDE ION IN SOLUTIONS - UNDIGESTED SAMPLE

V69-5829

date 94-05-24 time 15:03
GET pH 12 # 143
Id.#1 69-5829
Id.#2 .1916
pH(100) 8.24
pH(100) 7.71
EP1 .017 7.71
EP2 .049 6.59
stop volt. reached
=====

date 94-05-24 time 15:03
GET pH 12 # 143
.1916 ml cond=1/div
start V .200 ml

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BEST AVAILABLE COPY

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY
ANALYTICAL BATCH

WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No.
V73

Customer ID:
108AP-FB

Analysis:
OH-(AUTOMATIC)

Sample Prep:
DIRECT

Instrument: AL10636

Procedure/ Rev: LA 211-102 REVISION b-1

Technologist: DG GRIFFIN

Date: 07/03/94

Starting Time: 01:30

Temperature 23 CENTIGRADE

Ending Time: 02:30

Chemist: R.SCHROEDER

Comments: Batch # 3012

	Description	Lab ID
1	LMCS STD	V 71-5529
2	REAGENT BLANK	V 72-5629
3	SAMPLE	V 73-5729
4	SAMPLE DUP	V 73-5829
5		
6		
7		
8		
9		
10		

	Description	Lab ID
11		
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20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	21N8B .050 ML			

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batu 3012

Serial No V 71.-5529	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 1	Priority 26
Determination OH	Method/Standard LA-211-102	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 0.050 ml			Customer ID STD	
Remarks Calculations, Results S273 ITS-OH STD#21N8-B RESULT 9.58-1 STD VAL 9.39-1 %REC 102.02% <p style="text-align: center;">WHC-SD-WM-DP-065, REV.0</p>				
Analyst - 1 <i>KL B. B. B.</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7-3-94	Time Completed 0210	Lab Unit Mgr 7-6-94 <i>RW Schaefer</i>	<i>DeGruis</i>	

54-6800-061 (R-10-83)

OH (AUTO): LA-211-102 (B-1)

		STANDARD	DUPLICATE
Serial No.	Sample Size (mL) SS	0.050	
V71-5529	Molarity of HNO3	0.1916	
Batch ID	mL of HNO3 in Titration	0.250	
3012	OH Molarity	9.58E-01	N/A
Rerun No.	OH in µg/mL (PPM)	1.63E+04	N/A
0			
Instrument			
AL10636			
Analyst:			
D.G.GRIFFIN			
Date:			
07/03/94			

OH Molarity = ((mL HNO3)*(M HNO3))/Sample Size in mL

OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))

	STANDARD	DUPLICATE
OH Molarity	9.58E-01	N/A
OH in µg/mL (PPM)	1.63E+04	N/A

Data Entry by: <i>D. H. H.</i>	Date: 03-Jul-94
Approved by: <i>RW Schaefer</i>	Date: 7-6-94

WHC-SD-WM-DP-065, REV. 0

DETERMINATION OF HYDROXIDE ION IN SOLUTIONS - UNDIGESTED SAMPLE

V 71-5529

date 94-27-83 time 01:42
 GET pH 12 # 440
 Id.#1 71-5529
 Id.#2 .1910
 pH(10ml) 12.00
 V/ml pH
 EF1 .250 10.50
 EP2 .337 8.96
 EP3 .384 4.22
 EP4 .426 3.60
 stop volt. reached
 =====

date 94-27-83 time 01:42
 GET pH 12 # 440
 .10ml. div pH=1/div
 start V .200 ml

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 72.-5629	Sample Point 10BAP FLDBLK	Date 3-18-94	Time Issued 11: 5	Priority 26
Determination OH	Method/Standard LA-211-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK 3 ml QH₂O + 1 ml BaCl WHC-SD-WM-DP-065, REV. 0 NO OH, pH too Low < 42 ug/mL Q B Buffer				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7-3-94	Time Completed 0210	Lab Unit Mgr 7-6-94 RW Schneider PC Jones		

54-6800-061 (R-10-83)

OH (AUTO): LA-211-102 (B-1)		BLANK	DUPLICATE
Serial No.	Sample Size (mL) SS	3.000	
V 72-5629	Molarity of HNO ₃	0.1916	
Batch ID	mL of HNO ₃ in Titration	0.000	
3012	OH Molarity	0.00E+00	N/A
Rerun No.	OH in µg/mL (PPM)	0.00E+00	N/A
0			
Instrument			
AL10636	Detection Limit = 125µg/SS		
Analyst			
D.GRIFFEN	Detection Limit (µg/mL)	4.17E+01	
Date			
07/03/94			

OH Molarity = ((mL HNO₃)*(M HNO₃))/Sample Size in mL

OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))

	BLANK	DUPLICATE
OH Molarity	0.00E+00	N/A
OH in µg/mL (PPM)	<42	N/A

The Result is < Detection Limit

Data Entry by:	RW Schneider	Date:	06-Jul-94
Approved by:	RW Schneider	Date:	7-6-94

DETERMINATION OF HYDROXIDE ION IN SOLUTIONS - UNDIGESTED SAMPLE

V 112-5629

date 94-07-93 time 01:53
GET pH 12 # 442
Id.#1 72-5e25
Id.#2 .1918
pH(initial) 5.51
V/ml pH
EP1 .818 4.28
stop volt.reached
=====

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 73.-5729	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination OH	Method/Standard LA-211-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1 ml			Customer ID 108AP-FB	
Remarks, Calculations, Results <p style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</p> <p style="text-align: center;">< 125 ug/mL</p> <p style="text-align: center;"><i>D. J. Griffin</i></p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7-3-94	Time Completed 0210	Lab Unit Mgr 7-6-94 <i>Rw. Schroeder</i>	<i>R. Jones</i>	

54-6800-061 (R-10-83)

OH (AUTO): LA-211-102 (B-1)		SAMPLE	DUPLICATE
Serial No.	Sample Size (mL) SS	1.000	
V73-5729	Molarity of HNO3	0.1916	
Batch ID	mL of HNO3 in Titration	0.000	
3012	OH Molarity	0.00E+00	N/A
Rerun No.	OH in ug/mL (PPM)	0.00E+00	N/A
0			
Instrument			
AL10636	Detection Limit = 125 ug/SS		
Analyst			
D.GRIFFEN	Detection limit (ug/mL)	1.25E+02	
Date			
07/03/94			

OH Molarity = ((mL HNO3)*(M HNO3))/Sample Size in mL

OH in ug/mL = (OH MOLARITY)*(17.0 g/mole)*((1000000 ug/g)/(1000 mL/L))

	SAMPLE	DUPLICATE
OH Molarity	0.00E+00	N/A
OH in ug/mL (PPM)	< 125	N/A

The Result is < Detection Limit

Data Entry by:	<i>Rw. Schroeder</i>	Date:	06-Jul-94
Approved by:	<i>Rw. Schroeder</i>	Date:	7-6-94

DETERMINATION OF HYDROXIDE ION IN SOLUTIONS - UNDIGESTED SAMPLE

✓ 73-5729

date 94-07-03 time 01:57
 GET pH 12 # 443
 Id.#1 73-5729
 Id.#2 .1916
 pH(initial) 6.87
 V/ml pH
 EP1 .015 4.80
 stop volt.reached
 =====

date 94-07-03 time 01:58
 GET pH 12 # 443
 .10ml/div ΔpH=1/div
 start V .000 ml

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 73.-5829	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination OH	Method/Standard LA-211-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1 ml			Customer ID 108AP-FB	
Remarks: Calculations, Results DUPLICATE SAMPLE WHC-SD-WM-DP-065, REV. 0 <div style="text-align: center;"> $< 125 \mu\text{g/mL}$ </div>				
Analyst - 1 10 B Griffen	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7-3-94	Time Completed 0210	Lab Unit Mgr 7-6-94 Rw Schroeder	<div style="text-align: right;"> <i>R. Sporn</i> </div>	

54-6800-061 (R-10-83)

OH (AUTO): LA-211-102 (B-1)		SAMPLE	DUPLICATE
Serial No.	Sample Size (mL) SS	1.000	
V73-5829	Molarity of HNO3	0.1916	
Batch ID	mL of HNO3 in Titration	0.000	
3012	OH Molarity	0.00E+00	N/A
Rerun No.	OH in $\mu\text{g/mL}$ (PPM)	0.00E+00	N/A
0			
Instrument			
AL10636	Detection Limit = 125 $\mu\text{g/SS}$		
Analyst:			
D.GRIFFEN	Detection Limit ($\mu\text{g/mL}$)	1.25E+02	
Date:			
07/03/94			

OH Molarity = $((\text{mL HNO}_3) * (\text{M HNO}_3)) / \text{Sample Size in mL}$

OH in $\mu\text{g/mL}$ = $(\text{OH MOLARITY}) * (17.0 \text{ g/mole}) * ((1000000 \mu\text{g/g}) / (1000 \text{ mL/L}))$

	SAMPLE	DUPLICATE
OH Molarity	0.00E+00	N/A
OH in $\mu\text{g/mL}$ (PPM)	< 125	N/A

The Result is < Detection Limit

Data Entry by: <i>Rw Schroeder</i>	Date: 06-Jul-94
Approved by: <i>Rw Schroeder</i>	Date: 7-6-94

DETERMINATION OF HYDROXIDE ION IN SOLUTIONS - UNDIGESTED SAMPLE

V 73-5829

date 94-07-03 time 02:05
GET pH 12 # 445
13.#1 73-5829
1d.#2 .1916
pH(init) 5.97
V/m1 pH
EP1 .024 4.73
stop volt. reached

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THE FOLLOWING ANALYSES ARE INCLUDED IN THE DATA PACKAGE BUT THE RESULTS HAVE NOT BEEN REPORTED IN THE FINAL SUMMARY REPORTS.

WHC-SD-WM-DP-065, REV. 0

Customer ID: 108-AP-E

Sample Prep: Direct

Procedure/ Rev: LA - 211-102 / B-1

Date: 4-7-94

Temperature 7.3°

Chemist: R. Schroeder

Comments: Rerun - Several reasons: 1- Auto-titrator is not calibrated until further notice, 2- pH meter is not calibrated, 3- must have graphic report for all samples, 4- this work will require direct chemist supervision, or O.K. from me. Rui Schroeder

	Description	Lab ID
11		
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15		
16		DATA NOT USED IN PACKAGE
17		
18		
19		
20		

[illegible]

Dulch 5600

Serial No V 65.-5529	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority 26
Determination OH	Method-Standard LA-211-102	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size .050 mL			Customer ID STD	
Remarks Calculations Results S273 ITS-OH STD# Z/N 8-A RESULT STD VAL %REC OUT FOR RERUN WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>Tah Spk</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-7-94	Time Completed 0305	Lab Unit Mgr <i>Robitz</i>		

54-6800-061 (R-10-83)

Serial No V 67.-5729	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination OH	Method-Standard LA-211-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size - 250 mL			Customer ID 108-AP-C	
Remarks Calculations Results OUT FOR RERUN				
Analyst - 1 <i>Tah Spk</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-7-94	Time Completed 0325	Lab Unit Mgr <i>Robitz</i>		

54-6800-061 (R-10-83)

Serial No V 66 ⁵ -5629	Sample Point 108-AP	Date 3-18-94	Time Issued 9:38	Priority 26
Determination OH	Method/Standard LA-211-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size .1894 <u>ml</u> HNO ₃			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK WHC-SD-WM-DP-065, REV. 0 OUT FOR RERUN
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-7-94	Time Completed 0320	Lab Unit Mgr

54-6800-061 (R-10-83)

Serial No V 67 ⁵ -5829	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination OH	Method/Standard LA-211-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 250 <u>ml</u> .1894 <u>ml</u> HNO ₃			Customer ID 108-AP-C	
Remarks, Calculations, Results DUPLICATE SAMPLE OUT FOR RERUN
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-7-94	Time Completed 0340	Lab Unit Mgr

54-6800-061 (R-10-83)

Serial No V 68.-5729	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination OH	Method-Standard LA-211-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size .500 mL			Customer ID 108-AP-D	
Remarks Calculations Results WHC-SD-WM-DP-065, REV. 0 OUT FOR RERUN JASyl				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-7-94	Time Completed 0346	Lab Unit Mgr Dakota

54-6800-061 (R-10-83)

Serial No V 68.-5829	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination OH	Method-Standard LA-211-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size .500 mL			Customer ID 108-AP-D	
Remarks Calculations Results DUPLICATE SAMPLE OUT FOR RERUN JASyl				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-7-94	Time Completed 0351	Lab Unit Mgr Dakota

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
V 69.-5729	108-AP	3-18-94	9:42	26
Determination	Method-Standard	Result Units	Charge Code	Reruns
OH	LA-211-102	uG/ML	N1A7F	0
Sample Size	Customer ID			
500 uL	108-AP-E			
Remarks Calculations, Results				
OUT FOR RERUN				
WHC-SD-WM-DP-065, REV. 0				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
4-7-94	0511	<i>P. K. K.</i>	<i>P. K. K.</i>	

54-6800-061 (R 10-83)

Serial No	Sample Point	Date	Time Issued	Priority
V 65.-5829	108-AP	3-18-94	9:42	26
Determination	Method-Standard	Result Units	Charge Code	Reruns
OH	LA-211-102	uG/ML	N1A7F	0
Sample Size	Customer ID			
500 mL	108-AP-E			
Remarks Calculations, Results				
DUPLICATE SAMPLE				
OUT FOR RERUN				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
4-7-94	0521	<i>P. K. K.</i>	<i>P. K. K.</i>	

54-6800-061 (R 10-83)

WHC-SD-WM-DP-065, REV.0

ANALYTICAL BATCH SUMMARY SHEET							
METHOD: La-695-102		ANALYTE: CN		ANALYSIS START DATE 5/10/94			
PREPARED BY: Rob Schroeder		SUMMARY DATE: 5/25/94					
PROJECT 108-AP		UNITS: ug CN/mL		SAMPLE PREP: Direct/Water Dil.5x			
SPL ID	SERIAL NO	RESULT #1	RESULT #2	RPD%	% REC	DET LIM	DIG WT
STD	V60-7578	9.17E+2			100.3		
Reag.B1	V61-7678	<0.1				0.1	
108AP-A	V62-7778	8.90E-1	8.75E-1	1.70		0.1	
SPIKE	V62-7978	100.3%REC	99.9%REC	0.4			
108AP-B	V63-5778	1.03E-0	1.03E-1	0.0		0.02	
			^{E-0} RWS 7-19-94

NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE -- LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH

Sample V-62 was analyzed on dilluted sample due to the insufficient amount of direct sample available. Sample V-63 was analyzed on direct sample, as were the other samples for the 108-AP CN- analysis.

Robert W. Schroeder
5-25-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 60.-7578		Sample Point 108-AP		Date 3-18-94	Time Issued 8:26	Priority 26
Determination CN		Method-Standard LA-695-102		Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size .100mL-10mL-.500mL					Customer ID STD	
Remarks Calculations Results S244 KCN ABS. .724 STD# 19N8-E RESULT 9.17E+2 STD VAL 8.99E+2 %REC 102.0 100.3% SKM 5-19-94 9.14E+2 SKM 5-19-94 WHC-SD-WM-DP-065, REV. 0 P.H. Polm						
Analyst - 1		Analyst - 2		Analyst - 3		Analyst - 4
Hrs		Hrs		Hrs		Hrs
Date 5-10-94		Time Completed 1500		Lab Unit Mgr 5-17-94 R.W. Schroeder		5-19-94 SKM SKM

54-6800-061 (R 10 83)

CN- DETERMINATION : LA-695-102 (B-2) BLANK, LIQUID, SOLID

Type		SAMPLE	DUPLICATE
LIQUID	Sample Aliquot in mL	0.10000	
Work List	Flask Volume in mL	10.00000	
2994	Sample Aliquot Taken in mL (SS)	0.50000	
Test Code	Absorbance of Blank	0.0040	
	Absorbance of Sample	0.7240	
Matrix	Y-Intercept Value	-0.003130	-0.003130
LIQUID	Slope Value	0.157645	0.157645
Sample #	µG of Cyanide	4.59	N/A
V60-7578	µG/mL CN-	9.17E+02	N/A
Instrument Code			
AL 10724	µG of Cyanide = (((Absorb. of Sample - Absorb. of Blank) - (Y-Intercept))) / Slope Value		
Analyst	µG/mL of Cyanide = µG Cyanide / SS (mL) * Dilution Factor		
COLVIN	Dilution Factor = Flask Volume (mL) / Sample Aliquot (mL)		
Date	Detection Limit = 0.1 µG Cyanide		
05/10/94			
Time	v RESULTS v		
15:00	Cyanide Concentration (µG/mL)	9.17E+02	

Data Entry by: <i>[Signature]</i>	Date: 12-May-94
Approved by: <i>R.W. Schroeder</i>	Date: 5-17-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 61.-7678	Sample Point 108-AP	Date 3-18-94	Time Issued 8:27	Priority 26										
Determination CN	Method-Standard LA-695-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0										
Sample Size 5 mL			Customer ID BLANK											
Remarks Calculations Results REAGENT BLANK ABS .004														
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> $<0.1 \text{ } \mu\text{g}/\text{mL}$ </div>														
<i>Ed Colvin</i> <table border="1" style="width: 100%;"> <tr> <td>Analyst - 1</td> <td>Analyst - 2</td> <td>Analyst - 3</td> <td>Analyst - 4</td> <td>Analyst - 5</td> </tr> <tr> <td>Hrs</td> <td>Hrs</td> <td>Hrs</td> <td>Hrs</td> <td>Hrs</td> </tr> </table>					Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	Hrs	Hrs	Hrs	Hrs	Hrs
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5										
Hrs	Hrs	Hrs	Hrs	Hrs										
Date 5-10-94	Time Completed 1500	Lab Unit Mgr <i>Rw Schneider</i>	<i>5-19-94</i> <i>AKM</i>											

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

CN- DETERMINATION : LA-695-102 (B-2) BLANK, LIQUID, SOLID

Type		SAMPLE	DUPLICATE
liquid	Sample Aliquot in mL	5.00000	
Work List	Flask Volume in mL	10.00000	
2994	Sample Aliquot Taken in mL (SS)	5.00000	
Test Code	Absorbance of Blank	0.0040	
	Absorbance of Sample	0.0040	
Matrix	Y-Intercept Value	-0.003130	-0.003130
Water Digest	Slope Value	0.157645	0.157645
Sample #	uG of Cyanide	0.02	N/A
V61-7678	uG/mL CN-	7.94E-03	N/A
Instrument Code			
AL 10724	uG of Cyanide = ((Absorb. of Sample - Absorb. of Blank) - (Y-Intercept)) / Slope Value		
Analyst	uG/mL of Cyanide = uG Cyanide / SS (mL) * Dilution Factor		
Ed Colvin	Dilution Factor = Flask Volume (mL) / Sample Aliquot (mL)		
Date	Detection Limit = 0.1 uG Cyanide		
05/10/94			
Time	v RESULTS v		
15:00	Cyanide Concentration (uG/mL)	<0.1 uG Cyanide	
		<0.02 uG/mL Cyanide • S.O.D.F.	
		<0.1 uG/mL	

Data Entry by:	<i>Rw Schneider</i>	Date:	19-May-94
Approved by:	<i>Rw Schneider</i>	Date:	5-19-94

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AE Young
10-4-94

555

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-7778	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination CN	Method-Standard LA-695-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 5 mL			Customer ID 108-AP-A	
Remarks Calculations Results <p style="text-align: right;">ABS .071</p> <p>1.78 E-1 x 5.0 Dilution =</p> <p style="border: 1px solid black; padding: 5px; display: inline-block;">8.90 E-1 uG CN/mL</p> <p>Ed Colvin</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-10-94	Time Completed	Lab Unit Mgr 5-19-94 RW Schneider	5-19-94 AKM	

54 6800-061 (R-10 83)

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CN- DETERMINATION : LA-695-102 (B-2) BLANK, LIQUID, SOLID

Type		SAMPLE	DUPLICATE
Liquid	Sample Aliquot in mL	5.00000	
Work List	Flask Volume in mL	10.00000	
2994	Sample Aliquot Taken in mL (SS)	5.00000	
Test Code	Absorbance of Blank	0.0040	
	Absorbance of Sample	0.0710	
Matrix	Y-Intercept Value	-0.003130	-0.003130
Water Digest	Slope Value	0.157645	0.157645
Sample #	uG of Cyanide	0.44	N/A
V62-7778	uG/mL CN-	1.78E-01	N/A
Instrument Code	uG of Cyanide = ((Absorb. of Sample - Absorb. of Blank) - (Y-Intercept)) / Slope Value		
AL 10724	uG/mL of Cyanide = uG Cyanide / SS (mL) * Dilution Factor		
Analyst	Dilution Factor = Flask Volume (mL) / Sample Aliquot (mL)		
Ed Colvin	Detection Limit = 0.1 uG Cyanide		
Date	05/10/94		
Time	15:00		
v RESULTS v			
Cyanide Concentration (uG/mL)		1.78E-01 * 5.0 d.F.	
		8.90 E-1	

Data Entry by:	RW Schneider	Date:	19-May-94
Approved by:	RW Schneider	Date:	5-19-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-7878	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination CN	Method-Standard LA-695-102	Result Units ug/ML	Charge Code N1A7F	Reruns 0
Sample Size 5mL			Customer ID 108-AP-A	
Remarks, Calculations, Results DUPLICATE SAMPLE ABS .070 1.75E-1 ug/ml = 5 D.F. 8.75 E-1 mg CN/mL WHC-SD-WM-DP-065, REV.0				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-10-94	Time Completed 1500	Lab Unit Mgr 5-14-94 R. Schneider	5-19-94 K. M. Ginter	

54-6800-061 (R-10 83)

CN- DETERMINATION : LA-695-102 (B-2) BLANK, LIQUID, SOLID

Type		SAMPLE	DUPLICATE
Liquid	Sample Aliquot in mL	5.00000	
Work List	Flask Volume in mL	10.00000	
2994	Sample Aliquot Taken in mL (SS)	5.00000	
Test Code	Absorbance of Blank	0.0040	
	Absorbance of Sample	0.0700	
Matrix	Y-Intercept Value	-0.003130	-0.003130
Water Digest	Slope Value	0.157645	0.157645
Sample #	ug of Cyanide	0.44	N/A
V62-7878	ug/mL CN-	1.75E-01	N/A
Instrument Code			
AL 10724	ug of Cyanide = ((Absorb. of Sample - Absorb. of Blank) - (Y-Intercept)) / Slope Value		
Analyst	ug/mL of Cyanide = ug Cyanide / SS (mL) * Dilution Factor		
Ed Colvin	Dilution Factor = Flask Volume (mL) / Sample Aliquot (mL)		
Date	Detection Limit = 0.1 ug Cyanide		
05/10/94			
Time	v RESULTS v		
15:00	Cyanide Concentration (ug/mL)	1.75E-01 * 5.0 D.F.	
		8.75 E-1 mg CN/mL	

Data Entry by:	Date: 19-May-94
Approved by:	Date:

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-7978	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination CN	Method-Standard LA-695-102	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 5mL + 100mL - 10mL - .500mL SPIKE			Customer ID 108-AP-A	
Remarks Calculations, Results SAMPLE SPIKED ID SPIKE ID 1918E SPIKE VOLUME 100mL - 10mL - .500mL ABS .793 100.3 % rec 102.0 % rec RWS 5-25-94 Ed Colvin				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-10-94	Time Completed 1500	Lab Unit Mgr RWS 5-19-94	5-19-94 K.M. Yancey	

54-6800-061 (R 10-83)

WHC-SD-WM-DP-065, REV. 0

CN- DETERMINATION : LA-695-102 (B-2) SPIKE, STANDARD

Type		SPIKE	NA
spike-liquid	Spike Aliquot in mL	0.100	
Work List	Flask Volume in mL	10.000	
2994	Diluted Spike Standard in mL	0.500	
Test Code	LMCS Value (ppm)	914	
	Absorbance of Blank	0.004	
Matrix	Absorbance of Sample+Spike	0.793	
Water digest	Y-Intercept Value	-0.003130	-0.003130
Sample #	Slope Value	0.157645	0.157645
V62-7978	µg of Cyanide in Sample+Spike	5.02	
Instrument Code	N/A		
AL 10724	µg of Cyanide in Sample	0.44000	
Analyst	N/A		
Ed Colvin	N/A		N/A
Date	µg of Cyanide in Spike	4.57	
05/10/94	%Recovery	100.3	
Time	RESULT		
15:00			

$\mu\text{g of Cyanide in Spike} = \text{LMCS Value} / \text{Dilution Factor} * \text{Diluted Spike Standard}$

$\text{Dilution Factor} = \text{Flask Volume} / \text{Spike Aliquot}$

$\% \text{RECOVERY of Spike} = (\mu\text{g of Cyanide in Sample+Spike}) - (\mu\text{g of Cyanide in Sample}) / (\mu\text{g of Cyanide in Spike}) * 100$

Data Entry by:	RWS	Date:	25-May-94
Approved by:	RWS	Date:	5-25-94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-7078	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination CN	Method Standard LA-695-102	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 5mL + 100mL - 10mL - 500mL SPIKE			Customer ID 108-AP-A	
Remarks Calculations Results SAMPLE SPIKE DUPLICATE ABS .790 SPIKE ID 17N8F SPIKE VOL .100mL - 10mL - 500mL 99.9% rec +101.6% rec RWS 5-25-94 P.H. Cohn				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-10-94	Time Completed 1500	Lab Unit Mgr R. Schneider	5-19-94 AKM Yarnall	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

CN- DETERMINATION : LA-695-102 (B-2) SPIKE, STANDARD

Type	SPIKE	NA
spike-liquid	Spike Aliquot in mL	0.100
Work List	Flask Volume in mL	10.000
2994	Diluted Spike Standard in mL	0.500
Test Code	LMCS Value (ppm)	914
	Absorbance of Blank	0.004
Matrix	Absorbance of Sample+Spike	0.790
Water digest	Y-Intercept Value	-0.003130
		-0.003130
Sample #	Slope Value	0.157645
V62-7078	µg of Cyanide in Sample+Spike	5.01
Instrument Code	N/A	
AL 10724	µg of Cyanide in Sample	0.44000
Analyst	N/A	
Ed Colvin	N/A	N/A
Date	µg of Cyanide in Spike	4.57
05/10/94	% Recovery	99.9
Time	RESULT	
15:00		

µg of Cyanide in Spike = LMCS Value / Dilution Factor * Diluted Spike Standard

Dilution Factor = Flask Volume / Spike Aliquot

% RECOVERY of Spike = (µg of Cyanide in Sample+Spike) - (µg of Cyanide in Sample) / (µg of Cyanide in Spike) * 100

Data Entry by:	R. Schneider	Date:	25-May-94
Approved by:	R. Schneider	Date:	5-25-94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 63.-5778	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination CN LIQ	Method-Standard LA-695-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 5 mL			Customer ID 108-AP-B	
Remarks Calculations Results AB 5.408 1.03 E-04g CN/mL P.H. Colvin				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-10-94	Time Completed 1500	Lab Unit Mgr R.W. Schroeder	5-19-94 AKM Schroeder	

WHC-SD-WM-DP-065, REV. 0

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54 6800-061 (R 10 83)

CN- DETERMINATION : LA-695-102 (B-2) BLANK, LIQUID, SOLID

Type		SAMPLE	DUPLICATE
liquid	Sample Aliquot in mL	5.00000	
Work List	Flask Volume in mL	10.00000	
2994	Sample Aliquot Taken in mL (SS)	5.00000	
Test Code	Absorbance of Blank	0.0040	
	Absorbance of Sample	0.4080	
Matrix	Y-Intercept Value	-0.003130	-0.003130
direct	Slope Value	0.157645	0.157645
Sample #	µG of Cyanide	2.58	N/A
V63-5778	µG/mL CN-	1.03E+00	N/A
Instrument Code	µG of Cyanide = ((Absorb. of Sample - Absorb. of Blank) - (Y-Intercept)) / Slope Value		
AL 10724	µG/mL of Cyanide = µG Cyanide / SS (mL) * Dilution Factor		
Analyst	Dilution Factor = Flask Volume (mL) / Sample Aliquot (mL)		
Ed Colvin	Detection Limit = 0.1 µG Cyanide		
Date	05/10/94		
Time	15:00		
v RESULTS v			
Cyanide Concentration (µG/mL)		1.03E+00	

Data Entry by:	R.W. Schroeder	Date:	19-May-94
Approved by:	R.W. Schroeder	Date:	5-19-94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 63.-5878	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination CN LIQ	Method-Standard LA-695-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size ? 5 mL			Customer ID 108-AP-B	
Remarks, Calculations, Results DUPLICATE SAMPLE ABS. 405				
WHC-SD-WM-DP-065, REV. 0 1.03 E-04 g CN/mL P.H. Ch				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-10-94	Time Completed 1500	Lab Unit Mgr <i>P.H. Ch</i> 5-24-94 RW Schroeder <i>5-19-94</i> JKM <i>5-19-94</i>		

54 6800-061 (R 10 83)

CN- DETERMINATION : LA-695-102 (B-2) BLANK, LIQUID, SOLID

Type		SAMPLE	DUPLICATE
liquid	Sample Aliquot in mL	5.00000	
Work List	Flask Volume in mL	10.00000	
2994	Sample Aliquot Taken in mL (SS)	5.00000	
Test Code	Absorbance of Blank	0.0040	
	Absorbance of Sample	0.4050	
Matrix	Y-Intercept Value	-0.003130	-0.003130
direct	Slope Value	0.157645	0.157645
Sample #	uG of Cyanide	2.56	N/A
V63-5878	uG/mL CN-	1.03E+00	N/A
Instrument Code			
AL 10724	uG of Cyanide = (((Absorb. of Sample - Absorb. of Blank) - (Y-Intercept))) / Slope Value		
Analyst	uG/mL of Cyanide = uG Cyanide / SS (mL) * Dilution Factor		
Ed Colvin	Dilution Factor = Flask Volume (mL) / Sample Aliquot (mL)		
Date	Detection Limit = 0.1 uG Cyanide		
05/10/94			
Time	v RESULTS v		
15:00	Cyanide Concentration (uG/mL)	1.03E+00	

Data Entry by:	<i>RW Schroeder</i>	Date:	19-May-94
Approved by:	<i>RW Schroeder</i>	Date:	5-19-94

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CYANIDE ANALYSIS REPORT

WHC-SD-WM-DP-065, REV.0

TODAYS DATE: 05/10/94

PAYROLL NO.:

Y-INTERCEPT= -.00313

SLOPE= .157645

SAMPLE ID#: BLANK-A REAGENT BLANK

SAMPLE SIZE: 5ML

WVL AND ABS= 580NM 0.004 A

SAMPLE ID#: V-60 19A8-E STD

SAMPLE SIZE: .100ML-10ML-.500ML

WVL AND ABS= 580NM 0.724 A

SAMPLE ID#: V-61 SAMPLE BLANK

SAMPLE SIZE: 5ML

WVL AND ABS= 580NM 0.004 A

SAMPLE ID#: V-62

SAMPLE SIZE: 5ML - DILUTION

WVL AND ABS= 580NM 0.071 A

SAMPLE ID#: V-62 DUPLICATE

SAMPLE SIZE: 5ML - DILUTION

WVL AND ABS= 580NM 0.070 A

SAMPLE ID#: V-62 + SPIKE

SAMPLE SIZE: 5ML - DILUTION+.100ML-10ML-.500ML 19N8-E SPIKE

WVL AND ABS= 580NM 0.793 A

SAMPLE ID#: V-62 + SPIKE DUPLICATE

SAMPLE SIZE: 5ML - DILUTION+.100ML-10ML-.500ML 19N8-E SPIKE

WVL AND ABS= 580NM 0.790 A

SAMPLE ID#: V-63

SAMPLE SIZE: 5ML - DIRECT

WVL AND ABS= 580NM 0.408 A

SAMPLE ID#: V-63 DUPLICATE

SAMPLE SIZE: 5ML - DIRECT

WVL AND ABS= 580NM 0.405 A

TECHNOLOGIST SIGNATURE: E. M. Cohen

DATE SIGNED: 5-10-94

CALIBRATION CURVE LACHAT DISTILLED 25 ML

CYANIDE DEC. 16, 1993

CALIBRATION STANDARD # 39N16-B 1064 UG/ML CYANIDE

DILUTION FACTOR = $10/.1 = 100$. WORKING STD = $1064/100 = 10.64$

PIPET SIZE	MICROGRAMS CN	TOTAL ABS	NET ABS
BLANK	0	0.009	0
0.050ML WS#2	0.0532	0.011	0.002
0.100ML WS#2	0.1064	0.02	0.011
0.200ML WS#2	0.2128	0.038	0.029
0.050ML WS#1	0.532	0.092	0.083
0.075ML WS#1	0.798	0.135	0.126
0.100ML WS#1	1.064	0.175	0.166
0.200ML WS#1	2.128	0.338	0.329
0.500ML WS#1	5.32	0.845	0.836

Regression Output:

Constant Output: -0.00313 (Y-INTERCEPT)
 Std Err of Y Est 0.002900
 R Squared 0.999898
 No. of Observations 9
 Degrees of Freedom 7

X Coefficient(s) 0.157645 (SLOPE)
 Std Err of Coef. 0.000600

CYANIDE CALIBRATION CURVE

E.H. Cohen
 5-10-94

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA 695-102 ANALYTE: CN⁻ ANALYSIS START DATE: 4-17-94

PREPARED BY: Rob Schroeder SUMMARY DATE: 4-29-94

PROJECT: 108-AP UNITS: $\mu\text{g CN/mL}$ SAMPLE PREP: Direct / Digest

[illegible]

☒	NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH
-------------------------------------	---

NARRATIVE-LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH:

Robert W. Schroeder
4-29-94

WHC-SD-WM-DP-065, REV. 0

CYANIDE ANALYSIS - UNDIGESTED SAMPLE

Serial No V 65.-5578	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority 26
Determination CN	Method/Standard LA-695-102	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size .100mL - 10mL - .500mL .125M NaOH			Customer ID STD	
Remarks Calculations Results S244 KCN STD# 31N8A RESULT $\frac{891}{882} \text{ RWS}$ STD VAL 899 %REC 99.12 RWS $\text{abs} = 0.698$ <div style="border: 1px solid black; padding: 5px; display: inline-block;">99.12</div> 4-26-94				
Analyst - 1 <i>Maria M. Geller</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-17-94	Time Completed 0400	Lab Unit Mgr <i>P. Schreder</i> 4-26-94		

SA 6800-061 1A-10, A3

Serial No V 66.-5678	Sample Point 108-AP	Date 3-18-94	Time Issued 9:38	Priority 26
Determination CN	Method/Standard LA-695-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0 mL			Customer ID BLANK	
Remarks Calculations Results REAGENT BLANK $ABS = 0.006$ $\frac{(0.006 - 0.006) - (-0.00313)}{0.157645} = < 0.1 \text{ ug/mL}$				
Analyst - 1 <i>Lusie M. Dutton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-17-94	Time Completed 0400	Lab Unit Mgr <i>Direct</i> 4-26-94 <i>BW Schneider</i>		

54 6800-061 (R-10 83)

CYANIDE ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 67.-5778	108-AP	3-18-94	9:39	26
Determination	Method/Standard	Result Units	Charge Code	Reruns
CN LIQ	LA-695-102	uG/ML	N1A7F	0
Sample Size	Customer ID			
1.0 mL	108-AP-C			
Remarks, Calculations, Results				
abs. 0.017				
$\frac{(0.017 - 0.006) - (-0.00313)}{0.157645} = < 0.1 \text{ mg CN/mL}$				
Detection Limit = $0.1 \text{ mg CN} / 1.0 \text{ mL Sample Size} = 0.1 \text{ mg/mL}$				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>Lucia M. Fulton</i>				
Hrs	Hrs	Hrs	Hrs	Hrs
		<i>Dakota</i>		
Date	Time Completed	Lab Unit Mgr	4-26-94	
4-17-94	0.400	<i>R. Schneider</i>	<i>Ph. B.</i>	

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
V 67.-5878	108-AP	3-18-94	9:39	26
Determination	Method/Standard	Result Units	Charge Code	Reruns
CN LIQ	LA-695-102	uG/ML	N1A7F	0
Sample Size	Customer ID			
1.0 mL	108-AP-C			
Remarks, Calculations, Results				
DUPLICATE SAMPLE				
Abs = 0.017				
< 0.1 mg/mL				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>Lucia M. Fulton</i>				
Hrs	Hrs	Hrs	Hrs	Hrs
		<i>Dakota</i>		
Date	Time Completed	Lab Unit Mgr	4-26-94	
4-17-94	0400	<i>R. Schneider</i>	<i>Ph. B.</i>	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

CYANIDE ANALYSIS - UNDIGESTED SAMPLE

Serial No V, 68.-5778	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination CN LIQ	Method-Standard LA-695-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0 mL			Customer ID 108-AP-D	
Remarks Calculations Results abs = 0.020 1.09 E-1 mg CN/mL				
Analyst - 1 <i>Lusie M. J. J. J.</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-17-94	Time Completed 0400	Lab Unit Mgr <i>R. W. Schroeder</i>	4-26-94 <i>R. W. Schroeder</i>	

54-6800-061 (R 10-83)

Serial No V 68.-5878	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination CN LIQ	Method-Standard LA-695-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0 mL			Customer ID 108-AP-D	
Remarks Calculations Results DUPLICATE SAMPLE Abs = 0.017 < 0.1 mg/mL				
Analyst - 1 <i>Lusie M. J. J. J.</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-17-94	Time Completed 0400	Lab Unit Mgr <i>R. W. Schroeder</i>	4-26-94 <i>R. W. Schroeder</i>	

54 6800-061 (R 10 83)

WHC-SD-WM-DP-065, REV. 0

CYANIDE ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 69.-5778	108-AP	3-18-94	9:42	26
Determination	Method/Standard	Result Units	Charge Code	Reruns
CN LIQ	LA-695-102	uG/ML	N1A7F	0
Sample Size	Customer ID			
1.0 mL	108-AP-E			
Remarks, Calculations, Results				
Abs = 0.017				
< 0.1 ug/mL				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>Luci M. Fulton</i>				
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
4-17-94	0400	<i>RW Schneider</i>	<i>PLB</i>	

54 6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
V 69.-5878	108-AP	3-18-94	9:42	26
Determination	Method/Standard	Result Units	Charge Code	Reruns
CN LIQ	LA-695-102	uG/ML	N1A7F	0
Sample Size	Customer ID			
	108-AP-E			
Remarks, Calculations, Results				
Abs = 0.017				
DUPLICATE SAMPLE				
< 0.1 ug/mL				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>Luci M. Fulton</i>				
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
4-17-94	0400	<i>RW Schneider</i>	<i>PLB</i>	

54-6800-061 (R-10-83)

0A

WHC-SD-WM-DP-065, REV. 0

CALIBRATION CURVE LACHAT DISTILLED 25 ML
 CYANIDE DEC.16, 1993
 CALIBRATION STANDARD # 39N16-B 1064 UG/ML CYANIDE
 DILUTION FACTOR = 10/.1 = 100. WORKING STD = 1064/100 = 10.64

PIPET SIZE	MICROGRAMS CN	TOTAL ABS	NET ABS
BLANK	0	0.009	0
0.050ML WS#2	0.0532	0.011	0.002
0.100ML WS#2	0.1064	0.02	0.011
0.200ML WS#2	0.2128	0.038	0.029
0.050ML WS#1	0.532	0.092	0.083
0.075ML WS#1	0.798	0.135	0.126
0.100ML WS#1	1.064	0.175	0.166
0.200ML WS#1	2.128	0.338	0.329
0.500ML WS#1	5.32	0.845	0.836

Regression Output:
 Constant Output: -0.00313 (Y-INTERCEPT)
 Std Err of Y Est 0.002900
 R Squared 0.999898
 No. of Observations 9
 Degrees of Freedom 7
 X Coefficient(s) 0.157645 (SLOPE)
 Std Err of Coef. 0.000600

BEST AVAILABLE COPY

CYANIDE CALIBRATION CURVE

570

CYANIDE ANALYSIS REPORT

WHC-SD-WM-DP-065, REV.0

TEST DATE: 04/17/94

PAYROLL NO.: 00000

Y-INTERCEPT= -0.00313
SLOPE= 0.157645

SAMPLE ID#: V 66-⁵⁶⁷⁸~~7678~~ ^{SuF 4-26-94} REAGENT BLK
SAMPLE SIZE: 1.0
WVL AND ABS= 580NM 0.006 A

SAMPLE ID#: V 65-⁵⁵⁷⁸~~7578~~ ^{SuF 4-26-94} LMCS STD
SAMPLE SIZE: .100ml-10ml-.500ml
WVL AND ABS= 580NM 0.698 A

SAMPLE ID#: V 67-⁵⁷⁷⁸~~7778~~ ^{SuF 4-26-94}
SAMPLE SIZE: 1.0ml
WVL AND ABS= 580NM 0.017 A

SAMPLE ID#: V 67-⁵⁸⁷⁸~~7878~~ ^{SuF 4-26-94} DUP
SAMPLE SIZE: 1.0ml
WVL AND ABS= 580NM 0.017 A

SAMPLE ID#: V 68-⁵⁷⁷⁸~~7778~~ ^{SuF 4-26-94}
SAMPLE SIZE: 1.0ml
WVL AND ABS= 580NM 0.020 A

SAMPLE ID#: V 68-⁵⁸⁷⁸~~7878~~ ^{SuF 4-26-94} DUP
SAMPLE SIZE: 1.0ml
WVL AND ABS= 580NM 0.017 A

SAMPLE ID#: V 69-⁵⁷⁷⁸~~7778~~ ^{SuF 4-26-94}
SAMPLE SIZE: 1.0ml
WVL AND ABS= 580NM 0.017 A

SAMPLE ID#: V 69-⁵⁸⁷⁸~~7878~~ ^{SuF 4-26-94} DUP
SAMPLE SIZE: 1.0ml
WVL AND ABS= 580NM 0.017 A

TECHNOLOGIST SIGNATURE: Luzie M. Fulton

DATE SIGNED: 4-17-94

10A
94

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. v-73	Customer ID: n1a7f 142 AP FBI
Analysis: CYANIDE BEST AVAILABLE COPY	Sample Prep: WATER DIGEST

Instrument: AL10724	Procedure/ Rev: LA-695-102 B-2
Technologist: J.T. KNIGHT JR	Date: 07/29/94
Starting Time: 0630	Temperature 25 C
Ending Time: 1500	Chemist: R.W. SCHROEDER

Comments: BATCH #3018.

TWO BLANKS WERE RUN WITH THIS BATCH. THE FIRST BLANK IS THE CN- REAGENT BLANK USING 5ML Q-WATER (NO CARD FOR THIS ONE). THE SECOND BLANK IS THE WATER DIGEST BLANK.

	Description	Lab ID
1	BLANK	
2	INITIAL LMCS BLANK	V 71-7578
3	REAGENT BLANK	V 72-7678
4	SAMPLE	V 73-7778
5	SAMPLE DUPLICATE	V 73-7878
6		
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

[illegible]

[illegible]

NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

ATIONS FOR THIS BATCH
Robert W. Schach
8-1-94

BEST AVAILABLE COPY

CALIBRATION CURVE LACHAT DISTILLED 25 ML

CYANIDE JUNE 20, 1994

CALIBRATION STANDARD # 39N16-D 1032 UG/ML CYANIDE

DILUTION FACTOR = $10/.1 = 100$, WORKING STD = $1032/100 = 10.32$

PIPET SIZE	MICROGRAMS CN	TOTAL ABS	NET ABS
BLANK	0	0.003	0
0.050ML WS#1	0.516	0.09	0.087
0.100ML WS#1	1.032	0.175	0.172
0.250ML WS#1	2.58	0.429	0.426
0.500ML WS#1	5.16	0.844	0.841
0.750ML WS#1	7.74	1.24	1.237

Regression Output:

Constant Output: 0.006250 (Y-INTERCEPT)
 Std Err of Y Est 0.007631
 R Squared 0.999803
 No. of Observations 6
 Degrees of Freedom 4

X Coefficient(s) 0.160059 (SLOPE)
 Std Err of Coef. 0.001122

580NM 0.003 580NM 0.003 A Reg-Blank
 580NM 0.697 A Y71-7578 Std
 580NM 0.002 A V72-7678 Prep-Blank
 580NM 0.002 A V73-7778 Sample
 580NM 0.002 A V73-7878 Sample

CYANIDE CALIBRATION CURVE

CYANIDE ANALYSIS - WATER DIGESTION

Baker 3018

Serial No V 71.-7578	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 1	Priority 26
Determination CN	Method/Standard LA-695-102	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size <i>500ml - 10ml - 100ml - 10ml - 500ml</i>			Customer ID STD	
Remarks Calculations, Results 0.687 Abs S244 KCN STD# <i>31N8D</i> RESULT $8.55 \text{ E}+2$ STD VAL $9.35 \text{ E}+2$ %REC 91.5 WR# 9787 $\frac{(0.687 - 0.003) - (0.006250)}{0.160059} = 4.2344 \text{ mg CN}$ $\text{D.F.} = 10.1 / 0.1$ $(4.2344 \text{ mg} / 0.500) \cdot 101 = 855$				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 <i>[Signature]</i> Hrs	Analyst - 4 Hrs	Analyst - 5 <i>[Signature]</i> Hrs
Date 7.29.94	Time Completed	Lab Unit Mgr <i>Rw Schmedt</i>	8-1-94 <i>[Signature]</i>	

54-6800-061 (R-10 83)

Serial No V 72.-7678	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 5	Priority 26
Determination CN	Method/Standard LA-695-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size <i>5ml</i>			Customer ID BLANK	
Remarks Calculations, Results REAGENT BLANK Prep. RWS 8-1-94 $\text{D.F.} = 1 \text{ ug} / 5 \text{ ml} = 0.2 \frac{\text{ug}}{\text{ml}}$ $\frac{(0.002 - 0.003) - 0.00625}{0.160059} = 0.00 / 5 \times 1 = 0.0$ $< 2.0 \text{ E}+0 \text{ ug/ML}$ $0.002 \text{ Abs RWS 8-1-94}$ 0.002 Abs 8-1-94 $\times \text{Dig. Fact } 10 =$				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 <i>[Signature]</i> Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 7.29.94	Time Completed	Lab Unit Mgr <i>Rw Schmedt</i>	8-1-94 <i>[Signature]</i>	

54-6800-061 (R-10 83)

WHC-SD-WM-DP-065, REV. 0

CYANIDE ANALYSIS - WATER DIGESTION

Serial No V 73.-7778	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination CN	Method-Standard LA-695-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 5ml			Customer ID 108AP-FB	
Remarks Calculations Results <p>0.002 Abs.</p> $\frac{(0.002 - 0.003) - (0.00625)}{0.160059} = 0.0 / 5 \times 1 = 0.0$ <p>D.L. = $1/5 \times 10 = < 2.00 \text{E} + 0 \text{ug/mL}$</p>				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 7.29.94	Time Completed	Lab Unit Mgr 8-1-94 <i>[Signature]</i>	<i>[Signature]</i>	

54-6800-061 (R-10-83)

Serial No V 73.-7878	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination CN	Method-Standard LA-695-102	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 5ml			Customer ID 108AP-FB	
Remarks Calculations Results <p>DUPLICATE SAMPLE 0.002 Abs.</p> $\frac{(0.002 - 0.003) - (0.00625)}{0.160059} = 0.0 / 5 \times 10 = 0.0$ <p>D.L. = $1/5 \times 10 = < 2.00 \text{E} + 0 \text{ug/mL}$</p>				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 7.29.94	Time Completed	Lab Unit Mgr 8-1-94 <i>[Signature]</i>	<i>[Signature]</i>	

54-6800-061 (R-10-83)

3

WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No. V62 + V63	Customer ID: 108-AP-A+B
Analysis: TIC	Sample Prep: Water Digestion

Chemist: H. Schroeder

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

511

WHC-SD-WM-DP-065, REV. 0

[illegible][illegible]

NARRATIVE-LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH:

Sample was prepared by a (5x) dilution. All ^{results} ~~samples~~ above are reported in $\mu\text{g C/mL}$ units except the standard and spike results which are reported in Molarity and % recovery respectively.
 RUS 4-18-94

Robert W. Schroeder
4-18-94

Batch 2993

Serial No V 60.-7527	Sample Point 108-AP	Date 3-18-94	Time Issued 8:26	Priority 26
Determination TIC	Method/Standard LA-622-102	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size . 200 ml			Customer ID STD	
Remarks. Calculations. Results S223 C03 STD# 15N12-A RESULT $4.82 \times 10^{-02} \mu$ STD VAL $5.00 \times 10^{-06} \mu$ % REC 96.4 <div style="text-align: center; margin-top: 10px;">WHC-SD-WM-DP-065, REV. 0</div>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-12-94	Time Completed 0330	Lab Unit Mgr <i>Roberts</i> 4-18-94 <i>RW Schroeder</i> <i>Jay H...</i>		

54-6800-061 (R-10-83)

TIC: LA-622-102 (B-2)**LIQUIDS**

		STANDARD
Type	Sample Volume in mL (SS)	0.200
STANDARD	Dilution Factor (DF)	1.000
Work List	Digest Dilution Factor (DDF)	1.000
2993	μ g of Carbon in Sample (C1)	118.1
Test Code	μ g of Carbon in Blank (C2)	2.4
TIC		
Matrix		
LIQUID	g of Carbon/L =	5.79E-01
Sample #		
V60-7527	g of Carbon/L = $\frac{(C1-C2) \cdot DF \cdot DDF}{SS \cdot 1000}$	
Instrument Code		
WB39927		
Analyst	μ g of Carbon/mL = g of Carbon/L * 1000000 μ g/g / 1000 mL/L	
S.BOATRIGHT		
Date		
04/12/94	Detection Level (μ g/mL) = $\frac{1 \mu\text{g C} \cdot DF \cdot DDF}{SS}$	
Time		
03:30		

μ g Carbon/mL = 5.79E+02	DETECTION LEVEL in μ g/mL 5.00E+00
------------------------------	--

Data Entry by: <i>Jay H...</i>	Date: 12-Apr-94
Approved by: <i>RW Schroeder</i>	Date: 4-18-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 61.-7627	Sample Point 108-AP	Date 3-18-94	Time Issued 8:27	Priority 26
Determination TIC	Method/Standard LA-622-102	Result Units uG C/ML	Charge Code N1A7F	Reruns 0
Sample Size .200 ml			Customer ID BLANK	
Remarks Calculations Results REAGENT BLANK WHC-SD-WM-DP-065, REV. 0				
<p style="text-align: center;"> <i>Handwritten:</i> 4-14-94 $< 5.00 \text{ mg C/mL}$ $< 2.50 \text{ E-2 uG C/mL}$ <i>Signature:</i> <u>Setford Boatright</u> <i>Handwritten:</i> 4-18-94 </p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-12-94	Time Completed 0330	Lab Unit Mgr <i>Signature: RW Schroeder</i>	<i>Signature: [illegible]</i> <small>64-6606-061 (R-10-83)</small>	

TIC: LA-622-102 (B-2)

LIQUIDS

Type	Sample Volume in mL	(SS)	BLK
BLK	Dilution Factor	(DF)	0.200
Work List	Digest Dilution Factor	(DDF)	5.000
2993	ug of Carbon in Sample	(C1)	1.000
Test Code	ug of Carbon in Blank	(C2)	2.6
Matrix			2.4
LIQUID	g of Carbon/L	=	< 2.50E-02
Sample #			
V61-7627	g of Carbon/L	=	$\frac{(C1 - C2) * DF * DDF}{SS * 1000}$
Instrument Code			
WB39927	ug of Carbon/mL	=	g of Carbon/L * 1000000 ug/g / 1000 mL/L
Analyst			
BOATRIGHT			
Date	Detection Level (ug/mL)	=	$\frac{1 \text{ ug C} * DF * DDF}{SS}$
04/12/94			
Time			
0330			

NOTE: Reported Result is Below Detection Level.

ug Carbon/mL	=	< 2.50E+01	DETECTION LEVEL
			in ug/mL
			2.50E+01

Data Entry by: <i>Signature</i>	Date: 14-Apr-94
Approved by: <i>Signature: RW Schroeder</i>	Date: 4-18-94

Serial No V 62.-7727	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination TIC	Method/Standard LA-622-102	Result Units ug C/ML	Charge Code N1A7F	Reruns 0
Sample Size .200ml			Customer ID 108-AP-A	
Remarks, Calculations Results 4.18 ^{FO2} ug C/ml WHC-SD-WM-DP-065, REV. 0 Sutton Boatright				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-12-94	Time Completed 0330	Lab Unit Mgr 4-18-94 R. Schneider		

54-6800-061 (R-10-83)

TIC: LA-622-102 (B-2)

LIQUIDS

		SAM
Type	Sample Volume in mL (SS)	0.200
SAM	Dilution Factor (DF)	5.000
Work List	Digest Dilution Factor (DDF)	1.000
2993	µg of Carbon in Sample (C1)	19.1
Test Code	µg of Carbon in Blank (C2)	2.4
Matrix		
LIQUID	g of Carbon/L =	4.18E-01
Sample #		
V62-7727	g of Carbon/L = $\frac{(C1-C2) * DF * DDF}{SS * 1000}$	
Instrument Code		
WB39927		
Analyst	µg of Carbon/mL = g of Carbon/L * 1000000 µg/g / 1000 mL/L	
BOATRIGHT		
Date		
04/12/94	Detection Level (µg/mL) = $\frac{1 \text{ µg C} * DF * DDF}{SS}$	
Time		
0330		

µg Carbon/mL = 4.18E+02	DETECTION LEVEL
	in µg/mL 2.50E+01

Data Entry by: <i>[Signature]</i>	Date: 14-Apr-94
Approved by: <i>R. Schneider</i>	Date: 4-18-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-7827	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination TIC	Method Standard LA-622-102	Result Units uG C/ML	Charge Code N1A7F	Reruns 0
Sample Size . 200 ml			Customer ID 108-AP-A	
Remarks, Calculations Results DUPLICATE SAMPLE WHC-SD-WM-DP-065, REV. 0 4.15E02 ug C/ml SLHood Boatright				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-12-94	Time Completed 0330	Lab Unit Mgr 4-18-94 RW Schmeder	Guy Hammett	

54-6800-061 (R 10-83)

TIC: LA-622-102 (B-2)

LIQUIDS

		SAM
Type	Sample Volume in mL (SS)	0.200
SAM	Dilution Factor (DF)	5.000
Work List	Digest Dilution Factor (DDF)	1.000
2993	µg of Carbon in Sample (C1)	19
Test Code	µg of Carbon in Blank (C2)	2.4
Matrix		
LIQUID	g of Carbon/L =	4.15E-01
Sample #		
V62-7827	g of Carbon/L = $\frac{(C1-C2) * DF * DDF}{SS * 1000}$	
Instrument Code		
WB39927		
Analyst	µg of Carbon/mL = g of Carbon/L * 1000000 µg/g / 1000 mL/L	
BOATRIGHT		
Date		
04/12/94	Detection Level (µg/mL) = $\frac{1 \mu\text{g C} * DF * DDF}{SS}$	
Time		
0330		

µg Carbon/mL =	4.15E+02	DETECTION LEVEL
		in µg/mL
		2.50E+01

Data Entry by: <i>[Signature]</i>	Date: 14-Apr-94
Approved by: <i>[Signature]</i>	Date: 4-18-94

Serial No V 62.-7927	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination TIC	Method-Standard LA-622-102	Result Units % RECOVERY	Charge Code N1A7F	Reprints 0
Sample Size .200 ml			Customer ID 108-AP-A	
Remarks, Calculations, Result SAMPLE SPIKED ID SPIKE ID 15/12-A SPIKE VOLUME .100 ml WHC-SD-WM-DP-065, REV. 0 83.7 % Recovery S. Boatright				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
PLS	PLS	PLS	PLS	PLS
Date 4-12-94	Time Completed 0330	Lab Unit Mgr RW Schroeder	Date 4-18-94 J. H. Hamer 54 6800 061 (A-10-93)	

TIC: LA-622-102 (B-2)

SPIKED SAMPLE

SPIKE

Type	>>>>> Sample Vial Data <<<<<<	>>>>> Spiked Vial Data <<<<<
SPIKE	Sample Volume in mL 0.200	Sample Volume in mL 0.200
Work List	µg of Carbon in Sample 19.1	Spike Volume in mL 0.100
2993	µg of Carbon in Blank 2.4	Volume Injected in mL 0.200
Test Code		Spike Value (µg/mL) 600
TIC		µg C in Sample + Spike 47
Matrix		µg C in Blank 2.4
LIQUID		
Sample #		
V62-7927	PERCENT SPIKE RECOVERY = $\frac{\mu\text{g Carbon Recovered from Spike} \times 100}{\mu\text{g Carbon in Spike}}$	
Instrument Code		
WB39927		
Analyst	WHERE: $\mu\text{g Carbon Recovered from Spike} =$	
S. BOATRIGHT	$1 (\mu\text{gC in sample} + \text{spike} - \mu\text{gC in blank}) \times (\text{Spike Correction Factor})$	
Date	$- 1 (\mu\text{gC sample} - \mu\text{gC blank}) \times (\text{Sample Size Correction Factor})$	
04/12/94		
Time	Spike Correction Factor = $\frac{\text{Total volume in spiked sample vial (mL)}}{\text{Volume injected (mL)}}$	
3:30		

$$\text{Sample Size Correction Factor} = \frac{\text{Sample size in (mL) in spiked vial}}{\text{Sample size (mL) in sample}}$$

Percent Spike Recovery = 83.7%

Data Entry by: <i>[Signature]</i>	Date: 12-Apr-94
Approved by: <i>[Signature]</i>	Date: 4-18-94

Serial No V 62.-7027	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination TIC	Method-Standard LA-622-102	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size .200ml			Customer ID 108-AP-A	
Remarks Calculations Results SAMPLE SPIKE DUPLICATE SPIKE ID 15N12-A SPIKE VOL .100ml 91.6% Recovery S. Boatright				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
ms	ms	ms	ms	ms
Date 4-12-94	Time Completed 0330	Lab Unit Mgr RW Schroeder	4-18-94	

WHC-SD-WM-DP-065, REV. 0

TIC: LA-622-102 (B-2)

SPIKED SAMPLE

SPIKE

Type	>>>>> Sample Vial Data <<<<<<	>>>>> Spiked Vial Data <<<<<
SPIKE	Sample Volume in mL 0.200	Sample Volume in mL 0.200
Work List	µg of Carbon in Sample 19	Spike Volume in mL 0.100
2993	µg of Carbon in Blank 2.4	Volume Injected in mL 0.200
Test Code		Spike Value (µg/mL) 600
TIC		µg C in Sample + Spike 50.1
Matrix		µg C in Blank 2.4
LIQUID		
Sample #		
V62-7027		
Instrument Code		
WB39927		
Analyst		
S. BOATRIGHT		
Date		
04/12/94		
Time		
3:30		

$$\text{PERCENT SPIKE RECOVERY} = \frac{\mu\text{g Carbon Recovered from Spike} \times 100}{\mu\text{g Carbon in Spike}}$$

$$\begin{aligned} \text{WHERE: } \mu\text{g Carbon Recovered from Spike} &= \\ &= (\mu\text{gC in sample} + \text{spike} - \mu\text{gC in blank}) \times (\text{Spike Correction Factor}) \\ &- (\mu\text{gC sample} - \mu\text{gC blank}) \times (\text{Sample Size Correction Factor}) \end{aligned}$$

$$\text{Spike Correction Factor} = \frac{\text{Total volume in spiked sample vial (mL)}}{\text{Volume injected (mL)}}$$

$$\text{Sample Size Correction Factor} = \frac{\text{Sample size in (mL) in spiked vial}}{\text{Sample size (mL) in sample}}$$

$$\text{Percent Spike Recovery} = 91.6\%$$

Data Entry by: <i>[Signature]</i>	Date: 12-Apr-94
Approved by: <i>[Signature]</i>	Date: 4-18-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 63.-7727	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination TIC	Method/Standard LA-622-102	Result Units uG C/ML	Charge Code N1A7F	Reruns 0
Sample Size .200 ml			Customer ID 108-AP-B	
Remarks, Calculations, Results WHC-SD-WM-DP-065, REV. 0 4.35 E ⁰² uG C/ml Set Hood Boatright				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-12-94	Time Completed 0330	Lab Unit Mgr RW Schneider	4-18-94 J. H. H. H. H.	

54-6800-061 (R-10-83)

TIC: LA-622-102 (B-2)

LIQUIDS

		SAM
Type	Sample Volume in mL (SS)	0.200
SAM	Dilution Factor (DF)	5.000
Work List	Digest Dilution Factor (DDF)	1.000
2993	ug of Carbon in Sample (C1)	19.8
Test Code	ug of Carbon in Blank (C2)	2.4
Matrix		
LIQUID	g of Carbon/L =	4.35E-01
Sample #		
V63-7727	g of Carbon/L =	$\frac{(C1-C2) * DF * DDF}{SS * 1000}$
Instrument Code		
WB39927		
Analyst	ug of Carbon/mL =	g of Carbon/L * 1000000 ug/g / 1000 mL/L
BOATRIGHT		
Date		
04/12/94	Detection Level (ug/mL) =	$\frac{1 \text{ ug C} * DF * DDF}{SS}$
Time		
0330		

ug Carbon/mL =	4.35E+02	DETECTION LEVEL
		in ug/mL
		2.50E+01

Data Entry by: <i>RW Schneider</i>	Date: 14-Apr-94
Approved by: <i>RW Schneider</i>	Date: 4-18-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 63.-7827	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination TIC	Method Standard LA-622-102	Result Units uG C/ML	Charge Code N1A7F	Reruns 0
Sample Size e 200 ml			Customer ID 108-AP-B	
Remarks Calculations Results DUPLICATE SAMPLE WHC-SD-WM-DP-065, REV. 0 4.08 ⁰⁰² ug C/ml St. Hood Boatright				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-12-94	Time Completed 0330 RWS 10-3-94	Lab Unit Mgr RW Schroeder	4-18-94 Jany Hammett	

TIC: LA-622-102 (B-2)		LIQUIDS	SAM
Type	Sample Volume in mL	(SS)	0.200
SAM	Dilution Factor	(DF)	5.000
Work List	Digest Dilution Factor	(DDF)	1.000
2993	ug of Carbon in Sample	(C1)	18.7
Test Code	ug of Carbon in Blank	(C2)	2.4
Matrix			
LIQUID	g of Carbon/L	=	4.08E-01
Sample #			
V63-7827	g of Carbon/L	=	$\frac{(C1-C2) * DF * DDF}{SS * 1000}$
Instrument Code			
WB39927			
Analyst	ug of Carbon/mL	=	g of Carbon/L * 1000000 ug/g / 1000 mL/L
BOATRIGHT			
Date			
04/12/94	Detection Level (ug/mL)	=	$\frac{1 \text{ ug C} * DF * DDF}{SS}$
Time			
0330			

ug Carbon/mL =	4.08E+02	DETECTION LEVEL
		in ug/mL
		2.50E+01

Data Entry by:	<i>RWS</i>	Date:	14-Apr-94
Approved by:	<i>RW Schroeder</i>	Date:	4-18-94

SL HOOD
WHC-SD-WM-DP-065, REV. 0

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V 60

Date: 04.12.94

Time: 01:42:10

Sample Size = 200 uL

Analyst: SL HOOD

Dil Factor = 1

Min Readings = 14

Blank ID # = BLK

Max Readings = 14

Blank Value = 1.042700 ug/minute C

% Difference = 10

== Reading ==	Analysis Time ==	Coulometer ==	% Difference ==
1	0.51	0.20	0.00
2	1.01	0.30	0.00
3	1.51	24.00	74.39
4	2.01	48.40	48.61
5	2.50	63.80	26.84
6	3.00	78.20	19.04
7	3.50	90.20	12.64
8	4.00	96.10	6.70
9	4.50	105.00	5.50
10	5.00	109.00	4.20
11	5.50	112.70	2.76
12	6.00	115.20	2.17
13	6.50	116.90	1.45
14	7.00	118.10	1.02

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 587 TO 596.

BEST AVAILABLE COPY

Blank Value = 1.4 micrograms Carbon
Blank Factor = 1.4 / 7.00 (12) =

+3.4E-01 ug/min Carbon

ANALYSIS RESULTS:

(118.1 - 1.399999)(1)/(200) =
(118.1 - 1.399999)(1)/(200)(12) =

+5.785E-01 g/L Carbon
+4.821E-02 Molar Carbon

Sample Run By:

SL Hood Boctrygt
SL HOOD

RWS 4-18-94

587

STD

WHC-SD-WM-DP-065, REV. 0

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V 60

Date: 04/12/94

Time: 01:42:10

Sample Size = 200 uL

Dil Factor = 1

Blank ID # = BLK

Blank Value = .3427509 ug/minute C

Analyst : SL HOOD

Min Readings = 14

Max Readings = 14

% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.50	0.20	0.00
2	1.00	6.30	35.83
3	1.50	24.60	74.39
4	2.00	45.40	45.81
5	2.50	63.80	28.84
6	3.00	78.60	19.04
7	3.50	90.20	12.04
8	4.00	93.40	8.70
9	4.50	103.00	8.90
10	5.00	105.30	4.20
11	5.50	112.70	2.78
12	6.00	116.20	2.17
13	6.50	116.00	1.45
14	7.00	116.10	1.02

BEST AVAILABLE COPY

BLANK VALUE = 2.4 micrograms carbon

BLANK FACTOR = 2.4 / 7.002171 =

+3.4E-01 ug/min Carbon

SAMPLE RESULTS:

(116.1 - 2.399999)(1)/(200) =

+5.765E-01 g/L Carbon

(116.1 - 2.399999)(1)/(200)(12) =

+4.821E-02 Molar Carbon

Sample Run By:

SL Hood Boetright
SL HOOD

583

STD

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0
<<< BLANK ANALYSIS >>>

Sample: BLK Date: 04/12/94 Time: 00:50:04

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = N/A

Analyst : SL HOOD
Min Readings = 14
Max Readings = 14
% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.10	0.00
2	1.01	0.20	50.00
3	1.51	0.40	50.00
4	2.01	0.60	33.33
5	2.51	0.80	25.00
6	3.01	1.00	20.00
7	3.51	1.10	9.09
8	4.00	1.40	21.43
9	4.50	1.50	6.67
10	5.00	1.80	16.67
11	5.50	2.00	10.00
12	6.00	2.00	0.00
13	6.50	2.20	9.09
14	7.00	2.40	8.33

BEST AVAILABLE COPY

BLANK VALUE = 2.4 micrograms carbon
BLANK FACTOR = 2.4 / 7.002171 =

+3.4E-01 ug/min Carbon

589

Sample Run By: Sethood Boatright

WHC-SD-WM-DP-065, REV. 0

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT TICTOC REV 2.0

Sample: V 61

Date: 04/12/94

Time: 02:14:23

Sample Size = 200 uL

Dil Factor = 1

Blank ID # = BLK

Blank Value = .3427509 ug/minute C

Analyst : SL HOOD

Min Readings = 14

Max Readings = 14

% Difference = 10

== Reading ==	Analysis Time	==== Coulometer ==	% Difference ==
1	0.51	0.20	0.00
2	1.01	0.50	60.00
3	1.51	0.50	0.00
4	2.01	0.80	37.50
5	2.51	1.00	20.00
6	3.01	1.20	16.67
7	3.51	1.40	14.29
8	4.00	1.60	12.50
9	4.50	1.80	11.11
10	5.00	2.00	10.00
11	5.50	2.20	9.09
12	6.00	2.40	8.33
13	6.50	2.50	4.00
14	7.00	2.60	3.85

BEST AVAILABLE COPY

BLANK VALUE = 2.4 micrograms carbon

BLANK FACTOR = 2.4 / 7.002171 =

+3.4E-01 ug/min Carbon

SAMPLE RESULTS:

(2.6 - 2.400284)(1)/(200) =

< 5.00 E-3 g/L Carbon

(2.6 - 2.400284)(1)/(200)(12) =

< 4.17 E-4 Molar Carbon

Sample Run By:

SL Hood Boatright
SL HOOD

550

V61

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V 62

Date: 04/12/94

Time: 02:26:40

Sample Size = 200 uL

Dil Factor = 1

Blank ID # = BLK

Blank Value = .3427509 ug/minute C

Analyst : SL HOOD

Min Readings = 14

Max Readings = 14

% Difference = 10

== Reading ==	Analysis Time ==	Coulometer ==	% Difference ==
1	0.51	0.10	0.00
2	1.01	0.60	83.33
3	1.50	2.70	77.78
4	2.00	5.00	46.00
5	2.50	7.70	35.06
6	3.00	10.10	23.76
7	3.50	12.50	19.20
8	4.00	14.10	11.35
9	4.50	15.20	7.24
10	5.00	16.60	8.43
11	5.50	17.30	4.05
12	6.00	18.00	3.89
13	6.50	18.60	3.23
14	7.00	19.10	2.62

BEST AVAILABLE COPY

BLANK VALUE = 2.4 micrograms carbon
BLANK FACTOR = 2.4 / 7.002171 =

+3.4E-01 ug/min Carbon

SAMPLE RESULTS:

(19.1 - 2.399999)(1)/(200) =
(19.1 - 2.399999)(1)/(200)(12) =

+8.35E-02 g/L Carbon
+6.96E-03 Molar Carbon

Sample Run By:

SL Hood Boatright
SL HOOD

591

V62

WHC-SD-WM-DP-065, REV. 0

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT TICTOC REV 2.0

Sample: V 62 DUP

Date: 04/12/94

Time: 02:35:25

Sample Size = 200 uL

Dil Factor = 1

Blank ID # = BLK

Blank Value = .3427509 ug/minute C

Analyst : SL HOOD

Min Readings = 14

Max Readings = 14

% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.10	0.00
2	1.01	1.10	90.91
3	1.51	3.00	63.33
4	2.00	5.60	46.43
5	2.50	8.10	30.86
6	3.00	10.10	19.60
7	3.50	12.10	16.53
8	4.00	13.60	11.03
9	4.50	14.60	5.11
10	5.00	15.90	6.92
11	5.50	16.90	5.92
12	6.00	17.60	3.96
13	6.50	18.30	3.83
14	7.00	19.00	3.68

BEST AVAILABLE COPY

BLANK VALUE = 2.4 micrograms carbon

BLANK FACTOR = 2.4 / 7.002171 =

+3.4E-01 ug/min Carbon

SAMPLE RESULTS:

(13 - 2.400286)(1)/(200) =

+8.30E-02 g/L Carbon

(13 - 2.400286)(1)/(200)(12) =

+6.92E-03 Molar Carbon

Sample Run By:

SL Hood
SL HOOD

592

V 62 Dup

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V 62 SPK

Date: 04/12/94

Time: 02:54:19

Sample Size = 200 uL

Dil Factor = 1.5

Blank ID # = BLK

Blank Value = .3427509 ug/minute C

Analyst : SL HOOD

Min Readings = 14

Max Readings = 14

% Difference = 10

== Reading ==	== Analysis Time ==	== Coulometer ==	== % Difference ==
1	0.51	0.10	0.00
2	1.01	1.60	93.75
3	1.50	6.50	75.38
4	2.00	12.50	48.00
5	2.50	18.50	32.43
6	3.00	24.10	23.24
7	3.50	28.80	16.32
8	4.00	32.80	12.20
9	4.50	36.40	9.89
10	5.00	39.30	7.38
11	5.50	41.80	5.98
12	6.00	43.90	4.78
13	6.50	45.40	3.30
14	7.00	47.00	3.40

BEST AVAILABLE COPY

BLANK VALUE = 2.4 micrograms carbon

BLANK FACTOR = $2.4 / 7.002171 =$

+3.4E-01 ug/min Carbon

SAMPLE RESULTS:

(47 - 2.400281)(1.5)/(200) =

+3.34E-01 g/L Carbon

(47 - 2.400281)(1.5)/(200)(12) =

+2.79E-02 Molar Carbon

Sample Run By:

SL Hood Bostright
SL HOOD

593

V 62 spk

WHC-SD-WM-DP-065, REV. 0

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT TICTOC REV 2.0

Sample: V 62 DUP SPK Date: 04/12/94 Time: 03:04:43

Sample Size = 200 uL Analyst : SL HOOD
Dil Factor = 1.5 Min Readings = 14
Blank ID # = BLK Max Readings = 14
Blank Value = .3427509 ug/minute C % Difference = 10

== Reading ==	==== Analysis Time ==	==== Coulometer ==	==== % Difference ==
1	0.51	0.30	0.00
2	1.01	1.70	82.35
3	1.50	6.70	74.63
4	2.00	13.30	49.62
5	2.50	19.60	32.14
6	3.00	25.50	23.14
7	3.50	30.50	16.33
8	4.00	34.90	12.61
9	4.50	38.50	3.35
10	5.00	41.70	7.67
11	5.50	44.50	6.29
12	6.00	46.80	4.51
13	6.50	48.40	3.72
14	7.00	50.10	3.39

BEST AVAILABLE COPY

BLANK VALUE = 2.4 micrograms carbon

BLANK FACTOR = 2.4 / 7.002171 = +3.4E-01 ug/min Carbon

SAMPLE RESULTS:

(50.1 - 2.400286)(1.5)/(200) =

+3.58E-01 g/L Carbon

(50.1 - 2.400286)(1.5)/(200)(12) =

+2.98E-02 Molar Carbon

Sample Run By:

SL HOOD

50.1

V 62 Dup spk

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V 63

Date: 04/12/94

Time: 03:14:48

Sample Size = 200 uL

Dil Factor = 1

Blank ID # = BLK

Blank Value = .3427509 ug/minute C

Analyst : SL HOOD

Min Readings = 14

Max Readings = 14

% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.60	0.00
2	1.01	1.30	53.85
3	1.51	3.50	62.86
4	2.00	5.90	40.68
5	2.50	8.20	28.05
6	3.00	10.30	20.39
7	3.50	12.40	16.94
8	4.00	13.80	10.14
9	4.50	15.30	9.80
10	5.00	16.40	6.71
11	5.50	17.50	6.29
12	6.00	18.60	5.91
13	6.50	19.30	3.63
14	7.00	19.80	2.53

REST AVAILABLE COPY

BLANK VALUE = 2.4 micrograms carbon

BLANK FACTOR = 2.4 / 7.002171 =

+3.4E-01 ug/min Carbon

SAMPLE RESULTS:

(19.8 - 2.399941)(1)/(200) =

+8.70E-02 g C/min

(19.8 - 2.399941)(1)/(200)(12) =

+7.25E-03 g C/min

Sample Run By:

SL Hood Boatright
SL HOOD

595

V 63

WHC-SD-WM-DP-065, REV.0

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT TICTOC REV 2.0

Sample: V 63 Dup

Date: 04/12/94

Time: 06.24:39

Sample Size = 200 uL

Analyst: SL HOOD

Dil Factor = 1

Min. Readings = 14

Blank ID # = BLK

Max. Readings = 14

Blank Value = .3427509 ug/minute C

% Difference =

== Reading ==	Analysis Time ==	Coulometer ==	% Diff =
1	0.51	0.20	
2	1.01	0.70	
3	1.50	2.50	
4	2.00	4.90	
5	2.50	7.20	
6	3.01	9.20	
7	3.50	11.10	
8	4.00		
9	4.50		
10	5.00		
11	5.50		
12	6.00		
13			
14			

BEST AVAILABLE CC.

BLANK VALUE =
BLANK ID =

SL Hood Boatright

596

V 63 Dup

WHC-SD-WM-DP-065, REV. 0

WATER DIGESTION

Chemist: R. SCHROEDER

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

A-6000-881 (03/92)

WHC-SD-WM-DP-065, REV. 0

[illegible]

X

NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE -- LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH

Robert W. Schroeder
7-7-94

RERUN *Batch 3926*

Serial No 7 65.-7527	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority 22
Determination TIC	Method-Standard LA-622-102	Result Units % RECOVERY	Charge Code N1A7F	Reruns 2
Sample Size .200 ML			Customer ID STD	
Remarks, Calculations, Results 3223 C09 <i>4.95E-2M</i> <i>7-3-94</i> STD# 15N12B RESULT <i>5.95</i> STD VAL 5.00-2% REC 99.00% $5.95E^{-1} \text{ gC/L} / 12.011 = 4.95E^{-2} \text{ M}$ WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7-2-94	Time Completed	Lab Unit Mgr 7-6-94 <i>R. Schneider</i>	<i>Donahue</i> <i>Gary H. Hume</i>	

54-6800-061 (R-10-83)

TIC: LA-622-102 (B-2)

LIQUIDS

	STANDARD	
Type	Sample Volume in mL	(SS) 0.200
STANDARD	Dilution Factor	(DF) 1.000
Work List	Digest Dilution Factor	(DDF) 1.000
3926	µg of Carbon in Sample	(C1) 122
Test Code	µg of Carbon in Blank	(C2) 3.1
TIC		
Matrix		
LIQUID	g of Carbon/L	= 5.95E-01
Sample #		
V65-7527	g of Carbon/L	= $\frac{(C1-C2) \cdot DF \cdot DDF}{SS \cdot 1000}$
Instrument Code		
AL10656		
Analyst	µg of Carbon/mL	= g of Carbon/L * 1000000 µg/g / 1000 mL/L
K. MONTEITH		
Date		
07/02/94	Detection Level (µg/mL)	= $\frac{1 \text{ µg C} \cdot DF \cdot DDF}{SS}$
Time		
09:17		

BEST AVAILABLE COPY

µg Carbon/mL = 5.95E+02	DETECTION LEVEL
	in µg/mL 5.00E+00

Data Entry by: <i>Donahue</i>	Date: 03-Jul-94
Approved by: <i>R. Schneider</i>	Date: 7-6-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No					Sample Point		Date		Time Issued		Priority		
V 66.-7627					102-A2		3-13-94		3:53		26		
Determination			Method-Standard			Result Units			Charge Code			Reruns	
TIC			LA-622-102			ug C/mL			N1A7E			2	
Sample Size									Customer ID				
.200 ML									BLANK				
Remarks, Calculations Results													
REAGENT BLANK <div style="text-align: center;"> E+1 < 2.50E-2 ^{RWS} 7-7-94 < 5.00 ug C/mL ^{RWS} 7-6-94 </div>													
Analyst		Analyst		Analyst - 3		Analyst - 4		Analyst - 5					
								RIS-ENBROD					
Hrs		Hrs		Hrs		Hrs		Hrs					
Date			Time Completed			Lab Unit Mgr			7-6-94				
7-2-94													

WHC-SD-WM-DP-065, REV. 0

TIC: LA-622-102 (B-2)

LIQUIDS

BLANK		
Type	Sample Volume in mL	(SS)
BLANK	Dilution Factor	(DF)
Work List	Digest Dilution Factor	(DDF)
3926	ug of Carbon in Sample	(C1)
Test Code	ug of Carbon in Blank	(C2)
TIC		
Matrix		
LIQUID	g of Carbon/L	= < 2.50E-02
Sample #		
V66-7627	g of Carbon/L	= $\frac{(C1-C2) * DF * DDF}{SS * 1000}$
Instrument Code		
AL10656		
Analyst	ug of Carbon/mL	= g of Carbon/L * 1000000 ug/g / 1000 mL/L
K.MONTIETH		
Date		
07/02/94	Detection Level (ug/mL)	= $\frac{1 \text{ ug C} * DF * DDF}{SS}$
Time		
19:28		

NOTE: Reported Result is Below Detection Level.

BEST AVAILABLE COPY

ug Carbon/mL =	< 2.50E+01	DETECTION LEVEL
		in ug/mL
		2.50E+01

Data Entry by:		Date:	06-Jul-94
Approved by:		Date:	7-6-94

REKUN

Serial No V 67.-7727	Sample Point 103-AP	Date 3-13-94	Time Issued 9:39	Priority 23
Determination TIC	Method-Standard LA-622-102	Result Units ug C/ML	Charge Code N1A7F	Repeats 2
Sample Size .200 ML			Customer ID 103-AP-C	

Remarks, Calculations, Results

WHC-SD-WM-DP-065, REV. 0

4.88 E+2

$$\frac{9.15 \text{ FBI}}{\text{ug C / mL}}$$

 RWS
 7-6-94

Analyst - 1 	Analyst - 2 	Analyst - 3	Analyst - 4	Analyst - 5 RE-ENTERED
Hrs	Hrs	Hrs	Hrs	Hrs RE-ENTERED
Date 7-2-94	Time Completed	Lab Unit Mgr 7-6-94 RWS		

54-6800-C61 (R-10-83)

BEST AVAILABLE COPY

TIC: LA-622-102 (B-2)

LIQUIDS

		SAMPLE
Type	Sample Volume in mL	(SS) 0.200
SAMPLE	Dilution Factor	(DF) 1.000
Work List	Digest Dilution Factor	(DDF) 5.000
3926	ug of Carbon in Sample	(C1) 22.6
Test Code	ug of Carbon in Blank	(C2) 3.1
TIC		
Matrix		
LIQUID	g of Carbon/L	= 4.88E-01
Sample #		
V67-7727	g of Carbon/L	= $\frac{(C1-C2) * DF * DDF}{SS * 1000}$
Instrument Code		
AL10656		
Analyst	ug of Carbon/mL	= g of Carbon/L * 1000000 ug/g / 1000 mL/L
K.MONTIETH		
Date		
07/02/94	Detection Level (ug/mL)	= $\frac{1 \text{ ug C} * DF * DDF}{SS}$
Time		
19:36		

ug Carbon/mL =	4.88E+02	DETECTION LEVEL
		in ug/mL
		2.50E+01

Data Entry by:		Date:	06-Jul-94
Approved by:		Date:	7-6-94

602

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN

Serial No V 67-7827	Sample Point 103-AP	Date 3-13-94	Time Issued 9:39	Priority 26
Determination TIC	Method-Standard LA-622-102	Result Units ug C/ML	Charge Code N1A7F	Reruns 2
Sample Size .200 ML			Customer ID 103-AP-C	
Remarks Calculations, Results DUPLICATE SAMPLE 4.83 E+2 7.65 E+1 ug C/mL RWS 9-30-94				
Analyst 1 	Analyst 2	Analyst 3	Analyst 4	Analyst 5 RE-ENTERED
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7-2-94	Time Completed	Lab Unit Mgr 7-6-94 		

WHC-SD-WM-DP-065, REV. 0

TIC: LA-622-102 (B-2)

LIQUIDS

		SAMPLE
Type	Sample Volume in mL	(SS) 0.200
SAMPLE	Dilution Factor	(DF) 1.000
Work List	Digest Dilution Factor	(DDF) 5.000
3926	ug of Carbon in Sample	(C1) 22.4
Test Code	ug of Carbon in Blank	(C2) 3.1
TIC		
Matrix		
LIQUID	g of Carbon/L	= 4.82E-01
Sample #		
V67-7827	g of Carbon/L	= $\frac{(C1-C2) * DF * DDF}{SS * 1000}$
Instrument Code		
AL10656		
Analyst	ug of Carbon/mL	= g of Carbon/L * 1000000 ug/g / 1000 mL/L
K.MONTIETH		
Date		
07/02/94	Detection Level (ug/mL)	= $\frac{1 \text{ ug C} * DF * DDF}{SS}$
Time		
19:45		

BEST AVAILABLE COPY

ug Carbon/mL =	4.83E+02	DETECTION LEVEL
		in ug/mL
		2.50E+01

Data Entry by:		Date:	06-Jul-94
Approved by:		Date:	7-6-94

RERUN

Serial No V 68.-7727	Sample Point 103-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination TIC	Method Standard LA-622-102	Result Units ug C/ML	Charge Code N1A7F	Reruns 2
Sample Size .200 ML			Customer ID 103-AP-D	
Remarks, Calculations Results <div style="text-align: center;"> 5.65 E+2 RW 7-6-94 1.16 E02 ug C/ML 7-6-94 5.78 E+2 </div>				
Analyst	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 RE-ENTERED
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7-2-94	Time Completed	Lab Unit Mgr 7-6-94

WHC-SD-WM-DP-065, REV. 0

TIC: LA-622-102 (B-2)

LIQUIDS

		SAMPLE
Type	Sample Volume in mL (SS)	0.200
SAMPLE	Dilution Factor (DF)	1.000
Work List	Digest Dilution Factor (DDF)	5.000
3926	ug of Carbon in Sample (C1)	26.2
Test Code	ug of Carbon in Blank (C2)	3.1
TIC		
Matrix		
LIQUID	g of Carbon/L =	5.78E-01
Sample #		
V68-7727	g of Carbon/L = $\frac{(C1-C2) * DF * DDF}{SS * 1000}$	
Instrument Code		
AL10656		
Analyst	ug of Carbon/mL = g of Carbon/L * 1000000 ug/g / 1000 mL/L	
K, MONTIETH		
Date	Detection Level (ug/mL) = $\frac{1 \text{ ug C} * DF * DDF}{SS}$	
07/02/94		
Time		
19:54		

BEST AVAILABLE COPY

ug Carbon/mL =	5.78E+02	DETECTION LEVEL
		in ug/mL
		2.50E+01

Data Entry by:		Date:	06-Jul-94
Approved by:		Date:	7-7-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V68 7-7827 Sample Point 108-AP Date 3-18-94 Time Issued 9:39 Priority 26

Determination TIC Method-Standard LA-622-102 Result Units ug C/ML Charge Code N1A7F Reruns 2

Sample Size .200 ML Customer ID 108-AP-C

Remarks, Calculations, Results
DUPLICATE SAMPLE
5.65 E+2
WHC-SD-WM-DP-065, REV. 0
7-13 E+02
ms C/mx
RWS
7-6-94

Analyst - 1 [Signature] Analyst - 2 [Signature] Analyst - 3 [Signature] Analyst - 4 [Signature] Analyst - 5 [Signature]

Hrs [Signature] Hrs [Signature] Hrs [Signature] Hrs [Signature] Hrs [Signature]

Date 7-2-94 Time Completed [Signature] Lab Unit Mgr 7-6-94 [Signature] [Signature]

54-6800-061 (R-10-83)

TIC: LA-622-102 (B-2)		LIQUIDS	SAMPLE
Type	Sample Volume in mL	(SS)	0.200
SAMPLE	Dilution Factor	(DF)	1.000
Work List	Digest Dilution Factor	(DDF)	5.000
3926	ug of Carbon in Sample	(C1)	25.7
Test Code	ug of Carbon in Blank	(C2)	3.1
TIC			
Matrix			
LIQUID	g of Carbon/L	=	5.65E-01
Sample #			
V68-7827	g of Carbon/L	=	$\frac{(C1-C2) * DF * DDF}{SS * 1000}$
Instrument Code			
AL10656			
Analyst	ug of Carbon/mL	=	g of Carbon/L * 1000000 ug/g / 1000 mL/L
K.MONTIETH			
Date			
07/02/94	Detection Level (ug/mL)	=	$\frac{1 \text{ ug C} * DF * DDF}{SS}$
Time			
19:54			

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ug Carbon/mL =	5.65E+02	DETECTION LEVEL
		in ug/mL
		2.50E+01

Data Entry by: RW Schroeder Date: 06-Jul-94

Approved by: RW Schroeder Date: 7-6-94

RERUN

Serial No V 69.-7727	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination TIC	Method-Standard LA-622-102	Result Units ug C/ML	Charge Code N1A7F	Reruns 2
Sample Size .200 ML			Customer ID 108-AP-E	
Remarks, Calculations, Results <div style="text-align: center;"> $5.35E+2$ $\frac{1.07 \text{ ED } 2}{\text{ug C/mL}}$ RWS 7-6-94 </div>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 RS-BNTERED
Hrs	Hrs	Hrs	Hrs	Hrs
Date 2-2-94	Time Completed	Lab Unit Mgr 7-6-94

54-6800-061 (R-10-83)

TIC: LA-622-102 (B-2)

LIQUIDS

		SAMPLE
Type	Sample Volume in mL (SS)	0.200
SAMPLE	Dilution Factor (DF)	1.000
Work List	Digest Dilution Factor (DDF)	5.000
3926	ug of Carbon in Sample (C1)	24.5
Test Code	ug of Carbon in Blank (C2)	3.1
TIC		
Matrix		
LIQUID	g of Carbon/L =	5.35E-01
Sample #		
V69-7727	g of Carbon/L = $\frac{(C1-C2) * DF * DDF}{SS * 1000}$	
Instrument Code		
AL10656		
Analyst	ug of Carbon/mL = g of Carbon/L * 1000000 ug/g / 1000 mL/L	
K, MONTIETH		
Date	Detection Level (ug/mL) = $\frac{1 \text{ ug C} * DF * DDF}{SS}$	
07/02/94		
Time		
19:54		

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ug Carbon/mL = 5.35E+02	DETECTION LEVEL
	in ug/mL 2.50E+01

Data Entry by:	Date: 06-Jul-94
Approved by:	Date: 7-6-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN

Serial No V 69.-7827	Sample Point 103-AP	Date 3-13-94	Time Issued 9:42	Priority 26
Determination TIC	Method/Standard LA-622-102	Result Units uG C/ML	Charge Code N1A7F	Reruns 2
Sample Size .200 ML			Customer ID 103-AP-E	
Remarks, Calculations, Results DUPLICATE SAMPLE 5.33 E+2 1.07 E+2 ng/ml RWS 7-6-94				
Analyst	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7-2-94	Time Completed	Lab Unit Mgr 7-6-94 RWS

54-6800-261 (R-10-33)

WHC-SD-WM-DP-065, REV. 0

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TIC: LA-622-102 (B-2)

LIQUIDS

Type	Sample Volume in mL	(SS)	SAMPLE
SAMPLE	Dilution Factor	(DF)	0.200
Work List	Digest Dilution Factor	(DDF)	1.000
3926	ug of Carbon in Sample	(C1)	5.000
Test Code	ug of Carbon in Blank	(C2)	24.4
TIC			3.1
Matrix			
LIQUID	g of Carbon/L	=	5.33E-01
Sample #			
V69-7827	g of Carbon/L	=	$\frac{(C1-C2) * DF * DDF}{SS * 1000}$
Instrument Code			
AL10656			
Analyst	ug of Carbon/mL	=	g of Carbon/L * 1000000 ug/g / 1000 mL/L
K, MONTIETH			
Date			
07/02/94	Detection Level (ug/mL)	=	$\frac{1 \text{ ug C} * DF * DDF}{SS}$
Time			
19:54			

ug Carbon/mL =	5.33E+02	DETECTION LEVEL
		in ug/mL
		2.50E+01

Data Entry by:		Date:	06-Jul-94
Approved by:		Date:	7-6-94

WHC-SD-WM-DP-065, REV. 0

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WHC-SD-WM-DP-065, REV. 0

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	1.01	16.90	16.90
	2.01	16.90	16.90
	2.51	16.90	16.90
	3.01	16.90	16.90
	3.51	16.90	16.90
	4.01	16.90	16.90
	4.50	16.90	16.90
	5.00	16.90	16.90
	5.50	16.90	16.90
	6.00	16.90	16.90
	6.50	16.90	16.90
	7.00	16.90	16.90

WHC-SD-WM-DP-065, REV. 0

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WHC-SD-WM-DP-065, REV. 0

WHC-SD-WM-DP-065, REV. 0

WHC-SD-WM-DP-065, REV. 0

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Sample No. 111804

Date: 11/11/77

Sample No. 111804

Dr. R. L. ...

Site No. 111804

Site Name: ...

10.20
15.50
19.10
21.1
22.00
22.2
22.12
24.30
25.00
25.60
26.00
26.50
27.00

WHC-SD-WM-DP-065, REV. 0

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017
42

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. 7-12	Customer ID: 10560-EP
Analysis: -	Sample Prep: H.C. Riggs

Instrument: 115147	Procedure/ Rev: 11517-111
Technologist: J. (M) Rogers	Date: 7-13-94
Starting Time: 1:30	Temperature 25 C
Ending Time: 2:22	Chemist: S. Brander

Comments: _____

7-21-94					
	Description	Lab ID		Description	Lab ID
1	LMCS	11517-111	11		
2		11517-111	12		
3		11517-111	13		
4		11517-111	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
	5156-220			
				616

[illegible]

NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

Rw Schroeder
7-21-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3015

Serial No V 71.-7527	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 1	Priority 26
Determination TIC	Method Standard LA-622-102	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 200ml			Customer ID STD	
Remarks Calculations, Results S223 C03 STD# 15/112 B RESULT 4.85 E-ZM STD VAL 5.00 E-ZM % REC 97.0 <p style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</p>				
Analyst - 1 <i>R. Schmoeder</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7/18/94	Time Completed 2151	Lab Unit Mgr <i>R. Schmoeder</i>	<i>R. Schmoeder</i>	

54-6800-061 (R-10 83)

TIC: LA-622-102 (B-2)		LIQUIDS	STD
Type	Sample Volume in mL	(SS)	0.200
STD	Dilution Factor	(DF)	1.000
Work List	Digest Dilution Factor	(DDF)	1.000
3015	µg of Carbon in Sample	(C1)	120
Test Code	µg of Carbon in Blank	(C2)	3.5
TIC			
Matrix			
LIQUID	g of Carbon/L	=	5.83E-01
Sample #			
V71-7527	g of Carbon/L	=	$\frac{(C1 - C2) * DF * DDF}{SS * 1000}$
Instrument Code			
WB39927	µg of Carbon/mL	=	g of Carbon/L * 1000000 µg/g / 1000 mL/L
Analyst			
RD MEYERS			
Date			
07/18/94	Detection Level (µg/mL)	=	$\frac{1 \mu g C * DF * DDF}{SS}$
Time			
2151			

MOLARITY	=	4.85E-02	DETECTION LEVEL
			in µg/mL
			5.00E+00

Data Entry by:	<i>R. Schmoeder</i>	Date:	21-Jul-94
Approved by:	<i>R. Schmoeder</i>	Date:	7-21-94

Serial No V 72.-7627	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 5	Priority 26
Determination TIC	Method/Standard LA-622-102	Result Units uG C/ML	Charge Code N1A7F	Reruns 0
Sample Size 200ml			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK WHC-SD-WM-DP-065, REV. 0 $< 5.00 \text{ E}+0 \text{ ug/mL} \cdot \text{D.F. } 10 =$ $< 5.00 \text{ E}+1 \text{ ug/mL}$				
Analyst - 1 <i>R. Schneider</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7/19/94	Time Completed 2201	Lab Unit Mgr <i>R. Schneider</i>	7-19-94 <i>R. Schneider</i>	

54-6800-061 (R-10-83)

TIC: LA-622-102 (B-2)

LIQUIDS

	BLK
Type	Sample Volume in mL (SS) 0.200
BLK	Dilution Factor (DF) 1.000
Work List	Digest Dilution Factor (DDF) 10.000
3015	ug of Carbon in Sample (C1) 3.4
Test Code	ug of Carbon in Blank (C2) 3.5
TIC	
Matrix	
LIQUID	g of Carbon/L = < 5.00E-02
Sample #	
V72-7627	g of Carbon/L = $\frac{(C1-C2) \cdot DF \cdot DDF}{SS \cdot 1000}$
Instrument Code	
WB39927	
Analyst	ug of Carbon/mL = g of Carbon/L * 1000000 ug/g / 1000 mL/L
RD MEYERS	
Date	
07/18/94	Detection Level (ug/mL) = $\frac{1 \text{ ug C} \cdot DF \cdot DDF}{SS}$
Time	
2201	

NOTE: Reported Result is Below Detection Level.

ug Carbon/mL =	< 5.00E+01	DETECTION LEVEL in ug/mL 5.00E+01
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Data Entry by: <i>R. Schneider</i>	Date: 21-Jul-94
Approved by: <i>R. Schneider</i>	Date: 7-21-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 73.-7727	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination TIC	Method-Standard LA-622-102	Result Units uG C/ML	Charge Code N1A7F	Reruns 0
Sample Size .200m			Customer ID 108AP-FB	
Remarks Calculations, Results <p style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</p> <p style="text-align: center;">$< 5.00 E+0 \text{ ug/mL} \cdot D.F. 10 =$</p> <p style="text-align: center;">$< 5.00 E+1 \text{ ug/mL}$</p>				
Analyst <i>R. Meyer</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs 7 Feb 10/3/94	Hrs	Hrs <i>Rakete</i>	Hrs	Hrs
Date 7/13/94	Time Completed 2211	Lab Unit Mgr 7-19-94 <i>R. Schneider</i>	<i>Re Jones</i>	

54-6800-061 (R-10-83)

TIC: LA-622-102 (B-2)

LIQUIDS

		SAMPLE
Type	Sample Volume in mL	(SS) 0.200
SAMPLE	Dilution Factor	(DF) 1.000
Work List	Digest Dilution Factor	(DDF) 10.000
3015	ug of Carbon in Sample	(C1) 4.3
Test Code	ug of Carbon in Blank	(C2) 3.5
TIC		
Matrix		
LIQUID	g of Carbon/L	= < 5.00E-02
Sample #		
V73-7727	g of Carbon/L	= $\frac{(C1-C2) \cdot DF \cdot DDF}{SS \cdot 1000}$
Instrument Code		
WB39927		
Analyst	ug of Carbon/mL	= g of Carbon/L * 1000000 ug/g / 1000 mL/L
RD MEYERS		
Date		
07/18/94	Detection Level (ug/mL)	= $\frac{1 \text{ ug C} \cdot DF \cdot DDF}{SS}$
Time		
2211		

NOTE: Reported Result is Below Detection Level.

ug Carbon/mL =	< 5.00E+01	DETECTION LEVEL
		in ug/mL
		5.00E+01

Data Entry by:	<i>R. Schneider</i>	Date:	21-Jul-94
Approved by:	<i>R. Schneider</i>	Date:	7-22-94

Serial No V 73.-7827	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination TIC	Method/Standard LA-622-102	Result Units uG C/ML	Charge Code N1A7F	Reruns 0
Sample Size 200ml			Customer ID 108AP-FB	
Remarks, Calculations, Results DUPLICATE SAMPLE WHC-SD-WM-DP-065, REV. 0 $< 5.00E+0 \cdot 10 \text{ D.F.} =$ $< 5.00E+1 \text{ ug/mL}$				
Analyst 1 <i>R. Meyer</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7/18/94	Time Completed 2221	Lab Unit Mgr 7-19-94 <i>R. Schroeder</i>	<i>R. Meyer</i>	

54-6800-061 (R-10-83)

TIC: LA-622-102 (B-2)

LIQUIDS

		SAMPLE
Type	Sample Volume in mL (SS)	0.200
SAMPLE	Dilution Factor (DF)	1.000
Work List	Digest Dilution Factor (DDF)	10.000
3015	ug of Carbon in Sample (C1)	3.5
Test Code	ug of Carbon in Blank (C2)	3.5
TIC		
Matrix		
LIQUID	g of Carbon/L = < 5.00E-02	
Sample #		
V73-7827	g of Carbon/L = $\frac{(C1-C2) \cdot DF \cdot DDF}{SS \cdot 1000}$	
Instrument Code		
WB39927		
Analyst	ug of Carbon/mL = g of Carbon/L * 1000000 ug/g / 1000 mL/L	
RD MEYERS		
Date	Detection Level (ug/mL) = $\frac{1 \text{ ug C} \cdot DF \cdot DDF}{SS}$	
07/18/94		
Time		
2221		

NOTE: Reported Result is Below Detection Level.

ug Carbon/mL = < 5.00E+01	DETECTION LEVEL in ug/mL 5.00E+01
---------------------------	---

Data Entry by: <i>R. Schroeder</i>	Date: 21-Jul-94
Approved by: <i>R. Schroeder</i>	Date: 7-23-94

621

TOTAL 1.000000 CARBON WGT 313.4000
TIC 1.000000

DATE 07/18/94 TIME 10:00:00

1.000000

1.000000

1.000000

1.000000

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SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 622 TO 626.

J. L. L.

7-18-94

622

	1.0
	1.0
	1.0
	1.0
4.00	1.0
4.50	1.0
5.00	1.0
5.50	1.0
6.00	1.0
6.50	1.0
7.00	1.0
7.50	1.0
8.00	1.0
8.50	1.0
9.00	1.0
9.50	1.0
10.00	1.0

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WHC-SD-WM-DP-065, REV. 0

WHC-SD-WM-DP-065, REV. 0

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THE FOLLOWING ANALYSES ARE INCLUDED IN THE DATA PACKAGE BUT THE RESULTS HAVE NOT BEEN REPORTED IN THE FINAL SUMMARY REPORTS.

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WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No. <i>V66-7627, V67-7727, V67-7827, V68-7727, V68-7827, V69-7727, V69-7827</i>	Customer ID: <i>Blank, 108-AP-C, 108-AP-E, 108-AP-D, 108-AP-D, 108-AP-E, 108-AP-E</i>
Analysis: <i>TIC</i>	Sample Prep: <i>WATER DIGESTION</i>

Instrument: WB 39927	Procedure/ Rev: LA-622-102 B-2
Technologist: Brenda SEVERSON <i>Brenda Severson</i>	Date: 4-11-94
Starting Time: 1245	Temperature NA
Ending Time: 1500	Chemist: R. SCHROEDER

Comments: Rerun - Second blank "Prep blank" was too high.

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	Description	Lab ID		Description	Lab ID
1	LMCS	V65-7527	11	DATA NOT USED IN PACKAGE	
2	REAGENT BLANK	V66-7627	12		
3	SAMPLE	V67-7727	13		
4	DUPLICATE SAMPLE	V67-7827	14		
5	SAMPLE	V68-7727	15		
6	DUPLICATE SAMPLE	V68-7827	16		
7	SAMPLE	V69-7727	17		
8	DUPLICATE SAMPLE	V69-7827	18		
9			19		
10			20		

[illegible]

[illegible]

NARRATIVE-LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH:

Robert W Schroeder
4-25-94

Batch 3006

Serial No V 65.-7527	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority 26
Determination TIC	Method/Standard LA-622-102	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 200 mL			Customer ID STD	
Remarks, Calculations, Results S223 C03 STD# 15N12-A RESULT 5.90×10^{-01} g/L / 4.91×10^{-02} M STD VAL 5.00×10^{-2} % REC 98.2 <div style="text-align: right; font-weight: bold;">OUT FOR RERUN</div>				
Analyst - 1 <i>B. Severson</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-11-94	Time Completed 1327	Lab Unit Mgr <i>R. W. Schroeder</i>	4-20-94 <i>R. C. Jones</i>	

WHC-SD-WM-DP-065, REV. 0

54-6800-061 (R-10-83)

TIC: LA-622-102 (B-2)

LIQUIDS

	STANDARD
Type	Sample Volume in mL (SS) 0.200
STANDARD	Dilution Factor (DF) 1.000
Work List	Digest Dilution Factor (DDF) 1.000
3006	µg of Carbon in Sample (C1) 121
Test Code	µg of Carbon in Blank (C2) 3.1
TIC	
Matrix	
LIQUID	g of Carbon/L = 5.90E-01
Sample #	
V65-7527	g of Carbon/L = $\frac{(C1 - C2) \cdot DF \cdot DDF}{SS \cdot 1000}$
Instrument Code	
WB39927	
Analyst	µg of Carbon/mL = g of Carbon/L * 1000000 µg/g / 1000 mL/L
B. SEVERSON	
Date	
04/11/94	Detection Level (µg/mL) = $\frac{1 \mu\text{g C} \cdot DF \cdot DDF}{SS}$
Time	
1327	

µg Carbon/mL =	5.90E+02	DETECTION LEVEL in µg/mL
		5.00E+00

Data Entry by: <i>B. Severson</i>	Date: 11-Apr-94
Approved by: <i>R. W. Schroeder</i>	Date: 4-19-94

Serial No V 66.-7627	Sample Point 108-AP	Date 3-18-94	Time Issued 9:38	Priority 26
Determination TIC	Method-Standard LA-622-102	Result Units uG C/ML	Charge Code N1A7F	Reruns 0
Sample Size . 200mL			Customer ID BLANK	
Remarks Calculations Results REAGENT BLANK Prep, RWS 7-12-94 57.5 RWS 7-7-94 7.15 FOI ug C/ml OUT FOR RERUN WHC-SD-WM-DP-065, REV. 0 <i>Brenda Severson</i> Analyst - 1 Analyst - 2 Analyst - 3 Analyst - 4 Analyst - 5 Hrs Hrs Hrs Hrs Hrs Date 4-11-94 Time Completed; 3340 Unit Mgr 4-25-94 <i>RWS</i> <i>RWSchoeder</i> 54-6800-061 (R-10-83)				

TIC: LA-622-102 (B-2)

LIQUIDS

Type	Sample Volume in mL (SS)	BLANK
BLANK	Dilution Factor (DF)	0.200
Work List	Digest Dilution Factor (DDF)	1.000
3006	ug of Carbon in Sample (C1)	5 1.000
Test Code	ug of Carbon in Blank (C2)	5.4
TIC		3.1
Matrix		
LIQUID	g of Carbon/L =	1.15E-02
Sample #		
V66-7627	g of Carbon/L =	$\frac{(C1-C2) \cdot DF \cdot DDF}{SS \cdot 1000}$
Instrument Code		
WB39927	ug of Carbon/mL =	g of Carbon/L * 1000000 ug/g / 1000 mL/L
Analyst		
B. SEVERSON		
Date		
04/11/94	Detection Level (ug/mL) =	$\frac{1 \text{ ug C} \cdot DF \cdot DDF}{SS}$
Time		
1327		

RWS 7-7-94

ug Carbon/mL =	5.75 E-1	DETECTION LEVEL
	7.15E+01	in ug/mL
		5.00E+00
		2.5E+1

Data Entry by: <i>RWSchoeder</i>	Date: 11-Apr-94
Approved by: <i>RWSchoeder</i>	Date: 4-25-94

Serial No V 67.-7727	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination TIC	Method-Standard LA-622-102	Result Units uG C/ML	Charge Code N1A7F	Reruns 0
Sample Size 1200 mL			Customer ID 108-AP-C	
Remarks, Calculations Results WHC-SD-WM-DP-065, REV. 0				
<p>OUT FOR RERUN $\frac{24 \text{ 4-21-94}}{1.26 \text{ } \mu\text{g C/mL}} = 6.30 \text{ } \mu\text{g C/mL}$</p> <p><i>[Signature]</i> <i>[Signature]</i> <i>[Signature]</i> <i>[Signature]</i> <i>[Signature]</i></p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-11-94	Time Completed 1349 +338	Lab Unit Mgr RW Schroeder	4-25-94 <i>[Signature]</i>	

54-6800-061 (R-10-83)

TIC: LA-622-102 (B-2)

LIQUIDS

		SAMPLE
Type	Sample Volume in mL (SS)	0.200
SAMPLE	Dilution Factor (DF)	1.000
Work List	Digest Dilution Factor (DDF)	5.000
3006	µg of Carbon in Sample (C1)	28.3
Test Code	µg of Carbon in Blank (C2)	3.1
TIC		
Matrix		
LIQUID	g of Carbon/L =	6.30E-01
Sample #		
V67-7727	g of Carbon/L =	$\frac{(C1-C2) \cdot DF \cdot DDF}{SS \cdot 1000}$
Instrument Code		
WB39927	µg of Carbon/mL =	g of Carbon/L * 1000000 µg/g / 1000 mL/L
Analyst		
B SEVERSON		
Date		
04/11/94	Detection Level (µg/mL) =	$\frac{1 \text{ } \mu\text{g C} \cdot DF \cdot DDF}{SS}$
Time		
1327		

$\mu\text{g Carbon/mL} =$	6.30E+02	DETECTION LEVEL
		in $\mu\text{g/mL}$
		2.50E+01

Data Entry by: <i>[Signature]</i>	Date: 21-Apr-94
Approved by: <i>[Signature]</i>	Date: 4-25-94

Serial No V 67.-7827	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination TIC	Method/Standard LA-622-102	Result Units uG C/ML	Charge Code N1A7F	Reruns 0
Sample Size .200 mL			Customer ID 108-AP-C	
Remarks, Calculations, Results DUPLICATE SAMPLE WHC-SD-WM-DP-065, REV. 0				
<p>OUT FOR RERUN</p> <p>204 4-21-94 1.29E02 mg C/ml 6.45E02</p> <p>Mod by [Signature] 4-21-94</p>				
Analyst - 1 [Signature]	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-11-94	Time Completed 1358	Lab Unit Mgr 4-25-94 [Signature] [Signature]		

54-6800-061 (R-10-83)

TIC: LA-622-102 (B-2)		LIQUIDS	SAMPLE
Type	Sample Volume in mL	(SS)	0.200
SAMPLE	Dilution Factor	(DF)	1.000
Work List	Digest Dilution Factor	(DDF)	5.000
3006	ug of Carbon in Sample	(C1)	28.9
Test Code	ug of Carbon in Blank	(C2)	3.1
TIC			
Matrix			
LIQUID	g of Carbon/L	=	6.45E-01
Sample #			
V67-7827	g of Carbon/L	=	$\frac{(C1-C2) * DF * DDF}{SS * 1000}$
Instrument Code			
WB39927			
Analyst	ug of Carbon/mL	=	g of Carbon/L * 1000000 ug/g / 1000 mL/L
B SEVERSON			
Date			
04/11/94	Detection Level (ug/mL)	=	$\frac{1 \text{ ug C} * DF * DDF}{SS}$
Time			
1327			

ug Carbon/mL =	6.45E+02	DETECTION LEVEL
		in ug/mL
		2.50E+01

Data Entry by: [Signature]	Date: 21-Apr-94
Approved by: [Signature]	Date: 4-25-94

Serial No V 68.-7727	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination TIC	Method/Standard LA-622-102	Result Units uG C/ML	Charge Code N1A7F	Reruns 0
Sample Size .200 ml			Customer ID 108-AP-D	
Remarks, Calculations, Results WHC-SD-WM-DP-065, REV. 0 OUT FOR RERUN ^{2H 4-21-94} 1.26E02 uG C/mL 6.28E02 <i>[Signature]</i> mod by <i>[Signature]</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-11-94	Time Completed 1408	Lab Unit Mgr 4-25-94 <i>[Signature]</i> <i>[Signature]</i>		

54-6800-061 (R-10-83)

TIC: LA-622-102 (B-2)

LIQUIDS

		SAMPLE
Type	Sample Volume in mL (SS)	0.200
SAMPLE	Dilution Factor (DF)	1.000
Work List	Digest Dilution Factor (DDF)	5.000
3006	µg of Carbon in Sample (C1)	28.2
Test Code	µg of Carbon in Blank (C2)	3.1
TIC		
Matrix		
LIQUID	g of Carbon/L =	6.28E-01
Sample #		
V68-7727	g of Carbon/L = $\frac{(C1-C2) \cdot DF \cdot DDF}{SS \cdot 1000}$	
Instrument Code		
WB39927		
Analyst	µg of Carbon/mL = g of Carbon/L * 1000000 µg/g / 1000 mL/L	
B SEVERSON		
Date		
04/11/94	Detection Level (µg/mL) = $\frac{1 \mu g C \cdot DF \cdot DDF}{SS}$	
Time		
1327		

µg Carbon/mL = 6.28E+02	DETECTION LEVEL
	in µg/mL 2.50E+01

Data Entry by: <i>[Signature]</i>	Date: 21-Apr-94
Approved by: <i>[Signature]</i>	Date: 4-25-94

Serial No V 68.-7827	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination TIC	Method/Standard LA-622-102	Result Units uG C/ML	Charge Code N1A7F	Reruns 0
Sample Size . 200ml			Customer ID 108-AP-D	
Remarks Calculations Results DUPLICATE SAMPLE WHC-SD-WM-DP-065, REV. 0 OUT FOR RERUN 9/4 4-21-94 1.28E-02 6.40E02 uG/mL Breda Severson Mod by D. Hammett 4/11/94				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-11-94	Time Completed 1417	Lab Unit Mgr R. Schneider	Date 4-25-94 R. C. Jones	

54-6800-061 (R-10 83)

TIC: LA-622-102 (B-2)

LIQUIDS

		SAMPLE
Type	Sample Volume in mL (SS)	0.200
SAMPLE	Dilution Factor (DF)	1.000
Work List	Digest Dilution Factor (DDF)	5.000
3006	ug of Carbon in Sample (C1)	28.7
Test Code	ug of Carbon in Blank (C2)	3.1
TIC		
Matrix		
LIQUID	g of Carbon/L =	6.40E-01
Sample #		
V68-7827	g of Carbon/L =	$\frac{(C1-C2) \cdot DF \cdot DDF}{SS \cdot 1000}$
Instrument Code		
WB39927		
Analyst	ug of Carbon/mL =	g of Carbon/L * 1000000 ug/g / 1000 mL/L
B SEVERSON		
Date		
04/11/94	Detection Level (ug/mL) =	$\frac{1 \text{ ug C} \cdot DF \cdot DDF}{SS}$
Time		
1327		

ug Carbon/mL =	6.40E+02	DETECTION LEVEL
		in ug/mL
		2.50E+01

Data Entry by: <i>Breda Severson</i>	Date: 21-Apr-94
Approved by: <i>R. Schneider</i>	Date: 4-25-94

Serial No V 69.-7727	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination TIC	Method/Standard LA-622-102	Result Units uG C/ML	Charge Code N1A7F	Reruns 0
Sample Size 200mL			Customer ID 108-AP-E	
Remarks, Calculations, Results WHC-SD-WM-DP-065, REV. 0				
<p>OUT FOR RERUN 6.60E02</p> <p>1.37E02</p> <p>244/2/14/ mg C/mL</p> <p><i>[Signature]</i> MOD by D. [Signature] 4/6/94</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-11-94	Time Completed 1427	Lab Unit Mgr 4-25-94 R. Schneider	L. C. [Signature]	

54-6800-061 (R-10-83)

TIC: LA-622-102 (B-2)

LIQUIDS

		SAMPLE
Type	Sample Volume in mL	(SS) 0.200
SAMPLE	Dilution Factor	(DF) 1.000
Work List	Digest Dilution Factor	(DDF) 5.000
3006	ug of Carbon in Sample	(C1) 29.5
Test Code	ug of Carbon in Blank	(C2) 3.1
TIC		
Matrix		
LIQUID	g of Carbon/L	= 6.60E-01
Sample #		
V69-7727	g of Carbon/L	= $\frac{(C1-C2) \cdot DF \cdot DDF}{SS \cdot 1000}$
Instrument Code		
WB39927		
Analyst	ug of Carbon/mL	= g of Carbon/L * 1000000 ug/g / 1000 mL/L
B SEVERSON		
Date		
04/11/94	Detection Level (ug/mL)	= $\frac{1 \text{ ug C} \cdot DF \cdot DDF}{SS}$
Time		
1327		

ug Carbon/mL =	6.60E+02	DETECTION LEVEL
		in ug/mL
		2.50E+01

Data Entry by:	Date: 21-Apr-94
Approved by: <i>[Signature]</i>	Date: 4-25-94

Serial No V 69.-7827	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination TIC	Method/Standard LA-622-102	Result Units uG C/ML	Charge Code N1A7F	Reruns 0
Sample Size .200 mL			Customer ID 108-AP-E	
Remarks Calculations Results DUPLICATE SAMPLE WHC-SD-WM-DP-065, REV. 0 OUT FOR RERUN 6.58E02 1.32E03 2/14/94 uG C/mL B Severson msd by J. Hansen 4/14/94				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-11-94	Time Completed 1437	Lab Unit Mgr R. Schneider	4-25-94 R. C. Jones	

54-6800-061 (R-10-83)

TIC: LA-622-102 (B-2)

LIQUIDS

		SAMPLE
Type	Sample Volume in mL (SS)	0.200
SAMPLE	Dilution Factor (DF)	1.000
Work List	Digest Dilution Factor (DDF)	5.000
3006	µg of Carbon in Sample (C1)	29.4
Test Code	µg of Carbon in Blank (C2)	3.1
TIC		
Matrix		
LIQUID	g of Carbon/L =	6.58E-01
Sample #		
V69-7827	g of Carbon/L =	$\frac{(C1-C2) \cdot DF \cdot DDF}{SS \cdot 1000}$
Instrument Code		
WB39927		
Analyst	µg of Carbon/mL =	g of Carbon/L * 1000000 µg/g / 1000 mL/L
B SEVERSON		
Date		
04/11/94	Detection Level (µg/mL) =	$\frac{1 \mu g C \cdot DF \cdot DDF}{SS}$
Time		
1327		

µg Carbon/mL =	6.58E+02	DETECTION LEVEL
		in µg/mL
		2.50E+01

Data Entry by: <i>B. Severson</i>	Date: 21-Apr-94
Approved by: <i>R. Schneider</i>	Date: 4-25-94

WHC-SD-WM-DP-065, REV. 0

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT TICTOC REV 2.0

Sample: STD V65-7527

Date: 04/11/94

Time: 13:17:41

Sample Size = 200 uL

Dil Factor = 1

Blank ID # = BLK

Blank value = .4427336 ug/minute C

Analyst : BOBBE-11

Min Readings = 4

Max Readings = 14

% Difference =

Reading	Analysis Time	Coulometer	% Difference
1	0.51	3.20	1.0
2	1.01	38.20	1.0
3	1.51	9.70	1.0
4	2.01	20.40	1.0
5	2.51	102.5	1.0
6	3.01	109.60	1.0
7	3.51	113.80	1.0
8	4.01	8.40	1.0
9	4.50	114.10	1.0
10	5.00	114.00	1.0
11	5.50	114.7	1.0
12	6.00	120.30	1.0
13	6.50	120.70	1.0
14	7.00	120.10	1.0

Dr. J. J. J. J. J.

WHC-SD-WM-DP-065, REV. 0

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT TICTOC REV 2.0 << BLANK ANALYSIS >>>

Sample: BLK

Date: 04/11/94

Time: 12:59:57

Sample Size = 200 ul

Conc Factor = 1

Blank ID # = BLK

Blank Value = n/A

Analyst : BO SEVERSON

Min Readings = 14

Max Readings = 4

% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.20	0.00
2	1.01	0.40	50.00
3	1.51	0.80	50.00
4	2.00	1.00	20.00
5	2.50	1.20	16.67
6	3.00	1.50	20.00
7	3.50	1.60	20.00
8	4.00	1.90	25.00
9	4.50	2.00	25.00
10	5.00	2.10	25.00
11	5.50	2.30	25.00
12	6.00	2.30	25.00
13	6.50	2.60	25.00
14	7.00	2.70	25.00

Bo Severson

TIC- TOTAL INORGANIC CARBON ANALYSIS

1. 16. 001-7.17

3-000 - 31.4 - 200

3-100 - 31.4 - 200

3-200 - 31.4 - 200

3-300 - 31.4 - 200

3-400 - 31.4 - 200

3-000	31.4	200
3-100	31.4	200
3-200	31.4	200
3-300	31.4	200
3-400	31.4	200
3-500	31.4	200
3-600	31.4	200
3-700	31.4	200
3-800	31.4	200
3-900	31.4	200
3-1000	31.4	200
3-1100	31.4	200
3-1200	31.4	200
3-1300	31.4	200
3-1400	31.4	200
3-1500	31.4	200
3-1600	31.4	200
3-1700	31.4	200
3-1800	31.4	200
3-1900	31.4	200
3-2000	31.4	200

Handwritten signature

WHC-SD-WM-DP-065, REV. 0

ANALYST: CARSON ANALYSIS REPORT
REV. 1.1

Time: 11.4714

Analyst: BU SEVER:
Min Readings = 14
Max Readings = 14
% Difference = 10

BLR
Value = .4427336 ug/minute C

Reading	Analysis Time	Coulometer	% Difference
1	0.51	1.20	0.00
2	1.00	3.60	87.50
3	1.50	16.50	41.82
4	2.00	20.60	18.90
5	2.50	23.10	10.32
6	3.00	24.60	6.10
7	3.50	25.60	3.3
8	4.00	26.30	2.60
9	4.50	26.70	1.10
10	5.00	27.10	1.4
11	5.50	27.50	1.1
12	6.00	27.80	1.1
13	6.50	28.00	1.1
14	7.00	28.00	1.1

BLR VALUE = .4427336 ug/minute C
BLR VALUE = .4427336 ug/minute C

ANALYST: CARSON
REV. 1.1

Carson

WHC-SD-WM-DP-065, REV.0

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT TICTOC REV 2.0

Sample: v67-7827

Date: 04/11/04

Time: 13:00:00

Sample Size = 200 uL

Dil Factor = 1

Blank ID # = BL

Blank Value = .4427336 ug/minute

Analyst: BO SEVERIN

Min Readings = 14

Max Readings = 14

% Difference = 10

== Reading == Analysis Time == Coulometer == % Difference ==

1	0.51	1.40	0.00
2	1.01	9.90	65.86
3	1.51	16.80	40.36
4	2.00	21.00	20.97
5	2.50	23.50	10.84
6	3.00	25.20	6.78
7	3.51	26.10	3.43
8	4.01	26.60	2.3
9	4.50	27.30	1.55
10	5.00	27.70	1.44
11	5.50	28.10	1.42
12	6.00	28.40	1.06
13	6.50	28.60	0.71
14	7.00	28.90	1.0

Blank Value = .4427336 ug/minute

Blank Factor = 1.1

FILE: E301781

DATE: 04/11/04

TIME: 13:00:00

Sample No. 7827

642

WHC-SD-WM-DP-065, REV. 0

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT TIC-TOC REV 2.0

Sample # 101-1711

Date: 4/11/94

Time: 14:11

1. Sample Size = 2.00 mL

Analyst: BO SE - 1011

2. Sample # = 1

Min Readings = 4

3. Sample ID # = 8L

Max Readings = 4

4. Sample Value = 1.4427336 ug/minute C

% Difference = 10

Reading #	Analysis Time	Coulometer	% Difference
1	0.51	1.10	1.10
2	1.00	9.30	1.10
3	1.51	16.10	41.10
4	2.00	20.40	21.10
5	2.50	22.50	1.10
6	3.01	24.60	1.10
7	3.51	26.50	1.10
8	4.00	28.30	1.10
9	4.50	28.70	1.10
10	5.00	27.10	1.40
11	5.50	27.40	1.10
12	6.00	27.70	1.10
13	6.50	28.00	1.10
14	7.00	28.00	1.10

11. Sample Value = 1.4427336 ug/minute C

12. Sample Value = 1.4427336 ug/minute C

3d. Sample Value =

[Handwritten Signature]

643

WHC-SD-WM-DP-065, REV.0

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT TIC/TOC REV 2.0

Sample: V0087827

Date: 04 / 1 / 94

Time: 11:11

Sample Size = 200 uL

Analyst: B. G. B.

Dil Factor = 1

Min Readings = 4

Blank ID # = BLK

Max Retention = 4

Blank Value = .4427836 ug minute C

% Difference =

Reading	Analysis Time	Coulometer	Blank	% Difference
1	0.51	1.10	1.10	0.0
2	1.01	1.80	1.80	0.0
3	1.50	3.40	3.40	0.0
4	2.00	10.1	10.1	0.0
5	2.50	11.00	11.00	0.0
6	3.00	14.70	14.70	0.0
7	3.50	15.10	15.10	0.0
8	4.00	15.10	15.10	0.0
9	4.50	17.10	17.10	0.0
10	5.00	17.50	17.50	0.0
11	5.50	17.90	17.90	0.0
12	6.00	18.10	18.10	0.0
13	6.50	18.40	18.40	0.0
14	7.00	18.70	18.70	0.0

WHC-SD-WM-DP-065, REV. 0

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT TIC/TOC REV 2.0

Sample ID: 1717 Date: 04-1-84 Time: 10:11:14

Sample Size = 20.00 Analyst: BO SEVERSON
 Unit = 100.0 Min Readings = 14
 Blank ID = BLR Max Readings = 14
 Final Value = .442736 ug/minute C % Difference = 1.1

Reading	Analysis Time	Coulometer	% Difference
1	0.81	1.00	0.00
2	1.01	10.20	27.21
3	1.51	10.80	3.14
4	2.00	21.20	10.25
5	2.50	23.80	0.01
6	3.00	25.40	0.00
7	3.51	26.50	4.05
8	4.00	27.20	0.00
9	4.50	27.50	1.00
10	5.00	28.00	0.00
11	5.50	28.00	0.00
12	6.00	28.00	0.00
13	6.50	28.21	0.00
14	7.00	28.00	0.00

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TIC-TCO REV 3.0

Sample: v19-7a17

Date: 04/11/94

Sample Size = 200 uL

Dil Factor = 1

Blank ID # = BLK

Blank Value = .4427536 ug/minute

Analysis

Min Peak

Max Peak

Area

== Reading == Analysis Time ==

1	0.51	1.17
2	1.01	1.10
3	1.51	1.17
4	2.00	1.17
5	2.51	1.17
6	3.01	1.17
7	3.51	1.17
8	4.01	1.17
9	4.51	1.17
10	5.01	1.17
11	5.51	1.17
12	6.01	1.17
13	6.51	1.17
14	7.01	1.17
15	7.51	1.17
16	8.01	1.17
17	8.51	1.17
18	9.01	1.17
19	9.51	1.17
20	10.01	1.17

Frank J. Levenson

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. V65, V66, V67, V67
V68, V68, V69, V69

Customer ID:

108-AP-C, 108-AP-D, 108-AP-E

Analysis:

TIC

Sample Prep:

WATER DIGESTION

Instrument: W339927

Procedure/ Rev:

LH-L22-102 3 2

Technologist:

REGINA SEVERSON

Date:

4/28/94

Starting Time:

1315

Temperature

NA

Ending Time:

1415

Chemist:

R. SCHROEDER

Comments:

RE RUN - SUSPECT WRONG SAMPLE USED
 FOR ANALYSIS (Acid Digest) - OUT FOR RERUN

	Description	Lab ID
1	INITIAL LMCS CHECK STD	54
2	REAGENT BLANK	8.5
3	PREP BLANK	V66-7627
4	SAMPLE	V67-7727
5	SAMPLE DUPLICATE	V67-7827
6	SAMPLE	V68-7727
7	SAMPLE DUPLICATE	V68-7827
8	SAMPLE	V69-7727
9	SAMPLE DUPLICATE	V69-7827
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

DATA
 NOT USED
 IN PACKAGE

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	15N12-A/.200mL			

671

[illegible]

NARRATIVE-LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH:

Dilution Factor is 5.00 $\pm$ 0. All results are reported in $\mu\text{g}/\text{mL}$ except the standard which is reported in Molarity.

Robert W. Schroeder
5-2-94

After further review, It appears the sample analyzed was not the correct prep. type. (Acid digest).

Robert Schroeder
7-19-94

648

RERUN Batch 3262

Serial No V 65.-7527	Sample Point 108-AP	Time Issued 3-18-94	Priority 26
Determination TIC	Method Standard LA-622-102	Result Units % RECOVERY	Charge Code N1A7F
Sample Size .200 mL	Customer ID STD		
Remarks Calculations. Results S223 CO3 STD#, 15 N12-A RESULT 0.0596M ^{RWS 4-29-94} 0.0497 M STD VAL 0.05M % REC 1.19 x 10⁺² ^{RWS 4-29-94} 99.4 OUT FOR RERUN			
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 <i>[Signature]</i> Hrs	Analyst - 3 <i>[Signature]</i> Hrs	Analyst - 4 <i>[Signature]</i> Hrs
Date 7/25/94	Time Completed 0615	Lab Unit Mgr <i>[Signature]</i> 4-29-94	<i>[Signature]</i>

WHC-SD-WM-DP-065; REV. 0

54 6800-061 (R-10-83)

TIC: LA-622-102 (B-2)

LIQUIDS

		STD
Type	Sample Volume in mL (SS)	0.200
STD	Dilution Factor (DF)	1.000
Work List	Digest Dilution Factor (DDF)	1.000
3262	µg of Carbon in Sample (C1)	122.1
Test Code	µg of Carbon in Blank (C2)	2.799603
Matrix		
LIQUID	g of Carbon/L =	5.97E-01
Sample #		
V65-7527	g of Carbon/L =	$\frac{(C1-C2) * DF * DDF}{SS * 1000}$
Instrument Code		
WB 39927		
Analyst	µg of Carbon/mL =	g of Carbon/L * 1000000 µg/g / 1000 mL/L
SEVERSON		
Date		
04/28/94	Detection Level (µg/mL) =	$\frac{1 \text{ µg C} * DF * DDF}{SS}$
Time		
06:15		

MOLARITY =	4.97E-02	DETECTION LEVEL
		in µg/mL
		5.00E+00

Data Entry by: <i>[Signature]</i>	Date: 12-May-94
Approved by: <i>[Signature]</i>	Date: 12-MAY-94

RERUN

Serial No V 66.-7627		Sample Point 108-AP		Time Issued 3-18-94		Priority 26	
Determination TIC		Method: Standard LA-622-102		Result Units uG C/ML		Charge Code N1A7F	
Sample Size 200 mL				Customer ID BLANK		Reruns 1	
Remarks, Calculations, Results REAGENT BLANK <i>MS</i> OUT FOR RERUN <i>4-26-94</i> Prep. Blank <div style="border: 1px solid black; padding: 5px; display: inline-block; margin: 10px;"> $< 5.00 \text{ EO } \mu\text{g C/ML}$ </div> $\times 5 = < 25.0 \text{ } \mu\text{g C/ML}$							
Analyst - 1 <i>[Signature]</i> Hrs		Analyst - 2 Hrs		Analyst - 3 Hrs		Analyst - 4 Hrs	
Date 4/28/94		Time Completed 0615		Lab Unit Mgr <i>R. Schneider</i> 5-2-94			

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

TIC: LA-622-102 (B-2)

LIQUIDS

		BLK
Type	Sample Volume in mL (SS)	0.200
BLK	Dilution Factor (DF)	1.000
Work List	Digest Dilution Factor (DDF)	5.000
3262	μg of Carbon in Sample (C1)	2.4
Test Code	μg of Carbon in Blank (C2)	2.8
Matrix		
LIQUID	g of Carbon/L = <	2.50E-02
Sample #	g of Carbon/L = $\frac{(C1 - C2) \cdot DF \cdot DDF}{SS \cdot 1000}$	
V66-7627		
Instrument Code		
WB 39927		
Analyst	μg of Carbon/mL = g of Carbon/L * 1000000 $\mu\text{g/g}$ / 1000 mL/L	
SEVERSON		
Date	Detection Level ($\mu\text{g/mL}$) = $\frac{1 \text{ } \mu\text{g C} \cdot DF \cdot DDF}{SS}$	
04/28/94		
Time		
06:15		

NOTE: Reported Result is Below Detection Level.

$\mu\text{g Carbon/mL} = < 2.50\text{E}+01$	DETECTION LEVEL in $\mu\text{g/mL}$ 2.50E+01
---	--

Data Entry by: <i>[Signature]</i>	Date: 12-May-94
Approved by: <i>[Signature]</i>	Date: 12-MAY-94

Serial No	Sample Point	Date		Time Issued	Priority
V 67.-7727	108-AP	3-18-94		9:39	26
Determination	Method/Standard	Result Units	Charge Code	Reruns	
TIC	LA-622-102	uG C/ML	N1A7F	1	
Sample Size	Customer ID				
.200 mL	108-AP-C				
Remarks Calculations Results					
<p><5.00 * 50 D.F. = <2.50 E+1 ug C/mL</p> <p>WHC-SD-WM-DP-065, REV. 0</p>					
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
<i>[Signature]</i>					
Hrs	Hrs	Hrs	Hrs	Hrs	
Date	Time Completed	Lab Unit Mgr			
4/28/94	0615	<i>[Signature]</i>	5-2-94		
54-6800-061 (R-10-83)					

TIC: LA-622-102 (B-2)		LIQUIDS	SAM
Type	Sample Volume in mL	(SS)	0.200
SAM	Dilution Factor	(DF)	1.000
Work List	Digest Dilution Factor	(DDF)	5.000
3262	ug of Carbon in Sample	(C1)	2.4
Test Code	ug of Carbon in Blank	(C2)	2.8
Matrix			
LIQUID	g of Carbon/L	=	< 2.50E-02
Sample #			
V67-7727	g of Carbon/L	=	$\frac{(C1-C2) * DF * DDF}{SS * 1000}$
Instrument Code			
WB 39927			
Analyst	ug of Carbon/mL	=	g of Carbon/L * 1000000 ug/g / 1000 mL/L
SEVERSON			
Date	Detection Level (ug/mL)	=	$\frac{1 \text{ ug C} * DF * DDF}{SS}$
04/28/94			
Time			
06:15			

NOTE: Reported Result is Below Detection Level.

ug Carbon/mL =	<	2.50E+01	DETECTION LEVEL
			in ug/mL
			2.50E+01

Data Entry by:	<i>[Signature]</i>	Date:	12-May-94
Approved by:	<i>[Signature]</i>	Date:	12-May-94

Serial No V 67.-7827		Sample Point 108-AP		Time Issued 3-18-94		Priority 26
Determination TIC		Method-Standard LA-622-102		Result Units uG C/ML		Charge Code N1A7F
Sample Size 200 mL		Customer ID 108-AP-C				
Remarks, Calculations, Results DUPLICATE SAMPLE $< 5.00 \cdot 5.00 \cdot F = < 2.50 \text{ EH } \mu\text{g/mL}$ WHC-SD-WM-DP-065, REV. 0 OUT FOR RERUN						
Analyst - 1 <i>Debra Severson</i>		Analyst - 2		Analyst - 3		Analyst - 4
Hrs		Hrs		Hrs		Hrs
Date 4/28/94		Time Completed 0615		Lab Unit Mgr <i>R. J. Moen</i>		<i>Debra Severson</i>
54-6800-061 (R-10-83)						

TIC: LA-622-102 (B-2)

LIQUIDS

Type	Sample Volume in mL	(SS)	0.200
DUP	Dilution Factor	(DF)	1.000
Work List	Digest Dilution Factor	(DDF)	5.000
3262	µg of Carbon in Sample	(C1)	2.4
Test Code	µg of Carbon in Blank	(C2)	2.8
Matrix			
LIQUID	g of Carbon/L	=	< 2.50E-02
Sample #			
V67-7827	g of Carbon/L	=	$\frac{(C1-C2) \cdot DF \cdot DDF}{SS \cdot 1000}$
Instrument Code			
WB 39927	µg of Carbon/mL	=	g of Carbon/L * 1000000 µg/g / 1000 mL/L
Analyst			
SEVERSON			
Date			
04/28/94	Detection Level (µg/mL)	=	$\frac{1 \mu\text{g C} \cdot DF \cdot DDF}{SS}$
Time			
06:15			

NOTE: Reported Result is Below Detection Level.

µg Carbon/mL =	<	2.50E+01	DETECTION LEVEL
			in µg/mL
			2.50E+01

Data Entry by: <i>Debra Severson</i>	Date: 12-May-94
Approved by: <i>R. J. Moen</i>	Date: 12-May-94

RERUN

Serial No V 68.-7727	Sample Point 108-AP	Time Issued 3-18-94	Priority 26
Determination TIC	Method/Standard LA-622-102	Result Units uG C/ML	Charge Code N1A7F
Sample Size 200 mL		Customer ID 108-AP-D	
Remarks, Calculations, Results <p style="text-align: center; font-weight: bold;">WHC-SD-WM-DP-065, REV. 0</p> <p style="text-align: center; font-size: 1.1em;">< 5.00 * 5.0 D.F. = < 2.50 E+1 ug C/mL</p> <p style="text-align: center; font-weight: bold; font-size: 1.1em;">OUT FOR RERUN</p>			
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs
Date 4/28/94		Time Completed 0415	Lab Unit Mgr 5-2-94 <i>[Signature]</i>

54-6800-061 (R-10-83)

TIC: LA-622-102 (B-2)		LIQUIDS	SAM
Type	Sample Volume in mL	(SS)	0.200
SAM	Dilution Factor	(DF)	1.000
Work List	Digest Dilution Factor	(DDF)	5.000
3262	ug of Carbon in Sample	(C1)	2.4
Test Code	ug of Carbon in Blank	(C2)	2.8
Matrix			
LIQUID	g of Carbon/L	=	< 2.50E-02
Sample #			
V68-7727	g of Carbon/L	=	$\frac{(C1 - C2) * DF * DDF}{SS * 1000}$
Instrument Code			
WB 39927	ug of Carbon/mL	=	g of Carbon/L * 1000000 ug/g / 1000 mL/L
Analyst			
SEVERSON			
Date			
04/28/94	Detection Level (ug/mL)	=	$\frac{1 \text{ ug C} * DF * DDF}{SS}$
Time			
06:15			

NOTE: Reported Result is Below Detection Level.

ug Carbon/mL =	<	2.50E+01	DETECTION LEVEL
			in ug/mL
			2.50E+01

Data Entry by: <i>[Signature]</i>	Date: 12-May-94
Approved by: <i>[Signature]</i>	Date: 12-May-94

RERUN

Serial No V 68.-7827	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination TIC	Method/Standard LA-622-102	Result Units uG C/ML	Charge Code N1A7F	Reruns 1
Sample Size 1200 mL			Customer ID 108-AP-D	
Remarks, Calculations, Results WHC-SD-WM-DP-065, REV. 0 DUPLICATE SAMPLE $< 5.00 \cdot 5.0 D.F. = < 2.5 E+1 \mu g/mL$ OUT FOR RERUN				
Analyst - 1 <i>Blenda Sevrson</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4/28/94	Time Completed 0415	Lab Unit Mgr <i>RW Schneider</i>	4-29-94 <i>[Signature]</i>	

54-6800-061 (R 10-83)

TIC: LA-622-102 (B-2)

LIQUIDS

		DUP
Type	Sample Volume in mL (SS)	0.200
DUP	Dilution Factor (DF)	1.000
Work List	Digest Dilution Factor (DDF)	5.000
3262	µg of Carbon in Sample (C1)	2.4
Test Code	µg of Carbon in Blank (C2)	2.4
Matrix		
LIQUID	g of Carbon/L =	< 2.50E-02
Sample #		
V68-7827	g of Carbon/L =	$\frac{(C1-C2) \cdot DF \cdot DDF}{SS \cdot 1000}$
Instrument Code		
WB 39927	µg of Carbon/mL =	g of Carbon/L * 1000000 µg/g / 1000 mL/L
Analyst		
SEVERSON		
Date		
04/28/94	Detection Level (µg/mL) =	$\frac{1 \mu g C \cdot DF \cdot DDF}{SS}$
Time		
06:15		

NOTE: Reported Result is Below Detection Level.

µg Carbon/mL =	<	2.50E+01	DETECTION LEVEL
			in µg/mL
			2.50E+01

Data Entry by: <i>[Signature]</i>	Date: 12-May-94
Approved by: <i>[Signature]</i>	Date: 12-MAY-94

Serial No V 69.-7727	Sample Point 108-AP	KERUN		Time Issued 3-18-94	Priority 9:42	26
Determination TIC	Method-Standard LA-622-102	Result Units uG C/ML	Charge Code N1A7F	Reruns 1		
Sample Size 1.200 mL			Customer ID 108-AP-E			
Remarks Calculations. Results $< 5.00 \cdot 5.0 D.F. = < 2.50 E+1 \text{ uG C/ML}$ WHC-SD-WM-DP-065, REV. 0 OUT FOR RERUN						
Analyst - 1 <i>Severson</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5		
Hrs	Hrs	Hrs	Hrs	Hrs		
Date 4/28/94	Time Completed 0615	Lab Unit Mgr 5-2-94 <i>R. Schneider</i>				

54 6800-061 (R-10-83)

TIC: LA-622-102 (B-2)		LIQUIDS	SAM
Type	Sample Volume in mL	(SS)	0.200
SAM	Dilution Factor	(DF)	1.000
Work List	Digest Dilution Factor	(DDF)	5.000
3262	µg of Carbon in Sample	(C1)	2.4
Test Code	µg of Carbon in Blank	(C2)	2.4
Matrix			
LIQUID	g of Carbon/L	=	< 2.50E-02
Sample #			
V69-7727	g of Carbon/L	=	$\frac{(C1-C2) \cdot DF \cdot DDF}{SS \cdot 1000}$
Instrument Code			
WB 39927	µg of Carbon/mL	=	g of Carbon/L * 1000000 µg/g / 1000 mL/L
Analyst			
SEVERSON			
Date			
04/28/94	Detection Level (µg/mL)	=	$\frac{1 \text{ µg C} \cdot DF \cdot DDF}{SS}$
Time			
06:15			

NOTE: Reported Result is Below Detection Level.

µg Carbon/mL =	< 2.50E+01	DETECTION LEVEL
		in µg/mL
		2.50E+01

Data Entry by:	<i>Severson</i>	Date:	12-May-94
Approved by:	<i>R. Schneider</i>	Date:	MAY-12-94

Serial No V 69.-7827		Sample Point 108-AP		Time Issued 3-18-94		Priority 26
Determination TIC		Method-Standard LA-622-102		Result Units uG C/ML		Charge Code N1A7F
Sample Size 200 mL				Customer ID 108-AP-E		
Remarks, Calculations, Results DUPLICATE SAMPLE $< 5.00 \cdot 5.0 D.F. = 2.50 E + 1 \mu g C/mL$ WHC-SD-WM-DP-065, REV. 0 OUT FOR RERUN						
Analyst - 1 <i>Severson</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5		
Hrs	Hrs	Hrs	Hrs	Hrs		
Date 4/28/94	Time Completed 0615	Lab Unit Mgr 5-2-94 <i>R. Schneider</i>				

54-6800-061 (R-10-83)

TIC: LA-622-102 (B-2)		LIQUIDS	DUP
Type	Sample Volume in mL	(SS)	0.200
DUP	Dilution Factor	(DF)	1.000
Work List	Digest Dilution Factor	(DDF)	5.000
3262	µg of Carbon in Sample	(C1)	2.4
Test Code	µg of Carbon in Blank	(C2)	2.4
Matrix			
LIQUID	g of Carbon/L	=	< 2.50E-02
Sample #			
V69-7827	g of Carbon/L	=	$\frac{(C1-C2) \cdot DF \cdot DDF}{SS \cdot 1000}$
Instrument Code			
WB 39927	µg of Carbon/mL	=	g of Carbon/L * 1000000 µg/g / 1000 mL/L
Analyst			
SEVERSON			
Date			
04/28/94	Detection Level (µg/mL)	=	$\frac{1 \mu g C \cdot DF \cdot DDF}{SS}$
Time			
06:15			

NOTE: Reported Result is Below Detection Level.

µg Carbon/mL =	< 2.50E+01	DETECTION LEVEL in µg/mL
		2.50E+01

Data Entry by: <i>Severson</i>	Date: 12-May-94
Approved by: <i>R. Schneider</i>	Date: 12-MAY-94

WHC-SD-WM-DP-065, REV.0

TIC- TOTAL INORGANIC CARBON ANALYSIS REP. #
TICTOC REV 2.0

Sample: 370 vcl Date: 04/28/84 Time: 11:00 AM

Sample Size = 200 µl
Dil Factor = 1
Blank ID # = B1
Blank value = 1297717 ug, minute C
Min. Reading = 11
Max. Reading = 121
% Difference = 10

Reading	Analysis Time	Count	% Difference
0.00	0.00	11.00	0.00
1.00	1.00	41.60	63.18
2.00	2.00	74.60	44.14
3.00	3.00	95.70	22.06
4.00	4.00	107.20	10.71
5.00	5.00	113.50	5.81
6.00	6.00	117.00	2.40
7.00	7.00	118.70	1.41
8.00	8.00	120.20	1.21
9.00	9.00	120.90	0.58
10.00	10.00	121.20	0.25
11.00	11.00	121.50	0.25
12.00	12.00	121.30	0.17
13.00	13.00	121.10	0.17

WHC-SD-WM-DP-065, REV.0
TIC- TOTAL INORGANIC CARBON ANALYSIS REP. #
TICTOC REV 2.0

Sample: 370 vcl Date: 04/28/84 Time: 11:00 AM
Sample Size = 200 µl
Dil Factor = 1
Blank ID # = B1
Blank value = 1297717 ug, minute C
Min. Reading = 11
Max. Reading = 121
% Difference = 10

T. D. Drendel
T. D. Drendel

WHC-SD-WM-DP-065, REV. 0

WATER SAMPLING AND ANALYSIS REPORT TUTOR REV 2.0 SLAT ANALYSIS

Sample ID: 04/27/04 Time: 00:00:00

Sample Name: 04/27/04
 Sample Type: BLK
 Sample Value: N/A

Min Readings = 14
 Max Readings = 12
 % Difference = 10

Reading	Analysis Time	O. Alometer	% Difference
1	0.51	0.10	0.00
2	1.01	0.40	75.00
3	1.50	0.60	33.33
4	2.00	0.90	33.33
5	2.50	1.20	25.00
6	3.00	1.30	7.69
7	3.51	1.50	10.33
8	4.00	1.60	16.67
9	4.50	1.80	0.00
10	5.00	2.20	18.18
11	5.50	2.40	1.33
12	6.00	2.50	4.00
13	6.50	2.60	3.33
14	7.00	2.80	2.14

$$\frac{2.8 \text{ ug/l}}{200 \text{ ml}} = 14 \text{ ug/l/m}$$

BLANK VALUE = 2.8 micrograms carbon
 BLANK FACTOR = 2.8 / 7.000000 =

Sample Run By:

Dr. J. J. Jensen

WHC-SD-WM-DP-065, REV.0

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT TICTOC REV 2.0

Sample: v60

Date: 04/26/84

Time: 10:10

Sample Size = 100 µL

Dil Factor = 1

Blank ID # = BLK

Blank value = .3937717 ug/minute

Min Reading = 0.00
Max Reading = 0.00
Avg Reading = 0.00

== Reading == Analysis Time == Sample Name ==

1	0.00	0.00	
2	0.00	0.00	
3	0.00	0.00	
4	0.00	0.00	
5	0.00	0.00	
6	0.00	0.00	
7	0.00	0.00	
8	0.00	0.00	
9	0.00	0.00	
10	0.00	0.00	
11	0.00	0.00	
12	0.00	0.00	
13	0.00	0.00	
14	0.00	0.00	
15	0.00	0.00	
16	0.00	0.00	
17	0.00	0.00	
18	0.00	0.00	
19	0.00	0.00	
20	0.00	0.00	

Druid Johnson

WHC-SD-WM-DP-065, REV. 0

HEAVY METALS ANALYSIS OF WASTE WATER
TIC: 05-05-1994

DATE: 05-05-1994 TIME: 09:15:00

ANALYST: J. L. HARRIS
 SAMPLE NO: 1000000000
 ANALYSIS: 1000000000
 MAX. READING: 1.00
 % DIFFERENCE: 0.00
 1000000000 ug/minute C

Analysis Time	Count	Count Rate	% Difference
0.51	3.10	3.10	0.00
1.01	3.10	3.10	0.00
1.51	3.70	3.70	0.00
2.01	3.70	3.70	0.00
2.51	1.10	1.10	0.00
3.01	1.10	1.10	0.00
3.51	1.50	1.50	0.00
4.01	1.70	1.70	0.00
4.50	1.70	1.70	0.00
5.00	1.90	1.90	0.00
5.50	2.00	2.00	0.00
6.00	2.10	2.10	0.00
6.50	2.30	2.30	0.00
7.00	2.4	2.4	0.00

CLARK: 1000000000
 ANALYST: J. L. HARRIS

ANALYST: J. L. HARRIS
 ANALYSIS: 1000000000

Z.4 RWS 5-2-94

Debra L. Harrison

600

WHC-SD-WM-DP-065, REV.0

TOTAL INORGANIC CARBON ANALYSIS REPORT TICTOC REV 2.0

Sample ID #

Date: 04/16/94

Time: 07:42:11

Sample Size = 210 uL

Cell Factor = 1

Blank ID # = BLK

Blank Value = 1.3497717 ug/minute C

Analysis

Min Readings = 4

Max Readings = 10

% Difference = 0

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.20	0.00
2	1.00	0.20	0.00
3	1.50	0.50	60.00
4	2.00	0.80	27.50
5	2.50	0.60	0.00
6	3.00	1.10	27.50
7	3.50	1.10	0.00
8	4.00	1.60	41.67
9	4.50	1.60	0.00
10	5.00	1.60	0.00
11	5.50	1.40	11.11
12	6.00	1.90	0.00
13	6.50	2.10	0.00
14	7.00	2.10	0.00

TOTAL VALUE = 21.8 ug/minute C

CELL FACTOR = 1.00 ug/minute C

FINAL RESULT

2.4

RWS 5-2-94

Sample ID #

Brenda J. Wilson

662

TITLE: TOTAL INORGANIC CARBON IN WASTEWATER
TIC/TOC REV 2.0

DATE: 10/10/94

REV: 4/15/94

BY: J. L. HARRIS

FOR: WASTE MANAGEMENT

PROJECT: WASTE WATER TREATMENT

REVISION: 1.0

2.4 RWS 5-2-94

[Handwritten signature]

663

2.4 RWS 5-2-94

20
Dirk J. Larson

	1.00	1.00
5.00	1.80	1.00
5.00	1.80	1.00
5.00	1.00	1.00
5.00	1.00	1.00
5.00	1.00	1.00

2.4 RWS 5-2-94

Dianda L. L...

[illegible]

NARRATIVE: ☒ NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:
THE RESULTS FOR THE STANDARD ARE IN gU/L

WHC-SD-WM-DP-065, REV. 0

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3070

Serial No V 60.-5540	Sample Point 108-AP	Date 3-18-94	Time Issued 8:26	Priority 26
Determination U	Method-Standard LA-925-106	Result Units % RECOVERY	Charge Code N1A7F	Repeats 1
Sample Size .100ML-10ML-.100ML			Customer ID STD	
Remarks: Calculations, Results S267 UF1C STD# 144838 STD VAL 3.86E-02 %REC 3.53E-02 SPIKE ID/VAL 146836 / 100 ml 4-10-94 SPIKE VOL. .100 ml High Spike = 48 20				
WHC-SD-WM-DP-065, REV. 0				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-10-94	Time Completed 2330	Lab Unit Mgr Rakity	Date 4-10-94	

54 6800 061 (R-10-83)

URANIUM : LA-925-106 (B-1) LIQUIDS

URANIUM : LA-925-106 (B-1) LIQUIDS			STANDARD
Type	Spike concentration (gU/L)	CSP	5.04E-04
STANDARD	Volume of water (mL)		4.5
Work List	Volume of fluran (mL)		1
3070	Volume of sample (mL)	VSAM	0.100
Test Code	Volume of liquid in cell	VSUB	5.60
U	(sample + fluran + water)		
Matrix	Deflection (sample + fluran)	DSAM	0.2
LIQUID	Volume of spike (mL)	VSP	0.100
Sample #	Volume of liquid in cell (mL)	VTOT	5.70
V60-5540	(sample + fluran + water + spike)		
Instrument Code	Deflection (sample + fluran + spike)	DS+S	0.48
WB88807	Dilution factor of sample	DF	101
Analyst	Digestion Dilution Factor of Sample	DDF	1
D. DUNHAM	Preparation Factor	PF	1
Date	Concentration in sample (gU/L)	3.53E-02	
04/10/94	gU/L in Sample =	((DSAM*VSP*CSP*DF*DDF*PF)/(((VTOT	
Time	gU/L in Digest =	((DSAM*VSP*CSP*DF*PF)/(((VTOT/VSU	
2330	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & D		

RESULT	U in sample gU/L=	3.53E-02
RESULT	U in µg/ml=	3.53E+01

DETECTION LEVEL µg/ml= 3.53E+00

Data Entry by:	Date: 10-Apr-94
Approved by:	Date: 18-Apr-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

BACK 3070

Serial No V 61.-5640	Sample Point 108-AP	Date 3-18-94	Time Issued 8:27	Priority 26
Determination U	Method/Standard LA-925-106	Result Units uG/ML	Charge Code N1A7F	Repeats 1
Sample Size 100-10-500		Customer ID BLANK		
Remarks Calculations Results REAGENT BLANK high spike 0.28 7.69E-9 ug/ml				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-10-94	Time Completed 2330	Lab Unit Mgr J. J. Shepperd		

WHC-SD-WM-DP-065, REV. 0

BEST AVAILABLE COPY

54 6800-061 (R-10 83)

URANIUM : LA-925-106 (B-1) LIQUIDS		BLANK
Type	Spike concentration (gU/L)	CSP
BLANK	Volume of water (mL)	5.04E-04
Work List	Volume of fluran (mL)	4.5
3070	Volume of sample (mL)	1
Test Code	Volume of liquid in cell (sample + fluran + water)	VSAM
U		VSUB
Matrix	Deflection (sample + fluran)	DSAM
LIQUID	Volume of spike (mL)	VSP
Sample #	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT
V61-5640		6.10
Instrument Code	Deflection (sample + fluran + spike)	DS+S
WB88807	Dilution factor of sample	DF
Analyst	Digestion Dilution Factor of Sample	DDF
D. DUNHAM	Preparation Factor	PF
Date	Concentration in sample (gU/L)	< 7.69E-04
04/10/94	gU/L in Sample =	((DSAM*VSP*CSP*DF*DDF*PF)/((VTOT/VSU
Time	gU/L in Digest =	((DSAM*VSP*CSP*DF*DDF*PF)/((VTOT/VSU
2330	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & D	
	Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((VTOT/VSUB)*(DS+S))-DSAM*VSAM))*(1 E6	
RESULT	U in sample gU/L =	< 7.69E-04
RESULT	U in ug/mL =	< 7.69E-01

DETECTION LEVEL ug/mL= 7.69E-01

REPORT RESULT AS A < (LESS THAN) VALUE

Data Entry by: <i>Janey L. Hagan</i>	Date: 10-Apr-94
Approved by: <i>J. J. Shepperd</i>	Date: 4/12/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3070

Serial No V 62.-5740	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination U	Method-Standard LA-925-106	Result Units uG/ML	Charge Code N1A7F	Returns 1
Sample Size 100-10-500		Customer ID 108-AP-A		
Remarks, Calculations, Results <p style="text-align: center;">RERUN</p> <p style="text-align: center;">Low spike = 0.64 ± 0.00 $4.4/2 \text{ mg/ml}$ High Spike = 0.39 WHC-SD-WM-DP-065, REV. 0</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-10-94	Time Completed 2330	Lab Unit Mgr <i>[Signature]</i>		

54 6100-061 (11-10-83)

URANIUM : LA-925-106 (B-1) LIQUIDS

		SAMPLE
Type	Spike concentration (gU/L)	CSP 5.04E-04
SAMPLE	Volume of water (mL)	4.5
Work List	Volume of fluran (mL)	1
3070	Volume of sample (mL)	VSAM 0.500
Test Code	Volume of liquid in cell	VSUB 6.00
U	(sample + fluran + water)	
Matrix	Deflection (sample + fluran)	DSAM 0.12
LIQUID	Volume of spike (mL)	VSP 0.100
Sample #	Volume of liquid in cell (mL)	VTOT 6.10
V62-5740	(sample + fluran + water + spike)	
Instrument Code	Deflection (sample + fluran + spike)	DS+S 0.39
WB88807	Dilution factor of sample	DF 101
Analyst	Digestion Dilution Factor of Sample	DDF 1
D. DUNHAM	Preparation Factor	PF 1
Date	Concentration in sample (gU/L)	4.42E-03
04/10/94	gU/L in Sample =	$((DSAM \cdot VSP \cdot CSP \cdot DF \cdot DDF \cdot PF) / ((VTOT$
Time	gU/L in Digest =	$((DSAM \cdot VSP \cdot CSP \cdot DF \cdot PF) / ((VTOT / VSU$
2330	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & D Detection Level = $((0.02 \cdot VSP \cdot CSP \cdot DF \cdot DDF \cdot PF) / ((VTOT / VSUB \cdot (DS+S) - DSAM \cdot VSAM)) \cdot (1 EG$	

RESULT	U in sample gU/L=	4.42E-03
RESULT	U in ug/mL=	4.42E+00

DETECTION LEVEL ug/mL= 7.36E-01

Data Entry by: <i>[Signature]</i>	Date: 10-Apr-94
Approved by: <i>[Signature]</i>	Date: 4/12/94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3070				
Serial No	Sample Point	Date	Time Issued	Priority
V 62.-5840	108-AP	3-18-94	8:28	26
Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1A7F	1
Sample Size	RERUN		Customer ID	
100-10-500			108-AP-A	
Remarks Calculations Results				
DUPLICATE SAMPLE High Spike = .39 4.42 mg/ml WHC-SD-WM-DP-065, REV. 0				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Date	Time Completed	Lab Unit Mgr		
4-10-94	2330	J. Sepperson	J. Sepperson	

BEST AVAILABLE COPY

URANIUM : LA-925-106 (B-1) LIQUIDS			SAMPLE
Type	Spike concentration (gU/L)	CSP	5.04E-04
SAMPLE	Volume of water (mL)		4.5
Work List	Volume of fluran (mL)		1
3070	Volume of sample (mL)	VSAM	0.500
Test Code	Volume of liquid in cell (sample + fluran + water)	VSUB	6.00
U	Deflection (sample + fluran)	DSAM	0.12
Matrix	Volume of spike (mL)	VSP	0.100
LIQUID	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.10
Sample #	Deflection (sample + fluran + spike)	DS+S	0.39
V62-5840	Dilution factor of sample	DF	101
Instrument Code	Digestion Dilution Factor of Sample	DDF	1
WB88807	Preparation Factor	PF	1
Analyst	Concentration in sample (gU/L)		4.42E-03
D. DUNHAM	gU/L in Sample =	((DSAM*VSP*CSP*DF*DDF*PF)/((VTOT/VSU	
Date	gU/L in Digest =	((DSAM*VSP*CSP*DF*PF)/((VTOT/VSU	
04/10/94	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & D	Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/(VTOT/VSUB*(DS+S))-DSAM*VSAM))*(1E6	
Time			
2330			

RESULT U in sample gU/L= 4.42E-03
 RESULT U in µg/mL= 4.42E+00

DETECTION LEVEL µg/mL= 7.36E-01

Data Entry by:	<i>J. Sepperson</i>	Date:	10-Apr-94
Approved by:	<i>J. Sepperson</i>	Date:	4/10/94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3070

Serial No V 62.-5940	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination U	Method-Standard LA-925-106	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size 500-10 + 100 λ STD		Customer ID 108-AP-A		
Remarks Calculations, Results SAMPLE SPIKED ID SPIKE ID 146336 SPIKE VOLUME 100 ml High spike .28 High spike .54 86.5% Rec				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-10-94	Time Completed 2330	Lab Unit Mgr J. J. Schepers		

54-6800-061 (R-10-83)

BEST AVAILABLE COPY

URANIUM : LA-925-106 (B-1) SPIKE			SPIKE
Type	Spike concentration (gU/L)	CSP	5.04E-04
SPIKE	Volume of water (mL)		4.5
Work List	Volume of fluran (mL)		1
3070	Volume of sample (mL)	VSAM	0.1000
Test Code	Volume of liquid in cell	VSUB	5.60
U	(sample + fluran + water)		
Matrix	Volume of spike (mL)	VSP	0.1000
LIQUID	Volume of liquid in cell	VTOT	5.70
Sample #	(sample + fluran + water + spike)		
V62-5940	Deflection (sample + fluran)	DSAM	0.28
Instrument Code	Deflection (sample + fluran + spike)	DS+S	0.54
WB88807	Dilution factor of sample	DF	21.2
Analyst	Dilution factor of spike	DFS	106
D. DUNHAM	Spike value (matrix) (gU/L)	SV	3.8600E-02
Date	Preparation factor of sample	PF	1
04/10/94	Concentration (gU/L) Form 1 or Form 3 (SAMPLE)	gU/LI	4.4200E-03
Time	Concentration (gU/L)	gU/LS	1.110E-02
2330	% Recovery		86.5

$$gU/L = (DSAM \cdot VSP \cdot CSP \cdot DF \cdot PF) / (((VTOT/VSUB) \cdot DS+S - DSAM) \cdot VSAM)$$

$$\% Recovery = ((gU/LS - gU/LI) \cdot (DFS / (DF \cdot PF) / SV) \cdot 100$$

RESULT Concentration (gU/L) = 0.01

Data Entry by: <i>D. Dunham</i>	Date: 10-Apr-94
Approved by: <i>J. J. Schepers</i>	Date: 4/12/94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3070

Serial No V 63.-5740	Sample Point 108-AP-	Date 3-18-94	Time Issued 8:31	Priority 26
Determination U	Method, Standard LA-925-106	Result Units uG/ML	Charge Code N1A7F	Returns 1
Sample Size 100-10-100		Customer ID 108-AP-B		
Remarks, Calculations, Results <div style="text-align: center;"> <p>881-20-94</p> <p>4-59 mg/m³ + high spike</p> <p>2.29 E+1 uG/mL</p> <p>539 DEC</p> <p>64 4-10-94</p> <p>.12</p> <p>.38</p> </div>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-10-94	Time Completed 2330	Lab Unit Mgr <i>[Signature]</i>		

WHC-SD-WM-DP-065, REV. 0

URANIUM : LA-925-106 (B-1) LIQUIDS

		SAMPLE
Type	Spike concentration (gU/L)	CSP
SAMPLE	Volume of water (ml)	4.5
Work List	Volume of fluran (ml)	1
3070	Volume of sample (ml)	VSAM
Test Code	Volume of liquid in cell (sample + fluran + water)	VSUB
U	Deflection (sample + fluran)	DSAM
Matrix	Volume of spike (ml)	VSP
LIQUID	Volume of liquid in cell (ml) (sample + fluran + water + spike)	VTOT
Sample #	Deflection (sample + fluran + spike)	DS+S
V63-5740	Dilution factor of sample	DF
Instrument Code	Digestion Dilution Factor of Sample	DDF
WB88807	Preparation Factor	PF
Analyst	Concentration in sample (gU/L)	2.29E-02
D. DUNHAM	gU/L in Sample =	((DSAM*VSP*CSP*DF*DDF*PF)/((VTOT
Date	gU/L in Digest =	((DSAM*VSP*CSP*DF*PF)/((VTOT/VSU
04/10/94	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & D	
Time	Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((VTOT/VSUB)*(DS+S))-DSAM*VSAM))*(1 E6	
2330		

RESULT	U in sample gU/L=	2.29E-02
RESULT	U in µg/mL=	2.29E+01

DETECTION LEVEL µg/mL= 3.82E+00

Data Entry by: <i>R. [Signature]</i>	Date: 18-Apr-94
Approved by: <i>J. [Signature]</i>	Date: 4/20/94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3070

Serial No	Sample Point	Date	Time Issued	Priority
V 63.-5840	108-AP	3-18-94	8:31	26
Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1A7F	1
Sample Size	RERUN		Customer ID	
100-10-100			108-AP-B	
Remarks, Calculations, Results				
DUPLICATE SAMPLE .12 + high spike .37 4.77 ug/ml 2.38 E+1 ug/ml 2.38 E+1 ug/ml				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
4-10-94	2330	<i>[Signature]</i>	<i>[Signature]</i>	

WHC-SD-WM-DP-065, REV. 0

URANIUM : LA-925-106 (B-1) LIQUIDS			SAMPLE
Type	Spike concentration (gU/L)	CSP	5.04E-04
SAMPLE	Volume of water (mL)		4.5
Work List	Volume of fluran (mL)		1
3070	Volume of sample (mL)	VSAM	0.100
Test Code	Volume of liquid in cell (sample + fluran + water)	VSUB	5.60
U	Deflection (sample + fluran)	DSAM	0.12
Matrix	Volume of spike (mL)	VSP	0.100
LIQUID	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.70
Sample #	Deflection (sample + fluran + spike)	DS+S	0.37
V63-5840	Dilution factor of sample	DF	101
Instrument Code	Digestion Dilution Factor of Sample	DDF	1
WB88807	Preparation Factor	PF	1
Analyst	Concentration in sample (gU/L)		2.38E-02
D. DUNHAM	gU/L in Sample =	$\frac{((DSAM * VSP * CSP * DF * DDF * PF))}{((VTOT / VSU))}$	
Date	gU/L in Digest =	$\frac{((DSAM * VSP * CSP * DF * PF))}{((VTOT / VSU))}$	
04/10/94	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & D		
Time	Detection Level =	$((0.02 * VSP * CSP * DF * DDF * PF)) / ((VTOT / VSUB * (DS + S)) - DSAM * VSAM)) * (1 EG)$	
2330	RESULT	U in sample gU/L =	2.38E-02
	RESULT	U in ug/mL =	2.38E+01

DETECTION LEVEL ug/mL = 3.97E+00

Data Entry by:	<i>[Signature]</i>	Date:	18-Apr-94
Approved by:	<i>[Signature]</i>	Date:	4/20/94

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ANALYTICAL BATCH

Lab Segment Serial No. V67 : V68, V69	Customer ID: 108-AP-C, 108-AP-D, 108-AP-E
Analysis: URANIUM	Sample Prep: DIRECT

Instrument: WB88807	Procedure/ Rev: LA-925-106 B-1
Technologist: AJ HOLLIBAUGH <i>AJ Hollibaugh</i>	Date: 04-15-94
Starting Time: 0800	Temperature NA
Ending Time: 1500	Chemist: J. SLIPPERN

Comments: _____

	Description	Lab ID
1	LMCS STD	V65-5540
2	REAGENT BLANK	V66-5640
3	SAMPLE	V67-5740
4	SAMPLE DUPLICATE	V67-5840
5	SAMPLE	V68-5740
6	SAMPLE DUPLICATE	V68-5840
7	SAMPLE	V69-5740
8	SAMPLE DUPLICATE	V69-5840
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS STD	144B38/ .100 ml			
SPIKE	146B38/ .100 ml			
				676

[illegible]

NARRATIVE: ☒ NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:
THE RESULTS FOR THE STANDARD ARE IN $\mu\text{g/L}$.

WHC-SD-WM-DP-065, REV. 0

677

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 2999

Serial No V 65.-5540	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority 26
Determination U	Method-Standard LA-925-106	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 100-10-100			Customer ID STD	
Remarks, Calculations, Results S267 UF1C STD# 144B38 STD VAL 3.84E-2 %REC 15.8% SPIKE ID/VAL 144B38/5.04 SPIKE VOL. 100ml 3.70E-2 231.5108-4594 0.24/56				
WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 Hrs Amanda J. Fullbaugh	Analyst - 2 Hrs	Analyst - 3 Hrs Puketa	Analyst - 4 Hrs	Analyst - 5 Hrs Puketa
Date 4-15-94	Time Completed 1245	Lab Unit Mgr J. J. Seipp		

54 6800-061 (R-10-83)

URANIUM : LA-925-106 (B-1) LIQUIDS			STD
Type	Spike concentration (gU/L)	CSP	5.04E-04
STD	Volume of water (ml)		4.5
Work List	Volume of fluran (ml)		1
2999	Volume of sample (ml)	VSAM	0.100
Test Code	Volume of liquid in cell - (sample + fluran + water)	VSUB	5.60
Matrix	Deflection (sample + fluran)	DSAM	0.24
LIQUID	Volume of spike (ml)	VSP	0.100
Sample #	Volume of liquid in cell (ml) (sample + fluran + water + spike)	VTOT	5.70
V65-5540	Deflection (sample + fluran + spike)	DS+S	0.56
Instrument Code	Dilution factor of sample	DF	101
WB88807	Digestion Dilution Factor of Sample	DDF	1
Analyst	Preparation Factor	PF	1
HOLIBAUGH	Concentration in sample (gU/L)		3.70E-02
Date	gU/L in Sample =	((DSAM*VSP*CSP*DF*DDF*PF)/((VTOT	
04/15/94	gU/L in Digest =	((DSAM*VSP*CSP*DF*PF)/((VTOT/VSU	
Time	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & D		
1245	Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((VTOT/VSUB*(DS+S))-DSAM*VSAM))*(1EG		
RESULT	U in sample gU/L=	3.70E-02	
RESULT	U in µg/ml=	3.70E+01	

DETECTION LEVEL µg/ml= 3.09E+00

Data Entry by:	Date:	15-Apr-94
Approved by:	Date:	4/20/94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 66.-5640	Sample Point 108-AP	Date 3-18-94	Time Issued 9:38	Priority 26
Determination U	Method-Standard LA-925-106	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 100 10 100			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK .00/.30				
WHC-SD-WM-DP-065, REV.0 < 3.57 ug/ml				
Analyst - 1 <i>Shelbaugh</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-15-94	Time Completed 1300	Lab Unit Mgr <i>[Signature]</i>	<i>[Signature]</i>	

54 6800-061 (R-10-83)

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URANIUM : LA-925-106 (B-1) LIQUIDS			BLK
Type	Spike concentration (gU/L)	CSP	5.04E-04
BLK	Volume of water (mL)		4.5
Work List	Volume of fluran (mL)		1
2999	Volume of sample (mL)	VSAM	0.100
Test Code	Volume of liquid in cell (sample + fluran + water)	VSUB	5.60
Matrix	Deflection (sample + fluran)	DSAM	0.02
LIQUID	Volume of spike (mL)	VSP	0.100
Sample #	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VIOT	5.70
V66-5640			
Instrument Code	Deflection (sample + fluran + spike)	DS+S	0.3
WB88807	Dilution factor of sample	DF	101
Analyst	Digestion Dilution Factor of Sample	DDF	1
HOLIBAUGH	Preparation Factor	PF	1
Date	Concentration in sample (gU/L)	<	3.57E-03
04/15/94	gU/L in Sample =	(((DSAM*VSP*CSP*DF*DDF*PF)/((VIOT/VSU	
Time	gU/L in Digest =	(((DSAM*VSP*CSP*DF*PF)/((VIOT/VSU	
1245	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & D		

RESULT

RESULT

U in sample gU/L = <	3.57E-03
U in ug/mL = <	3.57E+00

DETECTION LEVEL ug/mL= 3.57E+00
REPORT RESULT AS A < (LESS THAN) VALUE

Data Entry by: <i>[Signature]</i>	Date: 15-Apr-94
Approved by: <i>[Signature]</i>	Date: 4/20/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	V 67.-5740	Sample Point	108-AP	Date	3-18-94	Time Issued	9:39	Priority	26
Determination	U	Method/Standard	LA-925-106	Result Units	uG/ML	Charge Code	N1A7F	Retuns	0
Sample Size	100-10-11ml					Customer ID	108-AP-C		
Remarks, Calculations, Results <i>10 ml to 10 ml Sample Prep</i> <i>4.1544</i> <i>110/34</i> <i>2.08 E + 0 ug/mL</i>									
Analyst - 1	Analyst - 2		Analyst - 3		Analyst - 4		Analyst - 5		
<i>Hrs</i>	<i>Hrs</i>		<i>Hrs</i>		<i>Hrs</i>		<i>Hrs</i>		
Date	Time Completed		Lab Unit Mgr						
<i>4-15-94</i>	<i>1320</i>		<i>[Signature]</i>		<i>[Signature]</i>				

WHC-SD-WM-DP-065, REV. 0

BEST AVAILABLE COPY

URANIUM : LA-925-106 (B-1) LIQUIDS

Type	Spike concentration (gU/L)	CSP	5.04E-04
SAM	Volume of water (mL)		4.5
Work List	Volume of fluran (mL)		1
2999	Volume of sample (mL)	VSAM	1.000
Test Code	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
NA			
Matrix	Deflection (sample + fluran)	DSAM	0.1
LIQUID	Volume of spike (mL)	VSP	0.100
Sample #	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
V67-5740			
Instrument Code	Deflection (sample + fluran + spike)	DS+S	0.34
WB88807	Dilution factor of sample	DF	101
Analyst	Digestion Dilution Factor of Sample	DDF	1
HOLIBAUGH	Preparation Factor	PF	1
Date	Concentration in sample (gU/L)	2.08E-03	
04/15/94	gU/L in Sample =		((DSAM*VSP*CSP*DF*DDF*PF)/(((VTOT
Time	gU/L in Digest =		((DSAM*VSP*CSP*DF*PF)/(((VTOT/VSU
1245	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & D		

RESULT	U in sample gU/L=	2.08E-03
RESULT	U in ug/mL=	2.08E+00

DETECTION LEVEL ug/mL= 4.15E-01

Data Entry by:	<i>[Signature]</i>	Date:	20-Apr-94
Approved by:	<i>[Signature]</i>	Date:	4/20/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 67.-5840	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination U	Method: Standard LA-925-106	Result Units uG/ML	Charge Code N1A7F	Refers 0
Sample Size 100-10-1111			Customer ID 108-AP-C	
Remarks, Calculations, Results DUPLICATE SAMPLE 10 ml to 10 ml Sample Prep $2.49E+04 \mu\text{g/ml}$ $112/36$ 4.98 mg/l $4-20-94$ <i>Amanda S. Fullenbaugh</i>				
Analyst - 1 Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-15-94	Time Completed 1340	Lab Unit Mgr <i>R. K. S.</i>		

WHC-SD-WM-DP-065, REV. 0

54 6800-061 (R-10-83)

URANIUM : LA-925-106 (B-1) LIQUIDS

Type	Spike concentration (gU/l)	CSP	DUP
DUP	Volume of water (ml)		5.04E-04
Work List	Volume of fluran (ml)		4.5
2999	Volume of sample (ml)		1
Test Code	Volume of liquid in cell (sample + fluran + water)	VSAM	1.000
NA	Deflection (sample + fluran)	VSUR	6.50
Matrix	Volume of spike (ml)	DSAM	0.12
LIQUID	Volume of liquid in cell (ml) (sample + fluran + water + spike)	VSP	0.100
Sample #	Deflection (sample + fluran + spike)	VTOT	6.60
V67-5840	Dilution factor of sample	DS+S	0.36
Instrument Code	Digestion Dilution Factor of Sample	DF	101
WB88807	Preparation Factor	DDF	1
Analyst	Concentration in sample (gU/l)	PF	1
HOLIBAUGH	gU/L in Sample =		2.49E-03
Date	gU/L in Digest =		
04/15/94	$0.02 \text{ is used as the Sample Deflection Reading for Calculating Less Than Values \& D}$ $\text{Detection Level} = ((0.02 * \text{VSP} * \text{CSP} * \text{DF} * \text{DDF} * \text{PF}) / ((\text{VTOT} / \text{VSUR}) * (\text{DS} + \text{S})) - \text{DSAM} * \text{VSAM})) * (1 / \text{E6})$		
Time	U in sample gU/l =	2.49E-03	
1245	- U in $\mu\text{g/ml}$ =	2.49E+00	

RESULT
RESULT

DETECTION LEVEL $\mu\text{g/ml}$ = 4.15E-01

Data Entry by: <i>Jennifer L. Slepian</i>	Date: 20-Apr-94
Approved by: <i>J. Slepian</i>	Date: 4/20/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 68.-5740	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination U	Method/Standard LA-925-106	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 100 10-250			Customer ID 108-AP-D	
Remarks, Calculations, Results 10 ml to 10 mL Sample Prep D.F. = 10 1.37 E+1 ug/mL 2.74 E+1 ug/mL 18/44 4-20-94 Amanda J. Fullbaugh Analyst - 1 Analyst - 2 Analyst - 3 Analyst - 4 Analyst - 5 Date 4-15-94 Time Completed 1400 Lab Unit Mgr Date 3-18-94 Time Issued 9:40 Priority 26				

WHC-SD-WM-DP-065, REV. 0

URANIUM : LA-925-106 (B-1) LIQUIDS

URANIUM : LA-925-106 (B-1) LIQUIDS			SAM
Type	Spike concentration (gU/L)	CSP	5.04E-04
SAM	Volume of water (mL)		4.5
Work List	Volume of fluran (mL)		1
2999	Volume of sample (mL)	VSAM	0.250
Test Code	Volume of liquid in cell (sample + fluran + water)	VSUB	5.75
NA	Deflection (sample + fluran)	DSAM	0.18
LIQUID	Volume of spike (mL)	VSP	0.100
Sample #	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.85
V68-5740	Deflection (sample + fluran + spike)	DS+S	0.44
Instrument Code	Dilution factor of sample	DF	101
WB88807	Digestion Dilution Factor of Sample	DDF	1
Analyst	Preparation Factor	PF	1
HOLIBAUGH	Concentration in sample (gU/L)		1.37E-02
Date	gU/L in Sample =	((DSAM*VSP*CSP*DF*DDF*PF)/((VTOT/VSU	
04/15/94	gU/L in Digest =	((DSAM*VSP*CSP*DF*PF)/((VTOT/VSU	
Time	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & D		
1245	Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((VTOT/VSUB*(DS+S))-DSAM*VSAM))*(1 EG		

RESULT
RESULT

U in sample gU/L=	1.37E-02
U in ug/mL=	1.37E+01

DETECTION LEVEL ug/mL= 1.52E+00

Data Entry by:	<i>Jennifer J. Deppert</i>	Date:	20-Apr-94
Approved by:	<i>J. Deppert</i>	Date:	4/20/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 68.-5840	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination U	Method-Standard LA-925-106	Result Units uG/ML	Charge Code N1A7F	Reprints 0
Sample Size 100-10-250			Customer ID 108-AP-D	
Remarks Calculations Results DUPLICATE SAMPLE 10 ml to 10 ml Sample Prep 1.55E+1 ug/ml 3.10E+1 ug/ml 4-20-94				
Analyst - 1 Hrs [Signature]	Analyst - 2 Hrs	Analyst - 3 Hrs [Signature]	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4.15.94	Time Completed 1415	Lab Unit Mgr [Signature]		

WHC-SD-WM-DP-065, REV. 0

URANIUM : LA-925-106 (B-1) LIQUIDS

Type	Spike concentration (gU/L)	CSP	DUP
DUP	Volume of water (mL)		4.5
Work List	Volume of fluran (mL)		1
2999	Volume of sample (mL)	VSAM	0.250
Test Code	Volume of liquid in cell (sample + fluran + water)	VSUB	5.75
NA	Deflection (sample + fluran)	DSAM	0.22
LIQUID	Volume of spike (mL)	VSP	0.100
Sample #	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.85
Instrument Code	Deflection (sample + fluran + spike)	DS+S	0.5
WB88807	Dilution factor of sample	DF	101
Analyst	Digestion Dilution Factor of Sample	DDF	1
HOLIBAUGH	Preparation Factor	PF	1
Date	Concentration in sample (gU/L)	1.55E-02	
04/15/94	gU/L in Sample =	((DSAM*VSP*CSP*DF*DDF*PF)/((VTOT	
Time	gU/L in Digest =	((DSAM*VSP*CSP*DF*PF)/((VTOT/VSU	
1245	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & D Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((VTOT/VSUB)*(DS+S))-DSAM*VSAM))*(1 EG		
RESULT	U in sample gU/L=	1.55E-02	
RESULT	U in ug/ml=	1.55E+01	

DETECTION LEVEL ug/mL= 1.41E+00

Data Entry by: [Signature]	Date: 20-Apr-94
Approved by: [Signature]	Date: 4/20/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 69.-5740	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination U	Method/Standard LA-925-106	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 100-10-100			Customer ID 108-AP-E	
Remarks, Calculations, Results 10 ml to 10 mL sample prep 12/36 2.48E+1 ug/mL 4.96 E+1 ug/mL 4-30-94 <i>M. J. Hallbaugh</i>				
Analyst - 1 <i>Hrs</i>	Analyst - 2 <i>Hrs</i>	Analyst - 3 <i>Hrs</i>	Analyst - 4 <i>Hrs</i>	Analyst - 5 <i>Hrs</i>
Date 4-15-94	Time Completed 1430	Lab Unit Mgr <i>[Signature]</i>		

54-6800-061 (R-10 83)

WHC-SD-WM-DP-065, REV. 0

URANIUM : LA-925-106 (B-1) LIQUIDS

SAM

Type	Spike concentration (gU/L)	CSP	5.04E-04
SAM	Volume of water (mL)		4.5
Work List	Volume of fluran (mL)		1
2999	Volume of sample (mL)	VSAM	0.100
Test Code	Volume of liquid in cell	VSUB	5.60
NA	(sample + fluran + water)		
Matrix	Deflection (sample + fluran)	DSAM	0.12
LIQUID	Volume of spike (mL)	VSP	0.100
Sample #	Volume of liquid in cell (mL)	VTOT	5.70
V69-5740	(sample + fluran + water + spike)		
Instrument Code	Deflection (sample + fluran + spike)	DS+S	0.36
WB88807	Dilution factor of sample	DF	101
Analyst	Digestion Dilution Factor of Sample	DDF	1
HOLIBAUGH	Preparation Factor	PF	1
Date	Concentration in sample (gU/L)	2.48E-02	
04/15/94	gU/L in Sample =		$((DSAM \cdot VSP \cdot CSP \cdot DF \cdot DDF \cdot PF) / ((VTOT$
Time	gU/L in Digest =		$((DSAM \cdot VSP \cdot CSP \cdot DF \cdot PF) / ((VTOT / VSU$
1245	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values &		

RESULT	U in sample gU/L=	2.48E-02
RESULT	U in ug/mL=	2.48E+01

DETECTION LEVEL ug/mL= 4.13E+00

Data Entry by: <i>[Signature]</i>	Date: 20-Apr-94
Approved by: <i>[Signature]</i>	Date: 4/30/94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 69.-5840	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination U	Method/Standard LA-925-106	Result/Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 100-10-100			Customer ID 108-AP-E	
Remarks, Calculations, Results DUPLICATE SAMPLE 10 ml to 10 ml Sample Prep 2.07E+1 $\mu\text{g}/\text{mL}$ 4.14 E+1 $\mu\text{g}/\text{mL}$ 110/34 4-1-20-94 Amanda J.				
Analyst - 1 Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-15-94	Time Completed 1450	Lab Unit Mgr		

WHC-SD-WM-DP-065, REV. 0

54-6800-061 (R-10-83)

URANIUM : LA-925-106 (B-1) LIQUIDS

		DUP
Type	Spike concentration (gU/L)	CSP
DUP	Volume of water (mL)	4.5
Work List	Volume of fluran (mL)	1
2999	Volume of sample (mL)	VSAM
Test Code	Volume of liquid in cell (sample + fluran + water)	VSUB
NA	Deflection (sample + fluran)	DSAM
LIQUID	Volume of spike (mL)	VSP
Sample #	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT
V69-5840	Deflection (sample + fluran + spike)	DS+S
Instrument Code	Dilution factor of sample	DF
WB88807	Digestion Dilution Factor of Sample	DDF
Analyst	Preparation Factor	PF
HOLIBAUGH	Concentration in sample (gU/L)	2.07E-02
Date	gU/L in Sample =	$((\text{DSAM} \cdot \text{VSP} \cdot \text{CSP} \cdot \text{DF} \cdot \text{DDF} \cdot \text{PF}) / ((\text{VTOT} / \text{VSUB} \cdot \text{DS} + \text{S}) - \text{DSAM} \cdot \text{VSAM})) \cdot (1 \text{ EG}))$
04/15/94	gU/L in Digest =	$((\text{DSAM} \cdot \text{VSP} \cdot \text{CSP} \cdot \text{DF} \cdot \text{PF}) / ((\text{VTOT} / \text{VSUB} \cdot \text{DS} + \text{S}) - \text{DSAM} \cdot \text{VSAM})) \cdot (1 \text{ EG}))$
Time	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & D	
1245	Detection Level =	$((0.02 \cdot \text{VSP} \cdot \text{CSP} \cdot \text{DF} \cdot \text{DDF} \cdot \text{PF}) / ((\text{VTOT} / \text{VSUB} \cdot \text{DS} + \text{S}) - \text{DSAM} \cdot \text{VSAM})) \cdot (1 \text{ EG}))$

RESULT	U in sample gU/L =	2.07E-02
RESULT	U in $\mu\text{g}/\text{mL}$ =	2.07E+01

DETECTION LEVEL $\mu\text{g}/\text{mL}$ = 4.14E+00

Data Entry by:	Date:	20-Apr-94
Approved by:	Date:	4/30/94

QA

LA-925-106

DATE START:

JULY 4, 1994

PREPARED BY:

J.L. SLIPPERN

DATE COMPLETE:

JULY 6, 1994

NARRATIVE:

X

☐ NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

THE RESULTS FOR THE STANDARD ARE IN gU/L.

WHC-SD-WM-DP-065, REV. 0

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3011

Serial No V 71.-5540	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 1	Priority 26
Determination U	Method-Standard LA-925-106	Result Units % RECOVERY	Charge Code N1A7F	Repeats 0
Sample Size .100 mL - 10 mL - .100 mL			Customer ID STD	
Remarks, Calculations, Results S267 UF1C STD# 144B38 RESULT 4.05E-02 STD VAL 3.36E-2 %REC 104.9 SPIKE ID/VAL 146B38/5.04x10 ⁻⁴ g/l SPIKE VOL. .100 mL .23 .51 WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>Robert J. McCown</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 <i>Ray Hammond</i> Hrs
Date 7/4/94	Time Completed 1150	Lab Unit Mgr <i>J. J. DeLoe</i> 54-6800-061 (R-10-83)		

URANIUM : LA-925-106 (B-1) LIQUIDS		STANDARD
Type	Spike concentration (gU/L)	CSP
STANDARD	Volume of water (mL)	4.5
Work List	Volume of fluran (mL)	1
3011	Volume of sample (mL)	VSAM
Test Code	Volume of liquid in cell (sample + fluran + water)	VSUB
U	Deflection (sample + fluran)	DSAM
Matrix	Volume of spike (mL)	VSP
LIQUID	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT
Sample #	Deflection (sample + fluran + spike)	DS+S
V71-5540	Dilution factor of sample	DF
Instrument Code	Digestion Dilution Factor of Sample	DDF
WB88807	Preparation Factor	PF
Analyst	Concentration in sample (gU/L)	4.05E-02
P McCOWN	$\text{gU/L in Sample} = ((\text{DSAM} \cdot \text{VSP} \cdot \text{CSP} \cdot \text{DF} \cdot \text{DDF} \cdot \text{PF}) / ((\text{VTOT} / \text{VSUB}) \cdot (\text{DS} + \text{S}) - \text{DSAM} \cdot \text{VSAM}))$	
Date	$\text{gU/L in Digest} = ((\text{DSAM} \cdot \text{VSP} \cdot \text{CSP} \cdot \text{DF} \cdot \text{DDF} \cdot \text{PF}) / ((\text{VTOT} / \text{VSUB}) \cdot (\text{DS} + \text{S}) - \text{DSAM} \cdot \text{VSAM}))$	
07/04/94	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level $\text{Detection Level} = ((0.02 \cdot \text{VSP} \cdot \text{CSP} \cdot \text{DF} \cdot \text{DDF} \cdot \text{PF}) / ((\text{VTOT} / \text{VSUB}) \cdot (\text{DS} + \text{S}) - \text{DSAM} \cdot \text{VSAM})) \cdot (1 \text{ EB } \mu\text{g/g} / 1000 \text{ mL/L})$	
Time		
1150		

RESULT
RESULT

U in sample gU/L=	4.05E-02
U in µg/mL=	4.05E+01

DETECTION LEVEL µg/mL= 3.52E+00

Data Entry by: <i>Ray Hammond</i>	Date: 04-Jul-94
Approved by: <i>J. J. DeLoe</i>	Date: 7/6/94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 72.-5640	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 5	Priority 26
Determination U	Method-Standard LA-925-106	Result Units uG/ML	Charge Code N1A7F	Repeats 0
Sample Size 5mL			Customer ID BLANK..	
Remarks Calculations, Results REAGENT BLANK SPIKE ID/VAL 146838/4.58x10 ⁻⁵ g/l SPIKE VOL. .100ML $< 8.18 \times 10^{-5} \text{ ng/mL}$				
Analyst - 1 <i>P. McCown</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7/4/94	Time Completed 1150	Lab Unit Mgr <i>J. H. H.</i>		

WHC-SD-WM-DP-065, REV. 0

54-6800-061 (R-10-83)

URANIUM : LA-925-106 (B-1) LIQUIDS

		BLANK
Type	Spike concentration (gU/L)	4.58E-05
BLANK	Volume of water (mL)	0
Work List	Volume of fluran (mL)	1
3011	Volume of sample (mL)	5.000
Test Code	Volume of liquid in cell (sample + fluran + water)	6.00
U	Deflection (sample + fluran)	0.02
Matrix	Volume of spike (mL)	0.100
LIQUID	Volume of liquid in cell (mL) (sample + fluran + water + spike)	6.10
Sample #	Deflection (sample + fluran + spike)	0.24
V72-5640	Dilution factor of sample	1
Instrument Code	Digestion Dilution Factor of Sample	1
WB88807	Preparation Factor	1
Analyst	Concentration in sample (gU/L)	< 8.18E-08
P McCOWN	$\text{gU/L in Sample} = ((\text{DSAM} \cdot \text{VSP} \cdot \text{CSP} \cdot \text{DF} \cdot \text{DDF} \cdot \text{PF}) / ((\text{VTOT} / \text{VSUB}) \cdot (\text{DS} + \text{S}) - \text{DSAM} \cdot \text{VSAM}))$	
Date	$\text{gU/L in Digest} = ((\text{DSAM} \cdot \text{VSP} \cdot \text{CSP} \cdot \text{DF} \cdot \text{DDF} \cdot \text{PF}) / ((\text{VTOT} / \text{VSUB}) \cdot (\text{DS} + \text{S}) - \text{DSAM} \cdot \text{VSAM}))$	
07/04/94	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level	
Time	$\text{Detection Level} = ((0.02 \cdot \text{VSP} \cdot \text{CSP} \cdot \text{DF} \cdot \text{DDF} \cdot \text{PF}) / ((\text{VTOT} / \text{VSUB}) \cdot (\text{DS} + \text{S}) - \text{DSAM} \cdot \text{VSAM})) \cdot (1153 \text{ } \mu\text{g/g} / 1000 \text{ mL/L})$	
1150		

RESULT
RESULT

U in sample gU/L =	< 8.18E-08
U in $\mu\text{g/mL}$ =	< 8.18E-05

DETECTION LEVEL $\mu\text{g/mL}$ = 8.18E-05

REPORT RESULT AS A < (LESS THAN) VALUE

Data Entry by: <i>J. H. H.</i>	Date: 04-Jul-94
Approved by: <i>J. H. H.</i>	Date: 7/16/94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 73.-5740	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination U	Method-Standard LA-925-106	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 5ML			Customer ID 108AP-FB	
Remarks, Calculations, Results SPIKE ID / VAL 146838 4.58×10^{-5} g/L .02 SPIKE VOL. .100 ML .24 $< 8.18 \times 10^{-5}$ ug/mL				
Analyst - 1 <i>Patrick J. McCann</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 7/4/94	Time Completed 1150	Lab Unit Mgr <i>Jennifer L. Deppa</i> 54-6800-061 (R-10-83)		

WHC-SD-WM-DP-065, REV. 0

URANIUM : LA-925-106 (B-1) LIQUIDS

SAMPLE		SAMPLE
Type	Spike concentration (gU/L)	CSP 4.58E-05
SAMPLE	Volume of water (mL)	0
Work List	Volume of fluran (mL)	1
3011	Volume of sample (mL)	VSAM 5.000
Test Code	Volume of liquid in cell (sample + fluran + water)	VSUB 6.00
U	Deflection (sample + fluran)	DSAM 0.02
LIQUID	Volume of spike (mL)	VSP 0.100
Sample #	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT 6.10
V73-5740	Deflection (sample + fluran + spike)	DS+S 0.24
Instrument Code	Dilution factor of sample	DF 1
WB88807	Digestion Dilution Factor of Sample	DDF 1
Analyst	Preparation Factor	PF 1
P McCOWN	Concentration in sample (gU/L)	< 8.18E-08
Date	$gU/L \text{ in Sample} = ((DSAM * VSP * CSP * DF * DDF * PF) / ((VTOT / VSUB) * (DS+S) - DSAM * VSAM))$	
07/04/94	$gU/L \text{ in Digest} = ((DSAM * VSP * CSP * DF * PF) / ((VTOT / VSUB) * (DS+S) - DSAM * VSAM))$	
Time	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level Detection Level = $((0.02 * VSP * CSP * DF * DDF * PF) / ((VTOT / VSUB) * (DS+S) - DSAM * VSAM)) * (1 EB \mu g / g / 1000 \text{ mL/L})$	
1150		

RESULT
RESULT

U in sample gU/L = <	8.18E-08
U in $\mu g/mL$ = <	8.18E-05

DETECTION LEVEL $\mu g/mL$ = 8.18E-05

REPORT RESULT AS A < (LESS THAN) VALUE

Data Entry by: <i>Deppa</i>	Date: 04-Jul-94
Approved by: <i>Jennifer L. Deppa</i>	Date: 7/6/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 73.-5840	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination U	Method-Standard LA-925-106	Result Units uG/ML	Charge Code N1A7F	Retuns 0
Sample Size 5mL			Customer ID 108AP-FB	
Remarks, Calculations, Results DUPLICATE SAMPLE SPIKE ID / VAL 146838 4.58×10^{-5} g/l WHC-SD-WM-DP-065, REV. 0 $< 8.57 \times 10^{-5}$ uG/mL 07 23				
Analyst - 1 <i>P. J. McCown</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 7/4/94	Time Completed 1150	Lab Unit Mgr <i>J. J. Depina</i> 54-6800-061 (R-10-83)		

BEST AVAILABLE COPY

URANIUM : LA-925-106 (B-1) LIQUIDS			DUPLICATE
Type	Spike concentration (gU/L)	CSP	4.58E-05
DUPLICATE	Volume of water (mL)		0
Work List	Volume of fluran (mL)		1
3011	Volume of sample (mL)	VSAM	5.000
Test Code	Volume of liquid in cell	VSUB	6.00
U	(sample + fluran + water)		
Matrix	Deflection (sample + fluran)	DSAM	0.02
LIQUID	Volume of spike (mL)	VSP	0.100
Sample #	Volume of liquid in cell (mL)	VTOT	6.10
V73-5840	(sample + fluran + water + spike)		
Instrument Code	Deflection (sample + fluran + spike)	DS+S	0.23
WB88807	Dilution factor of sample	DF	1
Analyst	Digestion Dilution Factor of Sample	DDF	1
P McCOWN	Preparation Factor	PF	1
Date	Concentration in sample (gU/L)	<	8.57E-08
07/04/94	gU/L in Sample = $((DSAM \cdot VSP \cdot CSP \cdot DF \cdot DDF \cdot PF) / ((VTOT / VSUB \cdot (DS+S)) - DSAM \cdot VSAM))$		
Time	gU/L in Digest = $((DSAM \cdot VSP \cdot CSP \cdot DF \cdot PF) / ((VTOT / VSUB \cdot (DS+S)) - DSAM \cdot VSAM))$		
1150	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level		

RESULT	U in sample gU/L = <	8.57E-08
RESULT	U in $\mu\text{g/mL}$ = <	8.57E-05

DETECTION LEVEL $\mu\text{g/mL}$ = 8.57E-05
 REPORT RESULT AS A < (LESS THAN) VALUE

Data Entry by:	<i>J. J. Depina</i>	Date:	04-Jul-94
Approved by:	<i>P. J. McCown</i>	Date:	7/6/94

WHC-SD-WM-DP-065, REV. 0

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THE FOLLOWING ANALYSES ARE INCLUDED IN THE DATA PACKAGE BUT THE RESULTS HAVE NOT BEEN REPORTED IN THE FINAL SUMMARY REPORTS.

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. V60 - V63	Customer ID: 108-AP-A, 108-AP-B
Analysis: Uranium	Sample Prep: Direct Liquid

Instrument: W B88807	Procedure/ Rev: LA-925-106/B-C
Technologist: Rae Ann Green	Date: 4-7-94
Starting Time: 08:00	Temperature 24° C
Ending Time: 14:00	Chemist: J. Slipperin

Comments: _____

~~OUT FOR RERUN~~

	Description	Lab ID		Description	Lab ID
1	LMCS	V60.-5540	11	DATA NOT USED IN PACKAGE	
2	Blank (Reagent)	V61.-5640	12		
3	Sample.	V62.-5740	13		
4	Sample. (duplicate)	V63.-5840	14		
5	Sample. spiked	V64.-5940	15		
6	Sample. spiked (duplicate)	V65.-5040	16		
7	Sample	V63.-5740	17		
8	Sample. (duplicate)	V63.-5840	18		
9			19		
10			20		

[illegible]

[illegible]

SPIKE RECOVERIES INDICATE TECHNIQUE ERROR IN SAMPLE ANALYSIS.
RERUN REQUESTED.

695

Batch 2984

Serial No V 60.-5540	Sample Point 108-AP	Date 3-18-94	Time Issued 8:26	Priority 26
Determination U	Method/Standard LA-925-106	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 100 - 10 - 100			Customer ID STD	
Remarks, Calculations, Results S267 UF1C STD# 144838 STD VAL 3.86 SPIKE ID/VAL 146838 / 5.04 SPIKE VOL. 100ml 3.59E-2 RESULT 241.57 high range %REC 93.02% E-4 <p style="text-align: center; font-size: 1.2em;">OUT FOR RERUN</p> <p>Rae Ann Green</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-7-94	Time Completed 14:00	Lab Unit Mgr <i>[Signature]</i>		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

URANIUM : LA-925-106 (B-1) LIQUIDS

		STD
Type	Spike concentration (gU/L)	CSP
STD	Volume of water (mL)	4.5
Work List	Volume of fluran (mL)	1
2984	Volume of sample (mL)	VSAM
Test Code	Volume of liquid in cell (sample + fluran + water)	VSUB
NA	Deflection (sample + fluran)	DSAM
Matrix	Volume of spike (mL)	VSP
LIQUID	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT
Sample #	Deflection (sample + fluran + spike)	DS+S
V60-5540	Dilution factor of sample	DF
Instrument Code	Digestion Dilution Factor of Sample	DDF
WB88807	Preparation Factor	PF
Analyst	Concentration in sample (gU/L)	3.59E-02
GREEN	gU/L in Sample =	((DSAM*VSP*CSP*DF*DDF*PF)/((VTOT
Date	gU/L in Digest =	((DSAM*VSP*CSP*DF*PF)/((VTOT/VSU
04/07/94	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & D	
Time	Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))	(1 EG
1400		

RESULT
RESULT

U in sample gU/L=	3.59E-02
U in µg/mL=	3.59E+01

DETECTION LEVEL µg/mL= 2.99E+00

Data Entry by: <i>[Signature]</i>	Date: 12-Apr-94
Approved by: <i>[Signature]</i>	Date: 4/13/94

Serial No V 61.-5640	Sample Point 108-AP	Date 3-18-94	Time Issued 8:27	Priority 26
Determination U	Method: Standard LA-925-106	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 100-10-100			Customer ID BLANK	
Remarks Calculations Results REAGENT BLANK <i>0.30</i> <i>4/19/94</i> <i>0/30</i>				
WHC-SD-WM-DP-065, REV.0 <3.57 E+0 μ g/mL OUT FOR RERUN				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-7-94	Time Completed 14:00	Lab Unit Mgr <i>Dr. S. S. S. S. S.</i>		

54 6800-061 (R-10-83)

URANIUM : LA-925-106 (B-1) LIQUIDS

Type	Spike concentration (gU/L)	CSP	5.04E-04
BLK	Volume of water (mL)		4.5
Work List	Volume of fluran (mL)		1
2984	Volume of sample (mL)	VSAM	0.100
Test Code	Volume of liquid in cell	VSUB	5.60
NA	(sample + fluran + water)		
Matrix	Deflection (sample + fluran)	DSAM	0
LIQUID	Volume of spike (mL)	VSP	0.100
Sample #	Volume of liquid in cell (mL)	VTOT	5.70
V61-5640	(sample + fluran + water + spike)		
Instrument Code	Deflection (sample + fluran + spike)	DS+S	0.3
WB88807	Dilution factor of sample	DF	101
Analyst	Digestion Dilution Factor of Sample	DDF	1
GREEN	Preparation Factor	PF	1
Date	Concentration in sample (gU/L)	<	3.57E-03
04/07/94	gU/L in Sample =	((DSAM*VSP*CSP*DF*DDF*PF))/(((VTOT	
Time	gU/L in Digest =	((DSAM*VSP*CSP*DF*PF))/(((VTOT/VSU	
1400	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & D		
	Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((VTOT/VSUB*(DS+S))-DSAM*VSAM))*(1 EG		
RESULT	U in sample gU/L =	<	3.57E-03
RESULT	U in µg/mL =	<	3.57E+00

DETECTION LEVEL μ g/mL = 3.57E+00
 REPORT RESULT AS A < (LESS THAN) VALUE

Data Entry by: <i>[Signature]</i>	Date: 12-Apr-94
Approved by: <i>[Signature]</i>	Date: 4/10/94

Serial No V 62.-5740	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination U	Method-Standard LA-925-106	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 100-10-100			Customer ID 108-AP-A	
Remarks, Calculations, Results .20/.48 high range WHC-SD-WM-DP-065, REV.0 OUT FOR RERUN 3.53 E+1 ug/ml Rae Ann Green				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-7-94	Time Completed 14:00	Lab Unit Mgr J. J. Slippert		

54-6800-061 (R-10-831)

URANIUM : LA-925-106 (B-1) LIQUIDS

Type	Spike concentration (gU/L)	CSP	5.04E-04
SAMPLE	Volume of water (mL)		4.5
Work List	Volume of fluran (mL)		1
2984	Volume of sample (mL)	VSAM	0.100
Test Code	Volume of liquid in cell	VSUB	5.60
NA	(sample + fluran + water)		
Matrix	Deflection (sample + fluran)	DSAM	0.2
LIQUID	Volume of spike (mL)	VSP	0.100
Sample #	Volume of liquid in cell (mL)	VTOT	5.70
V62-5740	(sample + fluran + water + spike)		
Instrument Code	Deflection (sample + fluran + spike)	DS+S	0.48
WB88807	Dilution factor of sample	DF	101
Analyst	Digestion Dilution Factor of Sample	DDF	1
GREEN	Preparation Factor	PF	1
Date	Concentration in sample (gU/L)	3.53E-02	
04/07/94	gU/L in Sample =	((DSAM*VSP*CSP*DF*DDF*PF)/(((VTOT	
Time	gU/L in Digest =	((DSAM*VSP*CSP*DF*PF)/(((VTOT/VSU	
1400	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & I		

RESULT
RESULT

U in sample gU/L=	3.53E-02
U in ug/ml=	3.53E+01

DETECTION LEVEL ug/ml= 3.53E+00

Data Entry by: <i>Jennifer J. Slippert</i>	Date: 12-Apr-94
Approved by: <i>J. J. Slippert</i>	Date: 4/12/94

Serial No V 62.-5840	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination U	Method/Standard LA-925-106	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 100-10-100			Customer ID 108-AP-A	
Remarks Calculations, Results DUPLICATE SAMPLE . 20/1.48 high range OUT FOR RERUN 3.53E+1 u8/mL Rae Ann Green				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-7-94	Time Completed 14:00	Lab Unit Mgr <i>[Signature]</i>		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV.0

URANIUM : LA-925-106 (B-1) LIQUIDS

URANIUM : LA-925-106 (B-1) LIQUIDS			SAMPLE
Type	Spike concentration (gU/L)	CSP	5.04E-04
SAMPLE	Volume of water (mL)		4.5
Work List	Volume of fluran (mL)		1
2984	Volume of sample (mL)	VSAM	0.100
Test Code	Volume of liquid in cell	VSUB	5.60
NA	(sample + fluran + water)		
Matrix	Deflection (sample + fluran)	DSAM	0.2
LIQUID	Volume of spike (mL)	VSP	0.100
Sample #	Volume of liquid in cell (mL)	VTOT	5.70
V62-5840	(sample + fluran + water + spike)		
Instrument Code	Deflection (sample + fluran + spike)	DS+S	0.48
WB88807	Dilution factor of sample	DF	101
Analyst	Digestion Dilution Factor of Sample	DDF	1
GREEN	Preparation Factor	PF	1
Date	Concentration in sample (gU/L)	3.53E-02	
04/07/94	gU/L in Sample =	((DSAM*VSP*CSP*DF*DDF*PF)/((VTOT	
Time	gU/L in Digest =	((DSAM*VSP*CSP*DF*PF)/((VTOT/VSU	
1400	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & D		

RESULT
RESULT

U in sample gU/L=	3.53E-02
U in µg/mL=	3.53E+01

DETECTION LEVEL µg/mL= 3.53E+00

Data Entry by: <i>[Signature]</i>	Date: 12-Apr-94
Approved by: <i>[Signature]</i>	Date: 4/12/94

Serial No V 62.-5940	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination U	Method/Standard LA-925-106	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 500 x STD Sample 100 x 100 = 10 - 100 - 500 R6 4/8/94 507 = 10 = 100 - R2 4/9/94			Customer ID 108-AP-A	
Remarks. Calculations. Results SAMPLE SPIKED ID .27/.57 high range SPIKE ID 146838 SPIKE VOLUME .100 ml				
WHC-SD-WM-DP-065, REV.0 OUT FOR RERUN				
Rae Ann Green				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-7-94	Time Completed 14:00	Lab Unit Mgr J. J. Shepperson Gary Hammer		

URANIUM : LA-925-106 (B-1)			SPIKE
Type	Spike concentration (gU/L)	CSP	5.04E-04
SPIKE	Volume of water (mL)		4.5
Work List	Volume of fluran (mL)		1
2984	Volume of sample (mL)	VSAM	0.1000
Test Code	Volume of liquid in cell	VSUM	5.60
NA	(sample + fluran + water)		
Matrix	Volume of spike (mL)	VSP	0.1000
LIQUID	Volume of liquid in cell	VTOT	5.70
Sample #	(sample + fluran + water + spike)		
V62-5940	Deflection (sample + fluran)	DSAM	0.27
Instrument Code	Deflection (sample + fluran + spike)	DS+S	0.57
WB88807	Dilution factor of sample	DF	21.2
Analyst	Dilution factor of spike	DFS	106
GREEN	Spike value (matrix) (gU/L)	SV	3.8600E-02
Date	Preparation factor of sample	PF	1
04/07/94	Concentration (gU/L) Form 1 or Form 3 (SAMPLE)	gU/LI	3.5300E-02
Time	Concentration (gU/L)	gU/IS	9.301E-03
1400	% Recovery		-336.8

$$\% \text{Recovery} = ((gU/LS - gU/LI) * (DFS / (DF * PF)) / SV) * 100$$

RESULT	Concentration (gU/L)	=	0.01
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Data Entry by:	<i>[Signature]</i>	Date:	12-Apr-94
Approved by:	<i>[Signature]</i>	Date:	4/12/94
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Serial No V 62.-5040	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination U	Method-Standard LA-925-106	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 500 ml sample -10-100 100 ml Std			Customer ID 108-AP-A	
Remarks Calculations, Results SAMPLE SPIKE DUPLICATE SPIKE ID 146B38 SPIKE VOL 100ml 271.57 high WHC-SD-WM-DP-065, REV. 0 OUT FOR RERUN Rae Ann Green				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-7-94	Time Completed 14:00	Lab Unit Mgr [Signature] 54-6800-061 (R-10-83)		

URANIUM : LA-925-106 (B-1) SPIKE			SPIKE
Type	Spike concentration (gU/L)	CSP	5.04E-04
SPIKE	Volume of water (ml)		4.5
Work List	Volume of fluran (ml)		1
2984	Volume of sample (ml)	VSAM	0.1000
Test Code	Volume of liquid in cell (sample + fluran + water)	VSUB	5.60
NA	Volume of spike (ml)	VSP	0.1000
Matrix	Volume of liquid in cell (sample + fluran + water + spike)	VTOT	5.70
LIQUID	Deflection (sample + fluran)	DSAM	0.27
Sample #	Deflection (sample + fluran + spike)	DS+S	0.57
V62-5040	Dilution factor of sample	DF	21.2
Instrument Code	Dilution factor of spike	DFS	106
WB88807	Spike value (matrix) (gU/L)	SV	3.8600E-02
Analyst	Preparation factor of sample	PF	1
GREEN	Concentration (gU/L) Form 1 or Form 3 (SAMPLE)	gU/LI	3.5300E-02
Date	Concentration (gU/L)	gU/IS	9.301E-03
04/07/94	% Recovery		-336.8
Time			
1400			

$$gU/L = (DSAM * VSP * CSP * DF * PF) / (((VTOT / VSUB) * DS+S - DSAM) * VSAM)$$

$$\% Recovery = ((gU/IS - gU/LI) * (DFS / (DF * PF) / SV) * 100$$

RESULT Concentration (gU/L) = 0.01

Data Entry by: [Signature]	Date: 12-Apr-94
Approved by: [Signature]	Date: 4/12/94

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Serial No V 63.-5740	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination U	Method/Standard LA-925-106	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 100 - 10 - 100			Customer ID 108-AP-B	
Remarks, Calculations, Results <p><i>.14 1.46 high range</i></p> <p><i>2.17E+1 uG/mL</i></p> <p>OUT FOR RERUN</p> <p>WHC-SD-WM-DP-065, REV. 0</p> <p><i>Rae Ann Green</i></p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-7-94	Time Completed 14:00	Lab Unit Mgr <i>[Signature]</i>		

54 6800-061 (R-10-83)

URANIUM : LA-925-106 (B-1) LIQUIDS

		SAMPLE
Type	Spike concentration (gU/l)	CSP
SAMPLE	Volume of water (ml)	4.5
Work List	Volume of fluran (ml)	1
2984	Volume of sample (ml)	VSAM
Test Code	Volume of liquid in cell (sample + fluran + water)	VSUB
NA	Deflection (sample + fluran)	DSAM
Matrix	Volume of spike (ml)	VSP
LIQUID	Volume of liquid in cell (ml) (sample + fluran + water + spike)	VTOT
Sample #	Deflection (sample + fluran + spike)	DS+S
V63-5740	Dilution factor of sample	DF
Instrument Code	Digestion Dilution Factor of Sample	DDF
WB88807	Preparation Factor	PF
Analyst	Concentration in sample (gU/L)	2.17E-02
GREEN	gU/L in Sample =	$((DSAM * VSP * CSP * DF * DDF * PF) / ((VTOT / VSU)))$
Date	gU/L in Digest =	$((DSAM * VSP * CSP * DF * PF) / ((VTOT / VSU)))$
04/07/94	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & D	
Time	Detection Level = $((0.02 * VSP * CSP * DF * DDF * PF) / ((VTOT / VSUB) * (DS+S)) - DSAM * VSAM)) * (1E6)$	
1400		

RESULT
RESULT

U in sample gU/L =	2.17E-02
U in µg/ml =	2.17E+01

DETECTION LEVEL µg/ml = 3.10E+00

Data Entry by:	<i>[Signature]</i>	Date:	12-Apr-94
Approved by:	<i>[Signature]</i>	Date:	4/12/94

Serial No V 63.-5840	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination U	Method/Standard LA-925-106	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 100-10-100			Customer ID 108-AP-B	
Remarks, Calculations, Results DUPLICATE SAMPLE .141.46 high range 2.17E+1 ug/ml OUT FOR RERUN WHC-SD-WM-DP-065, REV.0 Ree Ann Green				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-7-94	Time Completed 14:00	Lab Unit Mgr [Signature]		

34-6800-061 (R-10-83)

URANIUM : LA-925-106 (B-1) LIQUIDS

		SAMPLE
Type	Spike concentration (gU/L) CSP	5.04E-04
SAMPLE	Volume of water (mL)	4.5
Work List	Volume of fluran (mL)	1
2984	Volume of sample (mL) VSAM	0.100
Test Code	Volume of liquid in cell VSUB	5.60
NA	(sample + fluran + water)	
Matrix	Deflection (sample + fluran) DSAM	0.14
LIQUID	Volume of spike (mL) VSP	0.100
Sample #	Volume of liquid in cell (mL) VTOT	5.70
V63-5840	(sample + fluran + water + spike)	
Instrument Code	Deflection (sample + fluran + spike) DS+S	0.46
WB88807	Dilution factor of sample DF	101
Analyst	Digestion Dilution Factor of Sample DDF	1
GREEN	Preparation Factor PF	1
Date	Concentration in sample (gU/L)	2.17E-02
04/07/94	gU/L in Sample = $((DSAM \cdot VSP \cdot CSP \cdot DF \cdot DDF \cdot PF) / ((VTOT$	
Time	gU/L in Digest = $((DSAM \cdot VSP \cdot CSP \cdot DF \cdot PF) / (((VTOT / VSU$	
1400	0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & D	

RESULT	U in sample gU/L=	2.17E-02
RESULT	U in ug/mL=	2.17E+01

DETECTION LEVEL ug/mL= 3.10E+00

Data Entry by: [Signature]	Date: 12-Apr-94
Approved by: [Signature]	Date: 4/12/94

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CF

NARRATIVE: NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

Please refer to attachment for further explanation and summary.

6-29-94

1705

Batch Summary
Arsenic Analysis
Batch #: 3516
June 28, 1994

SUMMARY

The spike recoveries for this batch are low by ~50%. It is, therefore, possible that the reported results could also be 50% low. Because of the limited amount of sample available for further analyses, no additional information with regard to the amount of As in these samples can be obtained.

EXPLANATION

Some complications occurred during the acid digestion and arsenic (As) analysis for this batch (V60 - V63): 1) acid matrix mismatching, 2) insufficient sample. The following explanation describes what steps were taken to obtain the reported results.

- 1) The original acid digestion (digest 1) of this batch included the usual protocol of: sample and duplicate sample digested with a dilution factor (DF) of 5, and an As LMCS standard and spikes. This batch was analyzed twice for As (rerun 0 and rerun 1). Both times, high recoveries were obtained for the digested LMCS standard (166% and 167%). The matrix spike recoveries were 116% and 117%. It is important to note that the recoveries for the digested spikes are ~ 50% lower than those for the digested standard.

The high recoveries for the LMCS standards are a result of acid matrix mismatching between the calibration standards and the sample/LMCS standards. In this method, the extent of the arsenic borohydride reaction (which produces the vapor that is transported to the cell for atomization) is directly dependent on the acid concentration of the sample in the reaction flask. The As peak heights appears to be proportional to the concentration of HCl present. Previously, a single stock solution of As calibration standard was diluted such that the HCl concentration was less than that of the samples/LMCS standards. The peak heights for the calibration standards were artificially low leading to high recoveries for the LMCS standards.

This problem was dealt with in the following manner: the batch was redigested (digest 2) with a calibration standard for As included to more closely match the acid matrix of the samples. In addition, the procedure for preparing the dilutions of the calibration standards was altered. For this run, the individual calibration standards were prepared before being subjected to the As prep. As a result, the calibration standards and the samples/LMCS standards were matched with respect to HCl concentration. (We have recently determined that the critical step is to prepare individual dilutions of the calibration standards prior to the As preparation and that the acid digestion of the stock calibration standard is unnecessary.)

- 2) There was an insufficient amount of V62 to reprep for digest 2. Therefore, there is no

matrix spike or matrix spike duplicate for this digest (batch). Also, due to limited amounts of V63, this sample was prepared with a DF of 10 in this digest.

This problem was dealt with in the following manner: the batch was reanalyzed for As as follows (rerun 2):

- Digested Calibration Standards (from digest 2)
- Digested LMCS (from digest 2)
- Digested blank (from digest 2)
- V62 1 mL (from digest 1)
- V62 Dup 2 mL (from digest 1)
- V62 Dup Post-digestion Spike 2 mL (from digest 1)
- V62 Dup Post-digestion Spike dup 2 mL (from digest 1)
- V63 2 mL (from digest 1)
- V63 Dup 2 mL (from digest 1)
- V63 2 mL (from digest 2)
- V63 Dup 2 mL (from digest 2)

Only 1 mL of V62 was used for the sample analysis because there was not enough digested V62 left to run the normal 2 mL sample size. Due to miscommunication between the chemist and the analyst, the V62 matrix spike and matrix spike duplicate from digest 1 were not analyzed. However, V62 Dup from digest 1 was used for a post-digestion spike and spike duplicate. Finally, V63 (digest 1) was reanalyzed to determine digest 1 sample integrity and to compare the two digests.

The new procedure for preparing the calibration standards gave a calibration curve which more closely matched the acid concentration of the samples. The recovery of 105% on the digested LMCS standard (versus ~ 165% previously obtained on reruns 0 and 1) indicates that this is the case.

The spike recoveries on V62 are low, ~ 50% recovery. This may be because the standard that was used for the spike did not undergo any digestion or prep prior to addition to the sample (a post-digestion/prep spike). However, there is also strong evidence of sample matrix interference. Recall that the spike recoveries for the rerun 0 and rerun 1 analyses (in which the standard used for the spike underwent digestion and prep.) were also 50% lower than the recoveries of the corresponding standards.

Additional evidence of matrix interference can be seen by comparing the results for V63 from digest 1 and digest 2. Note that in digest 2, the dilution of V63 (DF = 10) was 2 times (2X) larger than that of digest 1 (DF = 5). The result for V63 digest 2 (Avg = 0.039 µg/mL) is higher than that for digest 1 (Avg = 0.026 µg/mL). One would expect the same answer for both since dilution is taken into account in the calculation. This behavior is typical when there is a matrix interference suppressing the absorbance for the analyte. The additional 2X dilution reduces the effect of the interference on the analyte allowing for higher results for the As.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch # 3516

Serial No V 60.-8595	Sample Point 108-AP	Date 3-18-94		Time Issued 8:26	Priority 26
Determination As	Method/Standard LA-355-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 2	
Sample Size 2 ML	Acid dig DF=4			Customer ID STD	
Remarks, Calculations Results EDP R742 AS/HYDRD PKHT= 1.337 STD# 35 N1A RESULT 0.105 ppm ng= 52.68 ng STD 0.100 ppm %REC 105.4 % WHC-SD-WM-DP-065, REV. 0					
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst 5	
Hrs	Hrs	Hrs	Hrs	Hrs	
Date 6-22-94	Time Completed 14:05	Lab Unit Man 6-22-94			

54 6800-061 (R-10-83)

BEST AVAILABLE COPY

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		STANDARD	DUPLICATE
Serial No	Sample Size in mL SS	2.000	
V60-8595	As ng (Nanograms)	52.68	
Batch ID	Acid Digest Dilution Factor DF	4.0	
3516	Conc As µg/mL (or ng/L or PPM)	0.105	N/A
Rerun No.	Conc As µg/L (PPB)	105.4	N/A
2		N/A	N/A
Instrument ID		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
06/22/94	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Valerie Massie			
Date			
06/22/94			

	STANDARD	DUPLICATE
Conc As (µg/mL)	1.05E-01	
	N/A	N/A
	N/A	N/A

Data Entry by: <i>RELLI</i>	Date: 22-Jun-94
Approved by: <i>M.D. [Signature]</i>	Date: 6/29/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No		Sample Point		Date	Time Issued	Priority
V 61.-8695		108-AP		3-18-94	8:27	26
Determination	Method-Standard	Result Units	Charge Code	Reruns		
As	LA-355-131	uG/ML	N1A7F	2		
Sample Size	Customer ID					
2 ML	BLANK					
Remarks Calculations Results						
<p>REAGENT BLANK</p> <p>Acid dig DF = —</p> <p>PKHT = .116</p> <p>ng = 1.51 ng</p> <p>No acid dig DF was reported. However, a DF of 10 will be used in the calculation for comparison to samples.</p> <p>0.025 µg/ml</p>						
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5		
Valerie Massie						
Hrs	Hrs	Hrs	Hrs	Hrs		
		Rat.				
Date	Time Completed	Lab Unit	Signature			
6-22-94	14:05	6-23-94				

54-6800-061 (R 10-83)

BEST AVAILABLE COPY

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

	BLANK	DUPLICATE
Serial No	2.000	
V61-8695	1.51	
Batch ID	10.0	
3516	0.008	N/A
Rerun No	7.6	N/A
2	N/A	N/A
Instrument ID	N/A	N/A
WB27979	N/A	N/A
Calibration Date	Conc As µg/mL = (As ng/SS) * (1 µg/1000 ng) * DF	
06/22/94	Average Conc. = (Sample + Duplicate) / 2	
Analyst	Relative % Difference = ((ABS(Sam. - Dup.)) / Average Conc.) * 100	
Valerie Massie	Detection Limit = (5 ng/SS) * (1 µg/1000 ng) * DF	
Date		
06/22/94	Detection Limit (µg/mL)	0.025
	Detection Limit (µg/L)	25.00

	BLANK	DUPLICATE
Conc As (µg/mL)	<0.025	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	<i>R. E. L. L. L. L.</i>	Date:	23-Jun-94
Approved by:	<i>h. J. S. J. S. J. S.</i>	Date:	6/29/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-8795	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination As	Method-Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 2
Sample Size 2 mL 1.0 mL Acid dig. DF=5			Customer ID 108-AP-A	
Remarks, Calculations, Results Used sample from acid dig. rerun 0. PKHT = .273 There was insufficient sample for redigest 1 ng = 8.09 ng in acid dig. rerun 1. WHC-SD-WM-DP-065, REV. 0 4.05E-2 µg/mL				
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6-22-94	Time Completed 14:05	Lab Unit Mgr R. L. L. L. L. 6-23-94		

54-6800-061 (R 10-83)

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Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No	Sample Size in mL SS	1.000	
V62-8795	As ng (Nanograms)	8.09	
Batch ID	Acid Digest Dilution Factor DF	5.0	
3516	Conc As µg/mL (or mg/L or PPM)	0.040	N/A
Rerun No	Conc As µg/L (PPB)	40.5	N/A
2		N/A	N/A
Instrument ID		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL = (As ng/SS) * (1 µg/1000 ng) * DF		
06/22/94	Average Conc. = (Sample + Duplicate) / 2		
Analyst	Relative % Difference = ((ABS(Sam. - Dup.)) / Average Conc.) * 100		
Valerie Massie	Detection Limit = (5 ng/SS) * (1 µg/1000 ng) * DF		
Date			
06/22/94	Detection Limit (µg/mL)	0.025	
	Detection Limit (µg/L)	25.00	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	4.05E-02	
	N/A	N/A
	N/A	N/A

Data Entry by: R. L. L. L.	Date: 23-Jun-94
Approved by: R. L. L. L.	Date: 6/29/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-8895		Sample Point 108-AP		Date 3-18-94	Time Issued 8:28	Priority 26
Determination As	Method/Standard LA-355-131	Result Units uG/ML		Charge Code N1A7F	Reruns 2	
Sample Size 2 ML				Customer ID 108-AP-A		
<p align="center">RERUN</p> <p>Remarks Calculations, Results</p> <p>DUPLICATE SAMPLE</p> <p>Used sample from acid dig rerun 1. There was insufficient sample for redigest in acid dig. rerun 1.</p> <p align="right">PKHT = .411 ng = 13.87ng</p> <p align="center"><u>3.47E-2 µg/mL</u></p> <p align="right">Avg = 0.038 µg/mL RPD = 15.4%</p>						
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5		
Hrs	Hrs	Hrs	Hrs	Hrs		
Date 6-22-94	Time Completed 14:05	Lab Used Rellio-da 6-23-94		Signature		

54-6800-061 (R-10 83)

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Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

	SAMPLE	DUPLICATE
Serial No	1.000	2.000
V62-8895	8.09	13.87
Batch ID	5.0	5.0
3516	0.040	0.035
Rerun No	40.5	34.7
2	N/A	0.038
Instrument ID	N/A	37.6
WB27979	N/A	15.4
Calibration Date	Conc As µg/mL=(As ng/SS)*(1 µg/1000ng)*DF	
06/22/94	Average Conc.=(Sample + Duplicate)/2	
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100	
Valerie Massie	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF	
Data		
06/22/94	Detection Limit (µg/mL)	0.025
	Detection Limit (µg/L)	25.00

	SAMPLE	DUPLICATE
Conc As (µg/mL)	4.05E-02	3.47E-02
Average Conc (µg/mL)	N/A	0.038
Relative % Difference	N/A	15.4

Data Entry by:	Rellio-da	Date:	23-Jun-94
Approved by:	W. J. J. J.	Date:	6/29/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

matrix spike duplicate

Arsenic: LA-355-131 (B-1) As LIQUIDS-DIRECT		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	0.500	0.500
V62-8895	As ng (Nanograms)	34.96	34.12
Batch ID	Conc As µg/mL (or mg/L or PPM)	0.070	0.068
3516	Conc As µg/L (PPB)	69.9	68.2
Rerun No	Average Conc (µg/mL)	N/A	0.069
2	Average Conc (µg/L)	N/A	69.1
Instrument ID:	Relative % Difference	N/A	2.4
WB27979	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
06/22/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst	Detection Limit = (5 ng/SS)*(1µg/1000ng)		
Valerie Massie	Detection Limit is Corrected for Sample Prep/Dilution		
Date:			
06/22/94	Detection Limit (µg/mL) =	0.010	
	Detection Limit (µg/L) =	10.0	

	SAMPLE	DUPLICATE
Conc As µg/mL	6.99E-02	6.82E-02
Average Conc (µg/mL)	N/A	0.069
Relative % Difference	N/A	2.4

Data Entry by:	<i>Valerie Massie</i>	Date:	23-Jun-94
Approved by:	<i>Valerie Massie</i>	Date:	

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-8995	Sample Point 108-AP	RERUN^e 3-18-94	Time Issued 8:28	Priority 26
Determination As	Method/Standard LA-355-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 2
Sample Size 2 ML	Customer ID 108-AP-A			
Remarks, Calculations Results <i>Acid dig. DF = 5 for sample</i> SAMPLE SPIKED ID <i>V62 dup</i> SPIKE ID <i>40N11B</i> SPIKE VOLUME <i>.500 ml</i> <i>Used sample dup. because there was insufficient sample digested for spike. Used duplicate sample from acid dig. rerun. Performed POST-digest. spike - Note: std. that was used for spike did NOT go through digestion. Assay prep.</i> <i>28.6-23-94 3.47 F 3pk</i> <i>PRHT = .914</i> <i>ng = 34.96 ng</i> <i>53.7%</i>				
Analyst - 1 <i>Valerie Massie</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6-22-94	Time Completed 14:05	Lab Unit <i>Residue</i> 6-22-94		

54,6800-061 (R-10 83)

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WHC-SD-WM-DP-065, REV. 0

Arsenic: LA-355-131 (B-1) As LIQUIDS-DIRECT

	SAMPLE	SPIKE
Serial No: V62-8995		0.500
Batch ID: 3516		34.96
Rerun No: 2	8.09	
Instrument ID: WB27979		40N11B
Calibration Date: 06/22/94		0.100
Analyst: Valerie Massie		53.7
Date: 06/22/94		

$$\% \text{ Recovery} = \{[(\text{ngSSAM} - \text{ngSAM}) / (\text{SSVOL} * 1000 \mu\text{L} / \text{mL})] / \text{Spike Std Value}\} * 100$$

% Recovery =	53.7
--------------	------

Data Entry by: <i>Residue</i>	Date: 23-Jun-94
Approved by: <i>LSG</i>	Date: 6/29/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-8095	Sample Point 108-AP	Date 3-18-94		Time Issued 8:28	Priority 26
Determination As	Method/Standard LA-355-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 2	
Sample Size 2 ML			Customer ID 108-AP-A		
Remarks, Calculations, Results SAMPLE SPIKE V62 dup DUPLICATE SPIKE ID 40N11B SPIKE VOL .50ml This is also a <u>POST</u> digestion spike PKHT = .894 ng = 34.12ng WHC-SD-WM-DP-065, REV.0 PPS 6-23-94 52.1% RPD = 2.4%					
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
Hrs	Hrs	Hrs	Hrs	Hrs	
Date 6-22-94	Time Completed 14:05	Lab Hwt Mgr R. Stender 6-23-94

54-6800-061 (R-10-83)

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Arsenic: LA-355-131 (B-1) As LIQUIDS-DIRECT

		SAMPLE	SPIKE
Serial No.	Spike Std Volume (mL) SSVOL		0.500
V62-8095	ng of Spike + Sample ngSSAM		34.12
Batch ID	ng of Sample ngSAM	8.09	
3516	Spike Std ID		40N11B
Rerun No.	Spike Std Value (ppm)		0.100
2	% Recovery	N/A	52.1
Instrument ID:			
WB27979			
Calibration Date			
06/22/94			
Analyst			
Valerie Massie			
Date:			
06/22/94			

$$\% \text{ Recovery} = \{[(\text{ngSSAM} - \text{ngSAM}) / (\text{SSVOL} * 1000 \mu\text{L/mL})] / \text{Spike Std Value}\} * 100$$

% Recovery =	52.1
--------------	------

Data Entry by:	R. Stender	Date:	23-Jun-94
Approved by:	Valerie Massie	Date:	6/29/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 63.-8795	Sample Point 108-AP	RERUN		Time Issued 8:31	Priority 26
Determination As	Method-Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 2	
Sample Size 2 ML	Acid dig DF = 10			Customer ID 108-AP-B	
Remarks Calculations, Results WHO-SD-WM-DP-065, REV. 0 PKHT = .251 ng = 7.17ng 3.59 E-2 µg/mL					
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
Hrs	Hrs	Hrs	Hrs	Hrs	
Date 6-22-94	Time Completed 14:05	Lab Unit Mgr R. L. Loda 6-23-94

54-6800-061 (R-10-83)

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Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No	Sample Size in mL SS	2.000	
V63-8795	As ng (Nanograms)	7.17	
Batch ID	Acid Digest Dilution Factor DF	10.0	
3516	Conc As µg/mL (or mg/L or PPM)	0.036	N/A
Rerun No	Conc As µg/L (PPB)	35.9	N/A
2		N/A	N/A
Instrument ID		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL = (As ng/SS) * (1 µg/1000ng) * DF		
06/22/94	Average Conc. = (Sample + Duplicate) / 2		
Analyst	Relative % Difference = ((ABS(Sam. - Dup.)) / Average Conc.) * 100		
Valerie Massie	Detection Limit = (5 ng/SS) * (1 µg/1000ng) * DF		
Data			
06/22/94	Detection Limit (µg/mL)	0.025	
	Detection Limit (µg/L)	25.00	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	3.59E-02	
	N/A	N/A
	N/A	N/A

Data Entry by:		Date:	23-Jun-94
Approved by:		Date:	6/24/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 63.-8895		Sample Point 108-AP		Time Issued 3-18-94		Priority 8:31		26	
Determination As		Method/Standard LA-355-131		Result Units uG/ML		Charge Code N1A7F		Reruns 2	
Sample Size 2 ML						Customer ID 108-AP-B			
Remarks, Calculations, Results DUPLICATE SAMPLE PKHT = .279 ng = 8.34 ng AVG = 0.039 µg/mL RPD = 15.1% 4.17E-2 µg/mL WHC-SD-WM-DP-065, REV. 0									
Analyst - 1 Valerie Massie		Analyst - 2		Analyst - 3		Analyst - 4		Analyst - 5	
Hrs		Hrs		Hrs		Hrs		Hrs	
Date 6-22-94		Time Completed 14:05		Lab Unit Mgr 6-23-94		Signature		54-6800-061 (R-10-83)	

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Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V63-8895	As ng (Nanograms)	7.17	8.34
Batch ID	Acid Digest Dilution Factor DF	10.0	10.0
3516	Conc As µg/mL (or mg/L or PPM)	0.036	0.042
Rerun No.	Conc As µg/L (PPB)	35.9	41.7
2	Average Conc (µg/mL)	N/A	0.039
Instrument ID:	Average Conc (µg/L)	N/A	38.8
WB27979	Relative % Difference	N/A	15.1
Calibration Date	Conc As µg/mL = (As ng/SS) * (1 µg/1000 ng) * DF		
06/22/94	Average Conc. = (Sample + Duplicate) / 2		
Analyst	Relative % Difference = ((ABS(Sam. - Dup.)) / Average Conc.) * 100		
Valerie Massie	Detection Limit = (5 ng/SS) * (1 µg/1000 ng) * DF		
Date			
06/22/94	Detection Limit (µg/mL)	0.025	
	Detection Limit (µg/L)	25.00	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	3.59E-02	4.17E-02
Average Conc (µg/mL)	N/A	0.039
Relative % Difference	N/A	15.1

Data Entry by:	<i>Valerie Massie</i>	Date:	23-Jun-94
Approved by:	<i>W. Sparks</i>	Date:	6/29/94

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

CALIBRATION RECORD

Analyte: As

Procedure: LA 355-131

Revision: B-1

Instrument: PE2280 (Hydride AA)

Property No.: WB27979

Technologist: *William F. Mason*Payroll No.: *N/A*

Date: 06/22/94

Calibration Standard ID: 33N11E

Analyte Concentration: 0.100 ppm

Type of Calibration: LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000 mL	0 ng	.000
2	.050 mL	5 ng	.234
3	.100 mL	10 ng	.352
4	.300 mL	30 ng	.811
5	.600 mL	60 ng	1.527
6	1.000 mL	100 ng	2.447
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments: R=0.9989, SLOPE=0.0800 Y-INT.=0.0239

717

14:05 6-22-94 AS Valeri L Massie

Analyte: AS
Date: 6-22-94

Analyst: Valeri L Massie
Start Time: 07:45 End Time: 14:05

MHS 20 Data:

Signal Concentration
Mode PKLT
Recorder TCS
Time 40 sec
Expansion 4
Purge 1 50 sec
Reaction 24 sec
Purge 2 60 sec
Temperature 999.0
LDL Power 8 Watts

Chart Recorder Data:

Chart speed 5 mm/min Chart full scale 20 mV

Calibration Data:

Intercept 0.0800 absorbance units
Slope 6.0239 abs units / concentration
Correlation 9999 (unitless)

Valeri L Massie
6-22-94

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73512

0A
48

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No. V67, V68, V69	Customer ID: 108-AP: -C, -D, -E
Analysis: As	Sample Prep: ACID DIGEST

Instrument: PE2280(Hydride AA) WB27979	Procedure/ Rev: LA 355-131 / B-1
Technologist: <i>Celine L. Nassiri</i>	Date: 06/15/94
Starting Time: 07:45	Temperature 900 C
Ending Time: 15:10	Chemist: L.D. SPARKS

Comments: _____

	Description	Lab ID
1	DIGESTED LMCS STD	V65-8595
2	DIGESTED BLANK	V66-8695
3	SAMPLE	V67-8795
4	DUPLICATE	V67-8895
5	SAMPLE	V68-8795
6	DUPLICATE	V68-8895
7	SAMPLE	V69-8795
8	DUPLICATE	V69-8895
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
DIGESTED LMCS	34N11E DF=4 2 mL			
				713

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN *Batch 3512*

Serial No V 65.-8595	Sample Point 108-AP	Time Issued 3-18-94	Priority 9:37	26
Determination As	Method-Standard LA-355-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size 2 ML	Customer ID STD			
Remarks Calculations Results EDP R7-12 AS/HYDRD 12.6mL → 50mL <i>pket 1.255</i> STD# 34011-E RESULT <i>0.102 µg/mL</i> 51.59 ng STD 0.100 ppm %REC 102.46				
WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>Vale</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6/15/94	Time Completed 15:10	Lab Unit Mgr <i>LD Jones</i>		

54 6800-061 (R 10-83)

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Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V65-8595	As ng (Nanograms)	51.59	
Batch ID	Acid Digest Dilution Factor DF	4.0	
3512	Conc As µg/mL (or mg/L or PPM)	0.102	ERR
Rerun No.	Conc As µg/L (PPB)	102.4	ERR
1		N/A	N/A
Instrument ID		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL = (As ng/SS) * (1µg/1000ng) * DI		
06/15/94	Average Conc. = (Sample + Duplicate) / 2		
Analyst	Relative % Difference = ((ABS(Sam. - Dup.)) / Average Conc.) * 100		
V.L. Massie			
Date:			
06/15/94			

	STANDARD	DUPLICATE
Conc As (µg/mL)	1.02E-01	ERR
	N/A	N/A
	N/A	N/A

Data Entry by: <i>LD Jones</i>	Date: 16-Jun-94
Approved by: <i>LD Jones</i>	Date: 6/16/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 66.-8695		Sample Point 108-AP		Date 3-18-94	Time Issued 9:38	Priority 26
Determination As	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 1		
Sample Size 2 ML			Customer ID BLANK			
Remarks, Calculations, Results REAGENT BLANK No acid digest DF was noted. A DF of 10 will be used to match that of the samples and duplicates in this batch. 0.025 ug/ml 0.72 ng 0.004						
Analyst - 1 V.L. Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5		
Hrs	Hrs	Hrs	Hrs	Hrs		
Date 6/15/94	Time Completed 15:10	Lab Unit Mgr L. J. Sparks		Signature		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

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Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		BLANK	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V66-8695	As ng (Nanograms)	0.72	
Batch ID	Acid Digest Dilution Factor DF	10.0	
3512	Conc As µg/mL (or mg/L or PPM)	0.004	ERR
Rerun No.	Conc As µg/L (PPB)	3.6	ERR
1		N/A	N/A
Instrument ID		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL = (As ng/SS) * (1µg/1000ng) * DF		
06/15/94	Average Conc. = (Sample + Duplicate) / 2		
Analyst	Relative % Difference = ((ABS(Sam. - Dup.)) / Average Conc.) * 100		
V.L. Massie	Detection Limit = (5 ng/SS) * (1µg/1000ng) * DF		
Date			
06/15/94	Detection Limit (µg/mL)	0.025	
	Detection Limit (µg/L)	25.00	

	BLANK	DUPLICATE
Conc As (µg/mL)	<0.025	ERR
	N/A	N/A
	N/A	N/A

ERR

Data Entry by: L. J. Sparks	Date: 16-Jun-94
Approved by: L. J. Sparks	Date: 6/16/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 67.-8795		Sample Point 108-AP		Time Issued 3-18-94		Priority 26	
Determination As		Method-Standard LA-355-131		Result Units uG/ML		Charge Code N1A7F	
Sample Size 2 ML		Customer ID 108-AP-C		Remarks Calculations Results			
<p>Acid Digest DF = 10 (5 mL → 50 mL)</p> <p>pklt .155 6.86 ug</p> <p>WSS 6/16/94 0.034</p> <p>0.034 ug/mL</p> <p>WHC-SD-WM-DP-065, REV. 0</p>							
Analyst - 1 Valerie Massie		Analyst - 2		Analyst - 3		Analyst - 4	
Hrs		Hrs		Hrs		Hrs	
Date 6/15/94		Time Completed 15:10		Lab Unit Mgr L. D. Sparks		Signature [Signature]	

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Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

	SAMPLE	DUPLICATE
Serial No	2.000	
V67-8795	6.86	
Batch ID	10.0	
3512	0.034	ERR
Rerun No.	34.3	ERR
1	N/A	N/A
Instrument ID	N/A	N/A
WB27979	N/A	N/A
Calibration Date	Conc As $\mu\text{g/mL} = (\text{As ng/SS}) \cdot (1\mu\text{g}/1000\text{ng}) \cdot \text{DF}$	
06/15/94	Average Conc. = (Sample + Duplicate)/2	
Analyst	Relative % Difference = ((ABS(Sam. - Dup.))/Average Conc.)*100	
V.L. Massie	Detection Limit = (5 ng/SS) * (1 $\mu\text{g}/1000\text{ng}$) * DF	
Date		
06/15/94	Detection Limit ($\mu\text{g/mL}$)	0.025
	Detection Limit ($\mu\text{g/L}$)	25.00

	SAMPLE	DUPLICATE
Conc As ($\mu\text{g/mL}$)	3.43E-02	ERR
	N/A	N/A
	N/A	N/A

ERR

Data Entry by: L. D. Sparks	Date: 16-Jun-94
Approved by: L. D. Sparks	Date: 6/16/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

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Serial No V 67.-8895		Sample Point 108-AP		RERUN		Time Issued 3-18-94		Priority 12	
Determination As		Method-Standard LA-355-131		Result Units uG/ML		Charge Code N1A7F		Reruns 1	
Sample Size 2 ML						Customer ID 108-AP-C			
Remarks Calculations, Results DUPLICATE SAMPLE <div style="border: 1px solid black; border-radius: 50%; width: 150px; height: 50px; margin: 10px auto; text-align: center; line-height: 50px;">0.034 ug/ml</div>						pklt .152 6.74 ng			
WHC-SD-WM-DP-065, REV. 0									
Analyst - 1 Valerie Massie		Analyst - 2		Analyst - 3		Analyst - 4		Analyst - 5	
Hrs		Hrs		Hrs		Hrs		Hrs	
Date 6/15/94		Time Completed 15:10		Lab Unit Mgr 6/16/94					

54 6800-061 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

Serial No	Sample Size in mL	SS	SAMPLE	DUPLICATE
V67-8895	As ng (Nanograms)		2.000	2.000
Batch ID	Acid Digest Dilution Factor DF		6.86	6.74
3512	Conc As µg/mL (or mg/L or PPM)		10.0	10.0
Rerun No.	Conc As µg/L (PPB)		0.034	0.034
1	Average Conc (µg/mL)		34.3	33.7
Instrument ID	Average Conc (µg/L)		N/A	0.034
WB27979	Relative % Difference		N/A	34.0
Calibration Date	Conc As µg/mL = (As ng/SS) * (1µg/1000ng) * DF			
06/15/94	Average Conc. = (Sample + Duplicate) / 2			
Analyst	Relative % Difference = ((ABS(Sam. - Dup.)) / Average Conc.) * 100			
V.L. Massie	Detection Limit = (5 ng/SS) * (1µg/1000ng) * DF			
Date				
06/15/94	Detection Limit (µg/mL)		0.025	
	Detection Limit (µg/L)		25.00	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	3.43E-02	3.37E-02
Average Conc (µg/mL)	N/A	0.034
Relative % Difference	N/A	1.8

Data Entry by:	Date: 16-Jun-94
Approved by:	Date: 6/16/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 68.-8795		Sample Point 108-AP		Time Issued 3-18-94		Priority 26
Determination As	Method-Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F		Reruns 1	
Sample Size 2 ML				Customer ID 108-AP-D		
Remarks Calculations Results <p>Acid Digest DF=10 (5ml→50ml)</p> <p>pkht : 110 5.03mg</p> <p>0.025 ug/ml</p> <p>WHC-SD-WM-DP-065, REV. 0</p>						
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5		
Hrs	Hrs	Hrs	Hrs	Hrs		
Date 6/15/94	Time Completed 15:10	Lab Unit Mgr 6/16/94 L.D. Spradka				

54 6800-061 (R-10-83)

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Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V68-8795	As ng (Nanograms)	5.03	
Batch ID	Acid Digest Dilution Factor DF	10.0	
3512	Conc As µg/mL (or mg/L or PPM)	0.025	N/A
Rerun No.	Conc As µg/L (PPB)	25.2	N/A
1		N/A	N/A
Instrument ID		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
06/15/94	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
V.L. Massie	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date			
06/15/94	Detection Limit (µg/mL)	0.025	
	Detection Limit (µg/L)	25.00	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	2.52E-02	
	N/A	N/A
	N/A	N/A

Data Entry by: L.D. Spradka	Date: 16-Jun-94
Approved by: L.D. Spradka	Date: 6/16/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 68.-8895		Sample Point 108-AP		Time Issued 3-18-94	Priority 9:40	26
Determination As	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 1		
Sample Size 2 ML			Customer ID 108-AP-D			
Remarks, Calculations, Results DUPLICATE SAMPLE <p style="text-align: right;">pkht 1.077 3.69 ng</p> <div style="border: 1px solid black; border-radius: 50%; width: 200px; height: 80px; margin: 20px auto; text-align: center; line-height: 80px;"> 20.025 ug/ml </div> <p style="text-align: right;">WHC-SD-WM-DP-065, REV. 0</p>						
Analyst - 1 Valerie H. Mann	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5		
Hrs	Hrs	Hrs	Hrs	Hrs		
Date 6/15/94	Time Completed 15:10	Lab Unit Mgr 6/16/94				

54-6800-061 (R-10-83)

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Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

	SAMPLE	DUPLICATE
Serial No.	2.000	2.000
V68-8895	5.03	3.69
Batch ID	10.0	10.0
3512	0.025	0.018
Rerun No.	25.2	18.5
1	N/A	N/A
Instrument ID	N/A	N/A
WB27979	N/A	N/A
Calibration Date	Conc As $\mu\text{g/mL} = (\text{As ng/SS}) \cdot (1\mu\text{g}/1000\text{ng}) \cdot \text{DF}$	
06/15/94	Average Conc. = (Sample + Duplicate)/2	
Analyst	Relative % Difference = ((ABS(Sam. - Dup.))/Average Conc.)*100	
V.L. Massie	Detection Limit = (5 ng/SS)*(1 $\mu\text{g}/1000\text{ng}$)*DF	
Date		
06/15/94	Detection Limit ($\mu\text{g/mL}$)	0.025
	Detection Limit ($\mu\text{g/L}$)	25.00

	SAMPLE	DUPLICATE
Conc As ($\mu\text{g/mL}$)	2.52E-02	<0.025
Average Conc ($\mu\text{g/mL}$)	N/A	N/A
Relative % Difference	N/A	N/A

The Duplicate Result is < Detection Limit

Data Entry by: <i>LD Spruill</i>	Date: 16-Jun-94
Approved by: <i>LD Spruill</i>	Date: 6/16/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN

Serial No V 69.-8795	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination As	Method-Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 1
Sample Size 2 ML <i>Acid Digest DF=10 (5mL→50mL)</i>			Customer ID 108-AP-E	
Remarks Calculations Results <div style="text-align: center;"> <p><i>pkht .082</i> <i>3.90 ng</i></p> <p><i>20.025 ug/ml</i></p> </div> <p style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</p>				
Analyst - 1 <i>Valein Massie</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6/15/94	Time Completed 15:10	Lab Unit Mgr <i>6/16/94</i> <i>LD Parks</i>		

54-6800-061 (R-10-83)

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Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No	Sample Size in mL SS	2.000	
V69-8795	As ng (Nanograms)	3.90	
Batch ID	Acid Digest Dilution Factor DF	10.0	
3512	Conc As µg/mL (or mg/L or PPM)	0.020	N/A
Rerun No	Conc As µg/L (PPB)	19.5	N/A
1		N/A	N/A
Instrument ID		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
06/15/94	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
V.L. Massie	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
06/15/94	Detection Limit (µg/mL)	0.025	
	Detection Limit (µg/L)	25.00	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.025	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by: <i>LD Parks</i>	Date: 16-Jun-94
Approved by: <i>LD Parks</i>	Date: 6/16/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

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Serial No V 69.-8895		Sample Point 108-AP		Time Issued 3-18-94		Priority 26	
Determination As		Method/Standard LA-355-131		Result Units uG/ML		Charge Code N1A7F	
Sample Size 2 ML		Customer ID 108-AP-E		Remarks, Calculations, Results			
DUPLICATE SAMPLE <div style="border: 1px solid black; border-radius: 50%; width: 150px; height: 50px; margin: 10px auto; text-align: center; line-height: 50px;"> 10.025 ug/ml </div>				pH 7.075 3.61 ng			
WHC-SD-WM-DP-065, REV. 0							
Analyst - 1 Valerie L. Massie		Analyst - 2		Analyst - 3		Analyst - 4	
Hrs		Hrs		Hrs		Hrs	
Date 6/15/94		Time Completed 15:10		Lab Unit Mgr 6/16/94		Signature	

54-6800-061 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

Serial No	Sample Size in mL	SS	SAMPLE	DUPLICATE
V69-8895	As ng (Nanograms)		2.000	2.000
Batch ID	Acid Digest Dilution Factor DF		3.90	3.61
3512	Conc As µg/mL (or mg/L or PPM)		10.0	10.0
Rerun No	Conc As µg/L (PPB)		0.020	0.018
1	Average Conc (µg/mL)		19.5	18.1
Instrument ID	Average Conc (µg/L)		N/A	N/A
WB27979	Relative % Difference		N/A	N/A
Calibration Date	Conc As µg/mL = (As ng/SS) * (1µg/1000ng) * DF			
06/15/94	Average Conc. = (Sample + Duplicate) / 2			
Analyst	Relative % Difference = ((ABS(Sam. - Dup.)) / Average Conc.) * 100			
V.L. Massie	Detection Limit = (5 ng/SS) * (1µg/1000ng) * DF			
Date				
06/15/94	Detection Limit (µg/mL)		0.025	
	Detection Limit (µg/L)		25.00	

SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.025
Average Conc (µg/mL)	N/A
Relative % Difference	N/A

Both Results are < Detection Limit

Data Entry by: <i>LD Spradley</i>	Date: 16-Jun-94
Approved by: <i>LD Spradley</i>	Date: 6/16/94

3512

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV.0

CALIBRATION RECORD

Analyte: As		
Procedure: LA 355-131	Revision: B-1	
Instrument: PE2280 (Hydride AA)	Property No.: WB27979	
Technologist: <i>Valerie H. Massie</i>	Payroll No.: XXXXX	Date: 06/15/94

Calibration Standard ID:	33N11D
Analyte Concentration:	.100 ppm
Type of Calibration:	LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000 mL	0 ng	.000
2	.050 mL	5 ng	.117
3	.100 mL	10 ng	.230
4	.300 mL	30 ng	.694
5	.600 mL	60 ng	1.466
6	1.000 mL	100 ng	2.452
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments: $r = .9999$; Y-INTERCEPT = -0.0138; SLOPE = 0.0246

Massie

WHC-SD-WM-DP-065, REV. 0

7/5/94 11:55 AM
 12 min 5/15/94
 6/16/94

15.10 L 15.10 L 15.10 L 15.10 L 15.10 L

Analyte: As Analyst: Valeri L. Nunez
 Date: 6/15/94 Start Time: 17.45 End Time: 15.10

MHS 20 Data:
 Signal: Concentration Purge I: 50 sec
 Mode: PKHT Reaction: 24 sec
 Recorder: IC3 Purge II: 60 sec
 Time: 40 sec Temperature: 900 C
 Expansion: 4 EDL Power: 8 Watts

Chart Recorder Data:
 Chart speed: 5 mm/min Chart full scale: 20 mV

Calibration Data:
 Intercept: -0.0130 absorbance units
 Slope: 0.0246 abs. units / concentration
 Correlation: 0.9999 (unitless)

12:	Intercept: -0.0130
11:	Slope: 0.0246
10:	0.0246
9:	0.0246
8:	0.0246
7:	0.0246
6:	0.0246
5:	0.0246
4:	0.0246
3:	0.0246
2:	0.0246
1:	0.0246

1 D spectra

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ANALYTICAL BATCH SUMMARY SHEET

METHOD:		DATE START:		BATCH #3021					
LA-355-131		8-10-94							
PREPARED BY:		DATE COMPLETE:		WHC-SD-WM-DP-065, REV. 0					
R. E. Skoda		8-10-94							
UNITS:									
SPL NAME	SPL ID	ANALYTE	ug/mL RESULT #1	ug/mL RESULT #2	ug/mL AVERAGE	RPD%	%REC	ug/mL DET LIM	% CT ER
STD/40N11C	V 71	As	0.099				99.2		
UNDIGESTED									
STD/38N11A	V 71	As	0.110				109.6		
DIGESTED									
Reagent Blank	V 72	As	< 0.020					0.020	
UNDIGESTED									
PREP BLK	V 72	As	< 0.025					0.025	
DIGESTED									
108AP FLDBLK	V 73	As	< 0.025	< 0.025	N/A	N/A		0.025	
STD/40N11C	-----	As	0.098				98.1		
UNDIGESTED									

NARRATIVE: ☐ NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
 LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

calculator
8-10-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 71.-5595	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 4	Priority 26
Determination As	Method/Standard LA-355-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 1250 ml			Customer ID STD	
Remarks Calculations Results EDP R741 AS/HYDRD. <i>pk Ht. 621</i> STD# 40N11C RESULT <i>9.92E-2 ppm</i> <i>24.80ng</i> STD VAL 0.100 ppm %REC 99.2% WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>Susie Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-10-94	Time Completed 0700	Laboratory <i>R. L. Smith</i> 8-10-94	<i>Guy Hammett</i>	

54-6800-061 (R-10 83)

Arsenic: LA-355-131 (B-1) As LIQUIDS-DIRECT

	STANDARD	DUPLICATE
Serial No	0.250	
V71-5595	24.80	
Batch ID	0.099	N/A
3021	99.2	N/A
Rerun No	N/A	N/A
0	N/A	N/A
Instrument ID	N/A	N/A
WB27979	Conc As $\mu\text{g}/\text{mL} = (\text{As ng}/\text{SS}) * (1 \mu\text{g}/1000 \text{ng})$	
Calibration Date	Average Conc. = (Sample + Duplicate)/2	
08/10/94	Relative % Difference = $((\text{ABS}(\text{Sam.} - \text{Dup.}))/\text{Average Conc.}) * 100$	
Analyst		
Susie Fulton		
Date		
08/10/94		

	STANDARD	DUPLICATE
Conc As $\mu\text{g}/\text{mL}$	9.92E-02	
	N/A	N/A
	N/A	N/A

Data Entry by: <i>R. L. Smith</i>	Date: 10-Aug-94
Approved by: <i>ND Smith</i>	Date: 8/10/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 302

Serial No V 71.-8595	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 4	Priority 26
Determination AS	Method/Standard LA-355-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 2.0 ml Acid dig DF=4			Customer ID STD	
Remarks, Calculations, Results EDP R742 AS/HYDRD PK Ht: 1.289 STD# 38N11A RESULT 0.110 ppm 54.81ng STD 0.100 ppm %REC 109.6% 2H 110.0 8/12/94 WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 S. Fulton	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-10-94	Time Completed 0700	Lab Unit Mgr R. Elliott 8-10-94	Signature D. Hammett	

54-6800-061 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V71-8595	As ng (Nanograms)	54.81	
Batch ID	Acid Digest Dilution Factor DF	4.0	
3021	Conc As µg/mL (or mg/L or PPM)	0.110	N/A
Rerun No.	Conc As µg/L (PPM)	109.6	N/A
0		N/A	N/A
Instrument ID		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
08/10/94	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Susie Fulton			
Date			
08/10/94			

	STANDARD	DUPLICATE
Conc As (µg/mL)	1.10E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:	<i>R. Elliott</i>	Date:	10-Aug-94
Approved by:	<i>D. Hammett</i>	Date:	8/10/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 72.-5695	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 5	Priority 26
Determination As	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.250 ml			Customer ID BLANK	
Remarks Calculations Results REAGENT BLANK <i>pk Hst .069</i> <i>1006 ng</i> <i>< 0.020 µg/ml</i> WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>Smith</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-10-94	Time Completed 0700	Lab Inv. No. <i>PELLODA</i> 8-10-94	<i>Dee Hammitt</i>	

54-6800-061 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUIDS-DIRECT

		BLANK	DUPLICATE
Serial No.	Sample Size in mL SS	0.250	
V72-5695	As ng (Nanograms)	0.01	
Batch ID	Conc As µg/mL (or mg/L or PPM)	0.000	N/A
3021	Conc As µg/L (PPH)	0.0	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID		N/A	N/A
WB27979	Conc As µg/mL=(As ng/SS)*(1 µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
08/10/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst	Detection Limit = (5 ng/SS)*(1 µg/1000ng)		
Susie Fulton	Detection Limit is Corrected for Sample Prep/Dilution		
Date			
08/10/94	Detection Limit (µg/mL) =	0.020	
	Detection Limit (µg/L) =	20.0	

	BLANK	DUPLICATE
Conc As µg/mL	<0.020	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by: <i>PELLODA</i>	Date: 10-Aug-94
Approved by: <i>AD Smith</i>	Date: 8/10/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 72.-8695	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 5	Priority 26
Determination As	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 2.0 ml			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK <i>acid dig DF=10 used for comparison with samples.</i> <i>pk Hx .093</i> <i>1.08 ng</i> <i><0.025 µg/mL</i> WHC-SD-WM-DP-065, REV.0				
Analyst - 1 <i>Susie Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-10-94	Time Completed 0700	Lab Unit Mgr <i>Redwood</i> 8-10-94	<i>Jay Harmon</i>	

54-6800-061 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		BLANK	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V72-8695	As ng (Nanograms)	1.08	
Batch ID	Acid Digest Dilution Factor DF	10.0	
3021	Conc As µg/mL (or mg/L or PPM)	0.005	N/A
Run No.	Conc As µg/L (PMB)	5.4	N/A
0		N/A	N/A
Instrument ID		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1 µg/1000ng)*DF		
08/10/94	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Susie Fulton	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF		
Date			
08/10/94	Detection Limit (µg/mL)	0.025	
	Detection Limit (µg/L)	25.00	

	BLANK	DUPLICATE
Conc As (µg/mL)	<0.025	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by: <i>Redwood</i>	Date: 10-Aug-94
Approved by: <i>TD Smith</i>	Date: 8/10/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 73.-8795	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination As	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 2.0 ml			Customer ID 108AP-FB	
Remarks Calculations Results <p>WHC-SD-WM-DP-065, REV.0</p> <p>Acid dig DF=10</p> <p>PK HL .080</p> <p>0.5 ng</p> <p><u><0.025 µg/mL</u></p>				
Analyst - 1 <i>Susie Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-10-94	Time Completed 0700	Lab Unit Pellurda 8-10-94	<i>Dan Hammett</i>	

54-6800-061 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

	SAMPLE	DUPLICATE
Serial No	2.000	
V73-8795	0.50	
Batch ID	10.0	
3021	0.003	N/A
Baron No	2.5	N/A
0	N/A	N/A
Instrument ID	N/A	N/A
WB27979	N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1 µg/1000ng)*DF	
08/10/94	Average Conc.=(Sample + Duplicate)/2	
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100	
Susie Fulton	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF	
Date		
08/10/94	Detection Limit (µg/mL)	0.025
	Detection Limit (µg/L)	25.00

	SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.025	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	<i>Pellurda</i>	Date:	10-Aug-94
Approved by:	<i>NO Smith</i>	Date:	9/10/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 73.-8895	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination As	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 2.0 ml			Customer ID 108AP-FB	
Remarks, Calculations, Results DUPLICATE SAMPLE <div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block;"> $10.025 \mu\text{g/mL}$ </div> AVG & RPD N/A				
pH H ₂ .086 228 8-10-94 +6 ng 0.77				
Analyst - 1 <i>Imfultor</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-10-94	Time Completed 0700	Lab Unit Mgr <i>R. L. L. L.</i> 8-10-94	<i>D. J. H. H.</i> 54-6800-061 (R-10-83)	

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V73-8895	As ng (Nanograms)	0.50	0.77
Batch ID	Acid Digest Dilution Factor DF	10.0	10.0
3021	Conc As $\mu\text{g/mL}$ (or mg/L or PPM)	0.003	0.004
Rerun No.	Conc As $\mu\text{g/L}$ (PPB)	2.5	3.9
0	Average Conc ($\mu\text{g/mL}$)	N/A	N/A
Instrument ID:	Average Conc ($\mu\text{g/L}$)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc As $\mu\text{g/mL} = (\text{As ng/SS}) \times (1 \mu\text{g}/1000\text{ng}) \times \text{DF}$		
08/10/94	Average Conc. = (Sample + Duplicate)/2		
Analyst	Relative % Difference = $((\text{ABS}(\text{Sam.} - \text{Dup.}))/\text{Average Conc.}) \times 100$		
Susie Fulton	Detection Limit = $(5 \text{ ng/SS}) \times (1 \mu\text{g}/1000\text{ng}) \times \text{DF}$		
Data:			
08/10/94	Detection Limit ($\mu\text{g/mL}$)	0.025	
	Detection Limit ($\mu\text{g/L}$)	25.00	

	SAMPLE	DUPLICATE
Conc As ($\mu\text{g/mL}$)	<0.025	<0.025
Average Conc ($\mu\text{g/mL}$)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:	<i>R. L. L. L.</i>	Date:	10-Aug-94
Approved by:	<i>NO Smith</i>	Date:	8/10/94

OP

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

CALIBRATION RECORD

Analyte: As			
Procedure: LA 355-131		Revision: B-1	
Instrument: PE2280 (Hydride AA)		Property No.: WB27979	
Technologist: SM FULTON <i>Laurie M. Fulton</i>		Payroll No.: 00000	Date: 08/10/94

Calibration Standard ID:	41N11D
Analyte Concentration:	.100ppm
Type of Calibration:	LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000ml	0 ng	.083
2	.050ml	5 ng	.189
3	.100ml	10 ng	.328
4	.300ml	30 ng	.710
5	.600ml	60 ng	1.313
6	1.000ml	100 ng	2.354
7		<i>200 ng</i>	
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments:	BATCH # <i>3321</i>
r = 0.9981	
Y intercept = 0.0689	<i>1739</i>
slope = 0.0223

Analyte: As
 Date: 8-10-99
 Analyst: James M. Sullivan
 Start Time: 0000 End Time: 0700

MHS 20 Data:

Signal Concentration
 Mode: PKHT
 Recorder: TC3
 Time: 40 sec
 Expansion: 4
 Purge I: 50 sec
 Reaction: 24 sec
 Purge II: 50 sec
 Temperature: 500 C
 EDI Power: 8 Watts

Chart Recorder Data:

Chart speed: 5 mm/min Chart full scale: 20 mV

Calibration Data:

Intercept: 0.0689 absorbance units
 Slope: 0.0223 abs units / concentration
 Correlation: 0.9981 (unitless)

WHC-SD-WM-DP-065, REV. 0

BEST AVAILABLE COPY

**THE FOLLOWING ANALYSES ARE INCLUDED IN THE
DATA PACKAGE BUT THE RESULTS HAVE NOT BEEN
REPORTED IN THE FINAL SUMMARY REPORTS.**

Batch # 2989

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV.0

ANALYTICAL BATCH

Lab Segment Serial No. V62, V63	Customer ID: 108-AP-A,B
Analysis: As	Sample Prep: ACID DIGEST

Instrument: PE2280 (Hydride AA) WB27979	Procedure/ Rev: LA 355-131 / B-1
Technologist: <i>Donna L. Massi</i>	Date: 05/12/94
Starting Time: 07:40	Temperature 900 C
Ending Time: 14:30	Chemist: L.D. SPARKS

Comments: INTERCEPT: -0.01619 ^{LWS} 5/13/94 BATCH #: 2989
SLOPE: 0.02049 ^{LWS} 5/13/94 PLEASE RERUN. ^{LWS} 5/14/94 ~~THE LMCS STANDARD IS LOW AND THE~~
CORRELATION: 0.9983 DIGESTED STANDARD DID NOT COME IN.

	Description	Lab ID
1	INITIAL LMCS CHECK STD	V 60-5595
2	DIGESTED STD	V 60-8595
3	REAGENT BLANK	V 61-5695
4	DIGESTED BLANK	V 61-8695
5	SAMPLE	V 62-8795
6	SAMPLE DUPLICATE	V 62-8895
7	SAMPLE SPIKE	V 62-8995
8	SPIKE DUPLICATE	V 62-8095
9	SAMPLE	V 63-8795
10	SAMPLE DUPLICATE	V 63-8895

	Description	Lab ID
11		
12		
13		
14		
15		
16	DATA NOT USED IN PACKAGE	
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	34N11C .250ml			
DIGESTED STD	34N11B DF=4 2mL			
				1742

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 60.-5595	Sample Point 108-AP	Date 3-18-94	Time Issued 8:26	Priority 26
Determination Aa	Method/Standard LA-355-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 250ml			Customer ID STD	
Remarks Calculations, Results EDP R741 AS/HYDRD STD# 34N11C RESULT 0.117ppm STD VAL 0.100ppm %REC 117% PKHT= .579 ng = 29.19 ng WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 Valerie J. Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-12-94	Time Completed 14:30	Lab Unit Mgr 5/13/94 WD Sparks

54 6800-061 (R 10 83)

Argenic LA 355-131 (B-1) AS

Selenium: LA-365-131 (B-2) Se LIQUIDS-DIRECT

Serial No.	Sample Size in mL	SS	STANDARD	DUPLICATE
V60-5595	Se ng (Nanograms)		0.250	
Batch ID	Conc Se µg/mL (or mg/L or PPM)		29.19	
2989	Conc Se µg/L (PPB)		0.117	N/A
Rerun No.			116.8	N/A
0			N/A	N/A
Instrument ID			N/A	N/A
WB27979	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)			
Calibration Date	Average Conc.=(Sample + Duplicate)/2			
05/12/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100			
Analyst				
VL Massie				
Date				
05/12/94				

Conc Se µg/mL	STANDARD	DUPLICATE
	1.17E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:	Date: 16-May-94
Approved by:	Date: 5/16/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 2989

Serial No V 60.-8595	Sample Point 108-AP	Date 3-18-94	Time Issued 8:26	Priority 26
Determination As	Method/Standard LA-355-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 2.0 ml			Customer ID STD	
Remarks, Calculations, Results EDP R742 AS/HYDRD PKHT = 1.672 STD# 34N11B RESULT 0.166 ppm ng = 82.80 ng STD 0.100 ppm %REC 166% WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-12-94	Time Completed 14:30	Lab Unit Mgr 3/13/94 LDS

54-6800-061 (R-10-83)

15 7/44
Arsenic LA 355-131 (8-1) As
Selenium: LA 365-131 (8-2) Se LIQUID-ACID DIGEST

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V60-8595	Se ng (Nanograms)	82.80	
Batch ID	Acid Digest Dilution Factor DF	4.0	
2989	Conc Se µg/mL (or ng/L or PPM)	0.166	N/A
Rerun No.	Conc Se µg/L (PPB)	165.6	N/A
0		N/A	N/A
Instrument ID		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL = (Se ng/SS) * (1 µg/1000 ng) * DF		
05/12/94	Average Conc. = (Sample + Duplicate) / 2		
Analyst	Relative % Difference = ((ABS(Sam. - Dup.)) / Average Conc.) * 100		
VL Massie			
Date			
05/12/94			

	STANDARD	DUPLICATE
Conc Se (µg/mL)	1.66E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:		Date:	16-May-94
Approved by:		Date:	5/16/94

Form 3 Rev. 2 Page 1 of 1

1741

Serial No V 61.-5695	Sample Point 108-AP	Date 3-18-94	Time Issued 8:27	Priority 26
Determination As	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size .250 ml			Customer ID BLANK	
Remarks. Calculations. Results REAGENT BLANK OUT FOR RERUN Rerun WHC-SD-WM-DP-065, REV. 0 PKHT = -.023 ng = -0.34 ng DATA NOT USED IN PACKAGE				
Analyst - 1 Valerie Masse	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-12-94	Time Completed 14:30	Lab Unit Mgr 5/13/94 LD Sparks

54-6800-061 (R-10-83)

Serial No V 61.-8695	Sample Point 108-AP	Date 3-18-94	Time Issued 8:27	Priority 26
Determination As	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 2.0 ml			Customer ID BLANK	
Remarks. Calculations. Results REAGENT BLANK OUT FOR RERUN Rerun PKHT = .107 ng = 6.04 ng				
Analyst - 1 Valerie Masse	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-12-94	Time Completed 14:30	Lab Unit Mgr 5/13/94 LD Sparks

54-6800-061 (R-10-83)

Serial No V 62.-8795	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination AS	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 2.0 ml			Customer ID 108-AP-A	
Remarks, Calculations, Results OUT FOR RERUN PK HT = .365 ng = 18.69 ng Rerun WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-12-94	Time Completed 14:30	Lab Unit Mgr 5/13/94 LD Sparks	54-6800-061 (R-10-83)	

Serial No V 62.-8895	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination AS	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 2.0 ml			Customer ID 108-AP-A	
Remarks, Calculations, Results DUPLICATE SAMPLE OUT FOR RERUN PK HT = .374 ng = 19.13 ng Rerun				
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-12-94	Time Completed 14:30	Lab Unit Mgr 5/13/94 LD Sparks	54-6800-061 (R-10-83)	

1746

Serial No V 62.-8995	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination As	Method: Standard LA-355-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 2.0ml			Customer ID 108-AP-A	
Remarks Calculations Results SAMPLE SPIKED ID V62 PKHT= 1.449 SPIKE ID 34N118 OUT FOR RERUN ng= 71.86ng SPIKE VOLUME Rerun WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 Valerie L. Masie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-12-94	Time Completed 14:30	Lab Unit Mgr 5/13/94 LDJ/jmk

54-6800-061 (R 10-83)

Serial No V 62.-8095	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination As	Method: Standard LA-355-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 2.0ml			Customer ID 108-AP-A	
Remarks Calculations Results SAMPLE SPIKE V62 PKHT= 1.547 DUPLICATE OUT FOR RERUN ng= 76.67ng SPIKE ID 34N118 SPIKE VOL Rerun				
Analyst - 1 Valerie L. Masie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-12-94	Time Completed 14:30	Lab Unit Mgr 5/13/94 LDJ/jmk

54-6800-061 (R 10-83)

174.1

Serial No V 63.-8795	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination As	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 2.0ml			Customer ID 108-AP-B	
Remarks, Calculations, Results <p style="text-align: center;">OUT FOR RERUN</p> <p style="text-align: center;">Rerun</p> <p style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</p> <p style="text-align: right;">PKHT = .282 ng = 14.62ng</p>				
Analyst - 1 Valerie M. Mason	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-12-94	Time Completed 14:30	Lab Unit Mgr 5/13/94 L. D. Sparks

54-6800-061 (R-10-83)

Serial No V 63.-8895	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination As	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 2.0ml			Customer ID 108-AP-B	
Remarks, Calculations, Results <p style="text-align: center;">DUPLICATE SAMPLE OUT FOR RERUN</p> <p style="text-align: center;">Rerun</p> <p style="text-align: right;">PKHT = .319 ng = 16.44ng</p>				
Analyst - 1 Valerie M. Mason	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-12-94	Time Completed 14:30	Lab Unit Mgr 5/13/94 L. D. Sparks

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

Serial No V 65.-5595	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority 26
Determination As	Method-Standard LA-355-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 1.0 ML 1.250 ml			Customer ID STD	
Remarks Calculations Results EDP R741 AS/HYDRD <i>PK HA =</i> STD# 34N11-C RESULT STD VAL %REC <i>Dehettell</i> OUT FOR RERUN DATA NOT USED IN PACKAGE				
Analyst - 1 <i>S. Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-17-94	Time Completed 0730	Lab Unit Mgr		

54-6800-061 (R 10 83)

Serial No V 65.-8595	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority 26
Determination As	Method-Standard LA-355-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 1.0 ML 2.0 ml			Customer ID STD	
Remarks Calculations Results EDP R742 AS/HYDRD <i>PK HA</i> STD# 34N11B RESULT STD %REC OUT FOR RERUN				
Analyst - 1 <i>S. Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-17-94	Time Completed 0730	Lab Unit Mgr <i>Rehette</i>		

54 6800-061 (R 10 83)

743

WHC-SD-WM-DP-065, REV.0

Serial No V 66.-5695	Sample Point 108-AP	Date 3-18-94	Time Issued 9:38	Priority 26
Determination As	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 22 ML			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK <div style="text-align: center;"> <i>Deleted</i> OUT FOR RERUN </div>				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 5-17-94	Time Completed 0730	Lab Unit Mgr	<i>[Signature]</i>	

54-6800-061 (R-10-83)

Serial No V 66.-8695	Sample Point 108-AP	Date 3-18-94	Time Issued 9:38	Priority 26
Determination As	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 22 ML			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK <div style="text-align: center;"> OUT FOR RERUN </div>				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 5-17-94	Time Completed 0730	Lab Unit Mgr <i>[Signature]</i>	<i>[Signature]</i>	

54-6800-061 (R-10-83)

750

WHC-SD-WM-DP-065, REV. 0

Serial No V 67.-8795	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination As	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 22 ML			Customer ID 108-AP-C	
Remarks Calculations Results				
OUT FOR RERUN				
Analyst - 1 <i>Amrilton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-17-94	Time Completed 0730	Lab Unit Mgr <i>Raketa</i>		<i>AS</i>

54 6800-061 (R 10 83)

[illegible]

54 6800 061 (R 10 83)

75

WHC-SD-WM-DP-065, REV. 0

54-6800-061 (R-10-83)

54-6800-061 (R-10-83)

752

WHC-SD-WM-DP-065, REV. 0

Serial No V 69.-8795	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination As	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 22 ML			Customer ID 108-AP-E	
Remarks Calculations, Results				
OUT FOR RERUN				
Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-17-94	Time Completed 0730	Lab Unit Mgr

54 6800 061 (R 10 83)

Serial No	Sample Point	Date	Time Issued	Priority
V 69.-8895	108-AP	3-18-94	9:42	26
Determination	Method/Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1A7F	0
Sample Size			Customer ID	
22 ML			108-AP-E	
Remarks Calculations Results				
DUPLICATE SAMPLE				
OUT FOR RERUN				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>[Signature]</i>				
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab. Unit Mgr		
5-17-94	0730	<i>[Signature]</i>	<i>[Signature]</i>	

54 6800 061 (R 10-83)

753

Batch # 2989

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

CALIBRATION RECORD

Analyte: As

Procedure: LA 355-131

Revision: B-1

Instrument: PE2280 (Hydride AA)

Property No.: WB27979

Technologist: *Volante M. Mores*

Payroll No.: XXXXX

Date: 05/12/94

Calibration Standard ID: 33N11B

Analyte Concentration: .100ppm

Type of Calibration: LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0 ng	-.001
2	.100mL	5 ng	.087
3	.200mL	10 ng	.180
4	.600mL	30 ng	.538
5	1.200mL	60 ng	1.285
6	2.000mL	100 ng	1.994
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments: $r=.9983$, Y intercept= $-.0161$, slope= $.0204$

751

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.

V 62, V63

Customer ID:

108-AP-A, 108-AP-B

Analysis:

As

Sample Prep:

ACID DIGEST

Instrument: PE2280 (Hydride AA) WB27979

Procedure/ Rev: LA 355-131 / B-1

Technologist:

Valerie F. Massie

Date: 05/16/94

Starting Time: 08:00

Temperature

900 C

Ending Time: 14:50

Chemist:

L. D. SPARKS

Comments: 1 BATCH # 3496

R=0.9979, SLOPE=0.0185, Y-INT.=-0.0355

	Description	Lab ID
1	LMCS CHECK STD(DIRECT)	V 60-5595
2	REAGENT BLANK(DIRECT)	V 61-5695
3	LMCS STD (ACID DIGEST)	V 60-8595
4	BLANK (ACID DIGEST)	V 61-8695
5	SAMPLE	V 62-8795
6	SAMPLE DUPLICATE	V 62-8895
7	SAMPLE SPIKE	V 62-8995
8	SAMPLE SPIKE DUPLICATE	V 62-80955 ⁵⁻¹¹⁻⁹⁴
9	SAMPLE	V 63-8795
10	SAMPLE DUPLICATE	V 63-8895

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

DATA
NOT USED
IN PACKAGE

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	34N11C 0.250 mL			
SPIKE	34N11B 2.0 mL	DF=4		
LMCS ACID DIGEST	STD 34N11B 2.0mL	DF=4		
				755

DON'T SAY IT ... Write It!

DATE 5/17/94

TO Sandy or Rick

FROM Laurie and Ruth

For Run #2 of V60-63 (As only) please cut the cards ^{for the analysis} as before except without the direct std and blk (i.e. eliminate V60-5595 and V61-5695). Also, ^{for the digest cards,} please cut an additional card for the calibration std to be digested. Sample size should be 25 ml on this, DF=1 with a final volume of 25 ml (this can be an R-number). Please do the same things for run #1 of V65-V69.

Thank you!
LOS+RES

"TO MAKE LIFE LAST, PUT SAFETY FIRST"

Serial No. V 60.-8595		Sample Point 108-AP		Date 3-18-94		Time Issued 8:26		Priority 26	
Determination As		Method/Standard LA-355-131		Result Units % RECOVERY		Charge Code N1A7F		Reruns 1	
Sample Size 2 ML		Acid Digest DF = 4				Customer ID STD			
Remarks, Calculations, Results EDP R742 AS/HYDRD PKHT = 1.515 STD# 34N11B RESULT <u>0.167 ug/ml</u> ng = 83.60ng STD 0.100ppm %REC OUT FOR RERUN $\frac{83.60ng}{2.000ml} \times \frac{1ug}{1000ng} \times 4 = 0.167 ug/ml$ $\frac{0.167ug/ml}{0.100ug/ml} \times 100 = 167.2\%$									
Analyst - 1 Valerie L. Masu		Analyst - 2		Analyst - 3		Analyst - 4		Analyst - 5	
Hrs		Hrs		Hrs		Hrs		Hrs	
Date 5-16-94		Time Completed 14:50		Lab Unit Mgr WD Sparks					

54-6800-061 (R-10-83)

Serial No. V 61.-8695		Sample Point 108-AP		Date 3-18-94		Time Issued 8:27		Priority 26	
Determination As		Method/Standard LA-355-131		Result Units ug/ML		Charge Code N1A7F		Reruns 1	
Sample Size 2 ML						Customer ID BLANK			
Remarks Calculations Results REAGENT BLANK PKHT = .111 WHC-SD-WM-DP-065, REV. 0 ng = 7.90ng Rerun OUT FOR RERUN									
Analyst - 1 Valerie L. Masu		Analyst - 2		Analyst - 3		Analyst - 4		Analyst - 5	
Hrs		Hrs		Hrs		Hrs		Hrs	
Date 5-16-94		Time Completed 14:50		Lab Unit Mgr WD Sparks					

54-6800-061 (R-10-83)

Serial No V 62.-8795	Sample Point 108-AP	RERUN		Date 3-18-94	Time Issued 8:28	Priority 26
Determination As	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 1		
Sample Size 2 ML			Customer ID 108-AP-A			
Remarks, Calculations, Results WHC-SD-WM-DP-065, REV. 0 PKHT= .381 ng= 22.46ng Rerun OUT FOR RERUN						
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5		
Hrs	Hrs	Hrs	Hrs	Hrs		
Date 5-16-94	Time Completed 14:50	Lab Unit Mgr 5/17/94 W Spinks

54-6800-061 (R-10-83)

Serial No V 62.-8895	Sample Point 108-AP	RERUN		Date 3-18-94	Time Issued 8:28	Priority 26
Determination As	Method Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 1		
Sample Size 2 ML			Customer ID 108-AP-A			
Remarks, Calculations, Results DUPLICATE SAMPLE PKHT= .352 ng= 20.89ng Rerun OUT FOR RERUN						
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5		
Hrs	Hrs	Hrs	Hrs	Hrs		
Date 5-16-94	Time Completed 14:50	Lab Unit Mgr 5/17/94 W Spinks

54-6800-061 (R-10-83)

RERUN

Serial No V 62.-8995	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination As	Method Standard LA-355-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size 2 ML + 20ml 1.5% HCL			Customer ID 108-AP-A	
Remarks. Calculations. Results SAMPLE SPIKED ID Y62 SPIKE ID 34N11B SPIKE VOLUME PKHT= 1.129 ng= 62.79ng OUT FOR RERUN Rerun OUT FOR RERUN WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 Valerie Mazzu	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-16-94	Time Completed 14:50	Lab Unit Mgr <i>Park</i> 5/17/94 <i>LD Sparks</i>		

54-6800-061 (R-10-83)

RERUN

Serial No V 62.-8095	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination As	Method Standard LA-355-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size 2 ML			Customer ID 108-AP-A ^{ms-16-94}	
Remarks. Calculations. Results SAMPLE SPIKE V62 Dup DUPLICATE SPIKE ID 34N11B SPIKE VOL PKHT= 1.4684 ng= 80.85ng Rerun OUT FOR RERUN				
Analyst - 1 Valerie Mazzu	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-16-94	Time Completed 14:50	Lab Unit Mgr <i>Park</i> 5/17/94 <i>LD Sparks</i>		

54-6800-061 (R-10-83)

Serial No. V 63.-8795	Sample Point 108-AP	RERUN Date 3-18-94		Time Issued 8:31	Priority 26
Determination As	Method Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 1	
Sample Size 2 ML			Customer ID 108-AP-B		
Remarks, Calculations, Results WHC-SD-WM-DP-065, REV. 0 PKHT = .313 ng = 18.79 ng Rerun OUT FOR RERUN					
Analyst - 1 Valerie L. Mason	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
Hrs	Hrs	Hrs	Hrs	Hrs	
Date 5-16-94	Time Completed 14:50	Lab Unit Mgr 5/17/94 [Signature]			

54-6800-061 (R-10-83)

Serial No. V 63.-8895	Sample Point 108-AP	RERUN Date 3-18-94		Time Issued 8:31	Priority 26
Determination As	Method Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 1	
Sample Size 2 ML			Customer ID 108-AP-B		
Remarks, Calculations, Results DUPLICATE SAMPLE PKHT = .302 ng = 18.20 ng Rerun					
Analyst - 1 Valerie L. Mason	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
Hrs	Hrs	Hrs	Hrs	Hrs	
Date 5-16-94	Time Completed 14:50	Lab Unit Mgr 5/17/94 [Signature]			

54-6800-061 (R-10-83)

760

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. V 65 -V 69	Customer ID: 108-AP
Analysis: As	Sample Prep: ACID DIGEST

Instrument: PE2280(Hydride AA) WB27979	Procedure/ Rev: LA 355-131 / B-1
Technologist: SM FULTON <i>Jessie M. Fulton</i>	Date: 05/15/94
Starting Time: 00:15	Temperature 900 C
Ending Time: 07:30	Chemist: L.D. SPARKS

Comments: BATCH # 3009
 Y INTERCEPT = -0.0124
 SLOPE = 0.0206
 CORR = 0.9999

	Description	Lab ID
1	INITIAL LMCS CHECK STD	V 65-5595
2	DIGESTED STD	V 65-8595
3	BLANK	V 66-5695
4	DIGESTED BLANK	V 66-8695
5	SAMPLE	V 67-8795
6	DUPLICATE STD	V 67-8895
7	SAMPLE	V 68-8795
8	DUPLICATE SAMPLE	V 68-8895
9	SAMPLE	V 69-8795
10	DUPLICATE SAMPLE	V 69-8895

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	34N11C .250ml			
DIGESTED STD	34N11B 2.00ml			
				762

34-3000-101 (9-39)

DON'T SAY IT ... Write It!

DATE 5/17/94

TO Sandy or Rick

FROM Laurie and Ruth

For Run #2 of V60-63 (As only) please
 cut the cards ^{for the analysis} as before except without the
 direct std and blk (i.e. eliminate V60-5595 and
 V61-5695). Also ^{for the digest cards,} please cut an additional
 card for the calibration std to be digested.
 Sample size should be 25 ml on this, DF=1
 with a final volume of 25 ml (This can be an
 R-number). Please do the same things for
 run #1 of V65-V69.

Thank you!
 LWS+RES

✚ "TO MAKE LIFE LAST, PUT SAFETY FIRST" ✚

Batch 3009

Serial No V 65.-8595	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority 26
Determination As	Method Standard LA-355-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 2.0 ml Acid Digest DF=4			Customer ID STD	
Remarks Calculations Results EDP R742 AS/HYDRD STD# 34N11B RESULT 0.147 ug/ml STD 0.100 ppm %REC 147.0%				
$\frac{73.49 \text{ ng}}{2.00 \text{ ml}} \times \frac{1 \text{ ug}}{1000 \text{ ng}} \times 4 = 0.147 \text{ ug/ml}$ $\frac{0.147 \text{ ug/ml}}{0.100 \text{ ug/ml}} \times 100 = 147.0\%$				
Analyst - 1 Santolone	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 M. J.
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-15-94	Time Completed 0730 2330	Lab Unit Mgr 5/17/94 W. J. Sparks		

54-6800-061 (R-10-83)

SMF 5-15-94

Serial No V 66.-8695	Sample Point 108-AP	Date 3-18-94	Time Issued 9:38	Priority 26
Determination As	Method Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 2.0 ml			Customer ID BLANK	
Remarks Calculations Results REAGENT BLANK pk. ht = 0.083 4.64 ng Rerun WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 Santolone	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-15-94	Time Completed 0730 2330	Lab Unit Mgr 5/17/94 W. J. Sparks		

54-6800-061 (R-10-83)

SMF 5-15-94

Serial No. V 67.-8795	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination As	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 2.0 ml			Customer ID 108-AP-C	
Remarks, Calculations, Results: <p style="text-align: right;"><i>pk ht = 0.368</i> <i>18.51 ng</i></p> <p style="text-align: center;"><i>Rerun</i></p> <p style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</p>				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-15-94	Time 0730 2330	Lab Unit Mgr 5/17/94 <i>[Signature]</i>		<i>[Signature]</i>

54-6800-061 (R-10-83)

SMF 5-15-94

Serial No. V 67.-8895	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination As	Method/Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 2.0 ml			Customer ID 108-AP-C	
Remarks, Calculations, Results: <p style="text-align: right;"><i>pk ht = 0.380</i> <i>19.09 ng</i></p> <p style="text-align: center;"><i>Rerun</i></p> <p style="text-align: center;">DUPLICATE SAMPLE</p>				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-15-94	Time 0730 2330	Lab Unit Mgr 5/17/94 <i>[Signature]</i>		<i>[Signature]</i>

54-6800-061 (R-10-83)

SMF 5-15-94

Serial No V 68.-8795	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination As	Method-Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 2.0 ml			Customer ID 108-AP-D	
Remarks, Calculations Results <p style="text-align: right;"><i>pk ht = 0.332</i> <i>16.76 ng</i></p> <p style="text-align: center;"><i>Rerun</i></p> <p style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</p>				
Analyst - 1 <i>Samuelson</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-15-94	Time Completed <i>0730</i> <i>2330</i>	Lab Unit Mgr <i>5/17/94</i> <i>LD Sparks</i>		<i>[Signature]</i>
<i>SMF 5-15-94</i>				

54-6800-061 (R-10-83)

Serial No V 68.-8895	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination As	Method-Standard LA-355-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 2.0 ml			Customer ID 108-AP-D	
Remarks Calculations Results <p style="text-align: right;"><i>pk ht = 0.302</i> <i>15.30 ng</i></p> <p style="text-align: center;"><i>Rerun</i></p> <p style="text-align: center;">DUPLICATE SAMPLE</p>				
Analyst - 1 <i>Samuelson</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-15-94	Time Completed <i>0730</i> <i>2330</i>	Lab Unit Mgr <i>5/17/94</i> <i>LD Sparks</i>		<i>[Signature]</i>
<i>SMF 5-15-94</i>				

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
V 69.-8795	108-AP	3-18-94	9:42	26
Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1A7F	0
Sample Size			Customer ID	
2.0 ml			108-AP-E	
Remarks, Calculations, Results				
<p style="text-align: right;">pk wt = 0.298 15.10 ng</p> <p style="text-align: center;">Rerun</p> <p style="text-align: right;">WHC-SD-WM-DP-065, REV. 0</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>Smfulton</i>				
Hrs	Hrs	Hrs	Hrs	Hrs
		<i>Rakuta</i>		
Date	Time	Lab Unit Mgr		
5-8-94	0730 2330	5/17/94 WD Sparks	<i>[Signature]</i>	
SMF 5-15-94				

Serial No	Sample Point	Date	Time Issued	Priority
V 69.-8895	108-AP	3-18-94	9:42	26
Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1A7F	0
Sample Size			Customer ID	
2.0 ml			108-AP-E	
Remarks, Calculations, Results				
<p style="text-align: right;">pk wt = 0.307 15.54 ng</p> <p style="text-align: center;">Rerun</p> <p>DUPLICATE SAMPLE</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>Smfulton</i>				
Hrs	Hrs	Hrs	Hrs	Hrs
		<i>Rakuta</i>		
Date	Time	Lab Unit Mgr		
5-15-94	0730 2330	5/17/94 WD Sparks	<i>[Signature]</i>	
SMF 5-15-94				

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

CALIBRATION RECORD

Analyte:	As		
Procedure:	LA 355-131	Revision:	B-1
Instrument:	PE2280 (Hydride AA)	Property No.:	WB27979
Technologist	SM FULTON <i>Susie M. Fulton</i>	Payroll No.:	00000
		Date:	05/15/94

Calibration Standard ID:	33N11B
Analyte Concentration:	.100ppm
Type of Calibration:	LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0 ng	.000
2	.100mL	5 ng	.071
3	.200mL	10 ng	.196
4	.600mL	30 ng	.614
5	1.200mL	60 ng	1.212
6	2.000mL	100 ng	2.046
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments:	BATCH # 3009
	$r = 0.9999$
	Y intercept = -0.0124
	slope = 0.0206

CA
21

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. V 60 -V 63	Customer ID: 108-AP
Analysis: Se	Sample Prep: ACID DIGEST

Instrument: PE2280 (Hydride) WB27979	Procedure/ Rev: LA-365-131 / B-2
Technologist: SM FULTON <i>Lucie M. Fulton</i>	Date: 05/10/94
Starting Time: 1600	Temperature 975 C
Ending Time: 2300	Chemist: LD SPARKS

Comments: BATCH # ~~2290~~ 2990 *285 5-12-94*

Y INTERCEPT = 0.0063 *Note: A separate reagent blk was not analyzed - since this sample is equivalent to Calibration blk will report that result*

SLOPE = 0.0074

CORR = 0.9999

	Description	Lab ID
1	INITIAL LMCS STD	V 60-5596
2	ACID DIGESTED LMCS STD	V 60-8596
3	REAGENT BLK	V 61-5696
4	ACID DIG REAGENT BLK	V 61-8696
5	SAMPLE	V 62-8796
6	DUPLICATE SAMPLE	V 62-8896
7	SPIKED SAMPLE	V 62-8996
8	SPIKED/DUPLICATE SAMPLE	V 62-8096
9	SAMPLE	V 63-8796
10	DUPLICATE SAMPLE	V 63-8896

	Description	Lab ID
11		
12		
13	<i>Not analyzed</i>	
14	<i>- see note in</i>	
15	<i>Comments</i>	
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	34N11C 0.500ml			
DIGESTED STD	34N11B 2.000ml <i>2.5 5-12-94</i>	<i>12.5ml → 50ml used 2.0ml of digest</i>		
Spike	34N11B 12.5ml	<i>→ 50ml used 2.0ml of digest</i>		
				768

ANALYTICAL BATCH SUMMARY SHEET

[illegible]

NARRATIVE: ☒ NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

* - This information pertains to the matrix spike duplicate for this sample.

28/11/20

5-12 94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 2990

Serial No V 60.-5596	Sample Point 108-AP	Date 3-18-94	Time Issued 8:26	Priority 26
Determination Se	Method/Standard LA-365-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size <i>0.500 ml</i>			Customer ID STD	
Remarks Calculations, Results EDP R743 SE/HYDRD <i>PK ht = 0.377</i> STD# 34N11.C RESULT <i>50.23 ng</i> STD VAL 0.100 ppm %REC <i>0.100 ppm</i> <i>100.0% rec.</i> <div style="border: 1px solid black; border-radius: 50%; width: 150px; height: 50px; margin: 10px auto; text-align: center; line-height: 50px;">0.100 ppm</div>				
Analyst - 1 <i>Susie Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	<i>5-13-94</i>
Date <i>5-10-94</i>	Time Completed <i>2300</i>	Lab Unit <i>Lab 108-AP</i>	<i>5-13-94</i>	
		<i>OK M Jarens</i>		

WHC-SD-WM-DP-065, REV. 0

54-6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.500	
V60-5596	Se ng (Nanograms)	50.23	
Batch ID	Conc Se µg/mL (or mg/L or PPM)	0.100	N/A
2990	Conc Se µg/L (PPB)	100.5	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979	Conc Se µg/mL=(Se ng/SS)*(1 µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
05/10/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst			
Susie Fulton			
Date:			
05/10/94			

	STANDARD	DUPLICATE
Conc Se µg/mL	1.00E-01	
	N/A	N/A
	N/A	N/A

Data Entry by: <i>Chlod</i>	Date: 11-May-94
Approved by: <i>W. J. Jarens</i>	Date: 5/12/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 2990

Serial No V 60.-8596	Sample Point 108-AP	Date 3-18-94	Time Issued 8:26	Priority 26
Determination Se	Method/Standard LA-365-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 100 mL <i>SWF 5-10-94</i> <i>2 ml</i>			Customer ID STD	
Remarks Calculations Results LDF R744 SE/HYDRD <i>PK HE = .415</i> STD# <i>34N11B</i> RESULT <i>(0.111 ppm)</i> <i>55.38 ng</i> STD VAL 0.100 ppm %REC <i>111 %</i> <i>Acid digest DF=4</i> <div style="text-align: right;">WHC-SD-WM-DP-065, REV. 0</div>				
Analyst - 1 <i>Susie Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	<i>5-13-94</i> <i>OK M. G. L.</i>
Date <i>5-10-94</i>	Time Completed <i>2300</i>	Lab Unit/Mod <i>Red Code</i> <i>5-12-94</i>	<i>5-13-94</i> <i>OK M. G. L.</i>	

54 6800-061 (R 10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V60-8596	Se ng (Nanograms)	55.38	
Batch ID	Acid Digest Dilution Factor DF	4.0	
2990	Conc Se µg/mL (or ng/L or PPM)	0.111	N/A
Rerun No.	Conc Se µg/L (PPB)	110.8	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
05/10/94	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Susie Fulton			
Date:			
05/10/94			

	STANDARD	DUPLICATE
Conc Se (µg/mL)	1.11E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:	<i>Red Code</i>	Date:	12-May-94
Approved by:	<i>NO. 2990</i>	Date:	5/12/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 61.-5696	Sample Point 108-AP	Date 3-18-94	Time Issued 8:27	Priority 26
Determination Se	Method/Standard LA-365-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size <i>2.00ml</i> <i>0.500ml</i>			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK <i>Calibration blank was used since it is equivalent to a reagent blank.</i> <i>PK HT: 005 -0.18 ng</i> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block;"> <i>20.010 ug/ml</i> </div>				
Analyst - 1 <i>Susie Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-10-94	Time Completed 2300	Lab Unit Mgr <i>R. Ellwood</i> 5-12-94	5-13-94 <i>PK M. Yarell</i>	

WHC-SD-WM-DP-065, REV. 0

54-6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUIDS-DIRECT		BLANK	DUPLICATE
Serial No.	Sample Size in mL SS	0.500	
V61-5696	Se ng (Nanograms)	-0.18	
Batch ID	Conc Se µg/mL (or mg/L or PPM)	-0.000	N/A
2990	Conc Se µg/L (PPB)	-0.4	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID		N/A	N/A
WB27979	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
05/10/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst	Detection Limit = (5 ng/SS)*(1µg/1000ng)		
Susie Fulton	Detection Limit is Corrected for Sample Prep/Dilution		
Date			
05/10/94	Detection Limit (µg/mL) =	0.010	
	Detection Limit (µg/L) =	10.0	

	BLANK	DUPLICATE
Conc Se µg/mL	<0.010	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by: <i>R. Ellwood</i>	Date: 11-May-94
Approved by: <i>h. J. [signature]</i>	Date: 5/12/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 61.-8696	Sample Point 108-AP	Date 3-18-94	Time Issued 8:27	Priority 26
Determination Se	Method-Standard LA-365-131	Result Units uG/ML	Charge Code NIA7F	Reruns 0
Sample Size 22 ML <i>2 ml</i>			Customer ID BLANK	
Remarks Calculations, Results REAGENT BLANK <i>Acid digest DF = 5</i> <i>pk ht = .012</i> <i>0.77 ng</i> <i><0.013 µg/ml</i>				
Analyst 1 <i>Susie Fulton</i>	Analyst 2	Analyst 3	Analyst 4	Analyst 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-10-94	Time Completed 2300	Lab Unit Mgr <i>Rebecca</i> 5-12-94	3-13-94 <i>DKM</i>	

WHC-SD-WM-DP-065, REV.0

54 6800-061 (R-10 83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		BLANK	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V61-8696	Se ng (Nanograms)	0.77	
Batch ID	Acid Digest Dilution Factor DF	5.0	
2990	Conc Se µg/mL (or ng/L or PPM)	0.002	N/A
Rerun No.	Conc Se µg/L (PPB)	1.9	N/A
0		N/A	N/A
Instrument ID		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1 µg/1000ng)*DF		
05/10/94	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Susie Fulton	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF		
Date			
05/10/94	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	BLANK	DUPLICATE
Conc Se (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by: <i>Rebecca</i>	Date: 12-May-94
Approved by: <i>LD Sprule</i>	Date: 5/12/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-8796	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination Se	Method/Standard LA-365-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 22 mL <i>5-10-94</i> <i>2 ml</i>			Customer ID 108-AP-A	
Remarks, Calculations, Results <p>Acid digest DF = 5</p> <p><i>pk wt = .010</i> <i>0.50 ng</i></p> <p><i>10.013 µg/ml</i></p> <p>WHC-SD-WM-DP-065, REV.0</p>				
Analyst - 1 <i>Susie Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-10-94	Time Completed 2300	Lab Unit Mgr <i>R. L. Rhoda</i> 5-12-94	5-13-94 <i>AKM Yalad</i>	

54 6800-061 (R-10 83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V62-8796	Se ng (Nanograms)	0.50	
Batch ID	Acid Digest Dilution Factor DF	5.0	
2990	Conc Se µg/mL (or ng/L or PPM)	0.001	N/A
Rerun No.	Conc Se µg/L (PPM)	1.3	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL = (Se ng/SS) * (1 µg/1000 ng) * DF		
05/10/94	Average Conc. = (Sample + Duplicate) / 2		
Analyst	Relative % Difference = ((ABS(Sam. - Dup.)) / Average Conc.) * 100		
Susie Fulton	Detection Limit = (5 ng/SS) * (1 µg/1000 ng) * DF		
Date:			
05/10/94	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by: <i>R. L. Rhoda</i>	Date: 12-May-94
Approved by: <i>W. D. Rhoda</i>	Date: 5/12/94

Form 3 Rev. 2 Page 1 of 1

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-8896	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination Se	Method-Standard LA-365-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size <i>2 ml</i> 22 ml			Customer ID 108-AP-A	
Remarks Calculations Results DUPLICATE SAMPLE Acid digest DF = 5 <div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block;"> $< 0.013 \mu\text{g/ml}$ </div> <div style="margin-left: 20px;"> $\rho K \text{ ht} = .028$ 2.94 ng </div>				
WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>Susie Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-10-94	Time Completed 2300	Lab Unit <i>Releoda</i> 5-12-94	<i>5-13-94</i> <i>AK McNeil</i>	

54 6800-061 (R 10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V62-8896	Se ng (Nanograms)	0.50	2.94
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
2990	Conc Se $\mu\text{g/mL}$ (or mg/L or PPM)	0.001	0.007
Rerun No.	Conc Se $\mu\text{g/L}$ (PPB)	1.3	7.4
0	Average Conc ($\mu\text{g/mL}$)	N/A	N/A
Instrument ID	Average Conc ($\mu\text{g/L}$)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc Se $\mu\text{g/mL} = (\text{Se ng/SS}) \times (1 \mu\text{g}/1000 \text{ ng}) \times \text{DF}$		
05/10/94	Average Conc. = (Sample + Duplicate)/2		
Analyst	Relative % Difference = $((\text{ABS}(\text{Sam.} - \text{Dup.}))/\text{Average Conc.}) \times 100$		
Susie Fulton	Detection Limit = $(5 \text{ ng/SS}) \times (1 \mu\text{g}/1000 \text{ ng}) \times \text{DF}$		
Date			
05/10/94	Detection Limit ($\mu\text{g/mL}$)	0.013	
	Detection Limit ($\mu\text{g/L}$)	12.50	

	SAMPLE	DUPLICATE
Conc Se ($\mu\text{g/mL}$)	<0.013	<0.013
Average Conc ($\mu\text{g/mL}$)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by: <i>Releoda</i>	Date: 12-May-94
Approved by: <i>W. Sprake</i>	Date: 5/12/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-065, REV. 0

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V63-8896	Se ng (Nanograms)	48.74	44.40
Batch ID	Acid Digest Dilution Factor DF	4.0	4.0
2990	Conc Se µg/mL (or mg/L or PPM)	0.097	0.089
Run No.	Conc Se µg/L (PPB)	97.5	88.8
0	Average Conc (µg/mL)	N/A	0.093
Instrument ID	Average Conc (µg/L)	N/A	93.1
WB27979	Relative % Difference	N/A	9.3
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
05/10/94	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Susie Fulton	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date			
05/10/94	Detection Limit (µg/mL)	0.010	
	Detection Limit (µg/L)	10.00	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	9.75E-02	8.88E-02
Average Conc (µg/mL)	N/A	0.093
Relative % Difference	N/A	9.3

Data Entry by:	<i>IC-Ext-1000</i>	Date:	12-May-94
Approved by:	<i>WJ-Susie</i>	Date:	

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-8996	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination Se	Method-Standard LA-365-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 22 <i>SmF 5-10-94</i> <i>2 ml</i>			Customer ID 108-AP-A	
Remarks Calculations Results SAMPLE SPIKED ID SPIKE ID <i>34N11B</i> SPIKE VOLUME <i>12.5 mL → 50 mL ΔF = 4</i> <i>pk ht = .366</i> <i>48.74 ng</i> WHC-SD-WM-DP-065, REV. 0 <i>97.5 % recovery</i>				
Analyst - 1 <i>Susie Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date <i>5-10-94</i>	Time Completed <i>2300</i>	Lab Unit Mgr <i>R. E. Clenden</i> <i>5-12-94</i>	<i>5-13-94</i> <i>AKM</i> 54 6800-061 (R 10 83)	

Selenium: LA-365-131 (B-2) Se LIQUIDS-ACID DIGEST

		SAMPLE	SPIKE
Serial No	Sample (ml) Vol. Acid Dig. Used SAVOL	2.00	N/A
V62-8996	Spike Std Volume (ml) SSVOL	N/A	12.500
Batch ID	ng of Spike + Sample ngSSAM	N/A	48.74
2990	ng of Sample ngSAM	0.50	N/A
Rerun No	Final Acid Digest Vol (ml) ADVOL	N/A	50.00
0		N/A	N/A
Instrument ID	Spike Std Dilution Factor SPDF	N/A	4.0
WB27979	Spike Std ID	N/A	34N11B
Calibration Date	Spike Std Value (ppm) SS VAL.	N/A	0.100
05/10/94	% Recovery	N/A	97.5
Analyst	Sample result is < 5 ng, 0 ng of sample is used in the calculation for % recovery		
Susie Fulton			
Date			
05/10/94	Spike Std. Dilution Factor = ADVOL/SSVOL		

$$\% \text{ Recovery} = \frac{((\text{ngSSAM}/\text{SAVOL}) \times (1/1000)) - ((0/\text{SAVOL}) \times (1/1000)) \times \text{SPDF}}{\text{SS VAL}} \times 100$$

% Recovery = 97.5

Data Entry by:	<i>R. E. Clenden</i>	Date:	12-May-94
Approved by:	<i>W.D. Smith</i>	Date:	5/12/94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-8096	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination Se	Method/Standard LA-365-131	Result Units % RECOVERY	Charge Code N1A7F*	Repeats 0
Sample Size 22 mL ⁵⁻¹⁰⁻⁹⁴ 2 mL			Customer ID 108-AP-A	
Remarks, Calculations, Results SAMPLE SPIKE DUPLICATE SPIKE ID 34N11-B SPIKE VOL 12.5 mL → 50 mL DF = 4 88.8% recovery PK ht = .334 44.40 ng ADD = 9.3% WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>Susie Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-10-94	Time Completed 2300	Lab Unit Mgr <i>R. J. Corder</i> 5-12-94	5-13-94 <i>AKM Jarrell</i>	

54-6800-061 (R-10 83)

Selenium: LA-365-131 (B-2) Se LIQUIDS-ACID DIGEST

		SAMPLE	SPIKE
Serial No.	Sample (mL) Vol. Acid Dig. Used SAVOL	2.00	N/A
V62-8096	Spike Std Volume (mL) SSVOL	N/A	12.500
Batch ID	ng of Spike + Sample ngSSAM	N/A	44.40
2990	ng of Sample ngSAM	0.50	N/A
Run No.	Final Acid Digest Vol (mL) ADVOL	N/A	50.00
0		N/A	N/A
Instrument ID	Spike Std Dilution Factor SPDF	N/A	4.0
WB27979	Spike Std ID	N/A	34N11B
Calibration Date	Spike Std Value (ppm) SS VAL	N/A	0.100
05/10/94	% Recovery	N/A	88.8
Analyst	Sample result is < 5 ng. 0 ng of sample is used in the calculation for % recovery		
Susie Fulton			
Date			
05/10/94	Spike Std. Dilution Factor = ADVOL/SSVOL		

$$\% \text{ Recovery} = \{[(\text{ngSSAM}/\text{SAVOL}) \times (1/1000)] - [(0/\text{SAVOL}) \times (1/1000)] \times \text{SPDF} / \text{SS VAL}\} \times 100$$

% Recovery = 88.8

Data Entry by: <i>R. J. Corder</i>	Date: 12-May-94
Approved by: <i>L. S. P. 11/22</i>	Date: 5/12/94

Form 4 Rev. 1 Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW- DO NOT WRITE IN SPACE

Serial No V 63.-8796	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination Se	Method/Standard LA-365-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 22-115 5.0-94 2ml			Customer ID 108-AP-B	
Remarks Calculations Results Acid digest DF=5 pk ht= 032 <div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block;"> $< 0.013 \mu\text{g/mL}$ </div> 3.48 ng				
WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>Susie Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-10-94	Time Completed 2300	Lab Unit/Min <i>Redhook</i> 5-12-94	<i>5-13-94</i> <i>AK m Jarland</i>	

54 6800-061 (R 10 83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V63-8796	Se ng (Nanograms)	3.48	
Batch ID	Acid Digest Dilution Factor DF	5.0	
2990	Conc Se $\mu\text{g/mL}$ (or mg/L or PPM)	0.009	N/A
Run No.	Conc Se $\mu\text{g/L}$ (PPB)	8.7	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se $\mu\text{g/mL} = (\text{Se ng/SS}) \times (1 \mu\text{g}/1000\text{ng}) \times \text{DF}$		
05/10/94	Average Conc. = (Sample + Duplicate)/2		
Analyst	Relative % Difference = $((\text{ARS}(\text{Sam.} - \text{Dup.}))/\text{Average Conc.}) \times 100$		
Susie Fulton	Detection Limit = $(5 \text{ ng/SS}) \times (1 \mu\text{g}/1000\text{ng}) \times \text{DF}$		
Data			
05/10/94	Detection Limit ($\mu\text{g/mL}$)	0.013	
	Detection Limit ($\mu\text{g/L}$)	12.50	

	SAMPLE	DUPLICATE
Conc Se ($\mu\text{g/mL}$)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by: <i>Redhook</i>	Date: 12-May-94
Approved by: <i>W. J. Jarland</i>	Date: 5/12/94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 63.-8896	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination Se	Method/Standard LA-365-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 5-10-94 22 ML 2 ml			Customer ID 108-AP-B	
Remarks, Calculations, Results DUPLICATE SAMPLE Acid Digest DF=5 <div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block;"> $< 0.013 \mu\text{g/ml}$ </div> <p style="text-align: right;">pk ht = .043 4.97 ng</p> <p style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</p>				
Analyst - 1 <i>Susie M. Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-10-94	Time Completed 2300	Lab Unit, Mgr <i>W Spawka</i> 5-12-94	5-13-94 <i>AK M Garland</i>	

54-6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V63-8896	Se ng (Nanograms)	3.48	4.97
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
2990	Conc Se $\mu\text{g/mL}$ (or mg/L or PPM)	0.009	0.012
Rerun No.	Conc Se $\mu\text{g/L}$ (PPB)	8.7	12.4
0	Average Conc ($\mu\text{g/mL}$)	N/A	N/A
Instrument ID:	Average Conc ($\mu\text{g/L}$)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc Se $\mu\text{g/mL} = (\text{Se ng/SS}) \times (1 \mu\text{g}/1000 \text{ng}) \times \text{DF}$		
05/10/94	Average Conc. = (Sample + Duplicate)/2		
Analyst	Relative % Difference = $((\text{ABS}(\text{Sam.} - \text{Dup.}))/\text{Average Conc.}) \times 100$		
Susie Fulton	Detection Limit = $(5 \text{ ng/SS}) \times (1 \mu\text{g}/1000 \text{ng}) \times \text{DF}$		
Data:			
05/10/94	Detection Limit ($\mu\text{g/mL}$)	0.013	
	Detection Limit ($\mu\text{g/L}$)	12.50	

	SAMPLE	DUPLICATE
Conc Se ($\mu\text{g/mL}$)	<0.013	<0.013
Average Conc ($\mu\text{g/mL}$)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by: <i>W Spawka</i>	Date: 12-May-94
Approved by: <i>W Spawka</i>	Date: 5/12/94

(C)

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

CALIBRATION RECORD

Analyte: Se

Procedure: LA 365-131 Revision: B-2

Instrument: PE2280 (Hydride) Property No.: WB27979

Technologist SM FULTON *Susie M. Fulton* Payroll No.: 00000 Date: 05/10/94

Calibration Standard ID: 37N11A

Analyte Concentration: .100ppm

Type of Calibration: LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0 ng	.000 1005 ^{1.80} 5-12-94
2	.100mL	5 ng	.041
3	.500mL	25 ng	.191
4	1.000mL	50 ng	.382
5	2.000mL	100 ng	.741
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments: r= 0.9999

Y intercept= 0.0063

SLOPE= 0.0074

786

.043	4.97 ng	2.0 ml	V63-8896
.032	3.48 ng	2.0 ml	V63-8896
.334	44.40 ng	2.0 ml	V62-8096
.366	48.74 ng	2.0 ml	V62-8996
.028	2.94 ng	2.0 ml	V62-8896
.010	0.50 ng	2.0 ml	V62-8796
.012	0.77 ng	2.0 ml	V61-8896
.415	55.38 ng	2.0 ml	V60-8596
.377	50.23 ng	1.500 ml	2. MGS 34N11-C
.741	100 ng	2.000 ml	V60 5596
.382	50 ng	1.000 ml	31N11A
.191	25 ng	.500 ml	31N11A
.041	5 ng	.100 ml	31N11A
.005	0 ng	0 ml	31N11A

1600-2300 5-10-94 Se Lucie M. Fulton

Signal = CONC Purge I = 40

mode = PK HT Purge II = 50

Recorder = TC3 Rxn = 10

T = 30 Speed = 5 ml/min

Exp = 10 mV = 20

Lamp Amp = 6 Temp = 975°C

START y-int - 0.0043
Slope = 0.0074
Corr. coeff = 0.9999

Intercept: 0
Slope: 0
Corr coeff: 0.9999

WHC-SD-WM-DP-065, REV. 0

BEST AVAILABLE COPY

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.

V67, V68, V69

Customer ID:

108-AP-C,D,E

Analysis:

Se

Sample Prep:

ACID DIGEST

Instrument: PE2280(Hydride) WB27979

Procedure/ Rev: LA 365-131 / B-2

Technologist: *Susie M. Fulton*

Date: 05/11/94

Starting Time: 1600

Temperature 975 C

Ending Time: 2330

Chemist: L.D. SPARKS

Comments: SLOPE: 0.0074 INTERCEPT: -0.0005 CORR. 0.9987

	Description	Lab ID
1	INITIAL LMCS CHECK STD	V 65-5596
2	DIGESTED STD	V 65-8596
3	REAGENT BLANK	V 66-5696
4	DIGESTED BLANK	V 66-8796
5	SAMPLE	V 67-8796
6	SAMPLE DUPLICATE	V 67-8896
7	SAMPLE	V 68-8796
8	SAMPLE DUPLICATE	V 68-8896
9	SAMPLE	V 69-8796
10	SAMPLE DUPLICATE	V 69-8896

	Description	Lab ID
11		
12		
13		
14	<i>V 66-8796</i>	
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	34N11C .500mL			
DIGESTED STD	34N11B DF=4 2mL			
				783

[illegible]

Billida
5-12-44

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

<i>Batch 3010</i>				
Serial No V 65.-5596	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority 26
Determination Se	Method/Standard LA-365-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size <i>.500ml</i>			Customer ID STD	
Remarks Calculations Results EDP R743 SE/HYDRD STD# <i>34N11C</i> RESULT <i>0.107ppm</i> <i>pk Ht = 399</i> STD VAL <i>0.100ppm</i> %REC <i>107.0%</i> <i>53.64ng</i>				
WHC-SD-WM-DP-065, REV.0				
Analyst - 1 <i>Susie Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date <i>5-11-94</i>	Time Completed <i>2330</i>	Lab Unit Mgr <i>5-12-94</i>		

54 6800-061 (R-10 83)

Selenium: LA-365-131 (B-2) Se LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.500	
V65-5596	Se ng (Nanograms)	53.64	
Batch ID	Conc Se µg/mL (or mg/L or PPM)	0.107	N/A
3010	Conc Se µg/L (PPH)	107.3	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID		N/A	N/A
WB27979	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
05/11/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst			
Susie Fulton			
Date			
05/11/94			

	STANDARD	DUPLICATE
Conc Se µg/mL	1.07E-01	
	N/A	N/A
	N/A	N/A

Data Entry by: <i>LD [signature]</i>	Date: 12-May-94
Approved by: <i>LD [signature]</i>	Date: <i>5/13/94</i>

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3010

Serial No V 65.-8596	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority 26
Determination Se	Method/Standard LA-365-131	Result Units % RECOVERY	Charge Code N1A7F	Recons 0
Sample Size 2 ml			Customer ID STD	
Remarks, Calculations, Results <i>acid digest DF=4</i> EDP R744 SE/HYDRD STD# 34N11B RESULT <i>0.105 ppm</i> pk ht 392 STD VAL <i>0.105 ppm</i> %REC <i>105.0%</i> 52.7 ng WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>Susie Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-11-94	Time Completed 2330	Lab Unit, Mgr <i>Pakita</i> <i>RE: Shirda</i> 5-12-94	<i>[Signature]</i>	

54-6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V65-8596	Se ng (Nanograms)	52.70	
Batch ID	Acid Digest Dilution Factor DF	4.0	
3010	Conc Se µg/mL (or ng/L or PPM)	0.105	N/A
Run No.	Conc Se µg/L (PPII)	105.4	N/A
0		N/A	N/A
Instrument ID		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
05/11/94	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Susie Fulton			
Date			
05/11/94			

	STANDARD	DUPLICATE
Conc Se (µg/mL)	1.05E-01	
	N/A	N/A
	N/A	N/A

Data Entry by: <i>[Signature]</i>	Date: 12-May-94
Approved by: <i>[Signature]</i>	Date: 5/13/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 66.-5696	Sample Point 108-AP	Date 3-18-94	Time Issued 9:38	Priority 26
Determination Se	Method/Standard LA-365-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size <i>2 ml</i> 5-12-94 <i>0.500ml</i>			Customer ID BLANK	
Remarks Calculations. Results REAGENT BLANK <i>pk ht .023</i> <i>3.16 ng</i> <i>10.010 pp.m</i> <i>= 10.010 ug/ml</i>				
Analyst - 1 <i>Susie M. Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-11-94	Time Completed 2330	Lab Unit Mgr <i>R. E. Merdo</i> 5-12-94		

WHC-SD-WM-DP-065, REV. 0

54 6800-061 (R 10-83)

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Selenium: LA-365-131 (B-2) Se LIQUIDS-DIRECT

		BLANK	DUPLICATE
Serial No	Sample Size in ml. SS	0.500	
V66-5696	Se ng (Nanograms)	3.16	
Batch ID	Conc Se µg/mL (or mg/L or PPM)	0.006	N/A
3010	Conc Se µg/L (PPB)	6.3	N/A
Rerun No		N/A	N/A
0		N/A	N/A
Instrument ID		N/A	N/A
WB27979	Conc Se µg/mL=(Se ng/SS)*(1 µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
05/11/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst	Detection Limit = (5 ng/SS)*(1 µg/1000ng)		
Susie Fulton	Detection Limit is Corrected for Sample Prep/Dilution		
Date			
05/11/94	Detection Limit (µg/mL) =	0.010	
	Detection Limit (µg/L) =	10.0	

	BLANK	DUPLICATE
Conc Se µg/mL	<0.010	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by: <i>L. J. Spaul</i>	Date: 12-May-94
Approved by: <i>L. J. Spaul</i>	Date: 5/13/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 66.-8696	Sample Point 108-AP	Date 3-18-94	Time Issued 9:38	Priority 26
Determination Se	Method/Standard LA-365-131	Result Units uG/ML	Charge Code N1A7F	Repeats 0
Sample Size 2 ml acid digest DF = 5			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK pk ht .033 4.50 ng 0.013 ug/ml WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 Simulation	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-11-94	Time Completed 23:30	Lab Unit/Mgr R. S. Linder 5-12-94		

54-6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		BLANK	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V66-8696	Se ng (Nanograms)	4.50	
Batch ID	Acid Digest Dilution Factor DF	5.0	
3010	Conc Se µg/mL (or ng/L or PPM)	0.011	N/A
Run No.	Conc Se µg/L (PPB)	11.3	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1 µg/1000ng)*DF		
05/11/94	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Susie Fulton	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF		
Data:			
05/11/94	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	BLANK	DUPLICATE
Conc Se (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by: <i>LD Sparks</i>	Date: 12-May-94
Approved by: <i>LD Sparks</i>	Date: 5/13/94

Form 3 Rev. 2 Page 1 of 1

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 67.-8796	108-AP	3-18-94	9:39	26
Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	N1A7F	0
Sample Size	Customer ID			
2 ml acid digest ΔF=5	108-AP-C			
Remarks Calculations Results				
<p style="text-align: center;">PK/Ht. -035 4.77 ng < 0.013 µg/ml WHC-SD-WM-DP-065, REV. 0</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Sufulton				
Hrs	Hrs	Hrs	Hrs	Hrs
5-11-93	4/4/94	Rakita		
Date	Time Completed	Lab Unit Mgr		
5-11-93	2330	R. Shoda 5-12-94		

54-6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

	SAMPLE	DUPLICATE
Serial No	2.000	
V67-8796	4.77	
Batch ID	5.0	
3010	0.012	N/A
Rerun No.	11.9	N/A
0	N/A	N/A
Instrument ID:	N/A	N/A
WB27979	N/A	N/A
Calibration Date:	Conc Se µg/mL=(Se ng/SS)*(1 µg/1000ng)*DF	
05/11/94	Average Conc.=(Sample + Duplicate)/2	
Analyst:	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100	
Susie Fulton	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF	
Date:		
05/11/94	Detection Limit (µg/mL)	0.013
	Detection Limit (µg/L)	12.50

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by: <u>W. J. J. J.</u>	Date: 12-May-94
Approved by: <u>W. J. J. J.</u>	Date: 5/13/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 67.-8896	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination Se	Method-Standard LA-365-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 2 ml			Customer ID 108-AP-C	
Remarks, Calculations, Results DUPLICATE SAMPLE acid digest DF=5 pk Hf .010 1.42 ng <0.013 µg/mL AVG 1-RAD N/A WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 Susie Fulton	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-11-94	Time Completed 2330	Lab Unit Mgr R. S. Cloda 5-12-94		

54-6800-061 (R-10-83)

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Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V67-8896	Se ng (Nanograms)	4.77	1.42
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
3010	Conc Se µg/mL (or mg/L or PPM)	0.012	0.004
Rerun No.	Conc Se µg/L (PPI)	11.9	3.6
0	Average Conc (µg/mL)	N/A	N/A
Instrument ID	Average Conc (µg/L)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1 µg/1000ng)*DF		
05/11/94	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Susie Fulton	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF		
Data			
05/11/94	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	<0.013	<0.013
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by: <i>[Signature]</i>	Date: 12-May-94
Approved by: <i>[Signature]</i>	Date: 5/13/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 68.-8796	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination Se	Method/Standard LA-365-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 2 ml acid digest DF=5			Customer ID 108-AP-D	
Remarks Calculations, Results <div style="text-align: center;"> <p><0.013 µg/ml</p> <p>PKht .006 0.88 ng</p> </div> <p style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</p>				
Analyst - 1 <i>Smt Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-11-94	Time Completed 2330	Lab Unit, Mgr <i>Rabata</i> 5-12-94	<i>Chen</i>	

54-6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V68-8796	Se ng (Nanograms)	0.88	
Batch ID	Acid Digest Dilution Factor DF	5.0	
3010	Conc Se µg/mL (or mg/L or PPM)	0.002	N/A
Rerun No.	Conc Se µg/L (PPB)	2.2	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
05/11/94	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Susie Fulton	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Data:			
05/11/94	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by: <i>L. D. J. L. L.</i>	Date: 12-May-94
Approved by: <i>L. D. J. L. L.</i>	Date: 5/13/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 68.-8896	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination Se	Method/Standard LA-365-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 2 ml acid digest DF=5			Customer ID 108-AP-D	
Remarks, Calculations, Results DUPLICATE SAMPLE PKht.009 1.28 ng 10.013 ug/ml WHC-SD-WM-DP-065, REV. 0 AVG 4 RPD N/A				
Analyst Susie Fulton	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-11-94	Time Completed 2330	Lab Unit Mgr R. L. Loda 5-12-94		

54-6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No	Sample Size in mL SS	2.000	2.000
V68-8896	Se ng (Nanograms)	0.88	1.28
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
3010	Conc Se µg/mL (or mg/L or PPM)	0.002	0.003
Rerun No	Conc Se µg/L (PPD)	2.2	3.2
0	Average Conc (µg/mL)	N/A	N/A
Instrument ID	Average Conc (µg/L)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1 µg/1000 ng)*DF		
05/11/94	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Susie Fulton	Detection Limit = (5 ng/SS)*(1 µg/1000 ng)*DF		
Date			
05/11/94	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	<0.013	<0.013
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by: L. D. Spauldine	Date: 12-May-94
Approved by: L. D. Spauldine	Date: 5/13/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 69.-8796	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination Se	Method-Standard LA-365-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 2 ml			Customer ID 108-AP-E	
Remarks, Calculations, Results <div style="text-align: center;"> <p>acid digest DF=5</p> <p><0.013 µg/ml</p> <p>1.01 ng</p> <p>007</p> <p>WHC-SD-WM-DP-065, REV.0</p> </div>				
Analyst - 1 Susie Fulton	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-11-94	Time Completed 2330	Lab Unit No 5-12-94	Signature	

54 6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V69-8796	Se ng (Nanograms)	1.01	
Batch ID	Acid Digest Dilution Factor DF	5.0	
3010	Conc Se µg/mL (or ng/L or PPM)	0.003	N/A
Rerun No.	Conc Se µg/L (PPB)	2.5	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1 µg/1000ng)*DF		
05/11/94	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Susie Fulton	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF		
Date			
05/11/94	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by: <i>LDG/ML/2</i>	Date: 12-May-94
Approved by: <i>LDG/ML/2</i>	Date: 5/13/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 69.-8896	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination Se	Method/Standard LA-365-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 2ml acid digest DF=5			Customer ID 108-AP-E	
Remarks, Calculations, Results DUPLICATE SAMPLE <div style="text-align: center;"> $<0.013 \mu\text{g/ml}$ </div> PKht. 009 1.28 ng WHC-SD-WM-DP-065, REV. 0 AVG of RPD N/A				
Analyst - 1 Susie Fulton	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-11-94	Time Completed 2330	Lab Unit Mgr R. J. L. 5-12-94	PHG	

54-6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No	Sample Size in mL SS	2.000	2.000
V69-8896	Se ng (Nanograms)	1.01	1.28
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
3010	Conc Se $\mu\text{g/mL}$ (or mg/L or PPM)	0.003	0.003
Rerun No.	Conc Se $\mu\text{g/L}$ (PPB)	2.5	3.2
0	Average Conc ($\mu\text{g/mL}$)	N/A	N/A
Instrument ID	Average Conc ($\mu\text{g/L}$)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc Se $\mu\text{g/mL} = (\text{Se ng/SS}) \times (1 \mu\text{g}/1000\text{ng}) \times \text{DF}$		
05/11/94	Average Conc. = (Sample + Duplicate)/2		
Analyst	Relative % Difference = $((\text{ABS}(\text{Sam.} - \text{Dup.}))/\text{Average Conc.}) \times 100$		
Susie Fulton	Detection Limit = $(5 \text{ ng/SS}) \times (1 \mu\text{g}/1000\text{ng}) \times \text{DF}$		
Data			
05/11/94	Detection Limit ($\mu\text{g/mL}$)	0.013	
	Detection Limit ($\mu\text{g/L}$)	12.50	

	SAMPLE	DUPLICATE
Conc Se ($\mu\text{g/mL}$)	<0.013	<0.013
Average Conc ($\mu\text{g/mL}$)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by: W. J. L.	Date: 12-May-94
Approved by: W. J. L.	Date: 5/13/94

Batch # 3016

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

CALIBRATION RECORD

Analyte: Se		
Procedure: LA 365-131	Revision: B-2	
Instrument: PE2280 (Hydride)	Property No.: WB27979	
Technologist: <i>Susie M. Fulton</i>	Payroll No.: XXXXX	Date: 05/11/94

Calibration Standard ID:	37N11A
Analyte Concentration:	.100ppm
Type of Calibration:	LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0 ng	.000
2	.100mL	5 ng	.040
3	.500mL	25 ng	.198
4	1.000mL	50 ng	.346
5	2.000mL	100 ng	.954
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments: r=.9987
Y intercept=-.0005
SLOPE=.0074
785

Batten # 3010
Run 5/11/94
Turned in 5/17/94

.280	37.66 ng	.500 ml STD 34N11C
.077	10.41 ng	2.0 ml T831
.144	19.41 ng	2.0 ml T734
.009	1.28 ng	2.0 ml V69D
.007	1.01 ng	2.0 ml V69
.009	1.28 ng	2.0 ml V68D
.006	0.88 ng	2.0 ml V68
.010	1.42 ng	2.0 ml V67D
.035	4.77 ng	2.0 ml V67
.033	4.5 ng	2.0 ml V66 Dig BLK
.392	52.70 ng	2.0 ml V65 Dig STD.
.023	3.16 ng	2.0 ml 34N11B
.399	53.64 ng	2.0 ml V66-BLK
.954	100 ng	.500 ml V65-STD
.346	50 ng	.500 ml 34N11C
.198	25 ng	2.000 ml 37N11A
.040	5 ng	1.000 ml 37N11A
.000	0 ng	.500 ml 37N11A
		.100 ml 37N11A
		0 ml 37N11A

Signal = CONC
Mode = PK HT
Recorder = TC3
Time = 30
Exp = 10
Lamp Amp = 6

Purge I = 30
Purge II = 40
Rxn = 10
Speed = 5 ml/min
mV = 20
Temp = 975°C

Intercept: -0.0005
Slope: 0.0074
16: 0.9987
15: 53.6410
14: 3.1615
13: 52.7012
12: 4.5040
11: 4.7726
10: 1.4162
9: 0.8792
8: 1.2820
7: 1.0134
6: 1.2820
5: 19.4062
4: 10.4112
3: 37.6647
2:
1:

165.77
Se
m. 11 5/11/94
J. 4.6 # 310

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y-int = 0.0005
slope = 0.0074
corr coeff = 0.9987

ANALYTICAL BATCH SUMMARY SHEET

METHOD:		DATE START:		BATCH # 4126					
LA-365-131		8/3/94							
PREPARED BY:		DATE COMPLETE:		WHC-SD-WM-DP-065, REV. 0					
R. E. Skoda		8/4/94							
UNITS:									
SPL NAME	SPL ID	ANALYTE	ug/mL RESULT #1	ug/mL RESULT #2	ug/mL AVERAGE	RPD%	%REC	ug/mL DET LIM	% CT ER
STD/40N11C	V 71	Se	0.106				105.8		
UNDIGESTED									
STD/38N11A	V 71	Se	0.109				108.9		
DIGESTED									
REAGENT BLK	V 72	Se	<0.010					0.010	
PREP BLK	V 72	Se	<0.025					0.025	
108AP	V 73	Se	0.025	0.028	0.027	10.5		0.025	
Field Blank									
STD/40N11C	-----	Se	0.156				156.2		
UNDIGESTED									
STD/40N11C	-----	Se	0.136				136.2		
UNDIGESTED									
STD/40N11C	-----	Se	0.135				134.8		
UNDIGESTED									

NARRATIVE: ☐ NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
 LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The % recovery of the ending standard was out of the calculated control limits of 59.5% - 140.5%. Two additional standards were run. The recoveries were still high, but within the control limits.

The sample and duplicate results (0.0252 ug/mL and 0.0280 ug/mL) are just slightly above the instrument detection limit of 0.025 ug/mL. The chemist believes that these results may be anomalous due to the apparent baseline drift. The drift of the baseline is also believed to be the cause of the high recoveries of the ending standards.

The results of this batch will be accepted.

R. E. Skoda
 8-4-94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V71-5596		Sample Point LOSAP ELDBLK		Time Issued 11: 4		Priority MC	
Determination		Method/Standard LA-365-131		Result Units RECOVERY		Charge Code NIA/F	
Sample Size 250ml		Customer ID		Reruns 1			
Remarks, Calculations, Results PKHT = .378 ng = 52.89 ng 0.106 ppm 105.8% WHC-SD-WM-DP-065, REV. 0							
Analyst - 1 Valerie Massie		Analyst - 2		Analyst - 3		Analyst - 4	
Hrs		Hrs		Hrs		Hrs	
Date 08-03-94		Time Completed 14:15		Lab. Unit, Mgr R. S. Lloida 8/4/94			

54 6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUIDS-DIRECT		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.500	
V71-5596	Se ng (Nanograms)	52.89	
Batch ID	Conc Se µg/mL (or mg/L or PPM)	0.106	N/A
4126	Conc Se µg/L (PPB)	105.8	N/A
Rerun No.		N/A	N/A
1		N/A	N/A
Instrument ID		N/A	N/A
WB27979	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
08/03/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst			
Valerie Massie			
Date			
08/03/94			

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	STANDARD	DUPLICATE
Conc Se µg/mL	1.06E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:	R. S. Lloida	Date:	04-Aug-94
Approved by:	R. S. Lloida	Date:	8-4-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No					Sample Point		Date	Time Issued	Priority
V 72-5696					108AP FLDBLK		3-16-94	11: 5	26
Determination		Method/Standard		Result Units		Charge Code		Reruns	
Se		LA-365-131		UG/ML		N1A7E		1	
Sample Size							Customer ID		
1m3-3-94 228 8/4/94 250ml .500ml							BLANK		
Remarks, Calculations, Results									
REAGENT BLANK									
<div style="text-align: right;">PKHT = .026 ng = 3.34ng</div> <div style="text-align: center; border: 1px solid black; border-radius: 50%; padding: 10px; margin: 10px 0;"> $< 0.010 \mu\text{g/ml}$ </div>									
Analyst - 1		Analyst - 2		Analyst - 3		Analyst - 4		Analyst - 5	
Valerie Massle									
Hrs		Hrs		Hrs		Hrs		Hrs	
				Pukita					
Date		Time Completed		Lab Unit Mgr					
08-03-94		14:15		Pukita 8/4/94

54-6800-061 (R-10-83)

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Selenium: LA-365-131 (B-2) Se LIQUIDS-DIRECT

		BLANK	DUPLICATE
Serial No	Sample Size in mL SS	0.500	
V72-5696	Se ng (Nanograms)	3.34	
Batch ID	Conc Se $\mu\text{g/mL}$ (or mg/L or PPM)	0.007	N/A
4126	Conc Se $\mu\text{g/L}$ (PPB)	6.7	N/A
Rerun No.		N/A	N/A
1		N/A	N/A
Instrument ID:		N/A	N/A
WB27979	Conc Se $\mu\text{g/mL} = (\text{Se ng/SS}) \times (1 \mu\text{g}/1000\text{ng})$	WHC-SD-WM-DP-065, REV. 0	
Calibration Date	Average Conc. = (Sample + Duplicate)/2		
08/03/94	Relative % Difference = $((\text{ABS}(\text{Sam.} - \text{Dup.}))/\text{Average Conc.}) \times 100$		
Analyst	Detection Limit = $(5 \text{ ng/SS}) \times (1 \mu\text{g}/1000\text{ng})$		
Valerie Massle	Detection Limit is Corrected for Sample Prep/Dilution		
Date:			
08/03/94	Detection Limit ($\mu\text{g/mL}$) =	0.010	
	Detection Limit ($\mu\text{g/L}$) =	10.0	

	BLANK	DUPLICATE
Conc Se $\mu\text{g/mL}$	<0.010	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:		Date:	04-Aug-94
Approved by:		Date:	8-4-94

Form 1 Rev. 1 Page 1 of 1

800

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN

Serial No V 71-8596	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 4	Priority 26
Determination Se	Method/Standard LA-365-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size 2.0 ml 2.0 ml Acid dig DF=4			Customer ID STD	
Remarks Calculations, Results EDT 1744 SE/HYDRD PRHT = .389 SALT 38N11A RESULT 0.109 ppm ng = 54.44 ng STD VAL 100 ppm %REC 108.9% WHC-SD-WM-DP-065, REV.0				
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 08-03-94	Time Completed 14:15	Lab Job No. 8/4/94

54 6800-061 (R-10-83)

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Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

	STANDARD	DUPLICATE
Serial No.	2.000	
V71-8596	54.44	
Se ng (Nanograms)		
Batch ID	4.0	
4126	0.109	N/A
Acid Digest Dilution Factor DF		
Conc Se µg/mL (or mg/L or PPM)	108.9	N/A
Rerun No.		
1	N/A	N/A
Conc Se µg/L (PPB)		
Instrument ID	N/A	N/A
WB27979	N/A	N/A
Calibration Date		
08/03/94		
Analyst		
Valerie Massie		
Date		
08/03/94		

	STANDARD	DUPLICATE
Conc Se (µg/mL)	1.09E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:		Date:	04-Aug-94
Approved by:		Date:	8-4-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 72-8696		Sample Point 108AP FLDBER		Time Issued 11: 5		Priority 26
Determination Se		Method/Standard LA-365-131		Result Units UG/ML		Charge Code N1A7F
Sample Size 8-3-94 2.0 ml				Customer ID BLANK		Reruns 1
Remarks, Calculations, Results REAGENT BLANK Acid dig prep 5ml → 50ml (DF 10) used for calculations to compare results to those of the sample. PKHT = .036 ng = 4.75ng < 0.025 8-4-94						
Analyst - 1 Valerie Massie		Analyst - 2		Analyst - 3		Analyst - 4
Hrs		Hrs		Hrs		Hrs
Date 08-03-94		Time Completed 14:15		Lab Unit, Mr. 8/4/94		

54-6800-061 (R-10-83)

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Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		BLANK	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V72-8696	Se ng (Nanograms)	4.75	
Batch ID	Acid Digest Dilution Factor DF	10.0	
4126	Conc Se µg/mL (or mg/L or PPM)	0.024	N/A
Rerun No.	Conc Se µg/L (PPB)	23.8	N/A
1		N/A	N/A
Instrument ID		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL = (Se ng/SS) * (1 µg/1000ng) * DF	WHC-SD-WM-DP-065, REV. 0	
08/03/94	Average Conc. = (Sample + Duplicate) / 2		
Analyst	Relative % Difference = ((ABS(Sam. - Dup.)) / Average Conc.) * 100		
Valerie Massie	Detection Limit = (5 ng/SS) * (1 µg/1000ng) * DF		
Date			
08/03/94	Detection Limit (µg/mL)	0.025	
	Detection Limit (µg/L)	25.00	

	BLANK	DUPLICATE
Conc Se (µg/mL)	< 0.025	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	<i>Valerie Massie</i>	Date:	04-Aug-94
Approved by:	<i>Valerie Massie</i>	Date:	8-9-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 73-8796	Sample Point 108AP	RERUN	Date 3-18-94	Time Issued 11:16	Priority 26
Determination Se	Method-Standard LA-365-131	Result Units uG/ML	Charge Code N1A7E	Reruns 1	
Sample Size 2.0 ml	DF=10	Customer ID 108AP-FB			
Remarks Calculations Results PK HT = .038 ng = 5.03 ng <div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block;"> 2.52E-2 µg/mL </div> WHC-SD-WM-DP-065, REV. 0					
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
Hrs	Hrs	Hrs	Hrs	Hrs	
Date 08-03-94	Time Completed 14:15	Lab Unit-Mgr R. L. L. L. L. 8/4/94			

54 6800-061 (R-10 83)

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Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

	SAMPLE	DUPLICATE
Serial No.	2.000	
V73-8796	5.03	
Batch ID	10.0	
4126	0.025	N/A
Rerun No.	25.2	N/A
1	N/A	N/A
Instrument ID	N/A	N/A
WB27979	N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1 µg/1000ng)*DF	
08/03/94	Average Conc=(Sample + Duplicate)/2	
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100	
Valerie Massie	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF	
Date		
08/03/94	Detection Limit (µg/mL)	0.025
	Detection Limit (µg/L)	25.00

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	2.52E-02	
	N/A	N/A
	N/A	N/A

Data Entry by:	R. L. L. L. L.	Date:	04-Aug-94
Approved by:	R. L. L. L. L.	Date:	8-4-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 73.-8896	Sample Point 108AP	RERUN		Date 3-18-94	Time Issued 11:18	Priority 26
Determination Se	Method/Standard LA-365-131	Result Units UG/ML	Charge Code N1A7F	Reruns 1		
Sample Size 2.0 ml	DF = 10	Customer ID 108AP-FB				
Remarks, Calculations, Results DUPLICATE SAMPLE <div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block;"> $2.80 \text{ E-2 } \mu\text{g/ml}$ </div> $\text{AVG} = 0.027 \mu\text{g/ml}$ $\% \text{ RPD} = 10.5 \%$						
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5		
Hrs	Hrs	Hrs	Hrs	Hrs		
Date 08-03-94	Time Completed 14:15	Lab Unit, Mgr <i>Reshoda</i> 8/4/94				

54-6800-061 (R-10 83)

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Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No	Sample Size in mL SS	2.000	2.000
V73-8896	Se ng (Nanograms)	5.03	5.59
Batch ID	Acid Digest Dilution Factor DF	10.0	10.0
4126	Conc Se $\mu\text{g/mL}$ (or mg/L or PPM)	0.025	0.028
Rerun No	Conc Se $\mu\text{g/L}$ (PPB)	25.2	28.0
1	Average Conc ($\mu\text{g/mL}$)	N/A	0.027
Instrument ID	Average Conc ($\mu\text{g/L}$)	N/A	26.6
WB27979	Relative % Difference	N/A	10.5
Calibration Date	Conc Se $\mu\text{g/mL} = (\text{Se ng/SS}) \times (1 \mu\text{g}/1000\text{ng}) \times \text{DF}$		
08/03/94	Average Conc. = (Sample + Duplicate)/2		
Analyst	Relative % Difference = $((\text{ABS}(\text{Sam.} - \text{Dup.}))/\text{Average Conc.}) \times 100$		
Valerie Massie	Detection Limit = $(5 \text{ ng/SS}) \times (1 \mu\text{g}/1000\text{ng}) \times \text{DF}$		
Date			
08/03/94	Detection Limit ($\mu\text{g/mL}$)	0.025	
	Detection Limit ($\mu\text{g/L}$)	25.00	

	SAMPLE	DUPLICATE
Conc Se ($\mu\text{g/mL}$)	2.52E-02	2.80E-02
Average Conc ($\mu\text{g/mL}$)	N/A	0.027
Relative % Difference	N/A	10.5

Data Entry by:	<i>Reshoda</i>	Date:	04-Aug-94
Approved by:	<i>Reshoda</i>	Date:	8-4-94

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

CALIBRATION RECORD

Analyte: Se

Procedure: LA 365-131

Revision: B-2

Instrument: PE2280 (Hydride)

Property No.: WB27979

Technologist *Walter L. Maxwell*

Payroll No.:

Date: 08/03/94

Calibration Standard ID: 37N11E

Analyte Concentration: .100ppm

Type of Calibration: LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0 ng	.006
2	.100mL	5 ng	.024
3	.500mL	25 ng	.184
4	1.000mL	50 ng	.370
5	2.000mL	100 ng	.706
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments: $r=.9994$

Y intercept= .0023

slope= .0071

805

.478 46.97 ng .500ml direct Lmcs 40N11C
.481 67.39 ng .500ml direct Lmcs 40N11C
.486 68.10 ng .500ml direct Lmcs 40N11C
.557 78.10 ng .500ml ending direct Lmcs 40N11C
.042 5.59 ng 2.0ml V73 dup
.033 5.03 ng 2.0ml V73
.036 4.75 ng 2.0ml digested Blank V72
.389 ~~2.48~~^{V73-3-14} 54.44 ng 2.0ml digested Lmcs 38N11A V71
.026 3.34 ng .500ml direct Blank V72
.374 52.89 ng .500ml direct Lmcs 40N11C V71
.706 2.0ml Cal atd 37N11E
~~1.86~~^{V73-3-14} .370 1.0ml Cal atd 37N11E
.184 25 ng .500ml Cal atd 37N11E
.024 5 ng .100ml Cal atd 37N11E
.006 0 ng

WHC-SD-WM-DP-065, REV. 0

Analyte: Se Analyst: Valein L. Massie
 Date: 08-03-94 Start Time: 07:50 End Time:

MHS 20 Data:

Signal: Concentration Purge I: 40 sec
 Mode: PKHT Reaction: 10 sec
 Recorder: IC3 Purge II: 50 sec
 Time: 30 sec Temperature: 975 C
 Expansion: 10 EDL Power: 6 Watts

Chart Recorder Data:

Chart speed: 5 mm/min Chart full scale: 20 mV

Calibration Data:

Intercept: 0.0023 absorbance units
 Slope: 0.0071 abs. units / concentration
 Correlation: .9994 (unitless)

Valein L. Massie
 08-03-94
 13: Intercept: 0.0023 /
 12: Slope: 0.0071
 11: 0.9994
 10: 52.8932
 9: 3.3398
 8: 54.4417
 7: 4.7476
 6: 5.0291
 5: 5.5922
 4: 78.0922
 3: 58.0971
 2: 57.3932
 1: 66.9709

12/11/94
 3.4.94

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**THE FOLLOWING ANALYSES ARE INCLUDED IN THE
DATA PACKAGE BUT THE RESULTS HAVE NOT BEEN
REPORTED IN THE FINAL SUMMARY REPORTS.**

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.
V71Customer ID:
108-AP FIELD BLANKAnalysis:
SeSample Prep:
ACID DIGEST

Instrument: PE2280(Hydride) WB27979

Procedure/ Rev: LA 365-131 / B-2

Technologist: *Undine J. Mares*

Date: 07/20/94

Starting Time: 08:00

Temperature 975 C

Ending Time: 13:40

Chemist: L.D. SPARKS

Comments: Batch #: 3022

OUT FOR RERUN

	Description	Lab ID
1	LMCS CHECK STD	V71-5596
2	DIGESTED STD	V71-8596
3	BLANK	V72-5696
4	DIGESTED BLANK	V72-8696
5	SAMPLE	V73-8796
6	DUPLICATE	V73-8896
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13	OUT FOR RERUN	
14		
15		
16		
17		
18		
19		
20		

DATA
NOT USED
IN PACKAGE

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	40N11C .500mL			
DIGESTED STD	36N11A DF=4 2 mL			
				800

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 71.-5596	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 4	Priority 26
Determination Se	Method Standard LA-365-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 0.500 ml			Customer ID STD	
Remarks Calculations Results EDP R743 SE/HYDRD STD# 40N11C RESULT 0.107 ppm STD VAL 0.100 ppm %REC 106.7% WHC-SD-WM-DP-065, REV. 0 OUT FOR RERUN phkt .571 53.37 ng				
Analyst - 1 V.L. Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7/20/94	Time Completed 1340	Lab Unit Mgr 7/25/94 W.D. Sparks	Signature 54-6800-061 (R-10-83)	

Selenium: LA-365-131 (B-2) Se LIQUIDS-DIRECT

Serial No.	Sample Size in mL	SS	STANDARD	DUPLICATE
V71-5596	Se ng (Nanograms)		0.500	
Batch ID	Conc Se µg/mL (or mg/L or PPM)		53.37	
3022	Conc Se µg/L (PPB)		0.107	ERR
Rerun No.			106.7	ERR
0			N/A	N/A
Instrument ID			N/A	N/A
WB27979	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)		N/A	N/A
Calibration Date	Average Conc.=(Sample + Duplicate)/2			
07/20/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100			
Analyst				
V.L. Massie				
Date:				
07/20/94				

	STANDARD	DUPLICATE
Conc Se µg/mL	1.07E-01	ERR
	N/A	N/A
	N/A	N/A

Data Entry by: <i>V.L. Massie</i>	Date: 21-Jul-94
Approved by: <i>R. Sparks</i>	Date: 7-26-94

Form 1 Rev. 1 Page 1 of 1

800

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3022

Serial No V 71.-8596	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 4	Priority 26
Determination Se	Method-Standard LA-365-131	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 2.0ml Acid Digest DF=4			Customer ID STD	
Remarks, Calculations Results EDP R744 SE/HYDRD <i>pklt .472</i> 32011-A STD# 40746 <i>46-702794</i> RESULT 0.089ppm <i>44.52ng</i> STD VAL 0.100ppm %REC 89.0% WHC-SD-WM-DP-065, REV.0 OUT FOR RERUN				
Analyst - 1 <i>Valeur Massie</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7/20/94	Time Completed 1340	Lab Unit Mgr <i>W.D. Sprules</i>	<i>R. Jones</i>	

54-6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST				STANDARD	DUPLICATE
Serial No	Sample Size in mL	SS		2.000	
V71-8596	Se ng (Nanograms)			44.52	
Batch ID	Acid Digest Dilution Factor	DF		4.0	
3022	Conc Se µg/mL (or mg/L or PPM)			0.089	N/A
Rerun No.	Conc Se µg/L (PPB)			89.0	N/A
0				N/A	N/A
Instrument ID				N/A	N/A
WB27979				N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF				
07/20/94	Average Conc.=(Sample + Duplicate)/2				
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100				
V.L. Massie					
Date					
07/20/94					

	STANDARD	DUPLICATE
Conc Se (µg/mL)	8.90E-02	
	N/A	N/A
	N/A	N/A

Data Entry by: <i>W.D. Sprules</i>	Date: 21-Jul-94
Approved by: <i>R. Jones</i>	Date: 7-26-94

Serial No V 72.-5696	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 5	Priority 26
Determination Se	Method/Standard LA-365-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size			Customer ID BLANK	
Remarks Calculations Results REAGENT BLANK OUT FOR RERUN <i>Rerun - too much baseline drift.</i> WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>Valerie Masare</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7/20/94	Time Completed 1340	Lab Unit Mgr <i>7/25/94</i> <i>NO Spence</i> <i>R. Jones</i>		

54-6800-061 (R-10-83)

Serial No V 73.-8796	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination Se	Method/Standard LA-365-131	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size			Customer ID 108AP-FB	
Remarks Calculations Results OUT FOR RERUN <i>Rerun - too much baseline drift.</i>				
Analyst - 1 <i>Valerie Masare</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7/20/94	Time Completed 1340	Lab Unit Mgr <i>7/25/94</i> <i>NO Spence</i> <i>R. Jones</i>		

54-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
V 73.-8896	108AP FLDBLK	3-18-94	11:16	26
Determination	Method/Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	N1A7F	0
Sample Size			Customer ID	
			108AP-FB	
Remarks, Calculations Results				
DUPLICATE SAMPLE OUT FOR RERUN <i>Rerun - too much baseline drift</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>Valerie Massel</i>				
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
7/20/94	1340	<i>7/25/94</i> <i>W. Spauld</i> <i>ES</i>		

54-6800-061 (R-10-83)

[illegible]

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- NS 2842.2
4/15/44

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 2986

Serial No V 60.-5597	Sample Point 108-AP	Date 3-18-94	Time Issued 8:26	Priority 26
Determination Hg	Method/Standard LA-325-104	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size <i>.300ml</i>			Customer ID STD	
Remarks Calculations, Results EDP R716 HG/HYDRD STD# 36N11A RESULT <u>0.100 ppm</u> STD VAL 0.100ppm %REC 100.0 % <div style="text-align: right;"><i>PK HY = .294</i> <i>29.99%</i> <i>30.00%</i></div>				
WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-15-94	Time Completed 1530	Lab Unit Mgr <i>4/15/94</i> <i>[Signature]</i>		

54-6800-061 (R-10-83)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Serial No	Sample Size in mL SS	0.300	
V60-5597	Hg ng (Nanograms)	30.00	
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	0.100	N/A
2986	Conc Hg µg/L (PPB)	100.0	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB26847	Conc Hg µg/mL=(Hg ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
04/15/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst			
J.L. Middleton			
Date:			
04/15/94			

	STANDARD	DUPLICATE
Conc Hg µg/mL	1.00E-01	
	N/A	N/A
	N/A	N/A

Data Entry by: <i>[Signature]</i>	Date: 15-Apr-94
Approved by: <i>[Signature]</i>	Date: 4/15/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 61.-5697	Sample Point 108-AP	Date 3-18-94	Time Issued 8:27	Priority 26
Determination Hg	Method/Standard LA-325-104	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 25ml			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK $PK HT = -.009$ $0.96ng$ $L 0.00021/ml$ $Det Lim = 0.2 ug/L = 0.00 ug/ml$ WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4/15-94	Time Completed 1530	Lab Unit Mgr <i>[Signature]</i>	4-18-94 <i>[Signature]</i>	

54-6800-061 (R 10-83)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		BLANK	DUPLICATE
Serial No.	Sample Size in mL SS	25.000	
V61-5697	Ilg ng (Nanograms)	0.96	
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	0.000	N/A
2986	Conc Ilg µg/L (PPB)	0.0	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB26847	Conc Ilg µg/mL=(Hg ng/SS)*(1 µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
04/15/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst	Detection Limit = (5 ng/SS)*(1 µg/1000ng)		
J.L. Middleton	Detection Limit is Corrected for Sample Prep/Dilution		
Date:			
04/15/94	Detection Limit (µg/mL) =	0.000	
	Detection Limit (µg/L) =	0.2	

BEST AVAILABLE COPY

	BLANK	DUPLICATE
Conc Ilg µg/mL	<0.000	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by: <i>[Signature]</i>	Date: 15-Apr-94
Approved by: <i>[Signature]</i>	Date: 4/15/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-5797	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination Hg	Method/Standard LA-325-104	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0ml			Customer ID 108-AP-A	
Remarks Calculations Results <div style="text-align: right;">PK HT = .059 7.47ug</div> <div style="text-align: center; border: 1px solid black; border-radius: 50%; width: 150px; margin: 10px auto;">0.007 ug/ml</div> <div style="text-align: right;">WHC-SD-WM-DP-065, REV.0</div> <div style="text-align: center; margin-top: 10px;">Det. Lim. = 0.005 ug/ml</div>				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-5-94	Time Completed 1530	Lab Unit Mgr <i>[Signature]</i> 4/15/94 <i>[Signature]</i>		

54-6800-061 (R-10-83)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	1.000	
V62-5797	Hg ng (Nanograms)	7.47	
Batch ID	Conc Hg µg/mL (or ng/L or PPM)	0.007	N/A
2986	Conc Hg µg/L (PPB)	7.5	N/A
Run No.		N/A	N/A
0		N/A	N/A
Instrument ID		N/A	N/A
WB26847	Conc Hg µg/mL = (Hg ng/SS) * (1 µg/1000ng)		
Calibration Date	Average Conc. = (Sample + Duplicate) / 2		
04/15/94	Relative % Difference = ((ABS(Sam. - Dup.)) / Average Conc.) * 100		
Analyst	Detection Limit = (5 ng/SS) * (1 µg/1000ng)		
J.L. Middleton	Detection Limit is Corrected for Sample Prep/Dilution		
Date			
04/15/94	Detection Limit (µg/mL) =	0.005	
	Detection Limit (µg/L) =	5.0	

BEST AVAILABLE COPY

	SAMPLE	DUPLICATE
Conc Hg µg/mL	7.47E-03	
	N/A	N/A
-	N/A	N/A

Data Entry by: <i>[Signature]</i>	Date: 15-Apr-94
Approved by: <i>[Signature]</i>	Date: 4/15/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-5897	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination Hg	Method/Standard LA-325-104	Result Units ug/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0ml			Customer ID 108-AP-A	
Remarks, Calculations, Results DUPLICATE SAMPLE <div style="text-align: right;">PK HT = .045 6.13ng</div> <div style="text-align: center;">0.006 ug/ml</div> <div style="text-align: center;">Det. Lim. = 0.005 ug/ml</div>				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-15-94	Time Completed 1530	Lab Unit Mgr 4/15/94 <i>[Signature]</i>		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

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CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	1.000	1.000
V62-5897	Hg ng (Nanograms)	7.47	6.13
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	0.007	0.006
2986	Conc Hg µg/L (PPB)	7.5	6.1
Run No.	Average Conc (µg/mL)	N/A	0.007
0	Average Conc (µg/L)	N/A	6.8
Instrument ID	Relative % Difference	N/A	19.7
WB26847	Conc Hg µg/mL = (Hg ng/SS) * (1 µg/1000 ng)		
Calibration Date	Average Conc. = (Sample + Duplicate) / 2		
04/15/94	Relative % Difference = ((ABS(Sam. - Dup.)) / Average Conc.) * 100		
Analyst	Detection Limit = (5 ng/SS) * (1 µg/1000 ng)		
J.L. Middleton	Detection Limit is Corrected for Sample Prep/Dilution		
Date			
04/15/94	Detection Limit (µg/mL) =	0.005	
	Detection Limit (µg/L) =	5.0	

	SAMPLE	DUPLICATE
Conc Hg µg/mL	7.47E-03	6.13E-03
Average Conc (µg/mL)	N/A	0.007
Relative % Difference	N/A	19.7

Data Entry by: <i>[Signature]</i>	Date: 15-Apr-94
Approved by: <i>[Signature]</i>	Date: 4/15/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-5997	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination Hg	Method/Standard LA-325-104	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 1.0ml			Customer ID 108-AP-A	
Remarks Calculations, Results SAMPLE SPIKED ID V62 SPIKE ID 36N11A SPIKE VOLUME .300ml <div style="text-align: right;">PK HT = .359 36.23ug</div> <div style="text-align: center; border: 1px solid black; border-radius: 50%; padding: 10px; margin: 10px auto; width: 150px;">95.98 Rec</div> WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-15-94	Time Completed 1530	Lab Unit Mgr 4/15/94 WJ Spaulds		

54-6800-061 (R-10-83)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		SAMPLE	SPIKE
Serial No.	Spike Std Volume (mL) SSVOL		0.300
V62-5997	ng of Spike + Sample ngSSAM		36.23
Batch ID	ng of Sample ngSAM	7.47	
2986	Spike Std ID		36N11A
Rerun No.	Spike Std Value (ppm)		0.100
0	% Recovery	N/A	95.9
Instrument ID:			
WB26847			
Calibration Date			
04/15/94			
Analyst			
J.L. Middleton			
Date:			
04/15/94			

$$\% \text{ Recovery} = \{[(\text{ngSSAM} - \text{ngSAM}) / (\text{SSVOL} * 1000 \mu\text{L/mL})] / \text{Spike Std Value}\} * 100$$

% Recovery =	95.9
--------------	------

Data Entry by:	Date: 15-Apr-94
Approved by:	Date: 4/15/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 62.-5097	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination Hg	Method/Standard LA-325-104	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 1.0 ml			Customer ID 108-AP-A	
Remarks, Calculations, Results SAMPLE SPIKE DUPLICATE SPIKE ID 36N11A SPIKE VOL 300ml WHC-SD-WM-DP-065, REV.0 <div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;">101.08 Rec.</div> PK HT = .375 37.76ng				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-15-94	Time Completed 1530	Lab Unit Mgr 4/15/94 <i>[Signature]</i>		

54-6800-061 (R-10-83)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		SAMPLE	SPIKE
Serial No:	Spike Std Volume (mL) SSVOL		0.300
V62-5097	ng of Spike + Sample ngSSAM		37.76
Batch ID:	ng of Sample ngSAM	7.47	
2986	Spike Std ID		36N11A
Run No:	Spike Std Value (ppm)		0.100
0	% Recovery	N/A	101.0
Instrument ID:			
WB26847			
Calibration Date:			
04/15/94			
Analyst:			
J.L. Middleton			
Date:			
04/15/94			

$$\% \text{ Recovery} = \{[(\text{ngSSAM} - \text{ngSAM}) / (\text{SSVOL} \times 1000 \mu\text{L/mL})] / \text{Spike Std Value}\} \times 100$$

% Recovery =	101.0
--------------	-------

Data Entry by: <i>[Signature]</i>	Date: 15-Apr-94
Approved by: <i>[Signature]</i>	Date: 4/15/94

Form 2 Rev. 1 Page 1 of 1.

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 63.-5797	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination Hg	Method/Standard LA-325-104	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0ml			Customer ID 108-AP-B	
Remarks, Calculations Results <div style="text-align: right;">PK H+ = .047 L. 32ng</div> <div style="text-align: center; border: 1px solid black; border-radius: 50%; padding: 10px; margin: 10px auto; width: 150px;">0.006 ug/ml</div> <div style="text-align: center;">Det. Lim. = 0.005 ug/ml</div>				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 3-15-94	Time Completed 1530	Lab Unit Mgr <i>[Signature]</i> 4/15/94 <i>[Signature]</i>		

WHC-SD-WM-DP-065, REV. 0

54-6800-061 (R-10-83)

CVA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

Serial No.	Sample Size in mL	SS	SAMPLE	DUPLICATE
V63-5797	1lg ng (Nanograms)		1.000	
Batch ID	Conc 1lg ug/mL (or ng/L or PPM)		6.32	
2986	Conc 1lg ug/L (PPB)		0.006	N/A
Rerun No.			6.3	N/A
0			N/A	N/A
Instrument ID			N/A	N/A
WB26847	Conc Hg ug/mL = (1lg ng/SS) * (1 ug/1000ng)			
Calibration Date	Average Conc. = (Sample + Duplicate) / 2			
04/15/94	Relative % Difference = ((ABS(Sam. - Dup.)) / Average Conc.) * 100			
Analyst	Detection Limit = (5 ng/SS) * (1 ug/1000ng)			
J.L. Middleton	Detection Limit is Corrected for Sample Prep/Dilution			
Date				
04/15/94	Detection Limit (ug/mL) =	0.005		
	Detection Limit (ug/L) =	5.0		

	SAMPLE	DUPLICATE
Conc 1lg ug/mL	6.32E-03	
	N/A	N/A
	N/A	N/A

Data Entry by: <i>[Signature]</i>	Date: 15-Apr-94
Approved by: <i>[Signature]</i>	Date: 4/15/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 63.-5897	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination Hg	Method/Standard LA-325-104	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0ml			Customer ID 108-AP-B	
Remarks, Calculations, Results DUPLICATE SAMPLE PK HT# .035 5.17mg 0.005 ug/ml WHC-SD-WM-DP-065, REV. 0 Det Lim = 0.005 ug/ml				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-15-94	Time Completed 1530	Lab Unit Mgr <i>[Signature]</i> 4/15/94		

54-6800-061 (R-10-83)

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CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	1.000	1.000
V63-5897	Hg ng (Nanograms)	6.32	5.17
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	0.006	0.005
2986	Conc Hg µg/L (PPB)	6.3	5.2
Rerun No.	Average Conc (µg/mL)	N/A	0.006
0	Average Conc (µg/L)	N/A	5.7
Instrument ID	Relative % Difference	N/A	20.0
WB26847	Conc Hg µg/mL=(Hg ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
04/15/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst	Detection Limit = (5 ng/SS)*(1µg/1000ng)		
J.L. Middleton	Detection Limit is Corrected for Sample Prep/Dilution		
Date			
04/15/94	Detection Limit (µg/mL) =	0.005	
	Detection Limit (µg/L) =	5.0	

	SAMPLE	DUPLICATE
Conc Hg µg/mL	6.32E-03	5.17E-03
Average Conc (µg/mL)	N/A	0.006
Relative % Difference	N/A	20.0

Data Entry by: <i>[Signature]</i>	Date: 15-Apr-94
Approved by: <i>[Signature]</i>	Date: 4/15/94

#2986

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

CALIBRATION RECORD

Analyte: Hg		
Procedure: LA 325-104	Revision: A-1	
Instrument: PE2380 (Hydride AA)	Property No.: WB26847	
Technologist:	Payroll No.:	Date: 04/15/94

Calibration Standard ID:	35N11-A
Analyte Concentration:	.147
Type of Calibration:	LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0ng	-.006
2	.034mL	5ng	.035
3	.100mL	14.7ng	.129
4	.250mL	36.75 ng	.354
5	.500mL	73.5 ng	.726
6	.750mL	110.25 ng	1.167
7	1.000mL	147 ng	1.502
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments:	r= .9995	Y-INTERCEPT = -0.0190	SLOPE = 0.0104

823

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.009

2.68ng

no emulsion
structure
was present

BLANK

1000000
4-12-74

.000

1.11ng

CCB

25ml

.675

66.51ng

90.50%

CCV

35N11A 500ml

.035

5.17ng

V63D

1.0ml

.047

6.51ng

V63

1.0ml

.375

31.16ng

V61/V

1.0ml

500ml
36N11A

.859

36.23ng

V62's

1.0ml

200.0
36N11A

.045

6.51ng

V61/D

1.0ml

.059

7.47ng

V61

1.0ml

.006

2.37ng

CCB

25ml

Clayton
202A

.276

76.19ng

103.61%

CCV

35N11A

500ml

.413

41.40ng

101.68 Recovery

R511b's

36N11A
200.0

.095

10.92ng

R511U

500ml

.057

10.16ng

R510/D

500ml

.047

10.16ng

R5109

500ml

.011

5.16ng

119.76%

CRA

100ml 0.0ml

.006

1.24ng

CCB

25ml

.756

74.48ng

101.06%

CCV

35N11A 500ml

.009

0.96ng

CCB

25ml

.294

30.00ng

99.99%

100.0%

R5108

36N11A 300ml

146ng

1.202

35N11A 10.1

1.167

110.5ng

35N11A

250ml

.716

73.5ng

35N11A

300ml

.354

36.75ng

35N11A

250ml

2-12-76 1000000
R511 #3101 P3P4
R511 #1514
R511 #1514

WHC-SD-WM-DP-065, REV. 0

825

QA
15

WHC-SD-WM-DP-065, REV. 0

[illegible]

QA

WHC-SD-WM-DP-065, REV. 0

☒

K. E. H. L. L. L.
4-22 94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN BATCH # 3103

Serial No V 65.-5597	Sample Point 108-AP	Time Issued 3-18-94	Priority 9:37 26
Determination Hg	Method/Standard LA-325-104	Result Units % RECOVERY	Charge Code N1A7F
Sample Size .300 ML		Customer ID STD	
Remarks Calculations Results EDP R716 HG/HYDRD Pk Ht = .285 STD# 36N11-IT RESULT: 0.093 27.94ng STD VAL 0.100ppm %REC 93.70 <div style="border: 1px solid black; border-radius: 50%; width: 150px; height: 50px; margin: 10px auto; text-align: center; line-height: 50px;">0.093 ppm</div> <p style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</p>			
Analyst - 1 <i>Susie M. Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4
Hrs	Hrs	Hrs	Hrs
Date 4-22-94	Time Completed 0530	Lab Unit Mon <i>R. E. Slade</i> 4-22-94	

54-6800-061 (R-10-83)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.300	
V 65-5597	Hg ng (Nanograms)	27.94	
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	0.093	N/A
3103	Conc Hg µg/L (PPB)	93.1	N/A
Rerun No.		N/A	N/A
1		N/A	N/A
Instrument ID		N/A	N/A
WB26847	Conc Hg µg/mL=(Hg ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
04/22/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst			
Susie Fulton			
Date			
04/22/94			

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	STANDARD	DUPLICATE
Conc Hg µg/mL	9.31E-02	
	N/A	N/A
	N/A	N/A

Data Entry by: <i>R. E. Slade</i>	Date: 22-Apr-94
Approved by: <i>R. E. Slade</i>	Date: 4-22-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 66.-5697		Sample Point 108-AP		Time Issued 3-18-94		Priority 26	
Determination Hg		Method-Standard LA-325-104		Result Units uG/ML		Charge Code N1A7F	
Sample Size 1 ML		Customer ID BLANK					
Remarks Calculations Results REAGENT BLANK <div style="text-align: center;"> <p>PK</p> <p>$< 0.005 \mu\text{g/mL}$</p> </div> <p style="text-align: right;">PKH = -0.010 -1.40ng</p>							
Analyst - 1 <i>Susie M. Fulton</i>		Analyst - 2		Analyst - 3		Analyst - 4	
Hrs		Hrs		Hrs		Hrs	
Date 4-22-94		Time Completed 0530		Lab Unit <i>Roberts</i> 4-22-94		Signature <i>[Signature]</i>	

WHC-SD-WM-DP-065, REV.0

54-6800-061 (R-10-83)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		BLANK	DUPLICATE
Serial No	Sample Size in mL SS	1.000	
V 66-5697	Hg ng (Nanograms)	-1.40	
Batch ID	Conc Hg $\mu\text{g/mL}$ (or mg/L or PPM)	-0.001	N/A
3103	Conc Hg $\mu\text{g/L}$ (PPB)	-1.4	N/A
Rerun No		N/A	N/A
1		N/A	N/A
Instrument ID		N/A	N/A
WB26847	Conc Hg $\mu\text{g/mL} = (\text{Hg ng/SS}) \times (1 \mu\text{g}/1000 \text{ng})$		
Calibration Date	Average Conc. = (Sample + Duplicate)/2		
04/22/94	Relative % Difference = $((\text{ABS}(\text{Sam.} - \text{Dup.}))/\text{Average Conc.}) \times 100$		
Analyst	Detection Limit = $(5 \text{ ng/SS}) \times (1 \mu\text{g}/1000 \text{ng})$		
Susie Fulton	Detection Limit is Corrected for Sample Prep/Dilution		
Date			
04/22/94	Detection Limit ($\mu\text{g/mL}$) =	0.005	
	Detection Limit ($\mu\text{g/L}$) =	5.0	

	BLANK	DUPLICATE
Conc Hg $\mu\text{g/mL}$	<0.005	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	<i>[Signature]</i>	Date:	22-Apr-94
Approved by:	<i>[Signature]</i>	Date:	4-21-94

BEST AVAILABLE COPY

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN

Serial No V 67.-5797	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination Hg	Method-Standard LA-325-104	Result Units uG/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ML			Customer ID 108-AP-C	
Remarks, Calculations, Results <div style="text-align: right;">PK Ht = -0.001 -0.50ng</div> <div style="text-align: center; border: 1px solid black; border-radius: 50%; padding: 10px; margin: 10px auto; width: 200px;"> $< 0.005 \mu\text{g/mL}$ </div> <p style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</p>				
Analyst - 1 <i>Susie M. Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-22-94	Time Completed 0530	Lab Unit Mgr <i>R. L. L. L.</i> 4-22-94	<i>[Signature]</i>	

54-6800-061 (R 10-83)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	1.000	
V 67-5797	Hg ng (Nanograms)	-0.50	
Batch ID	Conc Hg $\mu\text{g/mL}$ (or ng/L or PPM)	-0.001	N/A
3103	Conc Hg $\mu\text{g/L}$ (PPB)	-0.5	N/A
Rerun No.		N/A	N/A
1		N/A	N/A
Instrument ID:		N/A	N/A
WB26847	Conc Hg $\mu\text{g/mL} = (\text{Hg ng/SS}) \times (1 \mu\text{g}/1000\text{ng})$		
Calibration Date	Average Conc. = (Sample + Duplicate)/2		
04/22/94	Relative % Difference = $((\text{ABS}(\text{Sam.} - \text{Dup.}))/\text{Average Conc.}) \times 100$		
Analyst	Detection Limit = $(5 \text{ ng/SS}) \times (1 \mu\text{g}/1000\text{ng})$		
Susie Fulton	Detection Limit is Corrected for Sample Prep/Dilution		
Date:			
04/22/94	Detection Limit ($\mu\text{g/mL}$) =	0.005	
	Detection Limit ($\mu\text{g/L}$) =	5.0	

	SAMPLE	DUPLICATE
Conc Hg $\mu\text{g/mL}$	<0.005	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by: <i>R. L. L. L.</i>	Date: 22-Apr-94
Approved by: <i>R. L. L. L.</i>	Date: 4-22-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 67.-5897		Sample Point 108-AP		Time Issued 3-18-94		Priority 26	
Determination Hg		Method-Standard LA-325-104		Result Units uG/ML		Charge Code N1A7F	
Sample Size 1 ML		Customer ID 108-AP-C					
Remarks Calculations Results DUPLICATE SAMPLE PK TH = -0.003 -0.70ng <0.005 ug/ml WHC-SD-WM-DP-065, REV.0 % RPD N/A							
Analyst - 1 Susie M. Fulton		Analyst - 2		Analyst - 3		Analyst - 4	
Hrs		Hrs		Hrs		Hrs	
Date 4-22-94		Time Completed 0530		Lab Unit 4-22-94		Signature	

54-6800-061 (R 10 83)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		SAMPLE	DUPLICATE
Serial No	Sample Size in ml. SS	1.000	1.000
V 67-5897	Hg ng (Nanograms)	-0.50	-0.70
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	-0.001	-0.001
3103	Conc Hg µg/L (PPM)	-0.5	-0.7
Rerun No.	Average Conc (µg/mL)	N/A	N/A
1	Average Conc (µg/L)	N/A	N/A
Instrument ID	Relative % Difference	N/A	N/A
WB26847	Conc Hg µg/mL=(Hg ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
04/22/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst	Detection Limit = (5 ng/SS)*(1µg/1000ng)		
Susie Fulton	Detection Limit is Corrected for Sample Prep/Dilution		
Date			
04/22/94	Detection Limit (µg/mL) =	0.005	
	Detection Limit (µg/L) =	5.0	

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	SAMPLE	DUPLICATE
Conc Hg µg/mL	<0.005	<0.005
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:	Date:	22-Apr-94
Approved by:	Date:	4-22-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-065, REV.0

Serial No V 68.-5797		Sample Point 108-AP		Date 3-18-94		Time Issued 9:40		Priority 26	
Determination Hg		Method/Standard LA-325-104		Result Units uG/ML		Charge Code N1A7F		Reruns 1	
Sample Size 1 ML						Customer ID 108-AP-D			
Remarks, Calculations, Results <div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block;"> $< 0.005 \mu\text{g/mL}$ </div>						PK Ht = " 0.005 0.09 ng			
Analyst - 1 <i>Susie M. Fulton</i> Hrs		Analyst - 2 Hrs		Analyst - 3 Hrs		Analyst - 4 Hrs		Analyst - 5 Hrs	
Date 4-22-94		Time Completed 0530		Lab Unit Mgr <i>[Signature]</i> 4-22-94		<i>[Signature]</i>			

54-6800-061 (R-10-83)

BEST AVAILABLE COPY

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	1.000	
V 68-5797	Hg ng (Nanograms)	0.09	
Batch ID	Conc Hg $\mu\text{g/mL}$ (or mg/L or PPM)	0.000	N/A
3103	Conc Hg $\mu\text{g/L}$ (PPM)	0.1	N/A
Rerun No.		N/A	N/A
1		N/A	N/A
Instrument ID:		N/A	N/A
WB26847	Conc Hg $\mu\text{g/mL} = (\text{Hg ng/SS}) \times (1 \mu\text{g}/1000 \text{ng})$		
Calibration Date	Average Conc. = (Sample + Duplicate)/2		
04/22/94	Relative % Difference = $((\text{ABS}(\text{Sam.} - \text{Dup.}))/\text{Average Conc.}) \times 100$		
Analyst	Detection Limit = $(5 \text{ ng/SS}) \times (1 \mu\text{g}/1000 \text{ng})$		
Susie Fulton	Detection Limit is Corrected for Sample Prep/Dilution		
Data:			
04/22/94	Detection Limit ($\mu\text{g/mL}$) =	0.005	
	Detection Limit ($\mu\text{g/L}$) =	5.0	

	SAMPLE	DUPLICATE
Conc Hg $\mu\text{g/mL}$	<0.005	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by: <i>[Signature]</i>	Date: 22-Apr-94
Approved by: <i>[Signature]</i>	Date: 4-22-94

Form 1 Rev. 1 Page 1 of 1

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN

Serial No V 68.-5897	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination Hg	Method-Standard LA-325-104	Result Units uG/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ML			Customer ID 108-AP-D	
Remarks Calculations Results DUPLICATE SAMPLE pk Ht = 0.003 -0.10ng < 0.005 µg/ml %RPD N/A				
Analyst - 1 <i>Susie M. Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-22-94	Time Completed 0530	Lab Unit <i>RELLER</i> 4-22-94	<i>[Signature]</i>	

WHC-SD-WM-DP-065, REV.0

BEST AVAILABLE COPY

54-6800-061 (R-10 83)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	1.000	1.000
V 68-5897	Hg ng (Nanograms)	0.09	-0.10
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	0.000	-0.000
3103	Conc Hg µg/L (PPB)	0.1	-0.1
Rerun No.	Average Conc (µg/mL)	N/A	N/A
1	Average Conc (µg/L)	N/A	N/A
Instrument ID	Relative % Difference	N/A	N/A
WB26847	Conc Hg µg/mL=(Hg ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
04/22/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst	Detection Limit = (5 ng/SS)*(1µg/1000ng)		
Susie Fulton	Detection Limit is Corrected for Sample Prep/Dilution		
Date			
04/22/94	Detection Limit (µg/mL) =	0.005	
	Detection Limit (µg/L) =	5.0	

	SAMPLE	DUPLICATE
Conc Hg µg/mL	<0.005	<0.005
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by: <i>RELLER</i>	Date: 22-Apr-94
Approved by: <i>RELLER</i>	Date: 4-22-94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 69.-5897		Sample Point 108-AP		Time Issued 3-18-94		Priority 26	
Determination Hg		Method Standard LA-325-104		Result Units uG/ML		Charge Code N1A7F	
Sample Size 1 ML		Customer ID 108-AP-E					
Remarks Calculations Results DUPLICATE SAMPLE				$PK Ht = -0.002$ -0.60 $< 0.005 \mu g / ml$ $\% RPD \sim 1A$			
Analyst - 1 <i>Susie M. Fulton</i>		Analyst - 2		Analyst - 3		Analyst - 4	
Hrs		Hrs		Hrs		Hrs	
Date 4-22-94		Time Completed 0530		Lab Unit Mgr <i>R. E. Howard</i> 4-22-94		Signature <i>[Signature]</i>	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV.0

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	1.000	1.000
V 69-5897	Hg ng (Nanograms)	-0.40	-0.60
Batch ID	Conc Hg $\mu g/mL$ (or mg/L or PPM)	-0.000	-0.001
3103	Conc Hg $\mu g/L$ (PPB)	-0.4	-0.6
Rerun No.	Average Conc ($\mu g/mL$)	N/A	N/A
1	Average Conc ($\mu g/L$)	N/A	N/A
Instrument ID	Relative % Difference	N/A	N/A
WB26847	Conc Hg $\mu g/mL = (Hg \text{ ng}/SS) * (1 \mu g/1000ng)$		
Calibration Date	Average Conc. = (Sample + Duplicate)/2		
04/22/94	Relative % Difference = $((ABS(Sam. - Dup.)) / \text{Average Conc.}) * 100$		
Analyst	Detection Limit = $(5 \text{ ng}/SS) * (1 \mu g/1000ng)$		
Susie Fulton	Detection Limit is Corrected for Sample Prep/Dilution		
Date			
04/22/94	Detection Limit ($\mu g/mL$) =	0.005	
	Detection Limit ($\mu g/L$) =	5.0	

	SAMPLE	DUPLICATE
Conc Hg $\mu g/mL$	<0.005	<0.005
Average Conc ($\mu g/mL$)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:	<i>R. E. Howard</i>	Date:	22-Apr-94
Approved by:	<i>R. E. Howard</i>	Date:	4-22-94

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

CALIBRATION RECORD

Analyte: Hg

Procedure: LA-325-104

Revision: A-1

Instrument: PE2380(Hydride) WB26847

Property No.: WB26847

Technologist SM FULTON *Susie M. Fulton*

Payroll No.:

Date: 04/22/94

Calibration Standard ID: 35N11-B

Analyte Concentration: 147 ppm

Type of Calibration: LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000ml	0.0ng	.002
2	.034ml	5.0ng	.053
3	.100ml	14.7ng	.155
4	.250ml	36.75ng	.368
5	.500ml	73.5ng	.768
6	.750ml	110.25ng	1.082
	1.000ml	147ng	1.494
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21			

Comments: BATCH # 3103

836

WHC-SD-WM-DP-065, REV. 0

0000 - 053

4-22-94

Hg

Signal = CONC
mode = PK HT
Recorder = TCS

T = 55
Exp = 15

Lamp Amp = 5 EDL

Purge I = 35
Purge II = 40
Rxn = 16

Speed = 5 mm/min
mV = 20

Temp = 175°C

✓ 6.5 35N11B 200ml
C.C.B. 25ml
C.C.V. 35N11B 500ml
I.C.B. 2.5ml
I.C.V. 35N11B 360ml
14.1 ng 35N11B 1.000ml
110.25 ng 35N11B 750ml
73.5 ng 35N11B 500ml
36.75 ng 35N11B 250ml
14.1 ng 35N11B 100ml
5 ng 35N11B 0.034ml

Imp
Source in Injection

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CP
51

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. V73	Customer ID: 108AP-FB
Analysis: Hg	Sample Prep: DIRECT

Instrument:	PE2380(Hydride AA) WB26847	Procedure/ Rev:	LA 325-104 / A-1
Technologist:	JL STEELE <i>Jesse Steele</i>	Date:	07/07/94
Starting Time:	0800	Temperature	175 C
Ending Time:	1430	Chemist:	L.D. SPARKS

Comments: $r = 1.0000$ $Y = -0.0025$ SLOPE = 0.0097
 BATCH #3013

	Description	Lab ID
1	INITIAL LMCS CHECK STD	V71-5597
2	BLANK	V72-5697
3	SAMPLE	V73-5797
4	SAMPLE DUPLICATE	V73-5897
5		
6		
7		
8		
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10		

	Description	Lab ID
11		
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Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	39N11B .300mL			
				823

ANALYTICAL BATCH SUMMARY SHEET

[illegible]

NARRATIVE:

XXXXXX

NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

WD Sparks
7/8/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 71.-5597		Sample Point 108AP FLDBLK		Date 3-18-94	Time Issued 11: 1	Priority 26
Determination Hg	Method/Standard LA-325-104	Result Units % RECOVERY		Charge Code N1A7F	Reruns 0	
Sample Size .300 ml				Customer ID STD		
Remarks Calculations Results EDP R716 HG/HYDRD STD# 39N11B RESULT 0.106 µg/ml PKHT. 306 STD VAL 100 ppm %REC 105.5% RJ 31.65 ng 106.0% 7-8-94 WHC-SD-WM-DP-065, REV. 0						
Analyst - 1 J.L. Steele		Analyst - 2		Analyst - 3		Analyst - 4
Hrs		Hrs		Hrs		Hrs
Date 7-7-94		Time Completed 14:30		Lab Unit Mgr H.D. Spauld		Re Jones

54-6800-061 (R-10-83)

CVA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

	STANDARD	DUPLICATE
Serial No.	0.300	
V71-5597	31.65	
Batch ID	0.106	ERR
3031	105.5	ERR
Rerun No.	N/A	N/A
0	N/A	N/A
Instrument ID	N/A	N/A
WB26847	Conc Hg µg/mL=(Hg ng/SS)*(1µg/1000ng)	
Calibration Date	Average Conc.=(Sample + Duplicate)/2	
07/07/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100	
Analyst		
J.L. Steele		
Date		
07/07/94		

	STANDARD	DUPLICATE
Conc Hg µg/mL	1.06E-01	ERR
	N/A	N/A
	N/A	N/A

Data Entry by: H.D. Spauld	Date: 08-Jul-94
Approved by: H.D. Spauld	Date: 7/8/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 72.-5697	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 5	Priority 26
Determination Hg	Method: Standard LA-325-104	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 95.0 ml			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK A 1.0ml sample size is used for comparison with the samples. Det. Lim. = 0.005 ug/ml PKHT -0.003 < 0.005 ug/ml				
Analyst - 1 J.L. Steele	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7/7/94	Time Completed 1430	Lab Unit Mgr H.D. Sparks	Date 7/8/94 R.C. Jones	

WHC-SD-WM-DP-065, REV. 0

54-6800-061 (R-10-83)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		BLANK	DUPLICATE
Serial No.	Sample Size in mL SS	1.000	
V72-5697	Hg ng (Nanograms)	-0.06	
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	-0.000	ERR
3031	Conc Hg µg/L (PPB)	-0.1	ERR
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID		N/A	N/A
WB26847	Conc Hg µg/mL=(Hg ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
07/07/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst	Detection Limit = (5 ng/SS)*(1µg/1000ng)		
J.L. Steele	Detection Limit is Corrected for Sample Prep/Dilution		
Date			
07/07/94	Detection Limit (µg/mL) =	0.005	
	Detection Limit (µg/L) =	5.0	

	BLANK	DUPLICATE
Conc Hg µg/mL	<0.005	ERR
	N/A	N/A
	N/A	N/A

ERR

Data Entry by: H.D. Sparks	Date: 08-Jul-94
Approved by: H.D. Sparks	Date: 7/8/94

Form 1 Rev. 1

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 73.-5797	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination Hg	Method-Standard LA-325-104	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0 ml			Customer ID 108AP-FB	
Remarks Calculations Results <div style="text-align: center;"> <p>PKHT -.004 -.16ng</p> <p>< 0.005 ug/ml</p> <p>WHC-SD-WM-DP-065, REV. 0</p> </div>				
Analyst - 1 <i>Jacqueline Steele</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7-7-94	Time Completed 1430	Lab Unit Mgr <i>W.D. Steele</i>	<i>R. Jones</i> 54-6800-061 (R-10-83)	

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

	SAMPLE	DUPLICATE
Serial No: V73-5797	1.000	
Sample Size in mL SS	-0.16	
Hg ng (Nanograms)		
Batch ID: 3031	-0.000	ERR
Conc Hg µg/mL (or mg/L or PPM)	-0.2	ERR
Conc Hg µg/L (PPB)		
Rerun No: 0	N/A	N/A
	N/A	N/A
Instrument ID: WB26847	N/A	N/A
Conc Hg µg/mL=(Hg ng/SS)*(1µg/1000ng)		
Calibration Date: 07/07/94		
Average Conc.=(Sample + Duplicate)/2		
Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst: J.L. Steele		
Detection Limit = (5 ng/SS)*(1µg/1000ng)		
Detection Limit is Corrected for Sample Prep/Dilution		
Date: 07/07/94		
Detection Limit (µg/mL) =	0.005	
Detection Limit (µg/L) =	5.0	

	SAMPLE	DUPLICATE
Conc Hg µg/mL	<0.005	ERR
	N/A	N/A
	N/A	N/A

ERR

Data Entry by: <i>W.D. Steele</i>	Date: 08-Jul-94
Approved by: <i>W.D. Steele</i>	Date: 7/8/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 73.-5897	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination Hg	Method/Standard LA-325-104	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0 ml			Customer ID 108AP-FB	
Remarks, Calculations, Results DUPLICATE SAMPLE <div style="text-align: right;">PKHT -0.003 -0.06ng</div> <div style="text-align: center; border: 1px solid black; border-radius: 50%; padding: 10px; width: fit-content; margin: 10px auto;"> $< 0.005 \text{ ug/ml}$ </div> <div style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</div>				
Analyst - 1 <i>Jesse Steele</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 7-7-94	Time Completed 1430	Lab Unit Mgr <i>W.D. Sparks</i>	<i>P. Jones</i>	

54-6800-061 (R-10-83)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

	SAMPLE	DUPLICATE
Serial No.	1.000	1.000
V73-5897	-0.16	-0.06
Batch ID	-0.000	-0.000
3031	-0.2	-0.1
Rerun No.	N/A	N/A
0	N/A	N/A
Instrument ID	N/A	N/A
WB26847		
Calibration Date		
07/07/94		
Analyst		
J.L. Steele		
Date		
07/07/94		
Detection Limit (ug/mL) =	0.005	
Detection Limit (ug/L) =	5.0	

	SAMPLE	DUPLICATE
Conc Hg ug/mL	<0.005	<0.005
Average Conc (ug/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by: <i>W.D. Sparks</i>	Date: 08-Jul-94
Approved by: <i>W.D. Sparks</i>	Date: 7/8/94

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

CALIBRATION RECORD

WHC-SD-WM-DP-065, REV. 0

Analyte: Hg

Procedure: LA 325-104

Revision: A-1

Instrument: PE2380 (Hydride AA)

Property No.: WB26847

Technologist JL STEELE

Payroll No.:

Date: 07/07/94

Calibration Standard ID:

35N11-D

Analyte Concentration:

.123

Type of Calibration:

LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0 ng	.000
2	.041mL	5 ng	.041
3	.100mL	12.3 ng	.115
4	.250mL	30.75ng	.306
5	.500mL	61.5ng	.590
6	.750mL	92.25ng	.892
7	1.000mL	153.75ng	1.500
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments: r= 1.0000

Y-intercept =-0.0025

SLOPE= 0.0097

BATCH #3013

845

.317 32.78 ng IEN .300 39N11B 107.26%

.007 .97 ng CCB 25.0 ml

.640 45.92 ng CCV .500 ml 35N11D

.001 0.35 ng S9085 1.0 ml

.008 1.01 ng ^{1m} 7-7-94 _{1-07n} S9084 1.0 ml

.895 92.08 ng S9016 .250 ml

-.003 -0.06 ng V73 Dup 1.0 ml

-.004 -.11 ng V73 1.0 ml

.045 4.87 ng CRA .050 ml 39N11B

-.003 -.06 ng CCB 25.1 ml

WHC-SD-WM-DP-065, REV. 0

.003 122.12 ng CCV .500 ml 35N11D 101.01%

-.003 -.06 ng ICB 25.0 ml (V72)

.306 31.66 ng IEN (V71) .300 ml 39N11B 105.50%

1.300 153.75 ng 1.250 ml 35N11D

.872 92.25 ng .750 ml 35N11D

.490 61.5 ng .500 ml 35N11D

.306 30.75 ng .250 ml 35N11D

.115 12.3 ng .100 ml 35N11D

.046 5 ng .041 ml 35N11D

BEST AVAILABLE COPY

0.0 AB Org

Jackie Steele 7-7-94 Hg

Analyte: Hg
Date: 7-7-94
Analyst: Jackie Steele
Start Time: 8:00 End Time: 1:30

MHS 20 Data:
Signal Concentration
Mode PKHT
Recorder ECD
Time 55.00
Expansion 1
Purge I 35 sec
Purge II 87 sec
Reaction 15 sec
Temperature 17.2
EDL Power 12.5

Chart Recorder Data:
Chart speed 5 mm/min
Chart full scale 20 mV

Calibration Data:
Intercept -0.0025 absorbance units

846

100.0 1.00 ng 1.00 ml 5.90 84 1.00 ml
 .895 92.08 ng 59016 .250 ml

-003 -0.06 ng V23 Dup 1.0 ml
 -004 -1.1 ng V23 1.0 ml
 .045 4.87 ng CRA .050 ml 39N11B
 -003 -0.06 ng ECB 25.1 ml

WHC-SD-WM-DP-065, REV. 0

.003 12.12 ng CCN .500 ml 35N11D 101.01%
 -003 -0.06 ng ECB 25.0 ml (V12)
 .306 31.65 ng CCN (V11) .300 ml 39N11B 105.50%

1.500 153.76 ng 1.250 ml 35N11D
 .892 92.25 ng .150 ml 35N11D
 .590 61.5 ng .500 ml 35N11D
 .306 30.75 ng .250 ml 35N11D

.115 12.3 ng .100 ml 35N11D
 .045 5 ng .041 ml 35N11D
 0.0 0.0 ng

BEST AVAILABLE COPY

see table 7-7-94 Hg

Analyte: Hg Analyst: James Hinkle
 Date: 7-7-94 Start Time: 8:00 End Time: 1430

MHS 20 Data

Page 1 of 1
 Page 1 of 1
 Page 1 of 1
 Page 1 of 1
 Page 1 of 1
 Page 1 of 1

Chart Recorder Data

Page 1 of 1
 Page 1 of 1

Calibration Data

0.0025
 0.0097
 1.000

THE FOLLOWING ANALYSES ARE INCLUDED IN THE DATA PACKAGE BUT THE RESULTS HAVE NOT BEEN REPORTED IN THE FINAL SUMMARY REPORTS.

222-S LABORATORY

ANALYTICAL BATCH #3001

Lab Segment Serial No. V 66, V 67, V 68, V 69	Customer ID: 108-AP-C, 108-AP-D, 108-AP-E
Analysis: Hg	Sample Prep: DIRECT

Instrument: PE2380(Hydride AA) WB26847	Procedure/ Rev: LA-325-104/A-1
Technologist: SM FULTON <i>Lucie M. Fulton</i>	Date: 04/12/94
Starting Time: 1600	Temperature 20 C
Ending Time: 2345	Chemist: LD SPARKS

Comments:	BATCH # 3001	Please review. Ending LINES
	$r = .9996$	were low (~50% Recovery). Problems
	Y-Intercept = .0074	with instrument; baseline drift.
	Slope = .0073	MJ Perles 4/15/94

	Description	Lab ID
1	LMCS STANDARD	V 65-5597
2	REAGENT BLANK	V 66-5697
3	SAMPLE	V 67-5797
4	DUPLICATE SAMPLE	V 67-5897
5	SAMPLE	V 68-5797
6	DUPLICATE SAMPLE	V 68-5897
7	SAMPLE	V 69-5797
8	DUPLICATE SAMPLE	V 69-5897
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

[illegible]

WESTINGHOUSE HANFORD COMPANY

WHC-SD-WM-DP-065, REV. 0

222-S LABORATORY

CALIBRATION RECORD # 3001

Analyte: Hg

Procedure: LA-325-104

Revision: A-1

Instrument: PE2380 (Hydride AA)

Property No.: WB26847

Technologist SM FULTON *SM Fulton*

Payroll No.:

Date: 04/12/94

Calibration Standard ID: 35N11-A

Analyte Concentration: .147

Type of Calibration: LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000ml	0.0ng	.006
2	.034ml	5.0ng	.030
3	.100ml	14.7ng	.113
4	.250ml	36.75ng	.284
5	.500ml	73.5ng	.566
6	.750ml	110.25ng	.807
7	1.000ml	147.0ng	1.071
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments: $r = .9996$

Y-Intercept = .0074

Slope = .0073

853

Batch 3001

Serial No V 65.-5597	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority 26
Determination Hg	Method/Standard LA-325-104	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 0.300ml			Customer ID STD	
Remarks, Calculations, Results EDP R716 HG/HYDRD STD# 36N11-A RESULT 0.098 ppm STD VAL 0.100 ppm %REC 98.0% $\frac{29.41 \text{ ng}}{0.300 \text{ ml}} \times \frac{1 \text{ ng}}{100 \text{ ng}} = 0.098$ OUT FOR RERUN pH = .222 29.41 ng				
Analyst - 1 <i>Lusie M. Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-12-94	Time Completed 23 45	Lab Unit Mgr 4/15/94 <i>W. J. [Signature]</i>		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

Serial No V 66.-5697	Sample Point 108-AP	Date 3-18-94	Time Issued 9:38	Priority 26
Determination Hg	Method/Standard LA-325-104	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0 ml			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK Rerun OUT FOR RERUN				
Analyst - 1 <i>Lusie M. Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-12-94	Time Completed 23 45	Lab Unit Mgr 4/15/94 <i>W. J. [Signature]</i>		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

Serial No V 67.-5797	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination Hg	Method Standard LA-325-104	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0 ml			Customer ID 108-AP-C	
Remarks Calculations Results Rerun OUT FOR RERUN				
Analyst - 1 Lucie M. Fulton	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-12-94	Time Completed 2345	Lab Unit Mgr 4/15/94 MD Sparks		

54-6800-061 (R-10-83)

Serial No V 67.-5897	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination Hg	Method Standard LA-325-104	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0 ml			Customer ID 108-AP-C	
Remarks Calculations Results DUPLICATE SAMPLE Rerun OUT FOR RERUN				
Analyst - 1 Lucie M. Fulton	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-12-94	Time Completed 2345	Lab Unit Mgr 4/15/94 MD Sparks		

54-6800-061 (R-10-83)

Serial No V 68.-5797	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination Hg	Method/Standard LA-325-104	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0 mL			Customer ID 108-AP-D	
Remarks, Calculations, Results Rerun OUT FOR RERUN				
Analyst - 1 <i>Lusie M. Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-12-94	Time Completed 2345	Lab Unit Mgr 4/15/94 <i>W.D. Jones</i>	<i>[Signature]</i>	

54-6800-061 (R-10-83)

Serial No V 68.-5897	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination Hg	Method/Standard LA-325-104	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0 mL			Customer ID 108-AP-D	
Remarks, Calculations, Results DUPLICATE SAMPLE Rerun OUT FOR REPT				
Analyst - 1 <i>Lusie M. Fulton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-12-94	Time Completed 2345	Lab Unit Mgr 4/15/94 <i>W.D. Jones</i>	<i>[Signature]</i>	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

Serial No V 69.-5797	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination Hg	Method-Standard LA-325-104	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0 ml			Customer ID 108-AP-E	
Remarks Calculations Results Rerun OUT FOR RERUN				
Analyst - 1 <i>Luis M. Faltin</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-12-94	Time Completed 2345	Lab Unit Mgr 4/15/94 <i>[Signature]</i>		

54-6800-061 (R-10-83)

Serial No V 69.-5897	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination Hg	Method-Standard LA-325-104	Result Units uG/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0 ml			Customer ID 108-AP-E	
Remarks Calculations Results DUPLICATE SAMPLE Rerun OUT FOR RERUN				
Analyst - 1 <i>Luis M. Faltin</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-12-94	Time Completed 2345	Lab Unit Mgr 4/15/94 <i>[Signature]</i>		

54-6800-061 (R-10-83)

From: Inorganic Chemistry
Phone: 373-3589
Date: May 12, 1994
Subject: 108-AP NARRATIVE FOR ICP ANALYSIS OF SAMPLES V62 AND V63

To: G. L. Miller T6-06

INORGANIC ANALYSIS

The data evaluation for this project will follow the guidelines specified in "Technical Project Plan for the 222-S Laboratory in Support of Tank Waste Remediation System Tank Waste Characterization Plan (WHC-SD-WM-PLN-047, REV.0) and Statement of Work (WHC-SOW-93-0002)." Contained in this report is the evaluation of the data generated by Westinghouse Hanford Company - Analytical Services (WHC-AS), 222-S Laboratory. Information will be organized by quality control parameter. No computer-readable data will be submitted on floppy diskette as mentioned in the comment on the following cover page.

INITIAL AND CONTINUING CALIBRATION VERIFICATION

All calibration verification standard recoveries were within 90-110%.

INITIAL AND CONTINUING CALIBRATION BLANKS

All ICB and CCB analytical measurements were between +IDL and -IDL with the exception of Calcium, Magnesium, Silver and Sodium in CCB-1, CCB-2 and CCB-3, Iron in CCB-1 and Zinc in all calibration blanks. High values for Sodium are attributed to carryover from samples. No impact on data quality is indicated. Silver has been shown to carryover from digested standards. False positives for Silver in the samples are indicated. False positives are also indicated for Zinc and Magnesium.

PREPARATION BLANK

Contamination is indicated for Iron. Contamination is judged to be present when the blank analyte concentrations is greater than 20% of the average sample concentration. This criterion applies only when the sample concentration is greater than 10 times the IDL.

SPIKE SAMPLE RECOVERIES

Spike recovery failures were noted for Aluminum (126.2%), Cadmium (72.5%), Lead (73.6%), Magnesium (73.5%) and Silver (13.3% and 14.2%). The acceptance criterion is 75-125%. Low recoveries for Silver may be attributed to matrix effects of the digestion process. Aluminum recoveries may be influenced by the Sodium level; different initial volumes were used to prepare sample (10 mL in 50 mL) and spike (5 mL in 50 mL). Other failures are attributed to a spike transfer error.

SPIKE DUPLICATE ANALYSES

Spike Duplicate precision requirements were met for all analytes.

855

V62 108-AP
V63 108-AP

WHC-SD-WM-DP-065, REV. 0

Page 2

DUPLICATE ANALYSES

Relative Percent Difference values exceeding 20% were noted as follows: For V62, Calcium (39.6%), Iron (142.5%), Magnesium (44.6%), Silver (59.7%) and Zinc (43.6%); for V63, Iron (99.4%), Magnesium (22.1%) and Manganese (33.3%). No acceptance criteria apply to the duplicate analysis.

LABORATORY CONTROL SAMPLE

A failure was noted for Silver (16.2%). Low recoveries for Silver may be attributed to matrix effects of the digestion process.

ABBREVIATIONS

* = Duplicate failure. E = Serial dilution failure. N = Spike failure. NR = Not required. P = ICP method used. U = less than IDL.

Brian Wells

5/12/94

B. R. Wells
Senior Scientist, WHC-AS

brw

1
INORGANIC ANALYSES DATA SHEET

V62

Lab Name: WHC _____ Contract: _____ V62
Lab Code: _____ Case No.: 108AP SAS No.: _____ SDG No.: V62A
Matrix (soil/water): WATER Lab Sample ID: V62
Level (low/med): LOW Date Received: 05/09/94
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

[illegible]

WHC-SD-WM-DP-065, REV. 0

Color Before: _____ Clarity Before: _____ Texture: _____
Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

'853

1
INORGANIC ANALYSES DATA SHEET

V63

Concentration Units (ug/L or mg/kg dry weight): UG/L

[illegible]

WHC-SD-WM-DP-065, REV. 0

Color Before: _____ Clarity Before: _____ Texture: _____
Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

853

WHC-SD-WM-DP-065, REV. 0

Contract:

SDG No.: V62A

BW
5/10/24

Aqueous LCS Source: PLASMACHEM

[illegible]

EPA SAMPLE NO.

Lab Name: WHC _____ Contract: _____

V62L

Lab Code: _____ Case No.: 108AP SAS No.: _____ SDG No.: V62A

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

WHC-SD-WM-DP-065, REV. 0

[illegible]

9
ICP SERIAL DILUTION

V63L

Matrix (soil/water): WATER Level (low/med): LOW

WHC-SD-WM-DP-065, REV. 0

Concentration Units: ug/L

[illegible]

13
PREPARATION LOG

Lab Name: WHC _____

Contract: _____

Lab Code:

Case No.: 108AP

SAS No.:

SDG No.:V62A

Method: P

[illegible]

11A
ICP Interelement Correction Factors (Annually)

WHC-SD-WM-DP-065, REV. 0

ICP ID Number: ICP-1(ARL)___ Date: 02/09/94

Comments:

6
DUPLICATES

EPA SAMPLE NO.

V62D

Lab Name: WHC _____ Contract: _____

Lab Code: _____ Case No.: 108AP SAS No.: _____ SDG No.: V62A

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0 % Solids for Duplicate: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

WHC-SD-WM-DP-065, REV. 0

[illegible]

6
DUPLICATES

EPA SAMPLE NO.

V63D

Lab Name: WHC Contract: _____

Lab Code: Case No.: 108AP SAS No.: SDG No.: V62A

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0 % Solids for Duplicate: 0.0

WHC-SD-WM-DP-065, REV. 0

Concentration Units (ug/L or mg/kg dry weight): UG/L

[illegible]

3 BLANKS

WHC-SD-WM-DP-065, REV. 0

Lab Name: WHC Contract:

Lab Code: Case No.: 108AP SAS No.: _____ SDG No.: V62 A

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

[illegible]

5A
SPIKE SAMPLE RECOVERY

Lab Name: WHC

Contract:

V62S

Lab Code: Case No.: 108AP

SAS No.:

SDG No.: V62A Bw 5/10/94

Matrix: WATER

Level (low/med): LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

WHC-SD-WM-DP-065, REV. 0

Comments:

5A
SPIKE SAMPLE RECOVERY

Lab Name: WHC

Contract: _____

Lab Code: Case No.: 108AP

SAS No.:

SDG No.: V62A

-Bel
5/16/94

Matrix: WATER

Level (low/med): LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

WHC-SD-WM-DP-065, REV. 0

Comments:

6
E DUPLICATES
Bw
5/10/94

V62DS

% Solids for Duplicate: 0.0

WHC-SD-WM-DP-065, REV. 0

ILM02.1

10

Lab Name: WHC _____
 Lab Code: _____ Case No.: 108AP
 ICP ID Number: _____ ICP-1(ARL)____
 Flame AA ID Number : _____
 Furnace AA ID Number : _____

WHC-SD-WM-DP-065, REV. 0

Comments:

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. 160-64	Customer ID: 128-143 it, 128-MP-12
Analysis: IUP	Sample Prep:

Instrument: <i>CJ8 39939</i>	Procedure/ Rev: <i>LA-505-151 10-1</i>
Technologist: <i>D. GILCHRIST</i>	Date: <i>5-3-94</i> <i>Agmt</i> <i>BW 10-3-94</i>
Starting Time: <i>12.30</i>	Temperature <i>10A</i>
Ending Time: <i>15.30</i>	Chemist: <i>D. GILCHRIST</i>

Comments: _____

	Description	Lab ID		Description	Lab ID
1	ICV SSFV	V60-5550	11		
2	DG SPD	V60-8550	12	V60-8550 ^{3W} 10-4-74	
3	DG BLK	V61-8650	13		
4	108-17-A STM	V62-8750	14		
5	108-17-A Dup?	V62-8850	15		
6	108-17-A DG spike	V62-8950	16		
7	108-17-A Dup DG spike	V62-8050	17		
8	108-17-B STM	V63-8750	18		
9	108-17-B Dup?	V63-8850	19		
10	CCV SSFV	V64-5550	20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
SST4 Eup	25048 direct			direct
SST4 SST sample	25048 ml			5.76
				875

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No V 60.-5550	Sample Point 108-AP	Date 3-18-94	Time Issued 8:26	Priority 26
Determination ICP	Method/Standard LA-505-151	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 554 (ICV)			Customer ID STD	
Remarks, Calculations, Results LMCS CHECK SAMPLE COMPLETED 5/3/94 SEE WARD'S PACKAGE WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 5-3-94	Time Completed 15:30	Lab Unit Mgr 5/10/94 <i>Brian Wells</i> 5-4-94		

Serial No V 60.-8550	Sample Point 108-AP	Date 3-18-94	Time Issued 8:26	Priority 26
Determination ICP	Method/Standard LA-505-151	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 546 in 50ml 2 WIFC-1 5 WIFC-2 54-20			Customer ID STD	
Remarks, Calculations, Results 1st STD Digested STD COMPLETED 5/3/94 SEE WARD'S PACKAGE				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 5-3-94	Time Completed 15:30	Lab Unit Mgr 5/10/94 <i>Brian Wells</i> 5-4-94		

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
V 61.-8650	108-AP	3-18-94	8:27	26
Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	uG/L	N1A7F	0
Sample Size			Customer ID	
DIRECT DIGESTION BLK			BLANK	
Remarks Calculations Results REAGENT BLANK COMPLETED <u>5/3/94</u> SEE WARD'S PACKAGE WHC-SD-WM-DP-065, REV. 0				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>[Signature]</i>				
Hrs	Hrs	Hrs	Hrs	Hrs
				<i>[Signature]</i>
Date	Time Completed	Lab Unit Mgr		
5-3-94	1530	Brian Wells	5-4-94	

Serial No	Sample Point	Date	Time Issued	Priority
V 62.-8050	108-AP	3-18-94	8:28	26
Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	% RECOVERY	N1A7F	0
Sample Size			Customer ID	
5 mL in 50 mL			108-AP-A	
Remarks Calculations Results SAMPLE SPIKE DUPLICATE SPIKE ID 3444A BW SPIKE VOL 5 mL 10-3-94 COMPLETED <u>5/3/94</u> SEE WARD'S PACKAGE				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>[Signature]</i>				
Hrs	Hrs	Hrs	Hrs	Hrs
				<i>[Signature]</i>
Date	Time Completed	Lab Unit Mgr		
5-3-94	15:30	Brian Wells	5-4-94	

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No V 62.-8750	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination ICP	Method/Standard LA-505-151	Result Units uG/L	Charge Code N1A7F	Reruns 0
Sample Size <i>10 uL in 50 uL - 1 uL - 4 uL</i>			Customer ID 108-AP-A	
Remarks, Calculations, Results <div style="text-align: right;">COMPLETED <i>5/3/94</i></div> <div style="text-align: right;">SEE WARD'S PACKAGE</div> <div style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</div>				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date <i>5-3-94</i>	Time Completed <i>15:30</i>	Lab Unit Mgr <i>Brian Wells</i>		<i>5-4-94</i>

Serial No V 62.-8850	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination ICP	Method/Standard LA-505-151	Result Units uG/L	Charge Code N1A7F	Reruns 0
Sample Size <i>10 uL in 50 uL</i>			Customer ID 108-AP-A	
Remarks, Calculations, Results <div style="text-align: right;">COMPLETED <i>5/3/94</i></div> <div style="text-align: right;">SEE WARD'S PACKAGE</div> <div style="text-align: left;">DUPLICATE SAMPLE</div>				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date <i>5-3-94</i>	Time Completed <i>15:30</i>	Lab Unit Mgr <i>Brian Wells</i>		<i>5-4-94</i>

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No V 62.-8950	Sample Point 108-AP	Date 3-18-94	Time Issued 8:28	Priority 26
Determination ICP	Method/Standard LA-505-151	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size <i>5ml in 50ml</i>			Customer ID 108-AP-A	
Remarks, Calculations, Results SPIKE SAMPLE SPIKE ID <i>34444</i> BW SPIKE VOLUME <i>5ml</i> 10-3-94 COMPLETED <i>5/3/94</i> SEE WARD'S PACKAGE WHC-SD-WM-DP-065, REV.0				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date <i>5-3-94</i>	Time Completed <i>15:30</i>	Lab Unit Mgr <i>Brian Wells</i>	<i>5-4-94</i>	

Serial No V 63.-8750	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination ICP	Method/Standard LA-505-151	Result Units uG/L	Charge Code N1A7F	Reruns 0
Sample Size <i>10ml in 50ml - 1ml - 4ml</i>			Customer ID 108-AP-B	
Remarks, Calculations, Results COMPLETED <i>5/3/94</i> SEE WARD'S PACKAGE				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date <i>5-3-94</i>	Time Completed <i>15:30</i>	Lab Unit Mgr <i>Brian Wells</i>	<i>5-4-94</i>	

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No V 63.-8850	Sample Point 108-AP	Date 3-18-94	Time Issued 8:31	Priority 26
Determination ICP	Method/Standard LA-505-151	Result Units uG/L	Charge Code N1A7F	Reruns 0
Sample Size <i>10ul in 50ml</i>			Customer ID 108-AP-B	
Remarks, Calculations, Results DUPLICATE SAMPLE COMPLETED <u>5/3/94</u> SEE WARD'S PACKAGE WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 <i>[Signature]</i> Hrs
Date 5-3-94	Time Completed 15:30	Lab Unit Mgr <i>Brian Wells</i>		<i>5-4-94</i>

Serial No V 64.-5550	Sample Point 108-AP	Date 3-18-94	Time Issued 8:33	Priority 26
Determination ICP	Method/Standard LA-505-151	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size <i>5574 (CCV)</i>			Customer ID STD	
Remarks, Calculations, Results LMCS CHECK SAMPLE COMPLETED <u>5/3/94</u> SEE WARD'S PACKAGE				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 <i>[Signature]</i> Hrs
Date 5-3-94	Time Completed 15:30	Lab Unit Mgr <i>Brian Wells</i>		<i>5-4-94</i>

Identity 1: wp-284 Identity 2: wp-284 12:57 PM May 3, 1994
Task name : IWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV.0

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.001	0.000	0.023	0.369	0.134	0.045	0.006	-0.001
S.D.	0.001	0.000	0.010	0.002	0.005	0.001	0.000	0.001
% R.S.D.	100.966	32.479	42.246	0.553	3.393	1.699	5.364	96.191
	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.010	0.020	0.000	0.027	0.036	0.008	-0.026	0.069
S.D.	0.000	0.000	0.002	0.002	0.000	0.001	0.010	0.055
% R.S.D.	3.887	2.535	623.485	6.795	0.362	12.424	38.221	79.758
	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.008	0.014	0.028	-0.014	0.068	0.000	0.032	0.113
S.D.	0.007	0.013	0.000	0.001	0.004	0.000	0.003	0.005
% R.S.D.	86.211	91.362	0.718	7.318	6.595	33.334	9.597	4.092
	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.001	-0.001	0.001	0.038	0.001	0.009	0.037	-0.004
S.D.	0.001	0.008	0.000	0.007	0.000	0.001	0.001	0.029
% R.S.D.	50.224	1314.027	7.377	17.640	43.969	7.384	2.515	691.254
	Mn	Sb	V	Be	Tl			
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)			
Mean	0.010	-0.017	0.133	0.029	-0.006			
S.D.	0.000	0.014	0.001	0.000	0.023			
% R.S.D.	0.982	81.060	0.830	0.393	412.711			

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 58 TO 619.

[Handwritten signature]
5-3-94
OF-11P
110.110.005
J. Smith, ST

Identity 1: V60 icv Identity 2: sst4 29b48

1:03 PM May 3, 1994

WHC-SD-WM-DP-065, REV.0

Tank name : TWC93

Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	5.045	5.013	5.053	4.694	5.019	5.118	5.161	5.068
S.D.	0.011	0.012	0.030	0.009	0.007	0.016	0.013	0.015
% R.S.D.	0.209	0.234	0.589	0.195	0.131	0.304	0.248	0.306

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	5.156	5.088	5.046	5.026	5.026	5.106	5.196	9.831
S.D.	0.006	0.013	0.014	0.010	0.011	0.007	0.011	0.056
% R.S.D.	0.122	0.248	0.283	0.199	0.221	0.135	0.218	0.570

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	5.016	5.058	5.056	5.440	5.097	4.923	5.036	5.110
S.D.	0.011	0.015	0.012	0.052	0.014	0.010	0.020	0.018
% R.S.D.	0.216	0.303	0.237	0.960	0.275	0.202	0.397	0.348

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	5.072	5.857	5.043	5.068	4.938	5.099	5.072	5.081
S.D.	0.008	0.028	0.008	0.019	0.011	0.016	0.022	0.029
% R.S.D.	0.154	0.474	0.157	0.373	0.217	0.316	0.442	0.570

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	5.059	4.864	5.143	5.222	4.933
S.D.	0.011	0.003	0.010	0.011	0.027
% R.S.D.	0.208	0.072	0.193	0.208	0.553

883

Identity 1: icb Identity 2: icb 1:07 PM May 3, 1994

WHC-SD-WM-DP-065, REV.0

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.004	0.000	0.006	-0.004	-0.001	-0.000	-0.002	0.000
S.D.	0.000	0.000	0.004	0.002	0.004	0.001	0.000	0.001
% R.S.D.	10.237	41.426	69.258	50.078	427.898	581.821	18.121	174.193
	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.028	-0.002	-0.003	0.001	0.001	0.002	-0.008	-0.216
S.D.	0.000	0.001	0.000	0.001	0.000	0.001	0.010	0.056
% R.S.D.	0.631	76.589	0.652	96.123	8.985	47.825	113.998	25.814
	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.018	-0.052	-0.001	0.012	0.001	0.001	-0.000	0.002
S.D.	0.010	0.018	0.000	0.006	0.002	0.000	0.003	0.005
% R.S.D.	57.885	35.062	38.686	51.268	132.019	0.000	1987.245	229.435
	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.001	0.017	-0.001	-0.008	-0.001	0.001	0.001	-0.066
S.D.	0.001	0.012	0.001	0.003	0.001	0.001	0.000	0.009
% R.S.D.	128.684	67.619	54.790	44.048	56.785	53.610	16.160	13.469
	Mn	Sb	V	Be	Tl			
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)			
Mean	-0.002	-0.004	-0.002	0.000	-0.061			
S.D.	0.000	0.030	0.001	0.000	0.023			
% R.S.D.	6.627	707.340	73.984	90.470	37.177			

Identity 1: icsa-i Identity 2: icsa

1:10 PM May 3, 1994

WHC-SD-WM-DP-065, REV.0

Table name : TWC93

Weight : 1.0000 Solution Volume : 1.00

On-peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.004	0.000	-0.015	0.002	50.745	0.001	-0.001	-0.000
S.D.	0.001	0.000	0.010	0.003	0.139	0.000	0.001	0.000
% R.S.D.	18.468	81.907	66.173	197.097	0.274	21.581	59.115	54.243

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	-0.026	0.001	-0.006	0.008	0.002	0.002	0.006	-0.252
S.D.	0.000	0.001	0.003	0.001	0.000	0.001	0.011	0.066
% R.S.D.	0.649	80.328	46.994	13.454	2.112	67.750	195.046	26.318

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.043	-0.067	-0.001	-0.005	0.004	-0.000	-0.000	0.086
S.D.	0.012	0.016	0.000	0.008	0.002	0.000	0.002	0.004
% R.S.D.	28.591	23.326	28.924	168.536	40.306	33.333	4061.658	4.076

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.000	0.016	-0.002	-0.008	-0.001	-0.000	0.002	-0.079
S.D.	0.001	0.007	0.001	0.005	0.000	0.001	0.001	0.015
% R.S.D.	854.408	40.911	40.574	57.214	30.990	126.722	64.013	19.302

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	-0.003	-0.008	-0.003	0.000	-0.062
S.D.	0.000	0.010	0.001	0.000	0.027
% R.S.D.	3.460	115.287	32.233	93.969	43.007

Identity 1: xxx Identity 2: rinse 1:14 PM May 3, 1994

WHC-SD-WM-DP-065, REV.0

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.004	-0.000	0.011	-0.007	0.027	0.001	-0.002	0.001
S.D.	0.001	0.000	0.006	0.002	0.015	0.000	0.000	0.000
% R.S.D.	16.830	248.992	53.352	28.230	54.723	29.690	10.216	27.862

	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.060	-0.001	-0.005	0.003	0.001	0.003	0.007	-0.235
S.D.	0.003	0.001	0.001	0.001	0.000	0.001	0.005	0.045
% R.S.D.	5.530	86.737	18.568	21.546	3.608	33.614	77.055	19.244

	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.010	-0.053	-0.001	-0.005	0.008	0.001	-0.000	0.018
S.D.	0.008	0.013	0.000	0.012	0.004	0.000	0.005	0.005
% R.S.D.	82.103	23.948	20.059	250.890	54.562	14.783	1558.705	28.872

	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.000	-0.006	-0.002	0.001	-0.001	0.001	0.000	-0.085
S.D.	0.001	0.012	0.000	0.004	0.000	0.000	0.001	0.021
% R.S.D.	435.085	190.776	22.898	377.950	33.307	20.330	374.537	24.582

	Mn	Sb	V	Be	Tl
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.003	0.007	-0.001	-0.000	-0.101
S.D.	0.000	0.011	0.001	0.000	0.018
% R.S.D.	4.151	159.986	114.174	118.060	17.919

Identity 1: V61 dig blk Identity 2: direct

1:18 PM May 3, 1994

WHC-SD-WM-DP-065, REV. 0

Tr name : TWC93

Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.005	0.000	0.008	-0.004	0.017	0.002	-0.001	0.000
S.D.	0.002	0.000	0.012	0.004	0.006	0.001	0.001	0.000
% R.S.D.	39.201	61.079	161.619	96.949	36.755	64.405	77.797	529.088

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	-0.023	-0.001	0.001	0.029	0.022	0.003	0.003	-0.261
S.D.	0.000	0.001	0.002	0.001	0.000	0.001	0.009	0.069
% R.S.D.	0.546	144.803	276.792	2.294	0.450	23.437	247.810	26.510

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.017	-0.067	-0.000	-0.001	0.018	0.001	-0.004	0.025
S.D.	0.013	0.019	0.000	0.007	0.007	0.000	0.004	0.007
% R.S.D.	80.230	27.983	194.522	1170.847	36.601	20.377	104.877	27.716

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.001	0.020	0.001	0.005	-0.001	0.000	0.001	0.239
S.D.	0.000	0.009	0.001	0.009	0.000	0.000	0.000	0.012
% R.S.D.	18.414	44.114	119.507	171.760	51.830	70.223	28.520	5.080

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	-0.002	-0.027	-0.001	-0.000	-0.115
S.D.	0.000	0.008	0.001	0.000	0.035
% R.S.D.	8.758	29.325	100.345	262.960	30.728

Identity 1: V60 dig std Identity 2: 5ml in 50ml whc1&2

1:23 PM May 3, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV.0

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	9.822	9.696	9.628	9.367	10.293	-0.005	-0.001	9.864
S.D.	0.051	0.058	0.068	0.028	0.053	0.000	0.000	0.065
% R.S.D.	0.521	0.600	0.709	0.300	0.519	4.402	30.743	0.659
	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.013	9.734	10.798	9.659	9.786	9.903	10.076	-0.954
S.D.	0.000	0.052	0.064	0.032	0.051	0.044	0.039	0.059
% R.S.D.	3.334	0.537	0.594	0.334	0.518	0.439	0.383	6.180
	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	9.809	9.756	9.909	10.352	9.745	9.462	9.921	9.926
S.D.	0.065	0.061	0.050	0.146	0.092	0.047	0.041	0.061
% R.S.D.	0.667	0.624	0.501	1.406	0.947	0.501	0.416	0.612
	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	9.865	11.333	1.618	9.671	9.584	9.629	9.809	9.985
S.D.	0.057	0.047	0.008	0.043	0.058	0.043	0.037	0.045
% R.S.D.	0.579	0.419	0.500	0.446	0.604	0.447	0.375	0.454
	Mn	Sb	V	Be	Tl			
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)			
Mean	9.722	9.320	-0.097	10.236	9.494			
S.D.	0.045	0.047	0.000	0.061	0.014			
% R.S.D.	0.461	0.503	0.222	0.601	0.150			

Identity 1: V60 dig std Identity 2: 5ml in 50ml sm-20

1:26 PM May 3, 1994

Task name : TWC93

Weight : 1.0000 Solution Volume : 1.00

On-peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV.0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.006	0.002	-0.156	-0.004	-0.525	9.983	10.177	0.001
S.D.	0.003	0.000	0.008	0.008	0.013	0.040	0.062	0.001
% R.S.D.	44.610	20.043	5.273	214.246	2.533	0.402	0.607	138.558

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	9.644	9.883	-0.017	9.774	0.040	9.520	0.005	-0.173
S.D.	0.029	0.031	0.004	0.055	0.000	0.042	0.016	0.160
% R.S.D.	0.300	0.312	20.565	0.561	0.677	0.441	310.337	92.749

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.032	-0.076	0.001	0.003	0.009	0.004	0.009	0.004
S.D.	0.027	0.040	0.001	0.002	0.004	0.000	0.005	0.015
% R.S.D.	85.376	53.279	116.924	73.360	44.822	2.857	58.114	370.213

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.004	0.454	2.257	-0.002	0.000	9.613	0.025	0.105
S.D.	0.000	0.004	0.007	0.006	0.001	0.016	0.002	0.036
% R.S.D.	11.353	0.987	0.305	261.946	201.508	0.165	7.037	34.391

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	10.169	0.019	10.071	0.002	-0.097
S.D.	0.045	0.014	0.044	0.000	0.055
% R.S.D.	0.441	71.051	0.438	12.215	56.901

Identity 1: V62 sam dil Identity 2: 1ml sample - 4ml

1:30 PM May 3, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

WHC-SD-WM-DP-065, REV.0

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.005	0.000	-0.009	0.609	2.291	0.005	0.024	0.005
S.D.	0.002	0.000	0.007	0.001	0.006	0.000	0.001	0.000
% R.S.D.	29.974	22.755	72.597	0.084	0.241	2.039	4.069	6.005

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	-0.013	-0.000	-0.009	0.012	0.057	0.089	-0.008	-0.080
S.D.	0.001	0.001	0.001	0.001	0.000	0.001	0.002	0.067
% R.S.D.	3.825	233.879	6.505	10.602	0.174	0.808	24.655	84.303

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.040	-0.086	-0.001	1.104	3.370	0.002	0.001	130.043
S.D.	0.006	0.012	0.000	0.018	0.020	0.000	0.005	0.161
% R.S.D.	15.949	14.252	18.779	1.592	0.601	4.762	889.933	0.124

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.006	0.004	0.003	-0.002	-0.002	0.009	0.021	15.351
S.D.	0.001	0.015	0.001	0.011	0.000	0.001	0.001	0.026
% R.S.D.	11.358	418.905	32.282	539.616	19.467	7.115	4.190	0.168

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	-0.000	-0.029	0.001	-0.000	-0.077
S.D.	0.000	0.007	0.000	0.000	0.022
% R.S.D.	56.226	24.634	59.608	151.172	29.302

Identity 1: V63 sam dil Identity 2: 1ml sample - 4ml

1:34 PM May 3, 1994

Task name : TWC93

Weight : 1.0000 Solution Volume : 1.00

WHC-SD-WM-DP-065, REV.0

Peak Integrations : 3 Off-Peak Integrations : 1

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.004	0.003	0.008	0.303	1.396	0.006	0.025	0.008
S.D.	0.002	0.001	0.020	0.002	0.008	0.001	0.001	0.001
% R.S.D.	52.311	28.766	243.476	0.743	0.590	18.768	4.445	9.093

	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.002	0.010	-0.001	0.036	0.108	0.091	-0.009	0.648
S.D.	0.001	0.001	0.004	0.004	0.001	0.001	0.018	0.123
% R.S.D.	46.809	11.748	340.514	10.963	0.932	1.432	207.266	18.973

	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.023	-0.101	0.002	0.927	2.650	0.008	0.002	111.332
S.D.	0.021	0.028	0.001	0.009	0.008	0.001	0.002	0.491
% R.S.D.	91.393	27.436	52.962	0.996	0.289	11.278	95.361	0.441

	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.008	-0.002	0.002	0.005	0.001	0.011	0.029	8.618
S.D.	0.001	0.007	0.001	0.002	0.001	0.002	0.001	0.022
% R.S.D.	12.197	366.083	49.640	39.354	101.233	14.577	2.187	0.252

	Mn	Sb	V	Be	Tl
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.004	-0.015	0.000	0.002	-0.117
S.D.	0.002	0.015	0.001	0.001	0.052
% R.S.D.	51.047	98.259	280.135	49.815	44.843

Identity 1: V62 post spike Identity 2: 1ml sample - 4ml 1:38 PM May 3, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV.0

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.966	0.956	0.963	1.540	3.229	0.984	1.019	0.964
S.D.	0.001	0.004	0.009	0.009	0.006	0.005	0.002	0.003
% R.S.D.	0.087	0.403	0.982	0.600	0.193	0.519	0.213	0.353
	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.970	0.977	0.963	0.978	1.024	1.070	1.007	1.840
S.D.	0.001	0.005	0.005	0.008	0.003	0.001	0.015	0.064
% R.S.D.	0.153	0.511	0.511	0.853	0.292	0.054	1.487	3.454
	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.938	0.871	0.964	2.192	4.362	0.949	0.971	128.230
S.D.	0.008	0.014	0.003	0.017	0.017	0.003	0.001	0.523
% R.S.D.	0.897	1.558	0.360	0.768	0.397	0.324	0.104	0.408
	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.982	1.125	0.820	0.979	0.948	0.974	0.999	15.928
S.D.	0.003	0.005	0.002	0.012	0.004	0.002	0.006	0.042
% R.S.D.	0.331	0.460	0.305	1.184	0.379	0.173	0.554	0.263
	Mn	Sb	V	Be	Tl			
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)			
Mean	0.969	0.951	0.991	0.998	0.808			
S.D.	0.002	0.007	0.002	0.004	0.017			
% R.S.D.	0.187	0.693	0.198	0.358	2.049			

Identity 1: ccv Identity 2: ccv sst4 29b48 1:42 PM May 3, 1994

name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV.0

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	5.104	5.042	5.084	4.750	5.081	5.185	5.213	5.115
S.D.	0.004	0.006	0.001	0.004	0.007	0.009	0.008	0.013
% R.S.D.	0.080	0.120	0.024	0.075	0.138	0.177	0.154	0.253
	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	5.231	5.158	5.106	5.073	5.077	5.173	5.262	9.933
S.D.	0.006	0.005	0.012	0.011	0.011	0.011	0.028	0.035
% R.S.D.	0.115	0.096	0.243	0.211	0.216	0.212	0.529	0.356
	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	5.053	5.011	5.097	5.397	5.097	4.986	5.099	5.233
S.D.	0.017	0.006	0.006	0.037	0.020	0.010	0.028	0.017
% R.S.D.	0.334	0.120	0.126	0.687	0.383	0.194	0.540	0.323
	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	5.123	5.942	4.507	5.181	4.989	5.171	5.152	5.167
S.D.	0.016	0.006	0.032	0.008	0.007	0.006	0.016	0.038
% R.S.D.	0.314	0.099	0.707	0.162	0.137	0.124	0.309	0.731
	Mn	Sb	V	Be	Tl			
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)			
Mean	5.119	4.881	5.214	5.288	5.008			
S.D.	0.012	0.035	0.008	0.007	0.020			
% R.S.D.	0.235	0.712	0.154	0.137	0.394			

Identity 1: ccb-1 Identity 2: ccb 1:46 PM May 3, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV.0

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.001	0.002	0.014	0.002	0.012	0.004	-0.000	0.002
S.D.	0.001	0.000	0.008	0.001	0.007	0.001	0.000	0.000
% R.S.D.	213.261	11.236	58.991	27.294	61.146	18.075	408.630	8.444
	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.643	0.004	0.002	0.008	0.015	0.003	-0.001	-0.032
S.D.	0.032	0.001	0.002	0.001	0.000	0.001	0.009	0.057
% R.S.D.	5.026	25.662	66.130	14.723	3.041	22.081	886.369	178.294
	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.020	-0.006	0.002	0.003	0.154	0.015	0.003	0.161
S.D.	0.005	0.016	0.000	0.011	0.011	0.001	0.004	0.011
% R.S.D.	22.448	251.671	11.900	342.169	7.011	3.650	123.262	6.536
	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.003	0.008	0.310	0.007	0.001	0.002	0.002	-0.001
S.D.	0.001	0.004	0.020	0.006	0.000	0.001	0.001	0.028
% R.S.D.	36.367	53.721	6.327	93.763	30.907	26.571	71.748	5001.777
	Mn	Sb	V	Be	Tl			
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)			
Mean	-0.000	-0.038	0.001	0.001	-0.034			
S.D.	0.000	0.007	0.001	0.000	0.019			
% R.S.D.	96.377	18.915	83.540	11.932	57.929			

Identity 1: V62 sam Identity 2: 10ml in 50ml

1:50 PM May 3, 1994

WHC-SD-WM-DP-065, REV. 0

Tr name : TWC93

Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.005	0.002	0.000	2.925	10.823	0.004	0.119	0.024
S.D.	0.007	0.002	0.009	0.043	0.199	0.002	0.001	0.003
% R.S.D.	152.311	69.454	2572.669	1.458	1.836	53.866	0.505	11.118

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.026	0.014	-0.007	0.029	0.251	0.403	0.011	0.789
S.D.	0.001	0.003	0.004	0.002	0.005	0.004	0.021	0.318
% R.S.D.	3.848	20.678	62.393	8.726	1.996	1.018	184.853	40.363

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.018	-0.129	-0.000	5.308	16.114	0.011	0.003	599.992
S.D.	0.058	0.086	0.002	0.109	0.311	0.001	0.004	13.930
% R.S.D.	317.007	66.376	1559.559	2.045	1.929	5.793	111.120	2.322

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.030	0.034	0.021	0.013	-0.001	0.028	0.088	73.134
S.D.	0.001	0.014	0.005	0.007	0.003	0.001	0.002	1.704
% R.S.D.	4.690	40.871	23.212	51.908	507.110	4.630	1.940	2.331

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	-0.001	-0.005	0.003	0.001	-0.159
S.D.	0.001	0.005	0.004	0.001	0.108
% R.S.D.	154.350	95.695	127.762	89.266	67.918

Identity 1: V62 dup Identity 2: 10ml in 50ml 1:54 PM May 3, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV.0

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.000	0.002	-0.009	3.871	11.055	0.004	0.117	0.023
S.D.	0.001	0.000	0.023	0.018	0.042	0.001	0.000	0.000
% R.S.D.	1577.522	3.933	256.178	0.464	0.378	24.965	0.420	0.948

	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.041	0.014	-0.002	0.170	0.375	0.410	0.012	0.897
S.D.	0.000	0.001	0.003	0.002	0.002	0.002	0.008	0.027
% R.S.D.	0.781	5.342	136.457	1.445	0.420	0.600	66.439	3.064

	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.008	-0.088	0.001	5.389	16.368	0.018	0.005	609.410
S.D.	0.008	0.014	0.000	0.036	0.062	0.000	0.001	2.743
% R.S.D.	109.935	15.869	17.304	0.662	0.379	0.000	19.241	0.450

	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.031	-0.003	0.011	0.005	0.001	0.028	0.103	74.386
S.D.	0.000	0.014	0.001	0.003	0.001	0.001	0.001	0.380
% R.S.D.	0.855	473.712	9.078	67.728	121.030	4.191	0.564	0.511

	Mn	Sb	V	Be	Tl
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.004	-0.007	0.004	0.000	-0.121
S.D.	0.000	0.011	0.001	0.000	0.022
% R.S.D.	4.072	167.640	25.270	81.648	18.172

Identity 1: V63 sam Identity 2: 10ml in 50ml 1:59 PM May 3, 1994

WHC-SD-WM-DP-065, REV. 0

Task name : TWC93

Weight : 1.0000 Solution Volume : 1.00

On-peak Integrations : 3 Off-Peak Integrations : 1

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.002	0.003	-0.002	1.486	6.650	0.002	0.104	0.026
S.D.	0.003	0.000	0.007	0.005	0.023	0.000	0.001	0.001
% R.S.D.	124.068	10.498	305.874	0.331	0.348	8.003	0.998	3.055
	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.044	0.028	0.001	0.104	0.481	0.398	0.010	4.724
S.D.	0.001	0.002	0.001	0.002	0.003	0.001	0.018	0.165
% R.S.D.	1.404	6.635	50.159	2.025	0.600	0.254	174.970	3.488
	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.067	-0.053	0.003	4.481	12.870	0.026	0.013	523.116
S.D.	0.037	0.043	0.001	0.086	0.141	0.000	0.002	3.052
% R.S.D.	55.076	80.555	29.801	1.916	1.092	0.247	19.294	0.583
	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.030	0.008	0.012	0.014	0.001	0.028	0.133	41.728
S.D.	0.002	0.019	0.002	0.012	0.001	0.000	0.002	0.146
% R.S.D.	5.745	231.413	15.912	81.595	90.440	1.437	1.776	0.351
	Mn	Sb	V	Be	Tl			
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)			
Mean	0.003	0.025	0.000	0.000	-0.086			
S.D.	0.000	0.018	0.001	0.000	0.061			
% R.S.D.	9.075	69.686	5315.566	82.587	71.035			

Identity 1: V63 dup Identity 2: 10ml in 50ml 2:02 PM May 3, 1994

Task name : TWC93

WHC-SD-WM-DP-065, REV.0

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.005	0.002	0.009	2.132	6.833	-0.002	0.090	0.025
S.D.	0.001	0.000	0.015	0.016	0.047	0.001	0.000	0.000
% R.S.D.	32.359	12.104	157.516	0.772	0.688	69.848	0.067	1.951
	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.044	0.044	0.006	0.310	0.424	0.445	-0.022	5.037
S.D.	0.000	0.000	0.001	0.003	0.004	0.001	0.015	0.046
% R.S.D.	0.914	0.760	17.789	0.870	0.828	0.324	67.354	0.916
	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.005	0.001	0.004	4.579	13.366	0.032	-0.003	536.547
S.D.	0.021	0.028	0.000	0.037	0.139	0.000	0.003	4.188
% R.S.D.	458.114	3831.912	8.379	0.813	1.040	0.792	100.273	0.781
	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.031	0.003	0.012	0.002	0.004	0.027	1.079	42.682
S.D.	0.001	0.003	0.001	0.005	0.001	0.000	0.006	0.313
% R.S.D.	1.869	116.243	12.268	230.611	15.242	1.714	0.542	0.733
	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)			
Mean	0.004	-0.031	0.003	-0.000	-0.014			
S.D.	0.000	0.019	0.001	0.000	0.030			
% R.S.D.	4.244	60.876	22.739	43.906	209.178			

Identity 1: V62 dig spk Identity 2: 5ml in 50ml whc1&2

2:08 PM May 3, 1994

Task name : TWC93

Weight : 1.0000 Solution Volume : 1.00

WHC-SD-WM-DP-065, REV. 0

On Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	7.880	7.714	7.616	10.113	18.031	-0.001	0.095	8.083
S.D.	0.062	0.063	0.059	0.063	0.134	0.001	0.001	0.076
% R.S.D.	0.788	0.817	0.779	0.623	0.743	97.240	0.660	0.940

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.038	7.766	8.621	7.942	8.141	8.308	8.104	0.134
S.D.	0.001	0.051	0.073	0.073	0.068	0.055	0.051	0.042
% R.S.D.	1.861	0.662	0.843	0.915	0.832	0.665	0.626	31.465

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	7.799	7.820	7.858	12.843	21.854	7.635	7.890	525.605
S.D.	0.063	0.085	0.066	0.009	0.115	0.056	0.054	4.410
% R.S.D.	0.814	1.088	0.834	0.067	0.526	0.732	0.681	0.839

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	7.910	9.236	1.336	7.696	7.675	7.612	8.095	70.390
S.D.	0.060	0.037	0.020	0.046	0.060	0.039	0.059	0.666
% R.S.D.	0.753	0.395	1.530	0.602	0.785	0.511	0.731	0.946

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	7.801	7.392	-0.074	8.173	7.305
S.D.	0.052	0.031	0.001	0.061	0.044
% R.S.D.	0.667	0.424	0.704	0.745	0.605

Identity 1: V62 dig spk Identity 2: 5ml in 50ml sm-20

2:12 PM May 3, 1994

Task name : TWC93

WHC-SD-WM-DP-065, REV. 0

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.001	0.002	-0.118	1.990	10.682	9.274	9.767	0.021
S.D.	0.002	0.001	0.012	0.011	0.016	0.013	0.014	0.001
% R.S.D.	288.369	31.688	9.727	0.556	0.147	0.137	0.147	5.737

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Hd (ug/mL)	U (ug/mL)
Mean	9.424	9.191	-0.014	9.168	0.357	9.298	-0.025	1.339
S.D.	0.007	0.016	0.003	0.011	0.000	0.007	0.008	0.080
% R.S.D.	0.071	0.171	22.449	0.116	0.069	0.075	33.289	5.988

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.026	-0.019	0.003	5.567	16.855	0.019	0.012	617.351
S.D.	0.013	0.020	0.001	0.042	0.085	0.001	0.005	0.682
% R.S.D.	51.357	107.468	30.592	0.747	0.507	3.879	44.369	0.110

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.026	0.420	2.892	0.013	0.003	9.141	0.093	75.386
S.D.	0.001	0.017	0.085	0.005	0.001	0.016	0.003	0.039
% R.S.D.	4.027	4.158	2.942	36.565	40.340	0.176	3.285	0.052

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	9.484	0.001	9.540	0.002	-0.049
S.D.	0.006	0.009	0.007	0.001	0.017
% R.S.D.	0.060	637.042	0.072	29.687	34.445

Identity 1: V62 dup dig spike Identity 2: 5ml in 50ml whc1&2

2:16 PM May 3, 1994

Trace name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

WHC-SD-WM-DP-065, REV. 0

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	7.577	7.425	7.331	10.073	17.455	-0.003	0.094	7.888
S.D.	0.064	0.065	0.087	0.015	0.083	0.000	0.001	0.048
% R.S.D.	0.846	0.879	1.186	0.151	0.478	10.358	1.139	0.610
	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.041	7.452	8.284	7.618	7.852	7.976	7.826	0.028
S.D.	0.000	0.043	0.064	0.053	0.066	0.058	0.074	0.104
% R.S.D.	0.415	0.572	0.772	0.696	0.836	0.724	0.942	364.752
	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	7.439	7.457	7.567	12.347	20.996	7.352	7.568	510.304
S.D.	0.036	0.056	0.065	0.236	0.234	0.049	0.060	3.247
% R.S.D.	0.488	0.750	0.861	1.911	1.115	0.669	0.790	0.636
	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	7.587	8.792	1.434	7.363	7.384	7.263	7.851	68.711
S.D.	0.053	0.053	0.033	0.026	0.059	0.065	0.064	0.300
% R.S.D.	0.703	0.607	2.312	0.350	0.804	0.893	0.817	0.437
	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)			
Mean	7.505	7.091	-0.071	7.844	7.032			
S.D.	0.059	0.103	0.001	0.063	0.011			
% R.S.D.	0.787	1.451	1.411	0.802	0.155			

Identity 1: V62 dup dig spike Identity 2: 5ml in 50ml sm-20

2:19 PM May 3, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

WHC-SD-WM-DP-065, REV. 0

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.000	0.003	-0.158	2.891	10.398	9.070	9.347	0.023
S.D.	0.001	0.000	0.007	0.006	0.022	0.020	0.004	0.000
% R.S.D.	269.502	10.897	4.319	0.196	0.216	0.217	0.038	1.188

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	9.158	8.939	-0.011	8.986	0.223	9.047	0.001	1.156
S.D.	0.014	0.020	0.001	0.035	0.000	0.018	0.009	0.043
% R.S.D.	0.158	0.222	4.823	0.392	0.194	0.194	889.134	3.700

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.005	-0.056	0.003	5.511	16.513	0.017	0.015	598.757
S.D.	0.009	0.020	0.000	0.025	0.046	0.000	0.002	0.263
% R.S.D.	183.707	35.026	8.076	0.459	0.279	2.849	13.796	0.044

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.025	0.360	0.483	0.010	0.003	8.848	0.101	72.256
S.D.	0.001	0.015	0.047	0.005	0.000	0.027	0.001	0.073
% R.S.D.	3.730	4.157	9.663	45.681	5.531	0.301	0.734	0.102

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	9.207	0.009	9.218	0.002	-0.090
S.D.	0.007	0.008	0.007	0.000	0.024
% R.S.D.	0.077	92.551	0.073	21.044	26.165

Identity 1: ccv-2 Identity 2: ccv

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WHC-SD-WM-DP-065, REV. 0

Task name : TWC93

e Weight : 1.0000 Solution Volume : 1.00

On-peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	4.982	4.908	4.991	4.680	4.963	5.081	5.083	4.983
S.D.	0.015	0.025	0.019	0.014	0.011	0.018	0.022	0.033
% R.S.D.	0.301	0.512	0.379	0.303	0.228	0.348	0.435	0.670

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	5.144	5.058	4.980	4.986	4.946	5.062	5.092	9.794
S.D.	0.012	0.006	0.007	0.028	0.023	0.016	0.007	0.088
% R.S.D.	0.231	0.111	0.148	0.570	0.475	0.321	0.147	0.900

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	4.931	4.965	4.958	5.267	5.057	4.884	4.998	5.137
S.D.	0.011	0.009	0.026	0.108	0.038	0.016	0.039	0.014
% R.S.D.	0.219	0.173	0.517	2.057	0.752	0.327	0.789	0.279

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	5.014	5.803	5.044	5.085	4.868	5.066	5.039	5.430
S.D.	0.018	0.045	0.035	0.024	0.020	0.004	0.018	0.047
% R.S.D.	0.366	0.770	0.687	0.467	0.413	0.069	0.363	0.872

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	5.011	4.823	5.097	5.175	4.942
S.D.	0.012	0.054	0.015	0.018	0.027
% R.S.D.	0.236	1.128	0.289	0.339	0.539

Identity 1: ccb-2 Identity 2: ccb 2:30 PM May 3, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV.0

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.003	0.001	-0.000	-0.005	0.004	0.002	-0.001	0.001
S.D.	0.004	0.001	0.021	0.006	0.012	0.001	0.002	0.002
% R.S.D.	114.821	72.480	7115.431	108.779	283.722	61.471	267.070	123.419
	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.307	-0.002	-0.002	0.005	0.008	0.004	-0.004	-0.203
S.D.	0.002	0.003	0.003	0.002	0.001	0.002	0.024	0.166
% R.S.D.	0.604	185.033	126.960	48.387	9.397	57.588	589.138	81.475
	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.024	-0.042	0.000	-0.014	0.109	0.007	-0.001	0.124
S.D.	0.028	0.043	0.001	0.005	0.006	0.001	0.003	0.018
% R.S.D.	112.758	103.348	278.555	39.414	5.167	8.060	331.158	14.634
	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.001	0.002	0.246	0.001	0.000	0.001	0.004	0.166
S.D.	0.001	0.016	0.005	0.007	0.002	0.001	0.002	0.049
% R.S.D.	130.000	848.885	2.101	1196.006	2978.716	100.401	59.994	29.300
	Mn	Sb	V	Be	Tl			
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)			
Mean	-0.001	-0.029	0.000	0.001	-0.063			
S.D.	0.001	0.017	0.002	0.001	0.050			
% R.S.D.	59.318	60.100	2492.153	85.149	80.011			

Identity 1: icsa-f Identity 2: icsa

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WHC-SD-WM-DP-065, REV.0

Peak name : TWC93

a Weight : 1.0000 Solution Volume : 1.00

On-peak Integrations : 3 Off-Peak Integrations : 1

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.006	0.000	0.006	-0.001	50.246	0.000	-0.003	-0.000
S.D.	0.001	0.000	0.013	0.004	0.184	0.000	0.001	0.000
% R.S.D.	19.850	164.526	239.460	256.294	0.366	121.454	15.838	82.990
	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.026	-0.000	-0.006	0.003	0.002	-0.002	-0.000	-0.299
S.D.	0.000	0.002	0.001	0.001	0.000	0.001	0.004	0.042
% R.S.D.	0.189	8240.334	19.791	29.739	3.261	48.321	802.188	14.134
	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.032	-0.088	-0.001	-0.001	0.038	-0.001	0.001	0.116
S.D.	0.011	0.013	0.000	0.007	0.005	0.000	0.005	0.004
% R.S.D.	34.876	15.139	15.274	869.675	13.683	20.377	519.398	3.012
	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.001	0.004	0.189	-0.011	-0.002	0.000	0.001	0.127
S.D.	0.000	0.011	0.004	0.008	0.000	0.000	0.001	0.019
% R.S.D.	43.301	260.947	1.932	71.970	17.023	130.779	74.903	15.127
	Mn	Sb	V	Be	Tl			
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)			
Mean	-0.003	-0.007	-0.002	0.000	-0.091			
S.D.	0.000	0.009	0.001	0.000	0.006			
% R.S.D.	6.318	120.054	47.426	16.571	6.340			

Identity 1: icsab-f Identity 2: icsab

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WHC-SD-WM-DP-065, REV. 0

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.007	-0.000	0.003	-0.002	49.650	0.501	0.510	-0.001
S.D.	0.001	0.000	0.013	0.005	0.290	0.002	0.002	0.001
% R.S.D.	22.539	219.936	410.614	249.178	0.584	0.300	0.375	212.291

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.987	0.993	-0.009	0.006	0.002	0.501	-0.010	-0.375
S.D.	0.003	0.002	0.001	0.001	0.000	0.003	0.006	0.123
% R.S.D.	0.321	0.172	12.135	12.540	2.062	0.542	55.726	32.672

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.044	-0.096	0.485	0.018	0.022	-0.000	-0.003	0.126
S.D.	0.023	0.032	0.002	0.013	0.003	0.000	0.001	0.017
% R.S.D.	52.956	32.955	0.435	75.170	14.127	13.323	47.832	13.647

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.001	-0.007	1.093	0.982	-0.002	0.992	0.001	0.113
S.D.	0.000	0.012	0.003	0.004	0.001	0.004	0.001	0.043
% R.S.D.	14.139	165.134	0.305	0.451	46.439	0.355	128.681	38.207

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.492	0.002	0.496	0.503	-0.122
S.D.	0.002	0.029	0.002	0.002	0.043
% R.S.D.	0.324	1889.307	0.371	0.386	34.852

Identity 1: xxx Identity 2: rinse

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WHC-SD-WM-DP-065, REV.0

Tr name : TWC93

Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.003	0.000	0.008	-0.008	0.018	0.003	-0.001	0.001
S.D.	0.001	0.000	0.016	0.002	0.004	0.001	0.001	0.001
% R.S.D.	41.260	22.853	197.895	30.126	19.758	28.395	70.553	62.239

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.302	0.002	-0.005	-0.001	0.006	0.002	0.025	-0.192
S.D.	0.001	0.002	0.001	0.000	0.000	0.001	0.006	0.079
% R.S.D.	0.268	113.422	12.617	32.301	0.000	39.456	23.251	41.308

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.028	-0.055	-0.001	0.001	0.084	0.006	-0.000	0.129
S.D.	0.012	0.015	0.000	0.010	0.004	0.000	0.002	0.006
% R.S.D.	43.089	27.804	32.157	725.831	5.123	1.037	485.631	4.879

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.001	0.002	0.141	0.020	-0.001	0.001	0.001	0.169
S.D.	0.001	0.005	0.002	0.006	0.000	0.000	0.001	0.027
% R.S.D.	88.126	281.606	1.438	32.545	36.226	17.353	193.567	15.861

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	-0.003	0.017	-0.001	-0.000	-0.084
S.D.	0.000	0.015	0.001	0.000	0.030
% R.S.D.	7.883	92.635	67.905	37.310	35.123

Identity 1: V64 ccv-3 Identity 2: sst4 29b48 2:46-PM May 3, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV. 0

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	4.874	4.807	4.900	4.591	4.874	5.006	4.976	4.886
S.D.	0.025	0.028	0.036	0.016	0.023	0.019	0.027	0.034
% R.S.D.	0.510	0.587	0.737	0.353	0.472	0.389	0.549	0.702
	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	5.078	4.976	4.848	4.883	4.833	4.977	4.949	9.367
S.D.	0.016	0.018	0.027	0.037	0.028	0.023	0.028	0.070
% R.S.D.	0.315	0.356	0.548	0.758	0.576	0.463	0.559	0.749
	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	4.823	4.835	4.849	5.224	4.959	4.810	4.936	4.987
S.D.	0.014	0.019	0.029	0.061	0.040	0.021	0.008	0.022
% R.S.D.	0.287	0.394	0.605	1.165	0.810	0.443	0.158	0.431
	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	4.946	5.707	4.929	4.998	4.777	4.984	4.935	5.088
S.D.	0.025	0.052	0.020	0.017	0.023	0.016	0.029	0.028
% R.S.D.	0.500	0.909	0.403	0.346	0.481	0.312	0.581	0.547
	Mn	Sb	V	Be	Tl			
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)			
Mean	4.919	4.689	4.993	5.093	4.759			
S.D.	0.019	0.038	0.023	0.025	0.021			
% R.S.D.	0.388	0.816	0.467	0.483	0.450			

Identity 1: ccb-3 Identity 2: ccb

2:50 PM May 3, 1994

WHC-SD-WM-DP-065, REV. 0

Task name : TWC93

e Weight : 1.0000 Solution Volume : 1.00

On-peak Integrations : 3 Off-Peak Integrations : 1

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.001	0.002	0.010	-0.003	0.007	0.004	-0.001	0.001
S.D.	0.000	0.000	0.014	0.001	0.004	0.000	0.000	0.000
% R.S.D.	31.890	3.196	149.904	35.278	63.362	7.770	35.733	20.574
	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.433	0.001	0.002	0.002	0.018	0.002	0.001	-0.108
S.D.	0.001	0.001	0.003	0.002	0.000	0.001	0.009	0.049
% R.S.D.	0.251	45.658	164.090	105.317	0.368	26.061	623.653	45.163
	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.011	-0.034	0.002	-0.006	0.122	0.011	0.001	0.097
S.D.	0.006	0.005	0.000	0.009	0.004	0.000	0.003	0.003
% R.S.D.	57.987	14.521	8.489	157.815	2.985	0.000	560.421	3.125
	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.002	0.001	0.151	-0.004	0.002	0.002	0.002	0.080
S.D.	0.001	0.005	0.000	0.002	0.000	0.000	0.002	0.024
% R.S.D.	48.295	477.186	0.250	58.397	14.824	12.444	88.877	29.667
	Mn	Sb	V	Be	Tl			
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)			
Mean	-0.000	-0.013	0.002	0.002	-0.036			
S.D.	0.000	0.010	0.000	0.000	0.020			
% R.S.D.	190.023	75.634	14.342	10.608	54.966			

Handwritten signature
5-3-94
cc-11/17
cc-11/17
cc-11/17

Westinghouse
Hanford Company

P.O. Box 1970 Richland, WA 99352

V65A

CASE NARRATIVE - ICP

WHC-SD-WM-DP-065, REV. 0

WHC-AS LABORATORIES

WHC-AS CUSTOMER SAMPLE NOS: V67 108-AP

V68 108-AP

INORGANIC ANALYSIS V69 108-AP

The data evaluation for this project will follow the guidelines specified in "Technical Project Plan for the 222-S Laboratory in Support of Tank Waste Remediation System Tank Waste Characterization Plan (WHC-SD-WM-PLN-047, REV.0) and Statement of Work (WHC-SOW-93-0002)." Contained in this report is the evaluation of the data generated by Westinghouse Hanford Company - Analytical Services (WHC-AS), 222-S Laboratory. Information will be organized by quality control parameter. No computer-readable data will be submitted on floppy diskette as mentioned in the comment on the following cover page.

INITIAL AND CONTINUING CALIBRATION VERIFICATION

All calibration verification standard recoveries were within 90-110%.

INITIAL AND CONTINUING CALIBRATION BLANKS

All ICB and CCB analytical measurements were between +IDL and -IDL with the exception of Silver in CCB-1 and CCB-2, Sodium in CCB-1, CCB-2 and CCB-3 and Zinc in all calibration blanks. High values for Sodium are attributed to carryover from samples. No impact on data quality is indicated. Silver has been shown to carryover from digested standards. False positives for Silver in the samples are indicated. False positives are also indicated for Zinc.

PREPARATION BLANK

No contamination is indicated.

DUPLICATE ANALYSES

Relative Percent Difference values exceeding 20% were noted as follows: For V67, Silver (140.9%); for V68, Cadmium (33.2%), Calcium (41.4%), Iron (43.4%), Lead (196.2%), Magnesium (57.5%) and Zinc (43.6%); for V69, Calcium (41.1%), Iron (35.6%), Magnesium (31.2%), Manganese (23.3%) and Silver (21.9%). No acceptance criteria apply to the duplicate analysis.

LABORATORY CONTROL SAMPLE

A failure was noted for Silver (45.4%). Low recoveries for Silver may be attributed to matrix effects of the digestion process.

ABBREVIATIONS

* = Duplicate failure. E = Serial dilution failure. N = Spike failure. NR = Not required. P = ICP method used. U = less than IDL.

Brian Wells

Brian Wells 5/10/94
Senior Scientist, WHC-AS

910

WHC-SD-WM-DP-065, REV. 0

SOW No.: ILM02

911

1
INORGANIC ANALYSES DATA SHEET

V67

Concentration Units (ug/L or mg/kg dry weight): UG/L

[illegible]

Color Before: _____ Clarity Before: _____ Texture: _____
Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

1
INORGANIC ANALYSES DATA SHEET

V68

Concentration Units (ug/L or mg/kg dry weight): UG/L

WHC-SD-WM-DP-065, REV. 0

Comments:

1
INORGANIC ANALYSES DATA SHEET

V69

Concentration Units (ug/L or mg/kg dry weight): UG/L

WHC-SD-WM-DP-065, REV. 0

[illegible]

Comments:

WHC-SD-WM-DP-065, REV. 0

WHC-SD-WM-DP-065, REV. 0

Aqueous LCS Source: PLASMACHEM

915

11A
ICP Interelement Correction Factors (Annually)

Lab Name: WHC _____ Contract: _____

Lab Code: _____ Case No.: 108AP SAS No.: _____ SDG No.: V65A

ICP ID Number: ICP-1(ARL) / Date: 02/09/94

[illegible]

Comments:

12
ICP Linear Ranges (Quarterly)

Lab Name: WHC _____ Contract: _____

Lab Code: _____ Case No.: 108AP SAS No.: _____ SDG No.: V65A_____

ICP ID Number: ICP-1(ARL)____ Date: 03/31/94

[illegible]

Comments:

13
PREPARATION LOG

Lab Name: WHC _____

Contract: _____

Lab Code: _____ Case No.: 108AP

SAS No.: _____ SDG No.: V65A _____

[illegible]

Lab Name: WHC_____

Contract: _____

Lab Code: _____ Case No.: 108AP_

SAS No.: _____ SDG No.: V65A_

Instrument ID Number: ICP-1(ARL)_____

Method: P_

Start Date: 04/28/94

End Date: 04/28/94

EPA Sample No.	D/F	Time	% R	Analytes																			
				A L	B A	C D	C A	C R	F E	P B	M G	M N	A G	N A	Z N								
WP-284	1.00	1327		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ICV	1.00	1331		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
ICB	1.00	1334		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
ICSA-I	1.00	1338		X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RINSE	1.00	1341														-	-	-	-	-	-	-	-
V66PB	1.00	1345		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
V65LCS	1.00	1349		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
V65LCS1	1.00	1353		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
V67L	1.00	1358		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
	1.00	1401		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
	1.00	1404		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
V67A	1.00	1408		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
CCV-1	1.00	1413		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
CCB-1	1.00	1417		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
V67	1.00	1422		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
V67D	1.00	1426		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
V68	1.00	1430		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
V68D	1.00	1433		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
V69	1.00	1437		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
V69D	1.00	1440		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
CCV-2	1.00	1446		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
CCB-2	1.00	1450		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
ICSA-F	1.00	1453		X												-	-	-	-	-	-	-	-
ICSAB-F	1.00	1456		X	X	X		X		X		X	X		X	-	-	-	-	-	-	-	-
RINSE	1.00	1500														-	-	-	-	-	-	-	-
V70	1.00	1505		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
CCB-3	1.00	1508		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-
				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

EPA SAMPLE NO.

Lab Name: WHC

Contract:

V67D

Lab Code:

Case No.: 108AP

SAS No.:

SDG No.: V65A

Matrix (soil/water): WATER

Level (low/med): LOW

% Solids for Sample: 0.0

% Solids for Duplicate: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

WHC-SD-WM-DP-065, REV. 0

[illegible]

EPA SAMPLE NO.

V68D

Lab Name: WHC Contract:

Lab Code: Case No.: 108AP SAS No.: SDG No.: V65A

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0 % Solids for Duplicate: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

[illegible]

EPA SAMPLE NO.

Lab Name: WHC _____ Contract: _____

V69D

Lab Code: _____ Case No.: 108AP SAS No.: _____ SDG No.: V65A_____

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0 % Solids for Duplicate: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

[illegible]

WHC-SD-WM-DP-065, REV. 0

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

92-1

9
ICP SERIAL DILUTION

V67L

Level (low/med): LOW

Concentration Units: ug/L

[illegible]

EPA SAMPLE NO.

Lab Name: WHC _____ Contract: _____

V68L

Lab Code: _____ Case No.: 108AP SAS No.: _____ SDG No.: V65A_____

Matrix (soil/water): WATER

Level (low/med): LOW

WHC-SD-WM-DP-065, REV. 0

Concentration Units: ug/L

[illegible]

U.S. EPA - CLP

9
ICP SERIAL DILUTION

EPA SAMPLE NO.

V69L

Lab Name: WHC Contract: _____

Lab Code: Case No.: 108AP SAS No.: SDG No.: V65A

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

WHC-SD-WM-DP-065, REV. 0

[illegible]

10

Lab Name: WHC
Lab Code: _____ Case No.: I08AP
ICP ID Number: _____ ICP-1(ARL)____
Flame AA ID Number : _____
Furnace AA ID Number : _____

Contract: _____
SAS No.: _____ SDG No.: V65A____
Date: 04/27/94

WHC-SD-WM-DP-065 RE

WHC-SD-WM-DP-065, REV. 0

[illegible]

Comments:

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No V 65.-5550	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority 26
Determination ICP	Method/Standard LA-505-151	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size <i>b/c 4-1-94</i> <i>5-1-94 SST4 (ICV) 29648</i>			Customer ID STD	
Remarks, Calculations, Results LMCS CHECK SAMPLE COMPLETED <u>4/28/94</u> SEE WARD'S PACKAGE WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date <i>4-28-94</i>	Time Completed <i>07:00</i>	Lab Unit Mgr <i>5-9-94</i> <i>Brian Wela</i>		<i>[Signature]</i> <i>4-28-94</i>

Batch 3008

Serial No V 65.-8550	Sample Point 108-AP	Date 3-18-94	Time Issued 9:37	Priority 26
Determination ICP	Method/Standard LA-505-151	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size <i>5-1-94 SST4 (ICV) 29648</i> <i>WHC-1</i> <i>WHC-2</i> <i>WHC-3</i>			Customer ID STD	
Remarks, Calculations, Results 1st STD Digested STD COMPLETED <u>4/28/94</u> SEE WARD'S PACKAGE				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date <i>4-28-94</i>	Time Completed <i>07:00</i>	Lab Unit Mgr <i>5-9-94</i> <i>Brian Wela</i>		<i>[Signature]</i> <i>4-28-94</i>

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No V 66.-8650	Sample Point 108-AP	Date 3-18-94	Time Issued 9:38	Priority 26
Determination ICP	Method: Standard LA-505-151	Result Units uG/L	Charge Code N1A7F	Reruns 0
Sample Size DIRECT			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK <div style="text-align: right;">COMPLETED <u>4/28/94</u> SEE WARD'S PACKAGE</div> <div style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</div>				
Analyst - 1 <i>B. Ward</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-28-94	Time Completed 0800	Lab Unit Mgr 5-9-94 <i>Brian Wela</i>	4-28-94	

Serial No V 67.-8750	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination ICP	Method: Standard LA-505-151	Result Units uG/L	Charge Code N1A7F	Reruns 0
Sample Size 10 mL, 50 mL, 1 mL - 4 mL			Customer ID 108-AP-C	
Remarks, Calculations, Results <div style="text-align: right;">COMPLETED <u>4/28/94</u> SEE WARD'S PACKAGE</div>				
Analyst - 1 <i>B. Ward</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-28-94	Time Completed 0800	Lab Unit Mgr 5-9-94 <i>Brian Wela</i>	4-28-94	

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No V 67.-8850	Sample Point 108-AP	Date 3-18-94	Time Issued 9:39	Priority 26
Determination ICP	Method/Standard LA-505-151	Result Units uG/L	Charge Code N1A7F	Reruns 0
Sample Size 10ml in 50ml			Customer ID 108-AP-C	
Remarks Calculations, Results DUPLICATE SAMPLE COMPLETED <u>4/28/94</u> SEE WARD'S PACKAGE WHC-SD-WM-DP-065, REV.0				
Analyst - 1 <i>B. Ward</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-28-94	Time Completed 08:00	Lab Unit Mgr 5-9-94 <i>Brian Wells</i>	<i>B. Ward</i> 4-29-94	

Serial No V 68.-8750	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination ICP	Method/Standard LA-505-151	Result Units uG/L	Charge Code N1A7F	Reruns 0
Sample Size 10ml in 50ml, 10L-4ml			Customer ID 108-AP-D	
Remarks Calculations Results COMPLETED <u>4/28/94</u> SEE WARD'S PACKAGE				
Analyst - 1 <i>B. Ward</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-28-94	Time Completed 08:00	Lab Unit Mgr 5-9-94 <i>Brian Wells</i>	<i>B. Ward</i> 4-29-94	

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No V 68.-8850	Sample Point 108-AP	Date 3-18-94	Time Issued 9:40	Priority 26
Determination ICP	Method/Standard LA-505-151	Result Units uG/L	Charge Code N1A7F	Reruns 0
Sample Size <i>10 mL in 20 mL</i>			Customer ID 108-AP-D	
Remarks, Calculations, Results DUPLICATE SAMPLE COMPLETED <u>4/28/94</u> SEE WARD'S PACKAGE WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date <i>4-28-94</i>	Time Completed <i>08:00</i>	Lab Unit Mgr <i>Brian Wells</i>	<i>4-29-94</i>	

Serial No V 69.-8750	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination ICP	Method/Standard LA-505-151	Result Units uG/L	Charge Code N1A7F	Reruns 0
Sample Size <i>10 mL in 50 mL, 1 mL - 4 mL</i>			Customer ID 108-AP-E	
Remarks, Calculations, Results COMPLETED <u>4/28/94</u> SEE WARD'S PACKAGE				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date <i>4-28-94</i>	Time Completed <i>08:00</i>	Lab Unit Mgr <i>Brian Wells</i>	<i>4-29-94</i>	

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No V 69.-8850	Sample Point 108-AP	Date 3-18-94	Time Issued 9:42	Priority 26
Determination ICP	Method/Standard LA-505-151	Result Units uG/L	Charge Code N1A7F	Reruns 0
Sample Size 10.00 1.50.00			Customer ID 108-AP-E	
Remarks. Calculations Results DUPLICATE SAMPLE COMPLETED <u>4/28/94</u> SEE WARD'S PACKAGE WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>B. J. [Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-28-94	Time Completed 0800	Lab Unit Mgr 5-9-94 <i>Brian Wela</i>	4-28-94	

Serial No V 70.-5550	Sample Point 108-AP	Date 3-18-94	Time Issued 9:44	Priority 26
Determination ICP	Method/Standard LA-505-151	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size SSTY (CCV) 29648			Customer ID STD	
Remarks. Calculations Results LMCS CHECK SAMPLE COMPLETED <u>4/28/94</u> SEE WARD'S PACKAGE				
Analyst - 1 <i>B. J. [Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-28-94	Time Completed 0800	Lab Unit Mgr 5-9-94 <i>Brian Wela</i>	4-28-94	

Sample 1: wp-284 Identity 2: wp-284
name : TWC93

1:26 PM April 28, 1994

WHC-SD-WM-DP-065, REV. 0

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.001	0.001	-0.009	0.368	0.137	0.047	0.010	0.001
S.D.	0.001	0.000	0.009	0.001	0.004	0.001	0.000	0.000
% R.S.D.	114.454	10.615	99.379	0.297	2.714	2.515	2.117	32.050
	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	-0.014	0.019	0.001	0.027	0.028	0.007	-0.006	0.001
S.D.	0.000	0.001	0.002	0.003	0.000	0.001	0.007	0.056
% R.S.D.	1.424	4.493	152.041	10.114	0.984	21.336	113.205	3821.317
	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.055	-0.005	0.028	0.015	0.128	0.000	0.030	0.114
S.D.	0.006	0.014	0.000	0.007	0.006	0.000	0.003	0.003
% R.S.D.	11.746	303.918	0.176	50.307	4.937	57.735	9.427	2.727
	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.002	0.017	0.000	0.054	0.000	0.011	0.040	-0.023
S.D.	0.000	0.011	0.001	0.004	0.000	0.000	0.001	0.029
% R.S.D.	11.565	63.973	172.593	8.174	317.741	2.667	1.767	126.616
	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)			
Mean	0.012	-0.032	0.133	0.029	0.003			
S.D.	0.000	0.016	0.001	0.000	0.009			
% R.S.D.	1.141	50.076	0.650	0.968	301.210			

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 19 TO 19.

Identity 1: ICV Identity 2: Quality Control 1:30 PM April 28, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV. 0

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	4.802	4.705	4.805	4.551	4.734	4.867	4.940	4.840
S.D.	0.076	0.080	0.084	0.057	0.066	0.065	0.076	0.068
% R.S.D.	1.580	1.691	1.751	1.251	1.399	1.335	1.543	1.404
	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	5.006	4.844	4.797	4.777	4.728	4.854	5.024	9.029
S.D.	0.062	0.058	0.068	0.058	0.076	0.073	0.087	0.029
% R.S.D.	1.243	1.207	1.416	1.224	1.610	1.494	1.728	0.325
	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	4.678	4.700	4.755	5.242	4.846	4.708	4.777	4.814
S.D.	0.047	0.063	0.082	0.091	0.085	0.064	0.061	0.052
% R.S.D.	1.004	1.335	1.716	1.740	1.747	1.368	1.282	1.087
	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	4.800	5.343	4.817	4.892	4.657	4.863	4.909	4.835
S.D.	0.069	0.065	0.068	0.069	0.074	0.068	0.065	0.007
% R.S.D.	1.431	1.221	1.419	1.402	1.597	1.397	1.323	0.137
	Mn	Sb	V	Be	Tl			
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)			
Mean	4.826	4.663	4.860	4.932	4.785			
S.D.	0.072	0.080	0.072	0.070	0.017			
% R.S.D.	1.488	1.720	1.484	1.429	0.350			

Identity 1: ICB Identity 2: Quality Control

1:33 PM April 28, 1994

Task name : TWC93

WHC-SD-WM-DP-065, REV. 0

Sample Weight : 1.0000 Solution Volume : 1.00

Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.002	0.000	0.004	-0.003	-0.000	0.002	-0.000	0.001
S.D.	0.000	0.000	0.007	0.003	0.002	0.001	0.000	0.001
% R.S.D.	23.361	7.617	188.955	81.790	518.086	41.429	255.594	57.245

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.010	0.000	0.002	-0.001	0.001	0.000	0.005	-0.109
S.D.	0.000	0.001	0.002	0.000	0.000	0.002	0.009	0.011
% R.S.D.	2.732	873.345	106.141	33.410	5.096	507.782	192.930	10.382

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.000	-0.019	0.000	0.006	0.004	0.001	0.009	0.004
S.D.	0.004	0.007	0.000	0.002	0.004	0.000	0.001	0.002
% R.S.D.	6726.200	37.107	4053.506	32.289	83.577	20.000	12.065	43.282

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.000	0.005	0.000	0.003	0.000	0.001	0.004	-0.015
S.D.	0.000	0.014	0.000	0.003	0.000	0.000	0.002	0.007
% R.S.D.	86.603	288.020	696.238	97.431	37.314	51.619	40.271	43.708

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	-0.000	-0.000	0.003	0.001	-0.021
S.D.	0.000	0.010	0.001	0.000	0.011
% R.S.D.	184.679	9326.050	20.248	19.013	52.619

Identity 1: icsa-i Identity 2: icsa-i 1:37 PM April 28, 1994
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV.0

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.002	-0.000	0.006	0.007	49.842	0.001	-0.002	-0.002
S.D.	0.001	0.000	0.007	0.003	0.207	0.000	0.001	0.000
% R.S.D.	57.535	38.792	115.280	36.206	0.415	16.694	47.389	13.880
	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.025	-0.001	-0.000	-0.002	-0.001	-0.002	-0.043	-0.043
S.D.	0.000	0.002	0.001	0.001	0.000	0.002	0.011	0.078
% R.S.D.	1.700	296.388	293.230	44.259	11.175	81.488	24.486	182.873
	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.001	-0.006	-0.000	0.025	0.012	-0.000	-0.002	0.059
S.D.	0.012	0.015	0.000	0.009	0.002	0.000	0.002	0.010
% R.S.D.	1393.740	267.922	453.827	34.914	17.299	99.999	106.633	16.918
	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.001	0.003	-0.000	-0.002	0.000	-0.000	0.002	-0.030
S.D.	0.000	0.007	0.001	0.003	0.001	0.000	0.001	0.030
% R.S.D.	11.538	234.818	292.365	154.227	161.186	117.149	65.913	99.233
	Mn	Sb	V	Be	Tl			
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)			
Mean	-0.001	-0.031	0.002	0.000	-0.004			
S.D.	0.000	0.016	0.000	0.000	0.033			
% R.S.D.	30.005	50.929	23.342	33.521	749.587			

Identity 1: xxx Identity 2: rinse

1:40 PM April 28, 1994

WHC-SD-WM-DP-065, REV. 0

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.001	-0.000	0.016	0.024	-0.000	0.000	0.000	-0.001
S.D.	0.006	0.001	0.021	0.037	0.026	0.003	0.003	0.002
% R.S.D.	490.661	192.432	134.358	153.299	50555.923	1170.488	1236.027	131.334

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.034	0.003	-0.000	-0.003	-0.000	-0.002	-0.048	0.170
S.D.	0.010	0.002	0.006	0.003	0.001	0.002	0.018	0.332
% R.S.D.	28.453	54.602	1968.777	105.824	289.195	103.113	36.570	195.201

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.026	0.031	0.001	-0.002	0.012	0.000	0.001	-0.002
S.D.	0.054	0.084	0.001	0.009	0.012	0.000	0.004	0.025
% R.S.D.	204.273	266.384	186.629	402.800	103.572	26.647	545.836	1213.514

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.001	-0.019	0.002	-0.011	0.001	-0.000	0.005	0.011
S.D.	0.001	0.018	0.004	0.007	0.002	0.001	0.007	0.096
% R.S.D.	70.874	97.164	181.769	67.792	255.081	483.890	135.664	901.473

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	-0.000	-0.035	0.003	-0.000	0.049
S.D.	0.000	0.013	0.003	0.000	0.101
% R.S.D.	40.696	37.841	105.905	427.785	207.444

Identity 1: V66 dig blk Identity 2: direct 1:45 PM April 28, 1994

Task name : TWC93

WHC-SD-WM-DP-065, REV. 0

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.002	0.000	0.003	0.008	0.008	0.001	0.002	0.001
S.D.	0.002	0.000	0.007	0.005	0.008	0.001	0.001	0.001
% R.S.D.	125.421	305.758	285.616	58.818	104.609	143.074	66.518	106.513
	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.015	-0.002	-0.001	0.008	0.015	0.005	-0.007	-0.017
S.D.	0.000	0.002	0.004	0.002	0.000	0.001	0.021	0.127
% R.S.D.	2.277	105.416	302.573	29.223	1.216	28.872	315.534	743.825
	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.001	0.003	0.000	0.018	0.012	0.000	0.003	0.022
S.D.	0.029	0.036	0.001	0.010	0.004	0.000	0.000	0.011
% R.S.D.	4821.448	1396.082	382.319	53.816	36.279	0.000	15.379	50.166
	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.000	0.007	0.004	0.023	0.000	-0.001	0.005	0.199
S.D.	0.001	0.003	0.002	0.007	0.001	0.001	0.002	0.045
% R.S.D.	173.205	44.634	42.578	29.339	446.307	125.868	41.496	22.880
	Mn	Sb	V	Be	Tl			
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)			
Mean	-0.001	-0.025	0.002	0.000	0.014			
S.D.	0.000	0.012	0.002	0.000	0.039			
% R.S.D.	8.199	50.368	63.956	164.878	271.284			

Identity 1: V65 dig std whc1&2 Identity 2: 5ml in 50ml

1:49 PM April 28, 1994

Task name : TWC93

Weight : 1.0000 Solution Volume : 1.00

WHC-SD-WM-DP-065, REV. 0

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	9.632	9.459	9.322	9.048	9.880	-0.004	0.001	9.608
S.D.	0.045	0.051	0.053	0.044	0.026	0.001	0.001	0.051
% R.S.D.	0.467	0.541	0.570	0.481	0.260	15.923	79.301	0.527

	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.019	9.339	10.638	9.321	9.492	9.519	10.230	-0.845
S.D.	0.000	0.040	0.051	0.051	0.050	0.044	0.074	0.043
% R.S.D.	1.270	0.431	0.477	0.547	0.523	0.465	0.720	5.042

	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	9.416	9.520	9.703	10.140	9.341	9.118	9.423	9.469
S.D.	0.049	0.060	0.053	0.032	0.052	0.040	0.063	0.042
% R.S.D.	0.521	0.632	0.543	0.320	0.559	0.436	0.667	0.447

	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	9.427	10.424	4.542	9.364	9.271	9.240	9.650	9.713
S.D.	0.038	0.044	0.018	0.065	0.046	0.030	0.057	0.020
% R.S.D.	0.399	0.425	0.388	0.692	0.497	0.324	0.593	0.207

	Mn	Sb	V	Be	Tl
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	9.420	9.100	-0.097	9.878	9.238
S.D.	0.044	0.096	0.001	0.047	0.031
% R.S.D.	0.464	1.059	0.594	0.476	0.338

Identity 1: V65 dig std sm-20 Identity 2: 5ml in 50ml

1:53 PM April 28, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV. 0

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.005	0.001	-0.125	-0.023	-0.479	9.439	9.696	0.002
S.D.	0.001	0.000	0.005	0.002	0.003	0.030	0.031	0.000
% R.S.D.	9.840	8.308	3.910	8.677	0.590	0.313	0.319	10.936

	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	9.136	9.345	-0.012	9.237	0.012	8.995	0.007	0.071
S.D.	0.030	0.036	0.002	0.026	0.000	0.032	0.004	0.038
% R.S.D.	0.330	0.384	17.216	0.279	1.833	0.351	60.268	53.874

	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.015	-0.019	0.000	0.020	0.029	0.002	0.016	0.037
S.D.	0.010	0.018	0.000	0.007	0.001	0.000	0.007	0.005
% R.S.D.	71.688	96.710	12.204	37.345	4.943	10.767	42.063	12.729

	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.005	0.376	5.380	0.006	0.000	9.146	0.024	0.254
S.D.	0.001	0.006	0.017	0.003	0.000	0.029	0.002	0.021
% R.S.D.	13.056	1.543	0.315	45.871	62.016	0.322	8.799	8.154

	Mn	Sb	V	Be	Tl
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	9.643	0.025	9.444	0.002	-0.023
S.D.	0.025	0.013	0.033	0.000	0.015
% R.S.D.	0.261	52.418	0.348	25.125	63.118

Identity 1: V67 sam dil Identity 2: 1ml sample - 4ml

1:57 PM April 28, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

WHC-SD-WM-DP-065, REV. 0

Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.003	0.000	0.016	0.439	2.307	0.002	0.027	0.005
S.D.	0.001	0.000	0.005	0.003	0.015	0.001	0.000	0.000
% R.S.D.	27.586	13.715	32.449	0.728	0.646	25.780	0.957	8.622

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.007	0.003	-0.004	0.016	0.033	0.089	-0.011	0.133
S.D.	0.000	0.002	0.002	0.001	0.000	0.001	0.009	0.011
% R.S.D.	6.010	47.970	38.713	4.493	0.318	1.329	88.330	8.543

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.018	-0.019	0.001	1.204	3.496	0.001	0.002	127.361
S.D.	0.006	0.006	0.000	0.010	0.010	0.000	0.003	0.312
% R.S.D.	30.910	29.095	9.725	0.811	0.291	5.973	123.590	0.245

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.007	0.003	0.002	0.021	0.000	0.007	0.021	15.249
S.D.	0.001	0.008	0.001	0.005	0.000	0.000	0.001	0.003
% R.S.D.	10.232	235.582	36.337	25.458	48.834	5.126	5.324	0.019

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.000	-0.047	0.003	0.000	-0.018
S.D.	0.000	0.010	0.001	0.000	0.010
% R.S.D.	54.205	20.689	32.533	69.853	56.740

Identity 1: V68 sam dil Identity 2: 1ml sample - 4ml
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

2:01 PM April 28, 1994

WHC-SD-WM-DP-065, REV. 0

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.004	0.000	0.014	0.210	1.311	0.002	0.018	0.004
S.D.	0.002	0.000	0.009	0.003	0.006	0.001	0.000	0.001
% R.S.D.	38.886	87.436	65.400	1.191	0.429	41.625	1.469	20.914
	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.017	0.004	0.002	0.002	0.066	0.079	-0.028	1.143
S.D.	0.000	0.002	0.001	0.003	0.000	0.001	0.010	0.087
% R.S.D.	0.539	42.434	64.776	116.761	0.603	1.219	34.736	7.584
	Ce	Sm	Ba	P	S	Hg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.005	0.056	0.001	0.986	2.653	0.002	0.005	105.318
S.D.	0.011	0.022	0.000	0.028	0.028	0.000	0.003	0.625
% R.S.D.	230.567	39.156	42.822	2.789	1.070	5.556	51.176	0.593
	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.007	0.015	0.006	0.011	0.002	0.006	0.023	8.279
S.D.	0.001	0.004	0.002	0.008	0.001	0.000	0.002	0.050
% R.S.D.	12.152	30.285	26.895	67.352	24.555	5.651	10.002	0.606
	Mn	Sb	V	Be	Tl			
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)			
Mean	0.000	-0.053	0.004	0.000	0.063			
S.D.	0.000	0.007	0.001	0.000	0.016			
% R.S.D.	210.130	13.340	21.147	44.759	26.247			

Identity 1: V69 sam dil Identity 2: 1ml sample - 4ml

2:04 PM April 28, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

WHC-SD-WM-DP-065, REV. 0

Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.002	0.000	0.003	0.216	1.355	0.002	0.018	0.005
S.D.	0.001	0.000	0.003	0.003	0.005	0.000	0.001	0.001
% R.S.D.	70.748	42.200	130.428	1.217	0.359	20.814	5.198	10.958

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	-0.004	0.006	0.005	0.024	0.067	0.082	-0.034	0.926
S.D.	0.000	0.001	0.002	0.001	0.000	0.001	0.012	0.064
% R.S.D.	5.872	18.474	33.116	5.148	0.118	1.613	33.834	6.890

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.023	-0.007	0.000	0.990	2.714	0.003	0.003	107.495
S.D.	0.016	0.020	0.000	0.006	0.007	0.000	0.003	0.265
% R.S.D.	70.419	302.293	151.763	0.633	0.256	1.946	125.939	0.247

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.006	0.023	0.002	0.001	0.000	0.006	0.023	8.522
S.D.	0.001	0.008	0.001	0.013	0.000	0.001	0.002	0.004
% R.S.D.	10.551	34.084	25.605	1114.965	375.222	12.801	7.575	0.051

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.000	-0.012	0.003	0.000	-0.012
S.D.	0.000	0.015	0.000	0.000	0.027
% R.S.D.	60.373	126.372	11.138	142.459	213.628

Identity 1: V67 post spike Identity 2: 1ml sample - 4ml

2:08 PM April 28, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

WHC-SD-WM-DP-065, REV. 0

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.968	0.956	0.935	1.394	3.335	0.967	1.018	0.952
S.D.	0.002	0.001	0.016	0.001	0.005	0.000	0.000	0.001
% R.S.D.	0.186	0.101	1.742	0.076	0.149	0.041	0.016	0.155
	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.956	0.953	0.960	0.953	0.995	1.048	0.973	2.114
S.D.	0.001	0.005	0.005	0.002	0.002	0.005	0.021	0.044
% R.S.D.	0.095	0.557	0.488	0.200	0.184	0.443	2.120	2.090
	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.936	0.966	0.968	2.345	4.665	0.933	0.947	134.253
S.D.	0.004	0.006	0.001	0.029	0.023	0.001	0.006	0.124
% R.S.D.	0.398	0.617	0.080	1.253	0.483	0.086	0.655	0.092
	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.972	1.056	0.376	0.966	0.942	0.949	0.980	16.755
S.D.	0.003	0.008	0.001	0.009	0.001	0.001	0.005	0.024
% R.S.D.	0.309	0.799	0.332	0.975	0.117	0.105	0.501	0.145
	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)			
Mean	0.952	0.891	0.976	0.982	0.961			
S.D.	0.001	0.014	0.001	0.002	0.021			
% R.S.D.	0.124	1.616	0.112	0.254	2.136			

Identity 1: CCV Identity 2: Quality Control

2:12 PM April 28, 1994

Task name: TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

WHC-SD-WM-DP-065, REV. 0

Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	5.029	4.959	4.956	4.680	4.924	4.988	5.178	5.027
S.D.	0.037	0.041	0.028	0.034	0.029	0.049	0.036	0.042
% R.S.D.	0.739	0.822	0.573	0.726	0.596	0.988	0.700	0.840

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	5.112	4.978	5.056	4.946	4.986	5.008	5.338	9.480
S.D.	0.034	0.033	0.028	0.035	0.035	0.033	0.035	0.024
% R.S.D.	0.667	0.670	0.553	0.699	0.704	0.662	0.653	0.252

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	4.880	4.935	5.032	5.578	5.107	4.843	4.888	5.030
S.D.	0.040	0.034	0.040	0.105	0.048	0.036	0.031	0.043
% R.S.D.	0.818	0.685	0.799	1.874	0.942	0.749	0.639	0.847

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	4.950	5.527	4.919	5.013	4.864	4.986	5.069	5.088
S.D.	0.044	0.051	0.036	0.035	0.039	0.037	0.030	0.024
% R.S.D.	0.896	0.923	0.726	0.707	0.810	0.738	0.597	0.472

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	4.993	4.849	5.056	5.096	4.953
S.D.	0.031	0.036	0.038	0.039	0.010
% R.S.D.	0.614	0.752	0.747	0.769	0.197

Identity 1: CCB Identity 2: Quality Control

2:17 PM April 28, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV.0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.001	0.001	-0.003	-0.004	0.008	0.004	0.002	0.001
S.D.	0.002	0.000	0.012	0.001	0.003	0.001	0.001	0.000
% R.S.D.	139.407	33.552	467.761	21.896	38.403	30.346	41.262	34.156

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.028	0.001	0.001	-0.003	-0.000	0.000	0.009	-0.089
S.D.	0.000	0.002	0.003	0.003	0.000	0.000	0.019	0.070
% R.S.D.	0.986	279.078	421.891	97.715	29.725	316.186	208.202	78.124

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.002	-0.015	0.000	0.006	0.004	0.001	0.006	0.029
S.D.	0.009	0.021	0.000	0.003	0.003	0.000	0.003	0.010
% R.S.D.	514.551	142.363	519.934	44.120	77.664	26.458	43.278	32.731

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.001	0.016	0.020	0.011	-0.000	0.001	0.007	0.051
S.D.	0.000	0.009	0.003	0.003	0.000	0.000	0.001	0.016
% R.S.D.	22.878	55.268	13.847	26.304	712.856	44.511	7.963	32.096

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	-0.000	-0.037	0.001	0.001	-0.019
S.D.	0.000	0.013	0.000	0.000	0.022
% R.S.D.	472.363	35.761	28.767	30.838	117.508

Identity 1: V67 sam Identity 2: 10ml in 50ml

2:22 PM April 28, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

WHC-SD-WM-DP-065, REV. 0

Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.001	0.001	-0.005	2.153	11.053	0.003	0.117	0.024
S.D.	0.001	0.000	0.010	0.005	0.049	0.002	0.001	0.000
% R.S.D.	165.424	17.688	207.804	0.214	0.446	66.824	0.541	1.957

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.130	0.016	0.001	0.040	0.186	0.417	-0.015	1.035
S.D.	0.001	0.001	0.004	0.003	0.001	0.001	0.008	0.067
% R.S.D.	0.417	3.467	521.575	6.357	0.474	0.302	51.991	6.455

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.026	-0.037	0.003	5.926	16.943	0.006	0.007	603.608
S.D.	0.008	0.017	0.000	0.052	0.091	0.000	0.004	2.677
% R.S.D.	31.741	45.683	11.716	0.871	0.540	1.961	54.377	0.444

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.029	-0.001	0.026	0.014	0.001	0.029	0.084	74.456
S.D.	0.001	0.008	0.002	0.003	0.001	0.000	0.001	0.333
% R.S.D.	3.637	774.491	7.228	21.009	60.040	1.198	0.679	0.447

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.001	-0.045	0.007	0.000	-0.036
S.D.	0.000	0.018	0.001	0.000	0.031
% R.S.D.	8.556	40.166	10.055	23.620	86.455

Identity 1: V67 dup Identity 2: 10ml in 50ml

2:25 PM April 28, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

WHC-SD-WM-DP-065, REV.0

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.002	0.001	-0.000	1.403	10.688	0.002	0.112	0.023
S.D.	0.003	0.000	0.017	0.007	0.097	0.001	0.000	0.001
% R.S.D.	189.782	38.858	4417.261	0.501	0.911	40.064	0.367	4.341
	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.116	0.014	0.000	0.038	0.164	0.405	-0.026	0.891
S.D.	0.000	0.000	0.002	0.003	0.002	0.004	0.013	0.161
% R.S.D.	0.412	1.661	623.765	8.675	1.047	0.982	51.123	18.101
	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.007	-0.054	0.003	5.852	16.555	0.006	0.007	584.974
S.D.	0.030	0.049	0.001	0.043	0.167	0.000	0.001	5.761
% R.S.D.	449.927	90.482	24.166	0.743	1.009	2.083	18.601	0.985
	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.030	0.010	0.005	0.026	-0.000	0.028	0.070	72.194
S.D.	0.000	0.014	0.002	0.001	0.001	0.001	0.001	0.566
% R.S.D.	0.987	139.597	36.960	3.639	286.748	2.427	1.755	0.784
	Mn	Sb	V	Be	Tl			
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)			
Mean	0.001	-0.002	0.007	0.000	-0.073			
S.D.	0.000	0.006	0.001	0.000	0.049			
% R.S.D.	2.451	311.625	21.402	20.331	68.053			

Identity 1: V68 sam Identity 2: 10ml in 50ml

2:30 PM April 28, 1994

Sample name : TWC93

Weight : 1.0000 Solution Volume : 1.00

WHC-SD-WM-DP-065, REV. 0

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.002	0.001	0.014	1.022	6.460	0.003	0.089	0.024
S.D.	0.002	0.000	0.014	0.007	0.025	0.001	0.000	0.000
% R.S.D.	63.105	20.201	100.101	0.713	0.394	33.316	0.542	1.657

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.025	0.030	0.008	0.019	0.404	0.394	-0.018	4.844
S.D.	0.000	0.003	0.002	0.002	0.002	0.002	0.009	0.083
% R.S.D.	0.829	10.472	23.262	10.264	0.461	0.411	48.562	1.705

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.010	0.030	0.001	4.947	13.255	0.011	-0.000	515.476
S.D.	0.016	0.021	0.000	0.037	0.086	0.000	0.002	2.136
% R.S.D.	160.086	68.086	30.570	0.758	0.651	0.599	7683.653	0.414

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.026	0.010	0.011	0.028	0.003	0.026	0.110	42.036
S.D.	0.001	0.011	0.001	0.008	0.001	0.001	0.002	0.203
% R.S.D.	3.100	108.036	6.766	30.732	21.929	3.750	2.238	0.484

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.001	-0.059	0.006	-0.000	0.061
S.D.	0.000	0.020	0.000	0.000	0.020
% R.S.D.	21.190	32.887	5.412	590.580	33.506

Identity 1: V68 dup Identity 2: 10ml in 50ml

2:33 PM April 28, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.000	0.001	-0.013	1.017	6.547	0.001	0.091	0.026
S.D.	0.005	0.000	0.005	0.001	0.058	0.002	0.001	0.001
% R.S.D.	1908.170	35.626	37.648	0.064	0.879	126.055	1.306	5.440

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.016	0.030	-0.001	0.030	0.265	0.396	-0.027	4.805
S.D.	0.000	0.003	0.003	0.001	0.004	0.002	0.017	0.162
% R.S.D.	0.544	8.874	580.919	3.664	1.386	0.527	63.220	3.362

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.007	0.010	0.001	4.987	13.355	0.020	0.009	519.724
S.D.	0.040	0.053	0.001	0.050	0.067	0.000	0.004	6.395
% R.S.D.	546.452	531.983	73.001	1.002	0.500	0.333	39.084	1.230

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.029	0.015	0.011	2.867	0.040	0.037	0.114	42.266
S.D.	0.001	0.014	0.002	0.027	0.001	0.000	0.002	0.600
% R.S.D.	2.109	93.961	19.751	0.927	1.782	0.510	1.397	1.419

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.001	-0.025	0.006	0.000	0.009
S.D.	0.000	0.006	0.002	0.000	0.064
% R.S.D.	11.529	25.039	33.469	304.707	704.462

Identity 1: V69 sam Identity 2: 10ml in 50ml

2:37 PM April 28, 1994

Task name : TWC93

Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV. 0

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.001	0.001	-0.008	1.084	6.637	0.001	0.091	0.025
S.D.	0.003	0.000	0.007	0.004	0.066	0.001	0.000	0.001
% R.S.D.	380.515	22.414	85.739	0.355	0.995	138.262	0.331	4.593
	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.086	0.027	0.002	0.115	0.344	0.392	-0.043	4.662
S.D.	0.001	0.001	0.003	0.002	0.004	0.004	0.006	0.089
% R.S.D.	1.144	4.571	143.256	1.419	1.182	1.085	14.667	1.910
	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.038	-0.004	0.002	5.038	13.520	0.019	0.007	523.914
S.D.	0.033	0.034	0.001	0.085	0.135	0.000	0.005	6.010
% R.S.D.	85.171	857.664	39.249	1.678	0.996	0.613	70.886	1.147
	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.030	-0.009	0.010	-0.001	0.006	0.025	0.113	43.089
S.D.	0.001	0.015	0.002	0.006	0.005	0.001	0.001	0.467
% R.S.D.	3.480	158.878	16.025	385.808	86.767	2.398	0.969	1.083
	Mn	Sb	V	Be	Tl			
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)			
Mean	0.004	-0.004	0.005	-0.000	0.000			
S.D.	0.000	0.026	0.001	0.000	0.049			
% R.S.D.	0.317	736.486	13.034	370.098	54836.412			

Identity 1: V69 dup. Identity 2: 10ml in 50ml

2:40 PM April 28, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1.

WHC-SD-WM-DP-065, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.002	0.002	-0.003	1.166	6.592	0.002	0.093	0.026
S.D.	0.002	0.000	0.004	0.007	0.014	0.001	0.001	0.001
% R.S.D.	90.672	7.953	160.012	0.625	0.216	52.588	0.884	3.318
	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.070	0.024	0.003	0.165	0.522	0.391	0.004	4.418
S.D.	0.001	0.001	0.004	0.003	0.001	0.003	0.009	0.085
% R.S.D.	0.940	3.959	134.921	1.908	0.118	0.667	203.819	1.923
	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.018	-0.058	0.002	4.786	13.203	0.026	0.007	519.986
S.D.	0.018	0.027	0.000	0.033	0.022	0.000	0.005	0.362
% R.S.D.	102.372	46.485	23.748	0.693	0.166	0.448	74.468	0.070
	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.033	0.031	0.008	0.016	0.001	0.027	0.105	42.930
S.D.	0.001	0.010	0.001	0.007	0.001	0.001	0.001	0.006
% R.S.D.	2.252	33.028	10.495	42.019	58.135	1.898	0.666	0.013
	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)			
Mean	0.006	-0.018	0.004	0.000	-0.061			
S.D.	0.000	0.005	0.001	0.000	0.035			
% R.S.D.	3.463	25.201	21.525	36.972	57.910			

Identity 1: CCV Identity 2: Quality Control

2:46 PM April 28, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	4.808	4.692	4.767	4.550	4.700	4.862	4.927	4.808
S.D.	0.022	0.027	0.011	0.019	0.032	0.024	0.026	0.032
% R.S.D.	0.460	0.581	0.221	0.416	0.683	0.503	0.529	0.670

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	4.941	4.840	4.809	4.792	4.718	4.860	5.031	9.050
S.D.	0.021	0.016	0.020	0.031	0.026	0.023	0.021	0.035
% R.S.D.	0.427	0.334	0.408	0.648	0.552	0.477	0.409	0.383

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	4.662	4.707	4.745	5.540	4.905	4.707	4.789	4.866
S.D.	0.021	0.018	0.028	0.067	0.022	0.023	0.029	0.021
% R.S.D.	0.449	0.388	0.580	1.209	0.458	0.491	0.610	0.427

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	4.795	5.319	4.728	4.918	4.660	4.868	4.897	5.431
S.D.	0.023	0.023	0.030	0.010	0.025	0.014	0.037	0.039
% R.S.D.	0.486	0.424	0.643	0.196	0.537	0.282	0.763	0.712

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	4.837	4.708	4.867	4.935	4.768
S.D.	0.022	0.005	0.023	0.030	0.019
% R.S.D.	0.446	0.101	0.475	0.602	0.397

Identity 1: CCB Identity 2: Quality Control 2:50 PM April 28, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.003	0.000	0.013	0.004	-0.006	0.003	-0.000	-0.001
S.D.	0.001	0.000	0.007	0.004	0.007	0.001	0.001	0.001
% R.S.D.	36.557	48.325	51.872	102.249	111.325	28.637	132.140	120.030

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.047	-0.000	0.002	-0.006	0.000	-0.001	-0.028	0.173
S.D.	0.001	0.002	0.005	0.003	0.000	0.001	0.011	0.063
% R.S.D.	2.717	1000.955	227.988	48.048	8.251	49.673	39.215	36.564

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.023	0.049	0.001	0.043	0.017	0.002	-0.002	0.092
S.D.	0.015	0.022	0.000	0.013	0.007	0.000	0.001	0.011
% R.S.D.	63.943	44.328	22.091	30.732	39.878	4.225	47.978	11.972

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.001	0.001	0.031	0.012	0.002	-0.000	0.004	0.476
S.D.	0.000	0.012	0.004	0.001	0.000	0.001	0.001	0.008
% R.S.D.	56.930	1914.421	13.700	12.505	22.784	189.815	23.929	1.738

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	0.000	-0.017	0.004	0.001	0.081
S.D.	0.000	0.006	0.001	0.000	0.015
% R.S.D.	19.103	34.813	19.654	18.069	18.362

Identity 1: icsa-f Identity 2: icsa 2:53 PM April 28, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.002	-0.000	-0.002	0.011	48.915	0.001	-0.001	-0.002
S.D.	0.003	0.000	0.008	0.004	0.463	0.001	0.002	0.001
% R.S.D.	177.759	127.603	327.469	33.300	0.947	91.460	115.681	55.003

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	-0.026	0.000	0.003	0.002	-0.001	-0.003	-0.016	0.045
S.D.	0.000	0.001	0.003	0.002	0.000	0.001	0.016	0.147
% R.S.D.	0.366	3098.861	100.443	69.986	4.810	20.263	103.316	324.693

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.010	0.010	0.000	0.032	0.010	-0.000	-0.005	0.124
S.D.	0.029	0.036	0.001	0.006	0.010	0.000	0.005	0.014
% R.S.D.	281.990	371.849	147.525	20.420	99.486	199.999	97.331	11.553

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.000	-0.010	0.016	0.003	0.001	-0.000	0.001	0.344
S.D.	0.000	0.003	0.002	0.004	0.001	0.001	0.002	0.050
% R.S.D.	120.000	31.342	14.368	138.407	190.851	266.726	128.529	14.579

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	-0.000	-0.075	0.002	0.001	0.001
S.D.	0.000	0.014	0.001	0.000	0.046
% R.S.D.	39.971	18.278	70.930	19.702	3517.197

Task name : TWC93

WHC-SD-WM-DP-065, REV.0

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr	Sr	Bi	Si	Al	Co	Cu	Li
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.008	-0.000	0.005	0.017	48.512	0.502	0.509	-0.001
S.D.	0.003	0.000	0.013	0.007	0.424	0.004	0.002	0.001
% R.S.D.	31.698	106.190	289.382	39.621	0.874	0.754	0.380	128.798
	Zn	Ni	La	Fe	Ca	Cr	Nd	U
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.965	0.991	0.004	0.001	-0.001	0.495	-0.043	0.437
S.D.	0.005	0.003	0.001	0.002	0.000	0.001	0.012	0.126
% R.S.D.	0.511	0.350	26.665	293.148	4.810	0.181	28.880	28.750
	Ce	Sm	Ba	P	S	Mg	As	Na
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	-0.017	0.123	0.486	0.032	0.017	-0.000	0.001	0.121
S.D.	0.024	0.041	0.003	0.009	0.002	0.000	0.003	0.011
% R.S.D.	143.235	33.615	0.636	27.321	13.816	24.744	252.160	9.325
	Mo	Se	Ag	Pb	Ti	Cd	B	K
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)
Mean	0.000	0.017	0.978	0.979	0.003	0.990	0.005	0.340
S.D.	0.002	0.016	0.004	0.010	0.001	0.006	0.001	0.041
% R.S.D.	5723.634	93.306	0.420	1.052	34.505	0.607	23.572	12.041
	Mn	Sb	V	Be	Tl			
	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)	(ug/mL)			
Mean	0.491	-0.035	0.496	0.499	0.146			
S.D.	0.003	0.030	0.001	0.003	0.045			
% R.S.D.	0.565	86.251	0.216	0.654	31.057			

Identity 1: xxx Identity 2: rinse 3:00 PM April 28, 1994

WHC-SD-WM-DP-065, REV.0

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	0.002	-0.000	0.016	0.008	0.002	0.002	-0.000	0.000
S.D.	0.003	0.000	0.004	0.006	0.011	0.001	0.001	0.001
% R.S.D.	155.811	217.385	24.997	81.247	656.310	69.139	694.399	338.850

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.056	-0.001	0.001	-0.002	0.000	-0.001	-0.029	0.203
S.D.	0.000	0.003	0.002	0.002	0.000	0.001	0.019	0.129
% R.S.D.	0.649	389.967	233.642	131.620	24.775	204.296	65.272	63.418

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	0.018	0.050	0.001	0.016	0.016	0.001	0.000	0.047
S.D.	0.020	0.035	0.001	0.005	0.003	0.000	0.000	0.012
% R.S.D.	114.976	69.880	55.660	33.351	21.094	0.000	40.489	25.239

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	-0.001	-0.010	0.011	0.006	0.001	-0.000	0.003	0.280
S.D.	0.001	0.012	0.003	0.002	0.001	0.000	0.002	0.031
% R.S.D.	256.710	123.540	26.816	35.535	105.959	12.692	63.100	11.226

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	-0.000	-0.071	0.004	0.000	0.073
S.D.	0.000	0.012	0.000	0.000	0.040
% R.S.D.	52.364	16.561	9.671	149.604	55.542

Identity 1: V70 sst4 29b48 Identity 2: direct ccv-3

3:03 PM April 28, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-065, REV. 0

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	4.866	4.780	4.809	4.544	4.743	4.849	4.988	4.841
S.D.	0.015	0.014	0.032	0.008	0.001	0.004	0.017	0.013
% R.S.D.	0.305	0.300	0.674	0.169	0.022	0.081	0.333	0.260

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	4.900	4.831	4.881	4.804	4.799	4.867	5.095	9.285
S.D.	0.005	0.012	0.023	0.012	0.021	0.020	0.061	0.021
% R.S.D.	0.110	0.238	0.481	0.250	0.445	0.402	1.201	0.227

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	4.704	4.767	4.850	5.621	4.960	4.698	4.751	4.831
S.D.	0.010	0.003	0.017	0.016	0.029	0.007	0.011	0.003
% R.S.D.	0.205	0.073	0.349	0.286	0.575	0.159	0.236	0.065

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	4.802	5.293	4.849	4.894	4.709	4.850	4.905	5.059
S.D.	0.002	0.034	0.015	0.002	0.008	0.009	0.024	0.006
% R.S.D.	0.035	0.649	0.301	0.034	0.180	0.192	0.493	0.118

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	4.842	4.694	4.899	4.938	4.840
S.D.	0.012	0.039	0.018	0.008	0.032
% R.S.D.	0.242	0.838	0.367	0.153	0.665

Handwritten signature and date:
4-28-94

Identity 1: CCB Identity 2: Quality Control

3:08 PM April 28, 1994

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

WHC-SD-WM-DP-065, REV. 0

Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ug/mL)	Sr (ug/mL)	Bi (ug/mL)	Si (ug/mL)	Al (ug/mL)	Co (ug/mL)	Cu (ug/mL)	Li (ug/mL)
Mean	-0.002	0.000	0.016	-0.002	0.004	0.002	0.001	0.000
S.D.	0.002	0.000	0.009	0.005	0.006	0.001	0.001	0.001
% R.S.D.	72.702	33.704	57.815	352.374	141.605	73.666	56.945	156.112

	Zn (ug/mL)	Ni (ug/mL)	La (ug/mL)	Fe (ug/mL)	Ca (ug/mL)	Cr (ug/mL)	Nd (ug/mL)	U (ug/mL)
Mean	0.059	0.000	-0.001	-0.002	0.001	0.002	-0.020	-0.202
S.D.	0.000	0.001	0.001	0.001	0.001	0.002	0.006	0.100
% R.S.D.	0.406	173.425	71.946	37.304	100.165	106.791	28.477	49.640

	Ce (ug/mL)	Sm (ug/mL)	Ba (ug/mL)	P (ug/mL)	S (ug/mL)	Mg (ug/mL)	As (ug/mL)	Na (ug/mL)
Mean	-0.017	-0.037	-0.000	0.038	0.014	0.002	0.006	0.063
S.D.	0.017	0.026	0.000	0.006	0.001	0.000	0.001	0.012
% R.S.D.	98.855	68.774	85.865	16.511	9.403	3.936	18.234	18.619

	Mo (ug/mL)	Se (ug/mL)	Ag (ug/mL)	Pb (ug/mL)	Ti (ug/mL)	Cd (ug/mL)	B (ug/mL)	K (ug/mL)
Mean	0.002	0.020	0.001	0.008	-0.001	-0.000	0.004	0.132
S.D.	0.000	0.011	0.001	0.009	0.001	0.000	0.001	0.012
% R.S.D.	15.511	55.014	197.874	109.030	102.792	224.652	23.239	9.041

	Mn (ug/mL)	Sb (ug/mL)	V (ug/mL)	Be (ug/mL)	Tl (ug/mL)
Mean	-0.000	-0.036	0.000	0.000	-0.037
S.D.	0.000	0.002	0.001	0.000	0.035
% R.S.D.	32.307	4.449	904.857	63.524	95.230

**Westinghouse
Hanford Company**

WHC-SD-WM-DP-065, REV. 0

**Internal
Memo**

From: Inorganic Chemistry
Phone: 373-3589
Date: July 22, 1994
Subject: 108-AP NARRATIVE FOR ICP ANALYSIS OF FIELD BLANK (V73)

To: G. L. Miller T6-06

INORGANIC ANALYSIS

The data evaluation for this project will follow the guidelines specified in "Technical Project Plan for the 222-S Laboratory in Support of Tank Waste Remediation System Tank Waste Characterization Plan (WHC-SD-WM-PLN-047, REV.0) and Statement of Work (WHC-SOW-93-0002)." Contained in this report is the evaluation of the data generated by Westinghouse Hanford Company - Analytical Services (WHC-AS), 222-S Laboratory. Information will be organized by quality control parameter. No computer-readable data will be submitted on floppy diskette as mentioned in the comment on the following cover page.

INITIAL AND CONTINUING CALIBRATION VERIFICATION

All calibration verification standard recoveries were within 90-110%.

INITIAL AND CONTINUING CALIBRATION BLANKS

All ICB and CCB analytical measurements were between +IDL and -IDL.

PREPARATION BLANK

No contamination is indicated. Contamination is judged to be present when the blank analyte concentration is greater than 20% of the average sample concentration. This criterion applies only when the sample concentration is greater than 10 times the IDL.

DUPLICATE ANALYSES

No failures were noted.

LABORATORY CONTROL SAMPLE

Failures were noted for all analytes except Zinc resulting from omission of the proper standards.

ABBREVIATIONS

* = Duplicate failure. E = Serial dilution failure. N = Spike failure. NR = Not required. P = ICP method used. U = less than IDL.

Brian Wells

7/25/94

B. R. Wells
Senior Scientist, WHC-AS

brw

962

SOW No.: ILM02.1

EPA Sample No.

V73

V73D

Lab Sample ID

V73

V73D

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES

If yes - were raw data generated before application of background corrections ? Yes/No NO

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Brian Wells Name: Brian Wells

Date: 7/25/94 Title: Senior Scientist

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

V73

Lab Name: WHC _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: V73A _____

Matrix (soil/water): WATER

Lab Sample ID: V73

Level (low/med): LOW _____

Date Received: 03/18/94

% Solids: _____ 0.0

WHC-SD-WM-DP-065, REV. 0

Concentration Units (ug/L or mg/kg dry weight): UG/L _____

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	181	B		P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	81.6	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	50.0	U		P
7440-70-2	Calcium	1750	B		P
7440-47-3	Chromium	20.0	U		P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron	132	B		P
7439-92-1	Lead	280	U		P
7439-95-4	Magnesium	331	B		P
7439-96-5	Manganese	10.0	U		P
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver	49.9	B		P
7440-23-5	Sodium	800	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	112	B		P
	Cyanide				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

Lab Name: WHC_____

Contract: _____

Lab Code: _____

Case No.: _____

SAS No: _____

SDG No.: V73A__

ICP ID Number: TJA_____

ICS Source: SPEX_____

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol. A	Sol. AB	Sol. A	Sol. AB	%R	Sol. A	Sol. AB	%R
Aluminum	500000	500000	508739	450651.8	90.1	513313		
Antimony								
Arsenic								
Barium		500		467.0	93.4			
Beryllium								
Cadmium		1000		881.5	88.2			
Calcium	500000	500000	515284	473061.6	94.6	530328		
Chromium		500		442.8	88.6			
Cobalt								
Copper								
Iron	200000	200000	193253	174049.7	87.0	196303		
Lead		1000		861.6	86.2			
Magnesium	500000	500000	466069	417526.4	83.5	470794		
Manganese		500		443.8	88.8			
Mercury								
Nickel								
Potassium								
Selenium								
Silver		1000		928.8	92.9			
Sodium								
Thallium								
Vanadium								
Zinc		1000		907.7	90.8			

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

WHC-SD-WM-DP-065, REV. 0

Lab Name: WHC _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: V73A _____

Initial Calibration Source: PLASMACHEM _____

Continuing Calibration Source: PLASMACHEM _____

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum	5000.0	4952.28	99.0	5000.0	5146.11	102.9			P
Antimony									NR
Arsenic									NR
Barium	5000.0	4973.89	99.5	5000.0	5191.71	103.8			P
Beryllium									NR
Cadmium	5000.0	5061.24	101.2	5000.0	5252.25	105.0			P
Calcium	5000.0	5119.09	102.4	5000.0	5416.20	108.3			P
Chromium	5000.0	5093.90	101.9	5000.0	5298.59	106.0			P
Cobalt									NR
Copper									NR
Iron	5000.0	5074.00	101.5	5000.0	5279.60	105.6			P
Lead	5000.0	5067.92	101.4	5000.0	5242.79	104.9			P
Magnesium	5000.0	4925.90	98.5	5000.0	5116.11	102.3			P
Manganese	5000.0	4970.71	99.4	5000.0	5157.86	103.2			P
Mercury									NR
Nickel									NR
Potassium									NR
Selenium									NR
Silver	5000.0	5048.91	101.0	5000.0	5248.10	105.0			P
Sodium	5000.0	4847.06	96.9	5000.0	5082.19	101.6			P
Thallium									NR
Vanadium									NR
Zinc	5000.0	5025.30	100.5	5000.0	5214.77	104.3			P
Cyanide									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

3
BLANKS

BEST AVAILABLE COPY

Lab Name: WHC _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: V73A__

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L_

Analyte	Initial Calib. Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		M
		C	1.	C	2	C	3	C		C	
Aluminum	16.0	U	16.0	U					16.000	U	P
Antimony											NR
Arsenic											NR
Barium	1.0	U	1.0	U					1.000	U	P
Bismuth											NR
Cadmium	5.0	U	5.0	U					5.000	U	P
Calcium	200.0	U	200.0	U					200.000	U	P
Chromium	2.0	U	2.0	U					2.000	U	P
Cobalt											NR
Copper											NR
Iron	20.0	U	20.0	U					20.000	U	P
Lead	28.0	U	28.0	U					28.000	U	P
Magnesium	19.0	U	19.0	U					19.000	U	P
Manganese	1.0	U	1.0	U					1.000	U	P
Mercury											NR
Nickel											NR
Potassium											NR
Selenium											NR
Silver	4.0	U	4.0	U					4.000	U	P
Sodium	15.0	U	15.0	U					15.000	U	P
Thallium											NR
Vanadium											NR
Zinc	4.0	U	4.0	U					22.620		P
Cyanide											NR

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6
DUPLICATES

EPA SAMPLE NO.

V73D

Lab Name: WHC _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: V73A _____

Matrix (soil/water): WATER

Level (low/med): LOW _____

% Solids for Sample: 0.0

% Solids for Duplicate: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_ WHC-SD-WM-DP-065, REV.0

Analyte	Control Limit	Sample (S) C	Duplicate (D) C	RPD	Q	M
Aluminum		180.8000 B	213.9000 B	16.8		P
Antimony						NR
Arsenic						NR
Barium		81.6000 B	81.5000 B	0.1		P
Beryllium						NR
Cadmium		50.0000 U	50.0000 U			P
Calcium		1754.1000 B	845.1000 B	69.9		P
Chromium		20.0000 U	20.0000 U			P
Cobalt						NR
Copper						NR
Iron		132.0000 B	204.7000 B	43.2		P
Lead		280.0000 U	280.0000 U			P
Magnesium		330.7000 B	298.9000 B	10.1		P
Manganese		10.0000 U	10.0000 U			P
Mercury						NR
Nickel						NR
Potassium						NR
Selenium						NR
Silver		49.9000 B	40.0000 U	200.0		P
Sodium		799.6000 B	714.2000 B	11.3		P
Thallium						NR
Vanadium						NR
Zinc		111.9000 B	108.4000 B	3.2		P
Cyanide						NR

LABORATORY CONTROL SAMPLE

Lab Name: WHC _____

Contract: _____

Lab Code: _____

Case No.: _____

SAS No.: _____

SDG No.: V73A _____

Solid LCS Source: _____

Aqueous LCS Source: PLASMACHEM _____

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Aluminum	5000.0	154.60	3.1					
Antimony								
Arsenic								
Barium	5000.0	3.57	0.1					
Beryllium								
Cadmium	5000.0	5.00	0.1					
Cesium	5000.0	346.73	6.9					
Chromium	5000.0	2.00	0.0					
Cobalt								
Copper								
Iron	5000.0	21.92	0.4					
Lead	5000.0	49.93	1.0					
Magnesium	5000.0	197.63	4.0					
Manganese	5000.0	2.09	0.0					
Mercury								
Nickel								
Potassium								
Selenium								
Silver	5000.0	41.27	0.8					
Sodium	5000.0	15.00	0.3					
Thallium								
Vanadium								
Zinc	5000.0	4227.30	84.5					
Cyanide								

10

Instrument Detection Limits (Quarterly)

Lab Name: WHC _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: V73A _____

ICP ID Number: TJA _____ Date: 04/27/94

Flame AA ID Number : _____

Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.22		200	16.0	P
Antimony			60		NR
Arsenic			10		NR
Barium	455.40		200	1.0	P
Beryllium			5		NR
Cadmium	226.50		5	5.0	P
Calcium	317.93		5000	200.0	P
Chromium	267.72		10	2.0	P
Cobalt			50		NR
Copper			25		NR
Iron	259.94		100	20.0	P
Lead	220.35		3	28.0	P
Magnesium	279.08		5000	19.0	P
Manganese	257.61		15	1.0	P
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver	328.07		10	4.0	P
Sodium	589.00		5000	15.0	P
Thallium			10		NR
Vanadium			50		NR
Zinc	213.86		20	4.0	P

Comments:

11A

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: WHC _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: V73A__

ICP ID Number: TJA _____ Date: 04/27/94

Analyte	Wave-length (nm)	Interelement Correction Factors for :				
		Al	Ca	Fe	Mg	CD_
Aluminum	308.22	0.0000000	0.0000640	0.0000000	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	193.70	0.0173530	0.0000000	0.0000000	0.0000000	0.0000000
Barium	455.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0002391	0.0000290	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000090	0.0000000	0.0000000	0.0000190	0.0000000
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.75	0.0000000	0.0000000	0.0000910	0.0000000	0.0000000
Iron	259.94	0.0000540	0.0000180	0.0000000	0.0000000	0.0000000
Lead	220.35	0.0019720	0.0000000	0.0000000	0.0004270	0.0006210
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000210	0.0000000
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0039150	0.0005260	0.0000000	0.0000000	0.0000000
Silver	328.07	0.0000310	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	589.00	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0000000	0.0000000	0.0029410	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000160	0.0000000	0.0001470	0.0000000
Zinc	213.86	0.0000120	0.0000000	0.0001380	0.0000890	0.0000000

Comments:

11B

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: WHC _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: V73A _____

ICP ID Number: TJA _____ Date: 04/27/94

Analyte	Wave-length (nm)	Interelement Correction Factors for :				
		CO_	CR_	CU_	MN_	NI_
Aluminum	308.22	0.0002810	0.0003120	0.0000000	0.0011380	0.0000000
Antimony	206.84	0.0000000	0.0101340	0.0000000	0.0000000	-0.0046170
Arsenic	193.70	0.0000000	0.0000000	0.0000000	0.0000000	0.0023680
Barium	455.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0009660	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.62	0.0000000	0.0002830	0.0000000	0.0000000	0.0000000
Copper	324.75	-0.0000743	0.0000000	0.0000000	0.0000000	0.0000000
Iron	259.94	0.0000000	0.0000000	0.0000000	0.0008750	0.0000000
Lead	220.35	0.0000000	0.0000000	0.0024990	0.0000000	0.0021410
Magnesium	279.08	0.0000000	0.0006830	0.0000000	0.0018420	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Mercury						
Nickel	231.60	-0.0001220	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0018910	0.0007260	0.0003560	0.0006440	0.0002910
Silver	328.07	0.0000000	0.0000000	0.0001050	0.0000137	0.0000000
Sodium	589.00	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0000000	0.0002490	0.0000000	-0.0039410	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	213.86	0.0000000	0.0000000	0.0042810	0.0000000	0.0034940

Comments:

11B
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: WHC _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: V73A _____

ICP ID Number: TJA _____ Date: 04/27/94

Analyte	Wave-length (nm)	Interelement Correction Factors for :				
		PB_	V_	ZN_	_____	_____
Aluminum	308.22	0.0000000	0.0000000	0.0000000		
Antimony	206.84	0.0000000	0.0000000	0.0000000		
Arsenic	193.70	0.0000000	0.0000000	0.0006820		
Barium	455.40	0.0002470	0.0000000	0.0000000		
Beryllium	313.04	0.0000000	0.0010110	0.0000000		
Cadmium	226.50	0.0000000	0.0000000	0.0000000		
Calcium	317.93	0.0000000	0.0010990	0.0000000		
Chromium	267.72	0.0000000	0.0003110	0.0000000		
Cobalt	228.62	0.0000000	0.0000000	0.0000000		
Copper	324.75	0.0000000	0.0000000	0.0000000		
	259.94	0.0000000	0.0005270	0.0000000		
Lead	220.35	0.0000000	0.0000000	0.0000000		
Magnesium	279.08	0.0000000	0.0012530	0.0000000		
Manganese	257.61	0.0000000	0.0000000	0.0000000		
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000000		
Potassium	766.49	0.0000000	0.0000000	0.0000000		
Selenium	196.03	0.0000000	0.0008410	0.0006190		
Silver	328.07	0.0000000	0.0003530	0.0000000		
Sodium	589.00	0.0000000	0.0000000	0.0000000		
Thallium	190.86	0.0000000	0.0000000	0.0000000		
Vanadium	292.40	0.0000000	0.0000000	0.0000000		
Zinc	213.86	0.0000000	0.0005040	0.0000000		

Comments:

12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: WHC _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: V73A__

ICP ID Number: TJA _____ Date: 01/10/94

Analyte	Integ. Time (sec.)	Concentration (ug/L)	M
Aluminum	5.00	1000000.0	P
Antimony	5.00	100000.0	P
Arsenic	5.00	100000.0	P
Barium	5.00	100000.0	P
Beryllium	5.00	100000.0	P
Cadmium	5.00	100000.0	P
Calcium	5.00	1000000.0	P
Chromium	5.00	100000.0	P
Cobalt	5.00	100000.0	P
Copper	5.00	100000.0	P
Iron	5.00	500000.0	P
Lead	5.00	100000.0	P
Magnesium	5.00	1000000.0	P
Manganese	5.00	100000.0	P
Mercury			NR
Nickel	5.00	100000.0	P
Potassium	5.00	500000.0	P
Selenium	5.00	100000.0	P
Silver	5.00	100000.0	P
Sodium	5.00	500000.0	P
Thallium	5.00	100000.0	P
Vanadium	5.00	100000.0	P
Zinc	5.00	100000.0	P

Comments:

WHC-SD-WM-DP-065, REV. 0

V73

108GP-FB

ICP

Acid Digest

Chemist: S. Parong

Comments: _____

[illegible]

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No V 71.-5550	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 4	Priority 26
Determination ICP	Method Standard LA-505- 151 /41	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size SSTY (ICU) 326478 Direct			Customer ID STD 21	
Remarks, Calculations, Results LMCS CHECK SAMPLE				
COMPLETED 7/22/94 SEE WARD'S PACKAGE 7-21-94				
WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 [Signature] Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 7-22-94	Time Completed 1430	Lab Unit Mgr S. Parry	7-21-94	

54-6800-061 (R-10-83)

Serial No V 72.-8650	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:15	Priority 26
Determination ICP	Method Standard LA-505- 151 /41	Result Units uG/L	Charge Code N1A7F	Reruns 0
Sample Size Direct (ICB)			Customer ID BLANK 21	
Remarks, Calculations, Results REAGENT BLANK				
COMPLETED 7/22/94 SEE WARD'S PACKAGE 7-21-94				
Analyst - 1 [Signature] Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 7-22-94	Time Completed 1430	Lab Unit Mgr S. Parry	7-21-94	

54-6800-061 (R-10-83)

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No V 73.-8750	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:22	Priority 26
Determination ICP	Method/Standard LA-505-151/41	Result Units uG/L	Charge Code N1A7F	Reruns 0
Sample Size 5 ml in 50 ml			Customer ID 108AP-FB	
Remarks, Calculations, Results <div style="text-align: right;"> COMPLETED 2/22/94 SEE WARD'S PACKAGE JK 7-4-94 </div> <div style="text-align: center;"> WHC-SD-WM-DP-065, REV. 0 </div> <div style="text-align: left;"> JK 7-4-94 </div>				
Analyst - 1 Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 2/22-94	Time Completed 1430	Lab Unit Mgr S. Pang	07/21/94 JK 7-4-94	

54-6800-061 (R-10-83)

Serial No V 73.-8850	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:22	Priority 26
Determination ICP	Method/Standard LA-505-151/41	Result Units uG/L	Charge Code N1A7F	Reruns 0
Sample Size 5 ml in 50 ml			Customer ID 108AP-FB	
Remarks, Calculations, Results <div style="text-align: right;"> COMPLETED 2/22/94 SEE WARD'S PACKAGE JK 7-4-94 </div> <div style="text-align: left;"> JK 7-4-94 </div>				
Analyst - 1 Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 2/22-94	Time Completed 1430	Lab Unit Mgr S. Pang	07/21/94 JK 7-4-94	

54-6800-061 (R-10-83)

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No.	Sample Point	Date	Time Issued	Priority
V 74.-5550	108AP FLDBLK	3-18-94	11:27	26
Determination	Method-Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151/4	% RECOVERY	N1A7F	0
Sample Size	Customer ID			
5574 3.2848.3 DIRECT	21			
Remarks, Calculations, Results		COMPLETED 2/22/94		
LMCS CHECK SAMPLE		SEE WARD'S PACKAGE		
WHC-SD-WM-DP-065, REV. 0				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
2/7-22-94	1430	S. Lang		

#	Sample Name	File	Method	Date	Time	OpID	Type	Mode
1	SST4	940721A	PE	07/21/94	13:07	DKS	Q	CONC
2	HNO3 REAG BLK	940721A	PE	07/21/94	13:10	DKS	Q	CONC
3	WP284	940721A	PE	07/21/94	13:13	DKS	S	CONC
4	ICV	940721A	PE	07/21/94	13:15	DKS	Q	CONC
5	ICB	940721A	PE	07/21/94	13:18	DKS	Q	CONC
6	ICSAI	940721A	PE	07/21/94	13:20	DKS	Q	CONC
7	XXX	940721A	PE	07/21/94	13:24	DKS	Q	CONC
8	V72PB	940721A	PE	07/21/94	13:27	DKS	S	CONC
9	V71LCS	940721A	PE	07/21/94	13:30	DKS	S	CONC
10	V73	940721A	PE	07/21/94	13:33	DKS	S	CONC
11	V73 D	940721A	PE	07/21/94	13:36	DKS	S	CONC
12	CCV1	940721A	PE	07/21/94	13:40	DKS	Q	CONC
13	CCB1	940721A	PE	07/21/94	13:42	DKS	Q	CONC
14	ICSAF	940721A	PE	07/21/94	13:45	DKS	Q	CONC
15	ICSABF	940721A	PE	07/21/94	13:48	DKS	Q	CONC
16	XXX	940721A	PE	07/21/94	13:52	DKS	Q	CONC

WHC-SD-WM-DP-065, REV.0

7-21-94

108 GP FLDBLK

V71-7.4

Acid Digest

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 981 TO 984.

WHC-SD-WM-DP-065, REV. 0

#	Sample Name	Ag	Al	As	Ba	Be	Ca
1	SST4	5.082	4.967	5.184	4.971	5.174	5.205
2	HNO3 REAG BLK	.0026	.0211	-.0041	.0002	.0003	.0067
3	WP284	.0072	.1784	.0428	.0290	.0306	.0502
4	ICV	5.049	4.952	5.093	4.974	5.151	5.119
5	ICB	.0014	.0155	.0072	.0003	.0003	.0040
6	ICSAI	-.0026	508.7	.1070	.0040	.0006	515.3
7	XXX	.0011	.0056	-.0158	.0001	-.0001	.0105
8	V72PB	-.0017	-.0044	.0056	-.0000	.0000	.1659
9	V71LCS	.0413	.1546	.0931	.0036	.0015	.3467
10	V73	.0050	.0181	-.0078	.0082	.0000	.1754
11	V73	.0026	.0214	.0022	.0081	.0002	.0845
12	CCV1	5.248	5.146	5.316	5.192	5.372	5.416
13	CCB1	.0012	.0140	.0072	.0000	.0004	.0053
14	ICSAF	-.0015	513.3	.0842	.0043	.0007	530.3
15	ICSABF	.9288	450.7	.1504	.4670	.4666	473.1
16	XXX	.0025	.0083	-.0286	.0001	.0000	.0152

#	Sample Name	Cd	Co	Cr	Cu	Fe	K
1	SST4	5.138	5.089	5.162	4.899	5.128	4.608
2	HNO3 REAG BLK	.0002	.0008	-.0006	.0006	.0018	-.1642
3	WP284	.0086	.0464	.0078	.0093	.0394	-.2299
4	ICV	5.061	5.028	5.094	4.898	5.074	4.829
5	ICB	.0007	.0037	.0008	.0010	.0014	-.1736
6	ICSAI	.0018	.0013	.0003	.0013	193.3	-.2675
7	XXX	-.0032	-.0006	.0004	.0008	.0028	-.0047
8	V72PB	.0013	.0045	.0007	.0017	.0133	-.0563
9	V71LCS	-.0012	4.450	-.0096	4.692	.0219	-.0657
10	V73	.0014	.0025	.0006	.0039	.0132	.0892
11	V73	-.0003	-.0001	-.0007	.0039	.0205	.0563
12	CCV1	5.252	5.228	5.299	5.119	5.280	5.045
13	CCB1	.0021	.0024	.0005	.0008	.0008	-.1689
14	ICSAF	.0034	.0045	-.0010	.0013	196.3	-.1314
15	ICSABF	.8815	.4407	.4428	.4915	174.0	-.0985
16	XXX	-.0009	.0002	.0003	.0004	.0028	-.1408

#	Sample Name	Mg	Mn	Mo	Na	Ni	Pb
1	SST4	4.926	5.038	5.103	4.823	5.105	5.149
2	HNO3 REAG BLK	.0149	.0004	.0014	.0055	.0043	.0010
3	WP284	.0370	.0143	.0021	.1261	.0123	.0850
4	ICV	4.926	4.971	5.038	4.847	5.063	5.068
5	ICB	.0080	.0006	.0072	.0017	-.0062	.0052
6	ICSAI	466.1	.0133	.0063	.2871	.0140	-.0083
7	XXX	.0086	.0000	-.0006	.0038	-.0144	-.0212
8	V72PB	-.0070	-.0001	.0039	-.0116	.0040	.0020
9	V71LCS	.1976	.0021	4.510	-.0041	.0050	.0499
10	V73	.0331	.0003	.0008	.0800	.0063	.0022
11	V73	.0299	.0003	.0015	.0714	-.0076	.0147
12	CCV1	5.116	5.158	5.237	5.082	5.239	5.243
13	CCB1	.0025	.0005	.0055	-.0003	.0034	.0164

#	Sample Name	Mg	Mn	Mo	Na	Ni	Pb
14	ICSAF	470.8	.0135	.0096	.2878	.0205	-.0062
15	ICSABF	417.5	.4438	.0106	.2573	.8985	.8616
16	XXX	.0146	.0000	.0032	.0051	.0018	-.0242

#	Sample Name	Sb	Se	Ti	Tl	V	Zn
1	SST4	4.801	5.080	4.844	4.991	5.039	5.078
2	HNO3 REAG BLK	.0067	.0013	.0000	.0200	.0016	-.0009
3	WP284	.0288	.0264	-.0008	.0005	.1384	.0396
4	ICV	4.750	5.011	4.825	4.940	4.998	5.025
5	ICB	.0045	.0027	-.0004	.0223	.0004	.0006
6	ICSAI	-.0237	.0912	.0021	.0843	.0038	-.0015
7	XXX	-.0041	-.0076	-.0008	.0038	.0011	-.0040
8	V72PB	.0205	.0214	.0013	.0287	-.0021	.0226
9	V71LCS	4.085	.0135	4.450	-.0003	4.524	4.227
10	V73	.0086	.0109	.0008	.0061	.0030	.0112
11	V73	.0178	.0096	.0004	.0160	.0023	.0108
12	CCV1	4.921	5.236	5.049	5.081	5.204	5.215
13	CCB1	.0102	.0152	.0000	.0161	.0004	.0014
14	ICSAF	-.0062	.0744	.0021	.0844	.0044	-.0007
15	ICSABF	-.0002	.0784	.0028	.0847	.4517	.9077
16	XXX	.0027	-.0014	-.0013	.0034	.0025	-.0029

JK LGA

7-21-94

108 ap FLDBLK

V71-74

Acid Digest

File : 920721A.WSL

File Record	Laboratory Sample Name	Customer/EPA Sample Name	Instrument Type Matrix	Dil.	Date	Time	Flags
1	V71LCS	V71LCS	0 WATER	1.0	07/21/94	13:07:00	
2	XXXX		0	1.0	07/21/94	13:10:00	
3	XXXX		0	1.0	07/21/94	13:13:00	
4	ICV	ICV	0 WATER	1.0	07/21/94	13:15:00	
5	ICB	ICB	0 WATER	1.0	07/21/94	13:18:00	
6	ICSAI	ICSAI	0 WATER	1.0	07/21/94	13:20:00	
7	XXX		0	1.0	07/21/94	13:24:00	
8	V72PBW	V72PBW	0 WATER	1.0	07/21/94	13:27:00	
9	XXXXXX		0	1.0	07/21/94	13:30:00	
10	V73	V73	0 WATER	1.0	07/21/94	13:33:00	
11	V73D	V73D	0 WATER	1.0	07/21/94	13:36:00	
12	CCV1	CCV1	0 WATER	1.0	07/21/94	13:40:00	
13	CCB1	CCB1	0 WATER	1.0	07/21/94	13:42:00	
14	ICSAF	ICSAF	0 WATER	1.0	07/21/94	13:45:00	
15	ICSABF	ICSABF	0 WATER	1.0	07/21/94	13:48:00	
16	XXX		0	1.0	07/21/94	13:52:00	

WHC-SD-WM-DP-065, REV. 0

RADIOCHEMICAL ANALYSES

WHC-SD-WM-DP-065, REV. 0

A-6000-881 (03/92)

[illegible]

NO SPECIAL PROBLE

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

No duplicate was run for V73 because no duplicate cards were cut.

PREPARATION OF SAMPLE MOUNTS FOR GAMMA ENERGY ANALYSIS: LA-548-121 (D-0)

$$\mu_{Cl}/g = (\mu_{Cl}/l) / (g/l)$$

988

Date Entry by: *[Signature]* Date: 03-Aug-84
Approved by: *[Signature]* Date: 4-Aug-94
Form 1 Rev. 1 Page 1 of 1

3974

54-6800-061 (8-10-83)

[illegible]

Date Entry by: [Signature] Date: 03-Aug-84
Approved by: [Signature] Date: 4-Aug-94
Form 1 Rev. 1

 * 222-S Laboratory Counting Room 18-JUL-1994 22:47:04.68 *

>>>>>>> SAMPLE INFORMATION <<<<<<<<<

Sample ID: V71-8530
 Sample Size: 1.00000E-03 LI
 Dilution Factor: 1.00000E+01
 Conversion LI to LI: 1.00000E+00

Removed by:

A. Johansen

date: 7-18-94

>>>>>>> COUNT INFORMATION <<<<<<<<<

Detector ID: GEA3
 File Number: dka300:[spec.GEA3]3g3973.cnf
 Geometry: 42
 Description:
 Count Time: 0 00:50:00.00 sec
 Real Time: 0 00:50:01.66 sec

WHC-SD-WM-DP-065, REV. 0

>>>>>>> ANALYSIS INFORMATION <<<<<<<<<

Sample Count Time: 18-JUL-1994 21:56:13.59
 Decayed to: 18-JUL-1994 21:56:13.59
 Standard Deviations: 2
 Analysis Library: ENVGEA
 Analyst: ALJ
 Background Subtract: DKA300:[SPEC.GEA3]3GBACK

>>>>>>> CALIBRATION INFORMATION <<<<<<<<<

Date of last energy calibration: 11-MAR-1994 11:47:01.11
 Date of last efficiency calibration: 15-MAR-1994 10:28:40.20

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/LI
0	563.49	171	1.95	1127.18	1119	15	38.1		CS-134	17.1
0	569.66	276	1.61	1139.52	1134	12	21.2		CS-134	15.2
0	605.16	1637	1.53	1210.51	1202	23	7.0		CS-134	15.0
0	661.97*	2169	1.56	1324.12	1317	14	4.8		CS-137	24.6
0	796.16	1092	1.79	1592.48	1585	15	7.3		CS-134	14.4
0	802.16	112	1.06	1604.49	1600	11	38.4		CS-134	14.6
0	1173.53	1334	1.78	2347.34	2340	17	6.0		CO-60	21.0
0	1332.79	1187	1.82	2665.95	2657	19	5.9		CO-60	20.8
0	1365.44	45	2.46	2731.29	2724	13	29.8			

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
 COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 991 TO 1002.

Total number of lines in spectrum 9
Number of unidentified lines 1
Number of lines tentatively identified by NID 8 88.89%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CO-60	1925.30D	1.000	2.090E+01	2.090E+01	0.089E+01	4.23	
CS-134	753.10D	1.000	1.475E+01	1.475E+01	0.072E+01	4.86	
CS-137	11020.00D	1.000	2.457E+01	2.457E+01	0.119E+01	4.84	
Total Activity :			6.023E+01	6.023E+01			

Grand Total Activity : 6.023E+01 6.023E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

WHC-SD-WM-DP-065, REV.0

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV.0
BE-7	217.	477.59	4.8544E+00	
NA-22	13.	1274.55	2.8319E-01	
NA-24	25.	1368.53	4.2587E-01	
K-40	140.	1460.75	9.6712E+00	
SC-46	92.	889.23	5.5228E-01	
CR-51	223.	320.09	3.7003E+00	
MN-54	72.	834.83	4.6612E-01	
CO-56	63.	846.76	4.3875E-01	
CO-57	237.	122.06	2.6665E-01	
CO-58	80.	810.75	4.8083E-01	
FE-59	77.	1099.25	1.0789E+00	
ZN-65	65.	1115.55	1.1147E+00	
SE-75	269.	264.66	6.0353E-01	
KR-85	163.	513.99	1.0737E+02	
SR-85	163.	513.99	4.7141E-01	
Y-88	4.	1836.06	2.0975E-01	
Y-91	35.	1204.90	1.4856E+02	
NB-94	84.	871.10	5.1985E-01	
NB-95	78.	765.79	4.5031E-01	
ZR-95	72.	756.73	7.8149E-01	
RU-103	142.	497.08	4.6126E-01	
RURH-106	112.	621.93	9.0730E+00	
AG-108M	232.	433.94	5.3096E-01	
CD-109	239.	88.03	8.8666E+00	
AG-110M	108.	657.76	4.8895E-01	
SN-113	223.	391.67	6.7852E-01	
TE-123M	267.	159.00	2.9241E-01	
SB-124	899.	602.73	1.2689E+00	
SB-125	229.	427.89	1.6035E+00	
TE-125M	202.	35.46	0.0000E+00	
I-129	199.	39.60	0.0000E+00	
I-131	212.	364.48	4.9581E-01	
XE-131M	261.	163.98	1.2920E+01	
BA-133	211.	356.02	6.3347E-01	
CS-136	85.	818.51	4.9671E-01	
CS-138	6.	1435.86	4.5995E-01	
CE-139	269.	165.85	3.1320E-01	
BA-140	252.	162.67	3.8687E+02	
LA-140	9.	1596.20	2.9578E-01	
CE-141	251.	145.44	4.7934E-01	
CE-144	234.	133.51	2.0024E+00	
CEPR-144	234.	133.54	4.0021E+00	
EU-152	10.	1408.01	1.2656E+00	
EU-154	13.	1274.51	8.2009E-01	
EU-155	231.	105.31	1.1428E+00	
HF-181	193.	482.20	5.9296E-01	
TA-182	205.	67.75	1.3957E+00	
HG-203	249.	279.19	4.3709E-01	
BI-207	379.	569.70	7.8564E-01	
TL-208	135.	583.14	5.4354E-01	
PB-210	203.	46.50	0.0000E+00	

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)
I-212	66.	727.27	6.3577E+00
PB-212	335.	239.00	8.5835E-01
BI-214	151.	609.32	1.1443E+00
PB-214	213.	351.92	1.4236E+00
RA-224	309.	240.99	9.0162E+00
RA-226	302.	186.10	8.1337E+00
AC-228	120.	911.07	2.2225E+00
TH-228	322.	215.99	1.2644E+01
TH-229	245.	86.44	1.1140E+01
U-232	277.	129.08	3.5557E+02
PA-233	198.	311.98	9.5727E-01
PA-234M	95.	1001.03	1.0548E+00
TH-234	249.	92.80	2.9455E+00
U-235	243.	143.76	2.0783E+00
NP-237	245.	86.50	2.6508E+00
U-237	323.	208.00	1.5282E+00
NP-238	81.	984.45	2.0509E+00
NP-239	235.	106.12	1.0955E+00
PU-239	277.	129.30	3.7924E+03
AM-241	204.	59.54	2.9980E+00
AM-243	211.	74.66	6.5115E-01

WHC-SD-WM-DP-065, REV.0

 * 222-S Laboratory Counting Room 18-JUL-1994 23:44:24.74 *

>>>>>>> SAMPLE INFORMATION <<<<<<<<<

Sample ID: V72-8630
 Sample Size: 1.00000E-03 LI
 Dilution Factor: 1.00000E+00
 Conversion LI to LI: 1.00000E+00

Removed by:

date: 7.19.94

>>>>>>> COUNT INFORMATION <<<<<<<<<

Detector ID: GEA3
 File Number: dka300:[spec.GEA3]3g3974.cnf
 Geometry: 42
 Description:
 Count Time: 0 00:50:00.00 sec
 Real Time: 0 00:50:00.47 sec

WHC-SD-WM-DP-065, REV.0

>>>>>>> ANALYSIS INFORMATION <<<<<<<<<

Sample Count Time: 18-JUL-1994 22:53:48.10
 Decayed to: 18-JUL-1994 22:53:48.10
 Standard Deviations: 2
 Analysis Library: ENVGEA
 Analyst: ALJ
 Background Subtract: DKA300:[SPEC.GEA3]3GBACK

>>>>>>> CALIBRATION INFORMATION <<<<<<<<<

Date of last energy calibration: 11-MAR-1994 11:47:01.11
 Date of last efficiency calibration: 15-MAR-1994 10:28:40.20

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/LI
0	511.81*	37	2.42	1023.85	1014	21	92.5			
0	633.70	20	1.41	1267.59	1263	10	68.6			

Summary of Nuclide Activity
Sample ID : V72-8630

Page : 2
Acquisition date : 18-JUL-1994 22:53:48

Total number of lines in spectrum 2
Number of unidentified lines 1
Number of lines tentatively identified by NID 1 50.00%
**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

WHC-SD-WM-DP-065, REV.0

Minimum Detectable Activity Report
Sample ID : V72-8630

Page : 3
Acquisition date : 18-JUL-1994 22:53:48

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV A
BE-7	34.	477.59	1.9076E-01	
NA-22	11.	1274.55	2.6370E-02	
NA-24	2.	1368.53	1.1542E-02	
K-40	131.	1460.75	9.3400E-01	
SC-46	15.	889.23	2.2672E-02	
CR-51	50.	320.09	1.7455E-01	
MN-54	18.	834.83	2.3272E-02	
CO-56	13.	846.76	2.0143E-02	
CO-57	62.	122.06	1.3659E-02	
CO-58	18.	810.75	2.2502E-02	
FE-59	9.	1099.25	3.7677E-02	
CO-60	12.	1332.50	2.7948E-02	
ZN-65	13.	1115.55	5.0457E-02	
SE-75	64.	264.66	2.9464E-02	
KR-85	44.	513.99	5.6046E+00	
SR-85	44.	513.99	2.4596E-02	
Y-88	2.	1836.06	1.4832E-02	
Y-91	7.	1204.90	6.6146E+00	
NB-94	9.	871.10	1.6957E-02	
NB-95	12.	765.79	1.7432E-02	
ZR-95	11.	756.73	3.0261E-02	
RU-103	32.	497.08	2.1793E-02	
RURH-106	15.	621.93	3.3565E-01	
AG-108M	35.	433.94	2.0560E-02	
CD-109	66.	88.03	4.6393E-01	
AG-110M	20.	657.76	2.0946E-02	
SN-113	41.	391.67	2.8975E-02	
TE-123M	81.	159.00	1.6133E-02	
SB-124	26.	602.73	2.1658E-02	
SB-125	36.	427.89	6.3514E-02	
TE-125M	45.	35.46	0.0000E+00	
I-129	43.	39.60	0.0000E+00	
I-131	32.	364.48	1.9243E-02	
XE-131M	73.	163.98	6.8297E-01	
BA-133	48.	356.02	3.0112E-02	
CS-134	22.	795.84	2.9128E-02	
CS-136	12.	818.51	1.8907E-02	
CS-137	33.	661.65	3.0349E-02	
CS-138	3.	1435.86	3.1918E-02	
CE-139	77.	165.85	1.6756E-02	
BA-140	65.	162.67	1.9644E+01	
LA-140	5.	1596.20	2.1787E-02	
CE-141	76.	145.44	2.6408E-02	
CE-144	71.	133.51	1.1063E-01	
CEPR-144	72.	133.54	2.2134E-01	
EU-152	4.	1408.01	8.1421E-02	
EU-154	12.	1274.51	7.7412E-02	
EU-155	72.	105.31	6.3636E-02	
HF-181	34.	482.20	2.4971E-02	
TA-182	63.	67.75	7.7245E-02	
HG-203	56.	279.19	2.0723E-02	

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV.0
I-207	21.	569.70	1.8341E-02	
TL-208	45.	583.14	3.1302E-02	
PB-210	38.	46.50	0.0000E+00	
BI-212	20.	727.27	3.5005E-01	
PB-212	94.	239.00	4.5453E-02	
BI-214	49.	609.32	6.5443E-02	
PB-214	65.	351.92	7.8895E-02	
RA-224	77.	240.99	4.5121E-01	
RA-226	83.	186.10	4.2772E-01	
AC-228	37.	911.07	1.2295E-01	
TH-228	74.	215.99	6.0646E-01	
TH-229	67.	86.44	5.8412E-01	
U-232	72.	129.08	1.8089E+01	
PA-233	60.	311.98	5.2718E-02	
PA-234M	18.	1001.03	4.5563E-02	
TH-234	73.	92.80	1.5983E-01	
U-235	82.	143.76	1.2096E-01	
NP-237	67.	86.50	1.3826E-01	
U-237	81.	208.00	7.6442E-02	
NP-238	11.	984.45	7.5644E-02	
NP-239	74.	106.12	6.1547E-02	
PU-239	74.	129.30	1.9605E+02	
AM-241	49.	59.54	1.4738E-01	
AM-243	82.	74.66	4.0629E-02	

* 222-S Laboratory Counting Room 19-JUL-1994 01:24:43.42 *

>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<

Sample ID: V73-8730
Sample Size: 1.00000E-03 LI
Dilution Factor: 1.00000E+00
Conversion LI to LI: 1.00000E+00

Removed by: _____

date: _____

>>>>>>>> COUNT INFORMATION <<<<<<<<<<

Detector ID: GEA3
File Number: dka300:[spec.GEA3]3g3975.cnf
Geometry: 42
Description:
Count Time: 0 00:50:00.00 sec
Real Time: 0 00:50:00.46 sec

WHC-SD-WM-DP-065, REV.0

>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<

Sample Count Time: 19-JUL-1994 00:34:10.18
Decayed to: 19-JUL-1994 00:34:10.18
Standard Deviations: 2
Analysis Library: ENVGEA
Analyst: VR
Background Subtract: DKA300:[SPEC.GEA3]3GBACK

>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<

Date of last energy calibration: 11-MAR-1994 11:47:01.11
Date of last efficiency calibration: 15-MAR-1994 10:28:40.20

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/LI
0	583.38*	16	0.80	1166.96	1163	11	99.6			

Summary of Nuclide Activity
Sample ID : V73-8730

Page : 2
Acquisition date : 19-JUL-1994 00:34:10

Total number of lines in spectrum 1
Number of unidentified lines 0
Number of lines tentatively identified by NID 1 100.00%
*** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

WHC-SD-WM-DP-065, REV.0

1000

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV.0
BE-7	27.	477.59	1.7183E-01	
NA-22	11.	1274.55	2.5753E-02	
NA-24	7.	1368.53	2.1826E-02	
K-40	146.	1460.75	9.8747E-01	
SC-46	10.	889.23	1.8467E-02	
CR-51	54.	320.09	1.8134E-01	
MN-54	21.	834.83	2.5169E-02	
CO-56	12.	846.76	1.9181E-02	
CO-57	65.	122.06	1.3930E-02	
CO-58	15.	810.75	2.0832E-02	
FE-59	9.	1099.25	3.6969E-02	
CO-60	12.	1332.50	2.8071E-02	
ZN-65	15.	1115.55	5.2861E-02	
SE-75	53.	264.66	2.6757E-02	
KR-85	50.	513.99	5.9189E+00	
SR-85	50.	513.99	2.5992E-02	
Y-88	4.	1836.06	2.0916E-02	
Y-91	4.	1204.90	4.9944E+00	
NB-94	16.	871.10	2.2753E-02	
NB-95	26.	765.79	2.6171E-02	
ZR-95	12.	756.73	3.1951E-02	
RU-103	36.	497.08	2.3291E-02	
RURH-106	15.	621.93	3.2832E-01	
AG-108M	30.	433.94	1.9158E-02	
CD-109	75.	88.03	4.9533E-01	
AG-110M	17.	657.76	1.9634E-02	
SN-113	46.	391.67	3.0943E-02	
TE-123M	69.	159.00	1.4905E-02	
SB-124	20.	602.73	1.8989E-02	
SB-125	37.	427.89	6.4456E-02	
TE-125M	46.	35.46	0.0000E+00	
I-129	42.	39.60	0.0000E+00	
I-131	33.	364.48	1.9568E-02	
XE-131M	69.	163.98	6.6174E-01	
BA-133	55.	356.02	3.2289E-02	
CS-134	16.	795.84	2.4488E-02	
CS-136	17.	818.51	2.2246E-02	
CS-137	42.	661.65	3.4127E-02	
CS-138	5.	1435.86	4.1205E-02	
CE-139	70.	165.85	1.5946E-02	
BA-140	65.	162.67	1.9712E+01	
LA-140	3.	1596.20	1.7091E-02	
CE-141	91.	145.44	2.8783E-02	
CE-144	92.	133.51	1.2550E-01	
CEPR-144	91.	133.54	2.5012E-01	
EU-152	4.	1408.01	8.0567E-02	
EU-154	11.	1274.51	7.5085E-02	
EU-155	71.	105.31	6.3329E-02	
HF-181	29.	482.20	2.3112E-02	
TA-182	53.	67.75	7.1204E-02	
HG-203	54.	279.19	2.0380E-02	

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV. 0
BI-207	30.	569.70	2.1987E-02	
TL-208	43.	583.14	3.0507E-02	
PB-210	43.	46.50	0.0000E+00	
BI-212	21.	727.27	3.5602E-01	
PB-212	70.	239.00	3.9312E-02	
BI-214	35.	609.32	5.4964E-02	
PB-214	62.	351.92	7.6864E-02	
RA-224	66.	240.99	4.1720E-01	
RA-226	84.	186.10	4.2974E-01	
AC-228	26.	911.07	1.0410E-01	
TH-228	72.	215.99	5.9593E-01	
TH-229	80.	86.44	6.3557E-01	
U-232	66.	129.08	1.7319E+01	
PA-233	54.	311.98	4.9888E-02	
PA-234M	8.	1001.03	3.0098E-02	
TH-234	81.	92.80	1.6783E-01	
U-235	79.	143.76	1.1850E-01	
NP-237	81.	86.50	1.5194E-01	
U-237	61.	208.00	6.6538E-02	
NP-238	9.	984.45	6.7808E-02	
NP-239	67.	106.12	5.8335E-02	
PU-239	68.	129.30	1.8717E+02	
AM-241	53.	59.54	1.5296E-01	
AM-243	61.	74.66	3.4967E-02	

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.

V77

Customer ID:

COMP 006 10/3/94

Analysis:

GEA

Sample Prep:

Acid Digest

Instrument: WB 57237 WB 57265 WC 3893 006 * 7-21-94	Procedure/ Rev: LA 548-121/D-0
Technologist:	Date: 5/3/94
Starting Time: 0230	Temperature
Ending Time: 0300	Chemist: Eaton PP Bachelor *

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	V75.4530	11		
2	BLK	V76.4630	12		
3	Sample	V77.4730	13		
4	Sample dup	V77.4830	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	134B51 ml			
				1003

NARRATIVE: ☐ NO SPECIAL PROBLE

The results for the standard are in uCi/L.

The activity reported for CS-134 in V77-8830 has high uncertainty.

BEST AVAILABLE COPY

GAMMA ENERGY ANALYSIS - ACID DIGESTION

3430 **RERUN** Batch 3226

Serial No V 75.-8530	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 0	Priority 22
Determination GEA	Method Standard LA-548-121	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size 1 ML			Customer ID STD	
Remarks Calculations Results COLX STD# 131051 R901 STD VAL 2.5142501 RESULT 2.55501 % REC 101.4 C3137 R905 STD VAL 2.103501 RESULT 2.18501 % REC 103.7 C660				
Analyst - 1 S. D. Higgins	Analyst - 2 R. Johnson	Analyst - 3	Analyst - 4	Analyst - 5
Mrs	Mrs 5-3-94	Mrs P. Ketcher	Mrs	Mrs J. H. H. H.
Date 5/3/94	Time Completed 0300	Lab Unit Mgr R. Ketcher		

54-6800-061 (R-10 83)

WHC-SD-WM-DP-065, REV. 0

GAMMA ENERGY ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV.0

3431 **RERUN**

Serial No V 76.-8630	Sample Point 108-AP	Time Issued 3-18-94	Priority 12: 3	22
Determination GEA	Method Standard LA-548-121	Result Units uCi/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ML	Customer ID BLANK			
Remarks Calculations Results COUNT AS uCi/L LASER PRINTOUT $Co_{60} (2.25E-2)(5)/1000 = < 1.13E-4 \text{ uCi/me}$ $Nb_{94} (< 1.98E-2)(5)/1000 = < 9.91E-5$ Not Detectable / Set to Res. sen 7-21-94 $RuRh_{106} (< 3.75E-1)(5)/1000 = < 1.88E-3$ $Cs_{134} (< 2.35E-2)(5)/1000 = < 1.17E-4$ OK →				
Analyst 1 <i>[Signature]</i>	Analyst 2 <i>[Signature]</i>	Analyst 3 <i>[Signature]</i>	Analyst 4	Analyst 5
Hrs	Hrs 5-3-94	Hrs <i>[Signature]</i>	Hrs	Hrs 7-21-94
Date 5/3/94	Time Completed 0300	Lab Unit Mgr <i>[Signature]</i> Bachelor	<i>[Signature]</i> <i>[Signature]</i> 54-6800-061 (R-10-83)	

$Cs_{137} (< 3.68E-2)(5)/1000 = < 1.84E-4 \text{ uCi/me}$
 $Ce_{144} (< 1.11E-1)(5)/1000 = < 5.56E-4$ V76-8630
 $Eu_{154} (< 7.93E-2)(5)/1000 = < 3.96E-4$ 10/3/94
 $Eu_{155} (< 6.39E-2)(5)/1000 = < 3.20E-4$
 $Ra_{226} (< 4.36E-1)(5)/1000 = < 2.18E-3$

GAMMA ENERGY ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

3432 **RERUN**

Serial No V 77.-8730	Sample Point 108-AP	3-18-94	Time Issued 12:18	Priority 22
Determination GEA	Method-Standard LA-548-121	Result Units uCi/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ML			Customer ID COMP	
Remarks, Calculations Results COUNT AS uCi/L LASER PRINTOUT $\frac{8.60^{E+2} \mu\text{Ci/L}(5)}{1000} = 4.30 \mu\text{Ci/ml Cs137}$				
Analyst - 1 <i>F. M. M.</i>	Analyst - 2 <i>R. M. M.</i>	Analyst - 3 <i>P. M. M.</i>	Analyst - 4 <i>OK →</i>	Analyst - 5 <i>7-21-94</i>
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5/3/94	Time Completed 0300	Lab Unit Mgr <i>Rachelor</i>	<i>gok m. farley</i> <i>Ray Hammett</i>	

54-6800-061 (R-10-83)

$$\begin{aligned} \text{Co}_{60} & (<2.44\text{E-}2)(5)/1000 = <1.22\text{E-}4 \mu\text{Ci/me} \\ \text{Nb}_{94} & (<9.62\text{E-}2)(5)/1000 = <4.81\text{E-}4 \quad \checkmark 77-8730 \\ \text{RuRh}_{106} & (<5.44\text{E+}0)(5)/1000 = <2.72\text{E-}2 \\ \text{Cs}_{134} & (<1.44\text{E-}1)(5)/1000 = <7.21\text{E-}4 \\ \text{Ce}_{144} & (<1.80\text{E+}0)(5)/1000 = <8.98\text{E-}3 \\ \text{Eu}_{154} & (<1.78\text{E-}1)(5)/1000 = <8.91\text{E-}4 \\ \text{Eu}_{155} & (<9.75\text{E-}1)(5)/1000 = <4.87\text{E-}3 \\ \text{Ra}_{226} & (<7.46\text{E+}0)(5)/1000 = <3.73\text{E-}2 \end{aligned}$$

GAMMA ENERGY ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

3433 RERUN

Serial No V 77.-8830	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 22
Determination GEA	Method Standard LA-548-121	Result Units uCi/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ML			Customer ID COMP	
Remarks, Calculations, Results COUNT AS uCi/L LASER PRINTOUT $\frac{8.542E-02 \text{ uCi/L}(5)}{1000} = 4.27 \text{ uCi/ml CS-137}$ $\frac{2.975E-01(5)}{1000} = 1.49E-03 \text{ uCi/ml CS-134}$ <p style="text-align: center;">High Uncertainty</p>				
Analyst - 1 <i>[Signature]</i>	Analyst - 2 <i>[Signature]</i>	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5/3/94	Time Completed 0300	Lab Unit Mgr <i>[Signature]</i>	<i>[Signature]</i> 7-21-94 54-6800-061 (R-10-83)	

$$\begin{aligned}
\text{Nb94} & (<9.09E-2)(5)/1000 = <4.54E-4 \text{ uCi/me} \\
\text{RuRh}_{106} & (<5.39E+0)(5)/1000 = <2.70E-2 \quad \sqrt{77-8830} \\
\text{Ce}_{144} & (<1.81E+0)(5)/1000 = <9.04E-3 \\
\text{Eu}_{154} & (<1.80E-1)(5)/1000 = <9.01E-4 \\
\text{Eu}_{155} & (<9.70E-1)(5)/1000 = <4.85E-3 \\
\text{Ra}_{226} & (<7.47E+0)(5)/1000 = <3.74E-2 \\
\text{Co}_{60} & (<4.03E-2)(5)/1000 = <2.02E-4
\end{aligned}$$

* 222-S Laboratory Counting Room 20-JUL-1994 10:34:29.21 *

>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<

Sample ID: V75-8530
Sample Size: 1.00000E-03 LI
Dilution Factor: 1.00000E+00
Conversion LI to LI: 1.00000E+00

Removed by: _____

date: _____

>>>>>>>> COUNT INFORMATION <<<<<<<<<<

Detector ID:
File Number: NI3AC:1.cnf
Geometry: 42
Description:
Count Time: 0 00:50:00.00 sec
Real Time: 0 00:50:12.80 sec

WHC-SD-WM-DP-065, REV.0

>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<

Sample Count Time: 3-MAY-1994 06:25:02.73
Decayed to: 3-MAY-1994 06:25:02.73
Standard Deviations: 2
Analysis Library: ENVGEA
Analyst: JLA
Background Subtract: DKA300:[SPEC.GEA3]3GBACK

>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<

Date of last energy calibration: 11-MAR-1994 11:47:01.11
Date of last efficiency calibration: 15-MAR-1994 10:28:40.20

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/LI
0	475.17	287	1.49	950.57	946	13	74.9			
0	563.23	1470	1.55	1126.67	1123	10	10.2			
0	569.29	2607	1.51	1138.78	1133	14	7.8		CS-134	14.7
0	604.69	16592	1.51	1209.57	1202	13	1.8		CS-134	14.3
0	661.61*	22484	1.49	1323.40	1315	16	1.5		CS-134	15.2
0	795.77	11809	1.66	1591.70	1584	14	2.1		CS-137	25.5
0	801.84	997	1.67	1603.85	1599	11	12.6		CS-134	15.6
0	801.84	997	1.67	1603.85	1599	11	12.6		CS-134	13.0
3	1168.18	207	2.46	2336.63	2328	27	52.4	2.24E+00		
3	1173.04	13791	1.90	2346.34	2328	27	1.8		CO-60	21.7
0	1332.25	12464	1.95	2664.87	2657	19	1.8		CO-60	21.8
0	1364.89	328	1.82	2730.17	2723	16	14.0			
0	1400.53	152	1.83	2801.50	2793	18	24.6			
0	1460.55*	38	1.91	2921.59	2912	21	92.5		K-40	0.663
0	1638.90	11	0.61	3278.49	3272		9106.1			

Total number of lines in spectrum 14
Number of unidentified lines 5
Number of lines tentatively identified by NID 9 64.29%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	4.66E+11D	1.000	6.631E-01	6.631E-01	6.133E-01	92.49	13K68/37/2084
CO-60	1925.30D	1.000	2.178E+01	2.178E+01	0.028E+01	1.28	
CS-134	753.10D	1.000	1.526E+01	1.527E+01	0.021E+01	1.35	
CS-137	11020.00D	1.000	2.548E+01	2.548E+01	0.039E+01	1.52	
Total Activity :			6.318E+01	6.318E+01			

WHC-SD-WM-DP-065, REV.0

Grand Total Activity : 6.318E+01 6.318E+01

Flags: "K" = Keyline not found
"E" = Manually edited

"M" = Manually accepted
"A" = Nuclide specific abn. limit

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV.0
BE-7	1797.	477.59	1.3965E+00	
NA-22	101.	1274.55	7.8701E-02	
NA-24	95.	1368.53	8.2400E-02	
SC-46	755.	889.23	1.5865E-01	
CR-51	1864.	320.09	1.0704E+00	
MN-54	694.	834.83	1.4440E-01	
CO-56	641.	846.76	1.4019E-01	
CO-57	1999.	122.06	7.7367E-02	
CO-58	644.	810.75	1.3604E-01	
FE-59	640.	1099.25	3.1010E-01	
ZN-65	571.	1115.55	3.3058E-01	
SE-75	2230.	264.66	1.7362E-01	
KR-85	1301.	513.99	3.0324E+01	
SR-85	1301.	513.99	1.3309E-01	
Y-88	15.	1836.06	4.0619E-02	
Y-91	219.	1204.90	3.6962E+01	
NB-94	749.	871.10	1.5514E-01	
NB-95	636.	765.79	1.2837E-01	
ZR-95	646.	756.73	2.3447E-01	
RU-103	1402.	497.08	1.4502E-01	
RURH-106	810.	621.93	2.4381E+00	
AG-108M	1940.	433.94	1.5361E-01	
CD-109	1714.	88.03	2.3723E+00	
AG-110M	1135.	657.76	1.5861E-01	
SN-113	1995.	391.67	2.0307E-01	
TE-123M	2152.	159.00	8.3084E-02	
SB-124	12724.	602.73	4.7743E-01	
SB-125	1940.	427.89	4.6689E-01	
TE-125M	1702.	35.46	0.0000E+00	
I-129	1666.	39.60	0.0000E+00	
I-131	1930.	364.48	1.4971E-01	
XE-131M	2114.	163.98	3.6738E+00	
BA-133	1902.	356.02	1.9036E-01	
CS-136	653.	818.51	1.3786E-01	
CS-138	25.	1435.86	9.2142E-02	
CE-139	2149.	165.85	8.8493E-02	
BA-140	2079.	162.67	1.1120E+02	
LA-140	18.	1596.20	4.1988E-02	
CE-141	2051.	145.44	1.3691E-01	
CE-144	2105.	133.51	6.0096E-01	
CEPR-144	2106.	133.54	1.2012E+00	
EU-152	34.	1408.01	2.3679E-01	
EU-154	101.	1274.51	2.2916E-01	
EU-155	1819.	105.31	3.2092E-01	
HF-181	1487.	482.20	1.6440E-01	
TA-182	1617.	67.75	3.9231E-01	
HG-203	2036.	279.19	1.2497E-01	
BI-207	3721.	569.70	2.4608E-01	
TL-208	1208.	583.14	1.6259E-01	
PB-210	1560.	46.50	0.0000E+00	
BI-212	609.	727.27	1.9327E+00	

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV.0
B-212	2414.	239.00	2.3042E-01	
LI-214	952.	609.32	2.8768E-01	
PB-214	1904.	351.92	4.2616E-01	
RA-224	2340.	240.99	2.4809E+00	
RA-226	2430.	186.10	2.3080E+00	
AC-228	846.	911.07	5.9104E-01	
TH-228	2588.	215.99	3.5844E+00	
TH-229	1742.	86.44	2.9714E+00	
U-232	2065.	129.08	9.7045E+01	
PA-233	1984.	311.98	3.0301E-01	
PA-234M	708.	1001.03	2.8816E-01	
TH-234	1790.	92.80	7.8986E-01	
U-235	2067.	143.76	6.0644E-01	
NP-237	1743.	86.50	7.0681E-01	
U-237	2589.	208.00	4.3250E-01	
NP-238	740.	984.45	6.1991E-01	
NP-239	1857.	106.12	3.0808E-01	
PU-239	2072.	129.30	1.0368E+03	
AM-241	1575.	59.54	8.3233E-01	
AM-243	1621.	74.66	1.8054E-01	

 * 222-S Laboratory Counting Room 20-JUL-1994 10:35:56.84 *

>>>>>>> SAMPLE INFORMATION <<<<<<<<<

Sample ID: V76-8630
 Sample Size: 1.00000E-03 LI
 Dilution Factor: 1.00000E+00
 Conversion LI to LI: 1.00000E+00

Removed by: _____

date: _____

>>>>>>> COUNT INFORMATION <<<<<<<<<

Detector ID:
 File Number: NI3AC:1.cnf
 Geometry: 42
 Description:
 Count Time: 0 00:50:00.00 sec
 Real Time: 0 00:50:00.48 sec

WHC-SD-WM-DP-065, REV.0

>>>>>>> ANALYSIS INFORMATION <<<<<<<<<

Sample Count Time: 3-MAY-1994 07:31:42.99
 Decayed to: 3-MAY-1994 07:31:42.99
 Standard Deviations: 2
 Analysis Library: ENVGEA
 Analyst: JLA
 Background Subtract: DKA300:[SPEC.GEA3]3GBACK

>>>>>>> CALIBRATION INFORMATION <<<<<<<<<

Date of last energy calibration: 11-MAR-1994 11:47:01.11
 Date of last efficiency calibration: 15-MAR-1994 10:28:40.20

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw %Err	Fit	Nuclides	Activity uCi/LI
0	47.09	43	1.48	94.74	92	8 63.2		PB-210	0.000E+00
0	351.55*	25	1.45	703.40	699	9107.5			
0	1460.43*	10	2.14	2921.34	2911	19251.4		K-40	0.169

Total number of lines in spectrum 3
Number of unidentified lines 0
Number of lines tentatively identified by NID 3 100.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	4.66E+11D	1.000	1.693E-01	1.693E-01	4.256E-01	251.41	AKG 7/20/94
PR-210	8.14D	1.001	0.000E+00	0.000E+00	0.000E+00	0.00	

Total Activity : 1.693E-01 1.693E-01

WHC-SD-WM-DP-065, REV.0

Grand Total Activity : 1.693E-01 1.693E-01

Flags: "K" = Keyline not found
"E" = Manually edited

"M" = Manually accepted
"A" = Nuclide specific abn. limit

Minimum Detectable Activity Report
Sample ID : V76-8630

Page : 3
Acquisition date : 3-MAY-1994 07:31:42

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV.0
BE-7	29.	477.59	1.7706E-01	
NA-22	12.	1274.55	2.7478E-02	
NA-24	3.	1368.53	1.4315E-02	
SC-46	12.	889.23	1.9971E-02	
CR-51	51.	320.09	1.7706E-01	
MN-54	12.	834.83	1.8742E-02	
CO-56	13.	846.76	1.9906E-02	
CO-57	59.	122.06	1.3276E-02	
CO-58	15.	810.75	2.0763E-02	
FE-59	12.	1099.25	4.2841E-02	
CO-60	8.	1332.50	2.2511E-02	
ZN-65	12.	1115.55	4.8387E-02	
SE-75	58.	264.66	2.7914E-02	
KR-85	49.	513.99	5.9007E+00	
SR-85	49.	513.99	2.5923E-02	
Y-88	6.	1836.06	2.5267E-02	
Y-91	12.	1204.90	8.7843E+00	
NB-94	12.	871.10	1.9812E-02	
NB-95	11.	765.79	1.6783E-02	
ZR-95	16.	756.73	3.6331E-02	
RU-103	27.	497.08	1.9992E-02	
RURH-106	19.	621.93	3.7520E-01	
AG-108M	31.	433.94	1.9517E-02	
CD-109	56.	88.03	4.2825E-01	
AG-110M	23.	657.76	2.2721E-02	
SN-113	37.	391.67	2.7631E-02	
TE-123M	73.	159.00	1.5322E-02	
SB-124	26.	602.73	2.1728E-02	
SB-125	32.	427.89	5.9973E-02	
TE-125M	61.	35.46	0.0000E+00	
I-129	43.	39.60	0.0000E+00	
I-131	40.	364.48	2.1573E-02	
XE-131M	74.	163.98	6.8670E-01	
BA-133	41.	356.02	2.8033E-02	
CS-134	15.	795.84	2.3461E-02	
CS-136	22.	818.51	2.5305E-02	
CS-137	49.	661.65	3.6829E-02	
CS-138	4.	1435.86	3.5366E-02	
CE-139	71.	165.85	1.6072E-02	
BA-140	76.	162.67	2.1212E+01	
LA-140	7.	1596.20	2.5322E-02	
CE-141	78.	145.44	2.6731E-02	
CE-144	72.	133.51	1.1118E-01	
CEPR-144	72.	133.54	2.2252E-01	
EU-152	12.	1408.01	1.3854E-01	
EU-154	12.	1274.51	7.9297E-02	
EU-155	72.	105.31	6.3911E-02	
HF-181	30.	482.20	2.3477E-02	
TA-182	57.	67.75	7.3489E-02	
HG-203	62.	279.19	2.1757E-02	
BI-207	25.	569.70	2.0119E-02	

Nuclide	Bckgnd Sum	Energy (keV)	MDA	WHC-SD-WM-DP-065, REV.0
			(uCi/LI)	
P-208	31.	583.14	2.6108E-02	
SI-212	22.	727.27	3.6944E-01	
PB-212	84.	239.00	4.3029E-02	
BI-214	45.	609.32	6.2416E-02	
PB-214	79.	351.92	8.6641E-02	
RA-224	80.	240.99	4.5845E-01	
RA-226	87.	186.10	4.3627E-01	
AC-228	27.	911.07	1.0548E-01	
TH-228	82.	215.99	6.3870E-01	
TH-229	72.	86.44	6.0358E-01	
U-232	72.	129.08	1.8074E+01	
PA-233	56.	311.98	5.1100E-02	
PA-234M	10.	1001.03	3.4328E-02	
TH-234	74.	92.80	1.6091E-01	
U-235	69.	143.76	1.1048E-01	
NP-237	71.	86.50	1.4278E-01	
U-237	81.	208.00	7.6347E-02	
NP-238	21.	984.45	1.0537E-01	
NP-239	66.	106.12	5.8086E-02	
PU-239	71.	129.30	1.9127E+02	
AM-241	55.	59.54	1.5507E-01	
AM-243	72.	74.66	3.8027E-02	

* 222-S Laboratory Counting Room 20-JUL-1994 10:37:52.28 *

>>>>>>>> SAMPLE INFORMATION <<<<<<<<<

Sample ID: V77-8730
Sample Size: 1.00000E-03 LI
Dilution Factor: 1.00000E+00
Conversion LI to LI: 1.00000E+00

Removed by: _____

date: _____

>>>>>>>> COUNT INFORMATION <<<<<<<<<

Detector ID:
File Number: NI3AC:1.cnf
Geometry: 42
Description:
Count Time: 0 00:50:00.00 sec
Real Time: 0 00:51:33.80 sec

WHC-SD-WM-DP-065, REV.0

>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<

Sample Count Time: 3-MAY-1994 08:25:00.47
Decayed to: 3-MAY-1994 08:25:00.47
Standard Deviations: 2
Analysis Library: ENVGEA
Analyst: JLA
Background Subtract: DKA300:[SPEC.GEA3]3GBACK

>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<

Date of last energy calibration: 11-MAR-1994 11:47:01.11
Date of last efficiency calibration: 15-MAR-1994 10:28:40.20

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/LI
0	511.87*	464	1.43	1023.95	1021	7	69.3			
0	661.59*	758940	1.56	1323.35	1315	17	0.2		CS-137	860.
0	795.60	153	1.78	1591.36	1589	7	39.2			
0	1322.37	125	2.46	2645.12	2638	19	42.1			

Total number of lines in spectrum 4
Number of unidentified lines 1
Number of lines tentatively identified by NID 3 75.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CS-137	11020.00D	1.000	8.599E+02	8.599E+02	0.020E+02	0.23	
Total Activity :			8.599E+02	8.599E+02			

WHC-SD-WM-DP-065, REV.0

Grand Total Activity : 8.599E+02 8.599E+02

Flags: "K" = Keyline not found
"E" = Manually edited

"M" = Manually accepted
"A" = Nuclide specific abn. limit

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV.0
BE-7	23098.	477.59	5.0069E+00	
NA-22	61.	1274.55	6.1274E-02	
NA-24	11.	1368.53	2.7736E-02	
K-40	118.	1460.75	8.8612E-01	
SC-46	249.	889.23	9.1005E-02	
CR-51	18154.	320.09	3.3405E+00	
MN-54	339.	834.83	1.0091E-01	
CO-56	321.	846.76	9.9164E-02	
CO-57	18199.	122.06	2.3346E-01	
CO-58	374.	810.75	1.0365E-01	
FE-59	141.	1099.25	1.4585E-01	
CO-60	9.	1332.50	2.4416E-02	
ZN-65	134.	1115.55	1.6038E-01	
SE-75	19823.	264.66	5.1762E-01	
KR-85	11663.	513.99	9.0798E+01	
SR-85	11664.	513.99	3.9849E-01	
Y-88	5.	1836.06	2.3451E-02	
Y-91	54.	1204.90	1.8342E+01	
NB-94	288.	871.10	9.6157E-02	
NB-95	435.	765.79	1.0612E-01	
ZR-95	448.	756.73	1.9526E-01	
RU-103	13996.	497.08	4.5815E-01	
RURH-106	4037.	621.93	5.4442E+00	
AG-108M	23907.	433.94	5.3921E-01	
CD-109	15891.	88.03	7.2240E+00	
AG-110M	15543.	657.76	5.8704E-01	
SN-113	19874.	391.67	6.4088E-01	
TE-123M	19110.	159.00	2.4760E-01	
SB-124	4460.	602.73	2.8267E-01	
SB-125	23259.	427.89	1.6164E+00	
TE-125M	15192.	35.46	0.0000E+00	
I-129	14808.	39.60	0.0000E+00	
I-131	18418.	364.48	4.6248E-01	
XE-131M	19100.	163.98	1.1042E+01	
BA-133	18098.	356.02	5.8715E-01	
CS-134	552.	795.84	1.4428E-01	
CS-136	351.	818.51	1.0103E-01	
CS-138	5.	1435.86	4.1775E-02	
CE-139	19302.	165.85	2.6522E-01	
BA-140	18972.	162.67	3.3593E+02	
LA-140	3.	1596.20	1.7095E-02	
CE-141	19012.	145.44	4.1682E-01	
CE-144	18801.	133.51	1.7962E+00	
CEPR-144	18798.	133.54	3.5887E+00	
EU-152	12.	1408.01	1.3904E-01	
EU-154	61.	1274.51	1.7811E-01	
EU-155	16781.	105.31	9.7482E-01	
HF-181	18405.	482.20	5.7836E-01	
TA-182	14787.	67.75	1.1864E+00	
HG-203	18631.	279.19	3.7805E-01	
BI-207	4969.	569.70	2.8436E-01	

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV.0
PL-208	4523.	583.14	3.1463E-01	
PB-210	14571.	46.50	0.0000E+00	
BI-212	508.	727.27	1.7651E+00	
PB-212	22141.	239.00	6.9777E-01	
BI-214	4050.	609.32	5.9337E-01	
PB-214	18177.	351.92	1.3267E+00	
RA-224	21956.	240.99	7.5999E+00	
RA-226	25352.	186.10	7.4553E+00	
AC-228	252.	911.07	3.2230E-01	
TH-228	24972.	215.99	1.1134E+01	
TH-229	16126.	86.44	9.0411E+00	
U-232	18649.	129.08	2.9163E+02	
PA-233	17935.	311.98	9.1114E-01	
PA-234M	149.	1001.03	1.3202E-01	
TH-234	16154.	92.80	2.3729E+00	
U-235	18982.	143.76	1.8379E+00	
NP-237	16120.	86.50	2.1494E+00	
U-237	25953.	208.00	1.3694E+00	
NP-238	166.	984.45	2.9329E-01	
NP-239	16916.	106.12	9.3001E-01	
PU-239	18673.	129.30	3.1128E+03	
AM-241	14706.	59.54	2.5431E+00	
AM-243	15105.	74.66	5.5108E-01	

 * 222-S Laboratory Counting Room 20-JUL-1994 10:39:13.93 *

>>>>>>> SAMPLE INFORMATION <<<<<<<<<

Sample ID: V77-8830
 Sample Size: 1.00000E-03 LI
 Dilution Factor: 1.00000E+00
 Conversion LI to LI: 1.00000E+00

Removed by: _____

date: _____

>>>>>>> COUNT INFORMATION <<<<<<<<<

Detector ID:
 File Number: NI3AC:1.cnf
 Geometry: 42
 Description:
 Count Time: 0 00:50:00.00 sec
 Real Time: 0 00:51:33.06 sec

WHC-SD-WM-DP-065, REV. 0

>>>>>>> ANALYSIS INFORMATION <<<<<<<<<

Sample Count Time: 3-MAY-1994 09:33:59.37
 Decayed to: 3-MAY-1994 09:33:59.37
 Standard Deviations: 2
 Analysis Library: ENVGEA
 Analyst: JLA
 Background Subtract: DKA300:[SPEC.GEA3]3GBACK

>>>>>>> CALIBRATION INFORMATION <<<<<<<<<

Date of last energy calibration: 11-MAR-1994 11:47:01.11
 Date of last efficiency calibration: 15-MAR-1994 10:28:40.20

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/LI
0	604.68	346	1.40	1209.54	1206	8	60.1		CS-134	0.316
0	661.60*	753835	1.56	1323.37	1315	17	0.2		CS-137	854.
0	796.31	219	1.57	1592.79	1586	14	45.1		CS-134	0.289
0	1321.77	154	2.95	2643.90	2635	16	32.0			

Total number of lines in spectrum 4
Number of unidentified lines 1
Number of lines tentatively identified by NID 3 75.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CS-134	753.10D	1.000	2.975E-01	2.975E-01	1.074E-01	36.11	
CS-137	11020.00D	1.000	8.541E+02	8.541E+02	0.020E+02	0.24	
Total Activity :			8.544E+02	8.544E+02			

WHC-SD-WM-DP-065, REV. 0

Grand Total Activity : 8.544E+02 8.544E+02

Flags: "K" = Keyline not found
"E" = Manually edited

"M" = Manually accepted
"A" = Nuclide specific abn. limit

Minimum Detectable Activity Report
Sample ID : V77-8830

Page : 3
Acquisition date : 3-MAY-1994 09:33:59

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV. 0
BE-7	22645.	477.59	4.9576E+00	
NA-22	62.	1274.55	6.1759E-02	
NA-24	8.	1368.53	2.3965E-02	
K-40	141.	1460.75	9.6851E-01	
SC-46	254.	889.23	9.2006E-02	
CR-51	17434.	320.09	3.2735E+00	
MN-54	319.	834.83	9.7844E-02	
CO-56	342.	846.76	1.0235E-01	
CO-57	18015.	122.06	2.3228E-01	
CO-58	364.	810.75	1.0231E-01	
FE-59	119.	1099.25	1.3386E-01	
CO-60	25.	1332.50	4.0322E-02	
ZN-65	111.	1115.55	1.4578E-01	
SE-75	19455.	264.66	5.1280E-01	
KR-85	11602.	513.99	9.0558E+01	
SR-85	11603.	513.99	3.9744E-01	
Y-88	3.	1836.06	1.8165E-02	
Y-91	51.	1204.90	1.7794E+01	
NB-94	257.	871.10	9.0865E-02	
NB-95	423.	765.79	1.0470E-01	
ZR-95	408.	756.73	1.8627E-01	
RU-103	13659.	497.08	4.5260E-01	
RURH-106	3961.	621.93	5.3928E+00	
AG-108M	23442.	433.94	5.3393E-01	
CD-109	15780.	88.03	7.1988E+00	
AG-110M	14767.	657.76	5.7219E-01	
SN-113	19501.	391.67	6.3483E-01	
TE-123M	18738.	159.00	2.4518E-01	
SB-124	4340.	602.73	2.7884E-01	
SB-125	23142.	427.89	1.6124E+00	
TE-125M	15116.	35.46	0.0000E+00	
I-129	14988.	39.60	0.0000E+00	
I-131	18241.	364.48	4.6025E-01	
XE-131M	19178.	163.98	1.1065E+01	
BA-133	18110.	356.02	5.8734E-01	
CS-136	356.	818.51	1.0186E-01	
CS-138	7.	1435.86	4.7969E-02	
CE-139	19293.	165.85	2.6515E-01	
BA-140	19188.	162.67	3.3785E+02	
LA-140	4.	1596.20	1.9740E-02	
CE-141	18874.	145.44	4.1531E-01	
CE-144	19031.	133.51	1.8071E+00	
CEPR-144	19024.	133.54	3.6102E+00	
EU-152	12.	1408.01	1.4004E-01	
EU-154	62.	1274.51	1.8010E-01	
EU-155	16607.	105.31	9.6976E-01	
HF-181	18185.	482.20	5.7488E-01	
TA-182	14950.	67.75	1.1929E+00	
HG-203	18682.	279.19	3.7856E-01	
BI-207	4818.	569.70	2.8000E-01	
TL-208	4542.	583.14	3.1528E-01	

Sample ID : V77-8830

Acquisition date : 3-MAY-1994 09:33:59

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV.0
B-210	14411.	46.50	0.0000E+00	
BI-212	514.	727.27	1.7755E+00	
PB-212	21933.	239.00	6.9448E-01	
BI-214	3990.	609.32	5.8894E-01	
PB-214	17923.	351.92	1.3174E+00	
RA-224	21915.	240.99	7.5928E+00	
RA-226	25466.	186.10	7.4719E+00	
AC-228	212.	911.07	2.9566E-01	
TH-228	24473.	215.99	1.1023E+01	
TH-229	15814.	86.44	8.9531E+00	
U-232	18612.	129.08	2.9134E+02	
PA-233	17889.	311.98	9.0998E-01	
PA-234M	165.	1001.03	1.3901E-01	
TH-234	15934.	92.80	2.3567E+00	
U-235	19059.	143.76	1.8416E+00	
NP-237	15825.	86.50	2.1296E+00	
U-237	25663.	208.00	1.3617E+00	
NP-238	159.	984.45	2.8745E-01	
NP-239	16681.	106.12	9.2354E-01	
PU-239	18638.	129.30	3.1098E+03	
AM-241	14640.	59.54	2.5374E+00	
AM-243	15212.	74.66	5.5304E-01	

THE FOLLOWING ANALYSES ARE INCLUDED IN THE DATA PACKAGE BUT THE RESULTS HAVE NOT BEEN REPORTED IN THE FINAL SUMMARY REPORTS.

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.

V 76, V 77

Customer ID:

COMP

Analysis:

GEA

Sample Prep:

ACID DIGEST

Instrument: GEA2

Procedure/ Rev: LA-548-121/D-0

Technologist: SM FULTON

Susie M. Fulton

Date: 04/20/94

Starting Time: 0245

Temperature 20 C

Ending Time: 0315

Chemist: S CATLOW/P BACHLOR

Comments: BATCH #3030

OUT FOR RERUN*OSCR # 6633*

	Description	Lab ID
1	LMCS STANDARD	V 75-8530
2	BLANK	V 76-8630
3	SAMPLE	V 77-8730
4	DUPLICATE SAMPLE	V 77-8830
5		
6		
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

**DATA
NOT USED
IN PACKAGE**

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
				1026

2153

Date 3030

Serial No	V	75.-8530	Sample Point	108-AP	Date	3-18-94	Time Issued	12: 0	Priority	26
Determination	GEA		Method/Standard	LA-548-121	Result Units	% RECOVERY	Charge Code	N1A7F	Retuns	0
Sample Size	1.0 ml				Customer ID	STD				

Remarks Calculations, Results
 COLX STD# 139851 2.5171 E+1 REC 139851 2.5171 E+1 R901
 R901 STD VAL 2.339 E+1 4.20-94 R901
 RESULT 2.339 % REC 139851 2.5171 E+1
 R905 STD VAL 2.024 E+1 4.20-94
 RESULT 2.024 E+1 REC 139851 2.5171 E+1
 95.6%

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Laurie M. Jucker	D.H. Milbrink			
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
4-20-94	0315	XX Bachelor		

54 6000-061 (R-10-83)

2156

Serial No	V	77.-8730	Sample Point	108-AP	Date	3-18-94	Time Issued	12:18	Priority	26
Determination	GEA		Method/Standard	LA-548-121	Result Units	uCi/ML	Charge Code	N1A7F	Retuns	0
Sample Size	1.0 ml				Customer ID	COMP				

Remarks Calculations, Results

COUNT AS uCi/L
LASER PRINTOUT

10

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Laurie M. Jucker	D.H. Milbrink			
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
4-20-94	0315	XX Bachelor		

2155

Serial No	V	76.-8630	Sample Point	108-AP	Date	3-18-94	Time Issued	12: 3	Priority	26
Determination	GEA		Method/Standard	LA-548-121	Result Units	uCi/ML	Charge Code	N1A7F	Retuns	0
Sample Size	1.0 ml				Customer ID	BLANK				

Remarks Calculations, Results

COUNT AS uCi/L
LASER PRINTOUT

WHC-SD-WM-DP-065, REV.0

OUT FOR RERUN BEST AVAILABLE COPY

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Laurie M. Jucker	D.H. Milbrink			
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
4-20-94	0315	XX Bachelor		

54 6000-061 (R-10-83)

2157

Serial No	V	77.-8830	Sample Point	108-AP	Date	3-18-94	Time Issued	12:18	Priority	26
Determination	GEA		Method/Standard	LA-548-121	Result Units	uCi/ML	Charge Code	N1A7F	Retuns	0
Sample Size	1.0 ml				Customer ID	COMP				

Remarks Calculations, Results

COUNT AS uCi/L
LASER PRINTOUT

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Laurie M. Jucker	D.H. Milbrink			
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
4-20-94	0315	XX Bachelor		

 * 222-S Laboratory Counting Room 20-APR-1994 04:48:06.52

>>>>>>> SAMPLE INFORMATION <<<<<<<<<

Sample ID: V-75-8530
 Sample Size: 1.00000E-03 LI
 Dilution Factor: 1.00000E+00
 Conversion LI to LI: 1.00000E+00

Removed by:

D.H. Milicia

date: 4-20-94

>>>>>>> COUNT INFORMATION <<<<<<<<<

Detector ID: GEA2
 File Number: dka300:[spec.GEA2]2g2153.cnf
 Geometry: 42
 Description:
 Count Time: 0 00:50:00.00 sec
 Real Time: 0 00:50:10.79 sec

WHC-SD-WM-DP-065, REV.0

>>>>>>> ANALYSIS INFORMATION <<<<<<<<<

Sample Count Time: 20-APR-1994 03:57:19.55
 Decayed to: 20-APR-1994 03:57:19.55
 Standard Deviations: 2
 Analysis Library: ENVGEA
 Analyst: DM

>>>>>>> CALIBRATION INFORMATION <<<<<<<<<

Date of last energy calibration: 21-MAR-1994 09:31:55.15
 Date of last efficiency calibration: 21-MAR-1994 09:43:42.61

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/LI
0	475.67	269	1.73	951.45	947	9	52.4			
0	563.58	1143	1.47	1127.22	1123	10	12.0		CS-134	14.1
0	569.57	2086	1.41	1139.20	1133	12	8.1		CS-134	14.1
0	605.03	13012	1.48	1210.11	1203	15	2.2		CS-134	14.6
0	661.94*	16815	1.48	1323.90	1316	15	1.7		CS-137	23.4
3	796.11	8826	1.62	1592.22	1586	29	2.3	2.55E+00	CS-134	14.3
3	802.20	998	1.93	1604.39	1586	29	11.3		CS-134	15.9
3	1168.58	219	2.43	2337.21	2327	28	47.9	2.69E+00		
3	1173.37	10344	1.87	2346.79	2327	28	2.1		CO-60	20.3
0	1332.54*	9259	1.97	2665.23	2655	19	2.2		CO-60	20.1
0	1365.03	254	1.98	2730.24	2721	15	13.4			
0	1400.46	112	1.42	2801.14	2794	14	25.6			

Summary of Nuclide Activity
Sample ID : V-75-8530

Page : 2
Acquisition date : 20-APR-1994 03:57:19

Total number of lines in spectrum 12
Number of unidentified lines 4
Number of lines tentatively identified by NID 8 66.67%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CO-60	1925.30D	1.000	2.024E+01	2.024E+01	0.030E+01	1.49	
CS-134	753.10D	1.000	1.448E+01	1.448E+01	0.022E+01	1.53	
CS-137	11020.00D	1.000	2.339E+01	2.339E+01	0.041E+01	1.74	
Total Activity :			5.811E+01	5.811E+01			

WHC-SD-WM-DP-065, REV.0

Grand Total Activity : 5.811E+01 5.811E+01

Flags: "K" = Keyline not found
"E" = Manually edited

"M" = Manually accepted
"A" = Nuclide specific abn. limit

Nuclide	Bckgnd Sum	Energy (keV)	MDA	WHC-SD-WM-DP-065, REV.0 (uCi/LI)
E-7	1517.	477.59	1.5801E+00	
NA-22	75.	1274.55	8.4597E-02	
K-40	114.	1460.75	1.0848E+00	
SC-46	612.	889.23	1.7471E-01	
CR-51	1572.	320.09	1.1999E+00	
MN-54	570.	834.83	1.6026E-01	
CO-56	611.	846.76	1.6766E-01	
CO-57	1720.	122.06	9.2739E-02	
CO-58	501.	810.75	1.4708E-01	
FE-59	512.	1099.25	3.4409E-01	
ZN-65	499.	1115.55	3.8394E-01	
SE-75	1830.	264.66	1.9345E-01	
KR-85	1110.	513.99	3.4642E+01	
SR-85	1110.	513.99	1.5203E-01	
Y-88	11.	1836.06	4.3462E-02	
Y-91	159.	1204.90	3.9236E+01	
NB-94	603.	871.10	1.7046E-01	
NB-95	554.	765.79	1.4688E-01	
ZR-95	500.	756.73	2.5281E-01	
RU-103	1106.	497.08	1.5907E-01	
RURH-106	699.	621.93	2.7847E+00	
AG-108M	1552.	433.94	1.6742E-01	
CD-109	1521.	88.03	2.9945E+00	
AG-110M	801.	657.76	1.6360E-01	
SN-113	1673.	391.67	2.2509E-01	
TE-123M	1789.	159.00	9.5189E-02	
SB-124	7289.	602.73	4.4471E-01	
B-125	1577.	427.89	5.1210E-01	
TE-125M	1546.	35.46	0.0000E+00	
I-129	1562.	39.60	0.0000E+00	
I-131	1583.	364.48	1.6443E-01	
XE-131M	1929.	163.98	4.4009E+00	
BA-133	1579.	356.02	2.1059E-01	
CS-136	583.	818.51	1.5960E-01	
CS-138	19.	1435.86	9.9723E-02	
CE-139	1900.	165.85	1.0427E-01	
BA-140	1885.	162.67	1.3287E+02	
LA-140	14.	1596.20	4.6894E-02	
CE-141	1836.	145.44	1.6395E-01	
CE-144	1855.	133.51	7.2038E-01	
CEPR-144	1857.	133.54	1.4399E+00	
EU-152	23.	1408.01	2.4105E-01	
EU-154	75.	1274.51	2.4574E-01	
EU-155	1654.	105.31	4.0480E-01	
HF-181	1212.	482.20	1.8292E-01	
TA-182	1487.	67.75	4.6435E-01	
HG-203	1787.	279.19	1.4368E-01	
BI-207	3001.	569.70	2.7275E-01	
TL-208	1000.	583.14	1.8237E-01	
PB-210	1503.	46.50	0.0000E+00	
BI-212	561.	727.27	2.2755E+00	

Minimum Detectable Activity Report (continued)

Page : 4

Sample ID : V-75-8530

Acquisition date : 20-APR-1994 03:57:19

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV. 0
PB-212	2000.	239.00	2.5906E-01	
BI-214	858.	609.32	3.3588E-01	
PB-214	1663.	351.92	4.8381E-01	
RA-224	2038.	240.99	2.8587E+00	
RA-226	2098.	186.10	2.6717E+00	
AC-228	687.	911.07	6.5214E-01	
TH-228	2209.	215.99	4.1054E+00	
TH-229	1495.	86.44	3.6845E+00	
U-232	1863.	129.08	1.1816E+02	
PA-233	1662.	311.98	3.3895E-01	
PA-234M	555.	1001.03	3.1471E-01	
TH-234	1550.	92.80	9.8457E-01	
U-235	1797.	143.76	7.1636E-01	
NP-237	1495.	86.50	8.7619E-01	
U-237	2234.	208.00	4.9861E-01	
NP-238	582.	984.45	6.7720E-01	
NP-239	1664.	106.12	3.8535E-01	
PU-239	1862.	129.30	1.2598E+03	
AM-241	1497.	59.54	8.4571E-01	
AM-243	1507.	43.60	0.0000E+00	

>>>>>>>> SAMPLE INFORMATION <<<<<<<<<

Sample ID: V-76-8630
 Sample Size: 1.00000E-03 LI
 Dilution Factor: 1.00000E+00
 Conversion LI to LI: 1.00000E+00

Removed by:

D.H. Milian

date: 4-20-94

>>>>>>>> COUNT INFORMATION <<<<<<<<<

Detector ID: GEA2
 File Number: dka300:[spec.GEA2]2g2155.cnf
 Geometry: 42
 Description:
 Count Time: 0 00:50:00.00 sec
 Real Time: 0 00:50:00.51 sec

WHC-SD-WM-DP-065, REV.0

>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<

Sample Count Time: 20-APR-1994 05:19:49.40
 Decayed to: 20-APR-1994 05:19:49.40
 Standard Deviations: 2
 Analysis Library: ENVGEA
 Analyst: DM

>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<

Date of last energy calibration: 21-MAR-1994 09:31:55.15
 Date of last efficiency calibration: 21-MAR-1994 09:43:42.61

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw %Err	Fit	Nuclides	Activity uCi/LI
0	352.60	25	0.96	705.40	703	8 92.3			
0	510.76*	19	2.38	1021.61	1014	14192.7			
0	609.58*	2	1.42	1219.20	1212	15*****			
0	661.92*	17	1.52	1323.86	1315	17214.9		CS-137	2.365E-02
0	911.57	22	1.53	1823.13	1817	11 57.9			
0	1461.05*	5	1.50	2922.36	2916	14673.9		K-40	0.102

Summary of Nuclide Activity
Sample ID : V-76-8630

Page : 2
Acquisition date : 20-APR-1994 05:19:49

Total number of lines in spectrum 6
Number of unidentified lines 0
Number of lines tentatively identified by NID 6 100.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	4.66E+11D	1.000	1.016E-01	1.016E-01	6.847E-01	673.88	
CS-137	11020.00D	1.000	2.365E-02	2.365E-02	5.082E-02	214.91	Bkg 4/20/94
Total Activity :			1.253E-01	1.253E-01			

WHC-SD-WM-DP-065, REV. 0

Grand Total Activity : 1.253E-01 1.253E-01

Flags: "K" = Keyline not found
"E" = Manually edited

"M" = Manually accepted
"A" = Nuclide specific abn. limit

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV.0
LE-7	32.	477.59	2.2905E-01	
NA-22	12.	1274.55	3.3135E-02	
SC-46	12.	889.23	2.4490E-02	
CR-51	43.	320.09	1.9804E-01	
MN-54	18.	834.83	2.8452E-02	
CO-56	7.	846.76	1.7961E-02	
CO-57	66.	122.06	1.8118E-02	
CO-58	15.	810.75	2.5210E-02	
FE-59	8.	1099.25	4.3527E-02	
CO-60	6.	1332.50	2.4785E-02	
ZN-65	13.	1115.55	6.1951E-02	
SE-75	55.	264.66	3.3543E-02	
KR-85	48.	513.99	7.1739E+00	
SR-85	48.	513.99	3.1512E-02	
Y-88	5.	1836.06	2.9444E-02	
Y-91	15.	1204.90	1.2078E+01	
NB-94	16.	871.10	2.8140E-02	
NB-95	19.	765.79	2.7151E-02	
ZR-95	17.	756.73	4.7175E-02	
RU-103	31.	497.08	2.6682E-02	
RURH-106	17.	621.93	4.3707E-01	
AG-108M	31.	433.94	2.3845E-02	
CD-109	46.	88.03	5.1956E-01	
AG-110M	18.	657.76	2.4812E-02	
SN-113	38.	391.67	3.4004E-02	
TE-123M	72.	159.00	1.9090E-02	
LB-124	25.	602.73	2.5967E-02	
LB-125	31.	427.89	7.2064E-02	
TE-125M	64.	35.46	0.0000E+00	
I-129	64.	39.60	0.0000E+00	
I-131	46.	364.48	2.8062E-02	
XE-131M	77.	163.98	8.7642E-01	
BA-133	37.	356.02	3.2028E-02	
CS-134	15.	795.84	2.9613E-02	
CS-136	15.	818.51	2.5855E-02	
CS-138	8.	1435.86	6.3294E-02	
CE-139	76.	165.85	2.0883E-02	
BA-140	79.	162.67	2.7168E+01	
LA-140	4.	1596.20	2.4873E-02	
CE-141	67.	145.44	3.1385E-02	
CE-144	68.	133.51	1.3775E-01	
CEPR-144	68.	133.54	2.7501E-01	
EU-152	7.	1408.01	1.3476E-01	
EU-154	12.	1274.51	9.6253E-02	
EU-155	53.	105.31	7.2634E-02	
HF-181	31.	482.20	2.9379E-02	
TA-182	56.	67.75	9.0374E-02	
HG-203	62.	279.19	2.6748E-02	
BI-207	25.	569.70	2.4771E-02	
TL-208	38.	583.14	3.5657E-02	
PB-210	50.	46.50	0.0000E+00	

Minimum Detectable Activity Report (continued)

Page : 4

Sample ID : V-76-8630

Acquisition date : 20-APR-1994 05:19:49

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV.0
BI-212	16.	727.27	3.7953E-01	
PB-212	89.	239.00	5.4565E-02	
BI-214	50.	609.32	8.1159E-02	
PB-214	68.	351.92	9.7797E-02	
RA-224	69.	240.99	5.2618E-01	
RA-226	87.	186.10	5.4423E-01	
AC-228	27.	911.07	1.2929E-01	
TH-228	56.	215.99	6.5110E-01	
TH-229	46.	86.44	6.4315E-01	
U-232	79.	129.08	2.4376E+01	
PA-233	47.	311.98	5.6851E-02	
PA-234M	11.	1001.03	4.3836E-02	
TH-234	65.	92.80	2.0207E-01	
U-235	75.	143.76	1.4600E-01	
NP-237	45.	86.50	1.5227E-01	
U-237	70.	208.00	8.8229E-02	
NP-238	7.	984.45	7.3316E-02	
NP-239	50.	106.12	6.6749E-02	
PU-239	79.	129.30	2.6032E+02	
AM-241	56.	59.54	1.6372E-01	
AM-243	56.	43.60	0.0000E+00	

 * 222-S Laboratory Counting Room 20-APR-1994 07:06:16.07 *

>>>>>>>> SAMPLE INFORMATION <<<<<<<<<

Sample ID: V-77-8730
 Sample Size: 1.00000E-03 LI
 Dilution Factor: 1.00000E+00
 Conversion LI to LI: 1.00000E+00

Removed by:

D.H. Mubia

date: 4-20-94

>>>>>>>> COUNT INFORMATION <<<<<<<<<

Detector ID: GEA2
 File Number: dka300:[spec.GEA2]2g2156.cnf
 Geometry: 42
 Description:
 Count Time: 0 00:50:00.00 sec
 Real Time: 0 00:51:20.11 sec

WHC-SD-WM-DP-065, REV.0

>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<

Sample Count Time: 20-APR-1994 06:14:20.78
 Decayed to: 20-APR-1994 06:14:20.78
 Standard Deviations: 2
 Analysis Library: ENVGEA
 Analyst: DM

>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<

Date of last energy calibration: 21-MAR-1994 09:31:55.15
 Date of last efficiency calibration: 21-MAR-1994 09:43:42.61

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw %Err	Fit	Nuclides	Activity uCi/LI
0	186.46	537	1.86	373.27	371	6 79.9		RA-226	6.73
0	661.94*	593268	1.51	1323.89	1315	18 0.3		CS-137	825.
0	795.68	190	1.78	1591.35	1585	14 43.0			
0	1151.54	29	3.41	2303.12	2298	13104.5			
0	1323.21	49	1.55	2646.57	2642	13 82.3			
0	1460.86*	7	2.19	2921.99	2915	15445.6		K-40	0.150

Summary of Nuclide Activity
Sample ID : V-77-8730

Page : 2
Acquisition date : 20-APR-1994 06:14:20

Total number of lines in spectrum 6
Number of unidentified lines 2
Number of lines tentatively identified by NID 4 66.67%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	4.66E+11D	1.000	1.503E-01	1.503E-01	6.700E-01	445.613	KG 4/20/94
CS-137	11020.00D	1.000	8.253E+02	8.253E+02	0.022E+02	0.27	
RA-226	5.84E+05D	1.000	6.732E+00	6.732E+00	5.380E+00	79.92	BK 4/20/94
Total Activity :			8.322E+02	8.322E+02			

WHC-SD-WM-DP-065, REV. 0

Grand Total Activity : 8.322E+02 8.322E+02

Flags: "K" = Keyline not found
"E" = Manually edited

"M" = Manually accepted
"A" = Nuclide specific abn. limit

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV.0
B-7	19039.	477.59	5.5970E+00	
NA-22	42.	1274.55	6.3368E-02	
SC-46	178.	889.23	9.4276E-02	
CR-51	15440.	320.09	3.7604E+00	
MN-54	208.	834.83	9.6921E-02	
CO-56	219.	846.76	1.0036E-01	
CO-57	16337.	122.06	2.8580E-01	
CO-58	253.	810.75	1.0446E-01	
FE-59	88.	1099.25	1.4278E-01	
CO-60	12.	1332.50	3.5189E-02	
ZN-65	74.	1115.55	1.4816E-01	
SE-75	17301.	264.66	5.9476E-01	
KR-85	9824.	513.99	1.0307E+02	
SR-85	9825.	513.99	4.5236E-01	
Y-88	2.	1836.06	1.6735E-02	
Y-91	38.	1204.90	1.9141E+01	
NB-94	188.	871.10	9.5050E-02	
NB-95	301.	765.79	1.0831E-01	
ZR-95	336.	756.73	2.0739E-01	
RU-103	11755.	497.08	5.1856E-01	
RURH-106	3967.	621.93	6.6351E+00	
AG-108M	19930.	433.94	5.9993E-01	
CD-109	14561.	88.03	9.2647E+00	
AG-110M	8920.	657.76	5.4607E-01	
SN-113	16826.	391.67	7.1380E-01	
TE-123M	17010.	159.00	2.9355E-01	
SB-124	4180.	602.73	3.3676E-01	
B-125	19323.	427.89	1.7928E+00	
FE-125M	14585.	35.46	0.0000E+00	
I-129	14502.	39.60	0.0000E+00	
I-131	15753.	364.48	5.1868E-01	
XE-131M	16902.	163.98	1.3027E+01	
BA-133	15796.	356.02	6.6603E-01	
CS-134	418.	795.84	1.5379E-01	
CS-136	237.	818.51	1.0179E-01	
CS-138	6.	1435.86	5.8667E-02	
CE-139	17088.	165.85	3.1273E-01	
BA-140	17042.	162.67	3.9950E+02	
LA-140	3.	1596.20	2.2915E-02	
CE-141	17368.	145.44	5.0419E-01	
CE-144	17272.	133.51	2.1979E+00	
CEPR-144	17274.	133.54	4.3920E+00	
EU-152	13.	1408.01	1.7953E-01	
EU-154	42.	1274.51	1.8390E-01	
EU-155	15148.	105.31	1.2252E+00	
HF-181	15242.	482.20	6.4858E-01	
TA-182	13891.	67.75	1.4191E+00	
HG-203	16623.	279.19	4.3820E-01	
BI-207	4671.	569.70	3.4025E-01	
TL-208	4408.	583.14	3.8285E-01	
PB-210	14019.	46.50	0.0000E+00	

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV.0
BI-212	363.	727.27	1.8303E+00	
PB-212	19231.	239.00	8.0327E-01	
BI-214	4093.	609.32	7.3379E-01	
PB-214	15591.	351.92	1.4909E+00	
RA-224	19110.	240.99	8.7551E+00	
AC-228	170.	911.07	3.2432E-01	
TH-228	21527.	215.99	1.2815E+01	
TH-229	14574.	86.44	1.1505E+01	
U-232	16887.	129.08	3.5576E+02	
PA-233	15813.	311.98	1.0454E+00	
PA-234M	114.	1001.03	1.4277E-01	
TH-234	15031.	92.80	3.0661E+00	
U-235	17384.	143.76	2.2283E+00	
NP-237	14574.	86.50	2.7357E+00	
U-237	22170.	208.00	1.5706E+00	
NP-238	120.	984.45	3.0730E-01	
NP-239	15134.	106.12	1.1623E+00	
PU-239	16881.	129.30	3.7934E+03	
AM-241	13917.	59.54	2.5787E+00	
AM-243	14113.	43.60	0.0000E+00	

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Summary of Nuclide Activity

Sample ID : V-77-8830

Page : 2

Acquisition date : 20-APR-1994 07:08:36

Total number of lines in spectrum 4
 Number of unidentified lines 1
 Number of lines tentatively identified by NID 3 75.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/LI	Wtd Mean Decay Corr uCi/LI	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	4.66E+11D	1.000	1.930E-01	1.930E-01	6.466E-01	334.96	4/20/94
CS-137	11020.00D	1.000	8.190E+02	8.190E+02	0.022E+02	0.27	
Total Activity :			8.192E+02	8.192E+02			

WHC-SD-WM-DP-065, REV.0

Grand Total Activity : 8.192E+02 8.192E+02

Flags: "K" = Keyline not found
 "E" = Manually edited

"M" = Manually accepted
 "A" = Nuclide specific abn. limit

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV.0
3-7	18664.	477.59	5.5416E+00	
NA-22	35.	1274.55	5.8034E-02	
SC-46	178.	889.23	9.4210E-02	
CR-51	15409.	320.09	3.7565E+00	
MN-54	215.	834.83	9.8479E-02	
CO-56	246.	846.76	1.0638E-01	
CO-57	16373.	122.06	2.8611E-01	
CO-58	247.	810.75	1.0330E-01	
FE-59	89.	1099.25	1.4311E-01	
CO-60	9.	1332.50	3.1040E-02	
ZN-65	68.	1115.55	1.4183E-01	
SE-75	17210.	264.66	5.9320E-01	
KR-85	9590.	513.99	1.0184E+02	
SR-85	9592.	513.99	4.4697E-01	
Y-88	1.	1836.06	1.3168E-02	
Y-91	41.	1204.90	1.9912E+01	
NB-94	192.	871.10	9.6130E-02	
NB-95	289.	765.79	1.0607E-01	
ZR-95	305.	756.73	1.9747E-01	
RU-103	11602.	497.08	5.1517E-01	
RURH-106	3932.	621.93	6.6056E+00	
AG-108M	19704.	433.94	5.9652E-01	
CD-109	14733.	88.03	9.3192E+00	
AG-110M	8915.	657.76	5.4590E-01	
SN-113	16471.	391.67	7.0623E-01	
TE-123M	16900.	159.00	2.9261E-01	
SB-124	4260.	602.73	3.3996E-01	
B-125	19417.	427.89	1.7971E+00	
E-125M	14283.	35.46	0.0000E+00	
I-129	14213.	39.60	0.0000E+00	
I-131	15625.	364.48	5.1657E-01	
XE-131M	16993.	163.98	1.3062E+01	
BA-133	15519.	356.02	6.6016E-01	
CS-134	404.	795.84	1.5135E-01	
CS-136	227.	818.51	9.9652E-02	
CS-138	10.	1435.86	7.3466E-02	
CE-139	16818.	165.85	3.1024E-01	
BA-140	16964.	162.67	3.9858E+02	
LA-140	2.	1596.20	1.7449E-02	
CE-141	16937.	145.44	4.9789E-01	
CE-144	17070.	133.51	2.1851E+00	
CEPR-144	17070.	133.54	4.3660E+00	
EU-152	12.	1408.01	1.7658E-01	
EU-154	35.	1274.51	1.6743E-01	
EU-155	15093.	105.31	1.2230E+00	
HF-181	15108.	482.20	6.4571E-01	
TA-182	13723.	67.75	1.4105E+00	
HG-203	16340.	279.19	4.3446E-01	
BI-207	4554.	569.70	3.3597E-01	
TL-208	4254.	583.14	3.7608E-01	
PB-210	13994.	46.50	0.0000E+00	

Minimum Detectable Activity Report (continued)

Page : 4

Sample ID : V-77-8830

Acquisition date : 20-APR-1994 07:08:36

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/LI)	WHC-SD-WM-DP-065, REV.0
BI-212	372.	727.27	1.8524E+00	
PB-212	19567.	239.00	8.1027E-01	
BI-214	4093.	609.32	7.3376E-01	
PB-214	15470.	351.92	1.4850E+00	
RA-224	19107.	240.99	8.7542E+00	
RA-226	21444.	186.10	8.5424E+00	
AC-228	197.	911.07	3.4908E-01	
TH-228	21232.	215.99	1.2727E+01	
TH-229	14607.	86.44	1.1518E+01	
U-232	16871.	129.08	3.5559E+02	
PA-233	15578.	311.98	1.0376E+00	
PA-234M	112.	1001.03	1.4129E-01	
TH-234	14687.	92.80	3.0308E+00	
U-235	17045.	143.76	2.2064E+00	
NP-237	14627.	86.50	2.7407E+00	
U-237	22222.	208.00	1.5725E+00	
NP-238	134.	984.45	3.2454E-01	
NP-239	15131.	106.12	1.1622E+00	
PU-239	16863.	129.30	3.7914E+03	
AM-241	13597.	59.54	2.5489E+00	
AM-243	13993.	43.60	0.0000E+00	

WHC-SD-WM-DP-065, REV. 0

DATE START:

April 13, 1994

DATE COMPLETE:

April 18, 1994

[illegible]

NARRATIVE:

X

NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

Batch 3071

Serial No V 75.-5587	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 0	Priority 26
Determination H3	Method-Standard LA-218-114	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size mtd 1 ml	Customer ID STD			
Remarks, Calculations, Results EDP R907 ENVSTD STD# 126B51 RESULT 8.2279 E-1 STD VAL. 8.49 E-1 %REC 96.9 % WHC-SD-WM-DP-065, REV. 0				
Analyst - 1	Analyst - 2 D.H. Lewis	Analyst - 3 Em Bowler	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-13-94	Time Completed	Lab Unit Mgr		

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54-6800-061 (R-10-83)

H3: LA-218-111(E-0), 113(B-0), 114(A-2) TRITIUM LIQUIDS

	STD
Type	Disintegrations per Minute from Counter (dpm)
STD	1826.6
	Sample Volume in mL (SS)
	1
Work List	Dilution Factor (DF)
	1
3071	Digest Dilution Factor (DDF)
	1
Test Code	Background Count Rate in Counts per Minute (BKG cpm)
	24.88
	Background Count Time in Minutes (BKG Time)
	50
Matrix	Instrument Fractional Efficiency (EFF)
	0.912
LIQUID	Detection Limit (Ld)
	3.66
Sample #	Critical Level (Lc)
	1.64
V75-5587	Tritium Concentration in $\mu\text{Ci/L}$ =
	8.2279E-01
Instrument Code	
	Critical Level (Lc) = $2.33 \sqrt{\text{BKG cpm} / \text{BKG Time}}$
Analyst	Detection Limit (Ld) = $(2.72 / \text{BKG Time}) + (2) (Lc) / \text{EFF}$
LEWIS	H3 $\mu\text{Ci/L}$ = $(\text{dpm}) (1000\text{mL/L}) (DF) (DDF) / (SS) (2220000\text{dpm}/\mu\text{Ci})$
Date	H3 $\mu\text{Ci/mL}$ = $\mu\text{Ci/L} / 1000\text{mL/L}$
04/13/94	
Time	
1200	

RESULT Tritium Concentration in $\mu\text{Ci/L}$ = 8.23E-01RESULT Tritium Concentration in $\mu\text{Ci/mL}$ = 8.23E-04

Data Entry by: <i>[Signature]</i>	Date: 15-Apr-94
Approved by: <i>[Signature]</i>	Date: 18 APR 94

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BATCH 3071

Serial No V 76.-5687	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination H3	Method: Standard LA-218-114	Result Units uCi/ML	Charge Code N1A7F	Reruns 1
Sample Size mnt 1 ml			Customer ID BLANK	
Remarks Calculations Results REAGENT BLANK COUNT AS uCi/L $< 1.81 \text{E-5 uCi/mL}$				
WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 Analyst - 2 <i>D.H. Wilson</i> Analyst - 3 <i>Tom Brown</i> Analyst - 4 Analyst - 5				
Date 4-13-94 Time Completed Lab Unit Mgr. <i>[Signature]</i>				

54-6800-061 (R-10-83)

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H3: LA-218-111(E-0), 113(B-0), 114(A-2) TRITIUM LIQUIDS

		BLK
Type	Disintegrations per Minute from Counter (dpm)	-0.24
BLK	Sample Volume in mL (SS)	1
Work List	Dilution Factor (DF)	11
3071	Digest Dilution Factor (DDF)	1
Test Code	Background Count Rate in Counts per Minute (BKG cpm)	24.88
	Background Count Time in Minutes (BKG Time)	50
Matrix	Instrument Fractional Efficiency (EFF)	0.912
LIQUID	Detection Limit (Ld)	3.66
Sample #	Critical Level (Lc)	1.64
V76-5687	Tritium Concentration in uCi/L =	1.8129E-02
Instrument Code	Critical Level (Lc) = $2.33 \sqrt{\text{BKG cpm} / \text{BKG Time}}$	
Analyst	Detection Limit (Ld) = $(2.72 / \text{BKG Time}) + (2) (Lc) / \text{EFF}$	
LEWIS	H3 uCi/L = $(\text{dpm}) (1000 \text{ mL/L}) (DF) (DDF) / (SS) (2220000 \text{ dpm/uCi})$	
Date	H3 uCi/mL = $\text{uCi/L} / 1000 \text{ mL/L}$	
04/13/94	NOTE: Reported result is a LESS THAN value calculated from the statistical Detection Limit (Ld).	
Time		
1200		

RESULT Tritium Concentration in uCi/L = $< 1.81 \text{E-02}$

RESULT Tritium Concentration in uCi/mL = $< 1.81 \text{E-05}$

Data Entry by: <i>[Signature]</i>	Date: 17-Apr-94
Approved by: <i>[Signature]</i>	Date: 18 Apr 94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

BACK 3071

Serial No V 77.-5787	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination H3	Method/Standard LA-218-114	Result Units uCi/ML	Charge Code N1A7F	Reruns 1
Sample Size 1ml-10ml net 1ml			Customer ID COMP	
Remarks, Calculations, Results COUNT AS uCi/L WHC-SD-WM-DP-065, REV. 0 1.11 E-2 uCi/ml Clitg Juns				
Analyst - 1	Analyst - 2 DAMMISIA	Analyst - 3 Im Bureau	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-13-94	Time Completed	Lab Unit Mgr P. B. B.		

54-6800-061 (R-10-83)

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H3: LA-218-111(E-0), 113(B-0), 114(A-2) TRITIUM LIQUIDS

		SAM
Type	Disintegrations per Minute from Counter (dpm)	2230.83
SAM	Sample Volume in mL (SS)	1
Work List	Dilution Factor (DF)	11
3071	Digest Dilution Factor (DDF)	1
Test Code	Background Count Rate in Counts per Minute (BKG cpm)	24.88
	Background Count Time in Minutes (BKG Time)	50
Matrix	Instrument Fractional Efficiency (EFF)	0.922
LIQUID	Detection Limit (Ld)	3.62
Sample #	Critical Level (Lc)	1.64
V77-5787	Tritium Concentration in uCi/L =	1.1054E+01
Instrument Code	Critical Level (Lc) = 2.33 (Square Root of (BKG cpm / BKG Time))	
Analyst	Detection Limit (Ld) = (2.72 / BKG Time) + (2) (Lc) / EFF ..	
LEWIS	H3 uCi/L = (dpm) (1000mL/L) (DF) (DDF) / ((SS) (2220000dpm/uCi))	
Date	H3 uCi/mL = uCi/L / 1000mL/L	
04/13/94		
Time		
1200		

RESULT Tritium Concentration in uCi/L = 1.11E+01

RESULT Tritium Concentration in uCi/mL = 1.11E-02

Data Entry by: <i>[Signature]</i>	Date: 15-Apr-94
Approved by: <i>[Signature]</i>	Date: 18 Apr 94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 3071

Serial No V 77.-5887	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination H3	Method/Standard LA-218-114	Result Units uCi/ML	Charge Code N1A7F	Reruns 1
Sample Size 1ml - 10-ml	Customer ID COMP		PERUN	
Remarks Calculations Results DUPLICATE SAMPLE COUNT AS uCi/L $1.13 \text{ E}^{-2} \text{ uCi/mL}$				
Analyst - 1	Analyst - 2 D. J. Lewis	Analyst - 3 M. Baker	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-13-94	Time Completed	Lab Unit Mgr J. K. K.		

WHC-SD-WM-DP-065, REV. 0

54-6800-061 (R-10-83)

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H3: LA-218-111(E-0), 113(B-0), 114(A-2) TRITIUM LIQUIDS			SAM
Type	Disintegrations per Minute from Counter (dpm)		2270.6
SAM	Sample Volume in mL (SS)		1
Work List	Dilution Factor (DF)		11
3071	Digest Dilution Factor (DDF)		1
Test Code	Background Count Rate in Counts per Minute (BKG cpm)		24.88
	Background Count Time in Minutes (BKG Time)		50
Matrix	Instrument Fractional Efficiency (EFF)		0.954
LIQUID	Detection Limit (Ld)		3.50
Sample #	Critical Level (Lc)		1.64
V77-5887	Tritium Concentration in $\mu\text{Ci/L}$ =		1.1251E+01
Instrument Code	Critical Level (Lc) = $2.33 \sqrt{\text{BKG cpm} / \text{BKG Time}}$		
Analyst	Detection Limit (Ld) = $(2.72 / \text{BKG Time}) + (2) (Lc) / \text{EFF}$		
LEWIS	H3 $\mu\text{Ci/L}$ =	$(\text{dpm}) (1000\text{mL/L}) (DF) (DDF) / ((SS) (2220000\text{dpm}/\mu\text{Ci}))$	
Date	H3 $\mu\text{Ci/mL}$ =	$\mu\text{Ci/L} / 1000\text{mL/L}$	
04/13/94			
Time			
1200			

RESULT Tritium Concentration in $\mu\text{Ci/L}$ = 1.13E+01

RESULT Tritium Concentration in $\mu\text{Ci/mL}$ = 1.13E-02

Data Entry by: <i>PLS</i>	Date: 15-Apr-94
Approved by: <i>J. K. K.</i>	Date: 18 Apr 94

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Batch 3071

Serial No V 77.-5987	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination H3	Method/Standard LA-218-114	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size 1 ml - 10 ml mt 1 ml 1000			Customer ID COMP	
Remarks, Calculations, Results SPIKE SAMPLE SPIKE ID SPIKE VOLUME COUNT AS uCi/L 105.5 % spike rec				
WHC-SD-WM-DP-065, REV. 0				
Analyst - 1	Analyst - 2 <i>D. M. Garcia</i>	Analyst - 3 <i>Emmanuel</i>	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-13-94	Time Completed	Lab Unit Mgr <i>Rabala</i>	<i>PHB</i>	

54-6800-061 (R-10-83)

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H3: LA-218-113(B-0), LA-218-114(A-2) TRITIUM SPIKE		SPIKE
Type	dpm of Sample from Counter (dpm1)	2230.83
SPIKE	dpm of Sample + Spike from Counter (dpm2)	2109.95
Work List	Volume of Sample in Distillation Vial in mL (Svol)	1.5
3071	Volume of Spike in Distillation Vial in mL (SPK vol)	1.5
Test Code	Volume Transferred to Scintillation Vial in mL (TR vol)	1
	Spike Value in uCi/L (SPK val)	0.849
Matrix	Background Count Rate in cpm (BKG cpm)	24.88
LIQUID	Background Count Time in Minutes (BKG time)	50
Sample #	Instrument Fractional Efficiency of Sample (EFF)	0.9250
V77-5987	Detection Limit (Ld)	3.61
Instrument Code	Critical Level (Lc)	1.64
	H3 uCi/L in Sample Vial (Rsam)	1.00E+00
Analyst	H3 uCi/L in Sample + Spike Vial (Rs+s)	9.50E-01
LEWIS	Vol. Ratio Sample Vol. to Total Vol. (VRsam)	5.00E-01
Date	Vol. Ratio Spike Vol. to Total Vol. (VRspike)	5.00E-01
04/13/94	Detection Limit (Ld) = ((2.72 / BKG time) + (2 * Lc)) / EFF	
Time	Critical Level (Lc) = 2.33 * the Square Root of (BKG cpm / BKG time)	
1200	H3 uCi/L in Sample Vial (Rsam) = dpm1 * (1000mL/L) / (TR vol * (2220000dpm/uCi))	
	H3 uCi/L in Sample + Spike Vial (Rs+s) = dpm2 * (1000mL/L) / (TR vol * (2220000dpm/uCi))	
	Volume Ratio of Sample Volume to Total Volume (VRsam) = Svol / (Svol + SPK vol)	
	Volume Ratio of Spike Volume to Total Volume (VRspike) = SPK vol / (Svol + SPK vol)	
	% Spike Recovery = ((Rs+s) - (Rsam * VRsam) / (SPK val * VRspike)) * 100	

RESULT Spike Recovery = 105.5%

Data Entry by: <i>PHB</i>	Date: 17-Apr-94
Approved by: <i>PHB</i>	Date: 18 Apr 94

6 Batch 3071

Serial No V 77.-5087	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination H3	Method/Standard LA-218-114	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size 1 ml - 10 ml REUN			Customer ID COMP	
Remarks Calculations, Results SAMPLE SPIKE DUPLICATE 98.2 .. SPIKE ID 126B51 SPIKE VOL 1.5 ml spk/1.5 ml V77 mt 1 ml <i>Chlor Lewis</i>				
Analyst - 1	Analyst - 2 <i>DH Milicia</i>	Analyst - 3 <i>Em Bauer</i>	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-13-94	Time Completed	Lab Unit Mgr <i>Rakita</i>		

54-6800-061 (R-10-83)

BEST AVAILABLE COPY

H3: LA-218-113(B-0), LA-218-114(A-2) TRITIUM SPIKE

	SPIKE
Type	dpm of Sample from Counter (dpm1) 2270.6
SPIKE	dpm of Sample + Spike from Counter (dpm2) 2060.46
Work List	Volume of Sample in Distillation Vial in mL (Svol) 1.5
3071	Volume of Spike in Distillation Vial in mL (SPK vol) 1.5
Test Code	Volume Transferred to Scintillation Vial in mL (TR vol) 1
	Spike Value in $\mu\text{Ci/L}$ (SPK val) 0.849
Matrix	Background Count Rate in cpm (BKG cpm) 24.88
LIQUID	Background Count Time in Minutes (BKG time) 50
Sample #	Instrument Fractional Efficiency of Sample (EFF) 90.9000
V77-5087	Detection Limit (Ld) 0.04
Instrument Code	Critical Level (Lc) 1.64
	H3 $\mu\text{Ci/L}$ in Sample Vial (Rsam) 1.02E+00
Analyst	H3 $\mu\text{Ci/L}$ in Sample + Spike Vial (Rs+s) 9.28E-01
LEWIS	Vol Ratio Sample Vol to Total Vol (VRsam) 5.00E-01
Date	Vol Ratio Spike Vol to Total Vol (VRspike) 5.00E-01
04/13/94	Detection Limit (Ld) = $((2.72 / \text{BKG time}) + (2 * \text{Lc})) / \text{EFF}$
Time	Critical Level (Lc) = $2.33 * \text{the Square Root of (BKG cpm / BKG time)}$
1200	H3 $\mu\text{Ci/L}$ in Sample Vial (Rsam) = $\text{dpm1} * (1000 \text{ mL/L}) / (\text{TR vol} * (2220000 \text{ dpm}/\mu\text{Ci}))$

$$\text{H3 } \mu\text{Ci/L in Sample + Spike Vial (Rs+s)} = \text{dpm2} * (1000 \text{ mL/L}) / (\text{TR vol} * (2220000 \text{ dpm}/\mu\text{Ci}))$$

$$\text{Volume Ratio of Sample Volume to Total Volume (VRsam)} = \text{Svol} / (\text{Svol} + \text{SPK vol})$$

$$\text{Volume Ratio of Spike Volume to Total Volume (VRspike)} = \text{SPK vol} / (\text{Svol} + \text{SPK vol})$$

$$\% \text{ Spike Recovery} = ((\text{Rs+s}) - (\text{Rsam} * \text{VRsam}) / (\text{SPK val} * \text{VRspike})) * 100$$

WHC-SD-WM-DP-065, REV. 0

RESULT	Spike Recovery	=	98.2%
--------	----------------	---	-------

Data Entry by: <i>[Signature]</i>	Date: 17-Apr-94
Approved by: <i>[Signature]</i>	Date: 18 Apr 94

Im Barel
10-3-91

WHC-SD-WM-DP-065, REV. 0

PAGE: 1

ID: H-3 TRITIUM

13 APR 1994 22:36

USER: 1 COMMENT:
RESET TIME : 50.00
DATA CALC : SL DPM H# : YES SAMPLE REPEATS: 1 PRINTER : STD
COUNT BLANK : YES IC# : NO REPLICATES : 1 RS232 : EDIT
TWO PHASE : YES AQC : NO CYCLE REPEATS : 1
SCINTILLATOR: LIQUID LUMEX: YES LOW SAMPLE REJ: 0
LOW LEVEL : NO HALF LIFE CORRECTION DATE: none

ISOTOPE 1: 3H %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low: -4.323 High: 294.48

SAM NO	POS	TIME MIN	H#	<u>3H</u> CPM %ERROR	3H DPM	3H EFF-1	LUMEX %	ELAPSED 2P TIME
B1	** -1	50.00	91.2	24.88 5.67	54.84	45.37	0.03	51.49
		Blank Average		DPM for	3H :	54.84	COEF. OF	VAR: 0.000
1	** -3	50.00	91.2	853.48 0.97	1826.60	45.36	0.01	107.27
2	** -4	50.00	91.2	24.76 5.68	-0.24	45.35	0.04	155.01
3	** -5	50.00	92.2	1031.08 0.88	2230.83	45.11	0.00	206.73
4	** -6	50.00	95.4	1030.28 0.88	2270.60	44.31	0.00	258.51
5	** -7	50.00	92.5	974.96 0.91	2109.95	45.04	0.00	310.29
6	** -8	50.00	90.9	961.38 0.91	2060.46	45.45	0.00	362.05

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**THE FOLLOWING ANALYSES ARE INCLUDED IN THE
DATA PACKAGE BUT THE RESULTS HAVE NOT BEEN
REPORTED IN THE FINAL SUMMARY REPORTS.**

WHC-SD-WM-DP-065, REV. 0

Customer ID:

V77

C.O/11P

Analysis:

Sample Prep:

F/3

live at

Instrument: 77/a

Procedure/ Rev: *LA-218-114 H-2*

Technologist: amanda J. Hallbaugh

Date: 1-17-94

Starting Time: 0130

Temperature *N/A*

Ending Time: 0215

Chemist: S. Catlow

Comments: #5. were switched, so they had to rerun it to make sure **OUT FOR RERUN** everything was OK.

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

[illegible]

Batch 3028

Serial No V 75.-5587	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 0	Priority 26
Determination H3	Method/Standard LA-218-114	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 1 ml			Customer ID STD	
Remarks, Calculations, Results EDP R907 ENVSTD STD# 141B51 RESULT 6.9737 E-1 STD VAL. 7.27 E-1 %REC 95.9% OUT FOR RERUN WHC-SD-WM-DP-065, REV. 0 Amanda f.				
Analyst - 1 Hollibaugh	Analyst - 2 Deane	Analyst - 3 Raymond	Analyst - 4	Analyst - 5
Hrs 4-7-94	Hrs 4-7-94	Hrs 4-7-94	Hrs	Hrs
Date 4-7-94	Time Completed 0215	Lab Unit Mgr Rutledge

54-6800-061 (R-10-83)

H3: LA-218-111(E-0), 113(B-0), 114(A-2) TRITIUM LIQUIDS

		STD
Type	Disintegrations per Minute from Counter (dpm)	1548.17
STD	Sample Volume in mL (SS)	1
Work List	Dilution Factor (DF)	1
3028	Digest Dilution Factor (DDF)	1
Test Code	Background Count Rate in Counts per Minute (BKG cpm)	24.06
	Background Count Time in Minutes (BKG Time)	50
Matrix	Instrument Fractional Efficiency (EFF)	0.41
LIQUID	Detection Limit (Ld)	7.94
Sample #	Critical Level (Lc)	1.62
V75-5587	Tritium Concentration in $\mu\text{Ci/L}$ =	6.9737E-01
Instrument Code	Critical Level (Lc) = $2.33 \sqrt{\text{BKG cpm} / \text{BKG Time}}$	
Analyst	Detection Limit (Ld) = $1 (2.72 / \text{BKG Time}) + (2) (Lc) / \text{EFF}$	
HOLLIBAUGH	H3 $\mu\text{Ci/L}$ = $(\text{dpm}) (1000\text{mL/L}) (DF) (DDF) / ((SS) (2220000\text{dpm}/\mu\text{Ci}))$	
Date	H3 $\mu\text{Ci/mL}$ = $\mu\text{Ci/L} / 1000\text{mL/L}$	
04/07/94		
Time		
0215		

RESULT Tritium Concentration in $\mu\text{Ci/L}$ = 6.97E-01

RESULT Tritium Concentration in $\mu\text{Ci/mL}$ = 6.97E-04

Data Entry by:	Date: 08-Apr-94
Approved by:	Date: 18 APR 94

Serial No V 76.-5687	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination H3	Method/Standard LA-218-114	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 1 ml			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK WHC-SD-WM-DP-065, REV. 0 COUNT AS uCi/L OUT FOR RERUN				
Analyst - 1 <i>Hollibough</i>	Analyst - 2 <i>Johnson</i>	Analyst - 3 <i>Raymond</i>	Analyst - 4	Analyst - 5
Hrs	Hrs 4-7-94	Hrs 4-7-94	Hrs	Hrs
Date 4-14-94	Time Completed 0215	Lab Unit Mgr <i>OK</i>	<i>Pukite</i>	

54-6800-061 (R-10-83)

H3: LA-218-111(E-0), 113(B-0), 114(A-2) TRITIUM LIQUIDS		BLANK
Type	Disintegrations per Minute from Counter (dpm)	1.867545
BLANK	Sample Volume in mL (SS)	1
Work List	Dilution Factor (DF)	1
3028	Digest Dilution Factor (DDF)	1
Test Code	Background Count Rate in Counts per Minute (BKG cpm)	24.06
H3	Background Count Time in Minutes (BKG Time)	50
Matrix	Instrument Fractional Efficiency (EFF)	0.4177
LIQUID	Detection Limit (Ld)	7.79
Sample #	Critical Level (Lc)	1.62
V76-5687	Tritium Concentration in $\mu\text{Ci/L}$ =	3.5105E-03
Instrument Code	Critical Level (Lc) = $2.33 \sqrt{\text{BKG cpm} / \text{BKG Time}}$	
Analyst	Detection Limit (Ld) = $[(2.72 / \text{BKG Time}) + (2) (Lc)] / \text{EFF}$	
HOLLIBOUGH	H3 $\mu\text{Ci/L}$ = $(\text{dpm}) (1000\text{mL/L}) (DF) (DDF) / [(SS) (2220000\text{dpm}/\mu\text{Ci})]$	
Date	H3 $\mu\text{Ci/mL}$ = $\mu\text{Ci/L} / 1000\text{mL/L}$	
04/07/94	NOTE: Reported result is a LESS THAN value calculated from the statistical Detection Limit (Ld).	
Time		
0215		

RESULT Tritium Concentration in $\mu\text{Ci/L}$ = < 3.51E-03

RESULT Tritium Concentration in $\mu\text{Ci/mL}$ = < 3.51E-06

Data Entry by: <i>Sam Harrison</i>	Date: 10-Apr-94
Approved by: <i>OK</i>	Date: 10-Apr-94

Form X1 Rev. 1.0 Page 1 of 1

105G

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

3

Serial No V 77.-5787	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination H3	Method/Standard LA-218-114	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 1 ml			Customer ID COMP	
Remarks, Calculations, Results COUNT AS uCi/L WHC-SD-WM-DP-065, REV. 0 OUT FOR RERUN				
Analyst - 1 <i>Amanda J. Hollibaugh</i>	Analyst - 2 <i>John J. Blum</i>	Analyst - 3 <i>Raymond</i>	Analyst - 4	Analyst - 5
Hrs 4-7-94	Hrs 4-7-94	Hrs 4-7-94	Hrs	Hrs
Date 4-7-94	Time Completed 0215	Lab Unit Mgr <i>[Signature]</i>	<i>[Signature]</i>	

54-5800-061 (R-10-83)

H3: LA-218-111(E-0), 113(B-0), 114(A-2) TRITIUM LIQUIDS		SAMPLE
Type	Disintegrations per Minute from Counter (dpm)	23370.94
SAMPLE	Sample Volume in mL (SS)	1
Work List	Dilution Factor (DF)	1
3028	Digest Dilution Factor (DDF)	1
Test Code	Background Count Rate in Counts per Minute (BKG cpm)	24.06
H3	Background Count Time in Minutes (BKG Time)	50
Matrix	Instrument Fractional Efficiency (EFF)	0.4177
LIQUID	Detection Limit (Ld)	7.79
Sample #	Critical Level (Lc)	1.62
V77-5787	Tritium Concentration in uCi/L =	1.0527E+01
Instrument Code	Critical Level (Lc) = 2.33 (Square Root of (BKG cpm / BKG Time))	
Analyst	Detection Limit (Ld) = (2.72 / BKG Time) + (2) (Lc) / EFF	
HOLLIBOUGH	H3 uCi/L = (dpm) (1000mL/L) (DF) (DDF) / ((SS) (2220000dpm/uCi))	
Date	H3 uCi/mL = uCi/L / 1000mL/L	
04/07/94		
Time		
0215		

RESULT Tritium Concentration in uCi/L = 1.05E+01

RESULT Tritium Concentration in uCi/mL = 1.05E-02

Data Entry by: <i>[Signature]</i>	Date: 10-Apr-94
Approved by: <i>[Signature]</i>	Date: 18 Apr 94

PLACE ANALYST NAME CARD IN BOX BELOW

Sample No V 77.-5887	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination H3	Method/Standard LA-218-114	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 1 ml	Customer ID COMP			
Remarks, Calculations, Results DUPLICATE SAMPLE COUNT AS uCi/L WHC-SD-WM-DP-065, REV. 0 OUT FOR RERUN				
Analyst - 1 <i>Hollibaugh</i> Hrs	Analyst - 2 <i>Raymond</i> Hrs	Analyst - 3 <i>Raymond</i> Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-7-94	Time Completed 0215	Lab Unit Mgr <i>Raymond</i>		

54-6800-061 (R-10-83)

H3: LA-218-111(E-O), 113(B-O), 114(A-2) TRITIUM LIQUIDS			SAMPLE
Type	Disintegrations per Minute from Counter (dpm)		23650.99
SAMPLE	Sample Volume in mL (SS)		1
Work List	Dilution Factor (DF)		1
3028	Digest Dilution Factor (DDF)		1
Test Code	Background Count Rate in Counts per Minute (BKG cpm)		24.06
H3	Background Count Time in Minutes (BKG Time)		50
Matrix	Instrument Fractional Efficiency (EFF)		0.4177
LIQUID	Detection Limit (Ld)		7.79
Sample #	Critical Level (Lc)		1.62
V77-5887	Tritium Concentration in $\mu\text{Ci/L}$ =		1.0654E+01
Instrument Code	Critical Level (Lc) = $2.33 \sqrt{\text{BKG cpm} / \text{BKG Time}}$		
Analyst	Detection Limit (Ld) = $(2.72 / \text{BKG Time}) + (2) (Lc) / \text{EFF}$		
HOLLIBOUGH	H3 $\mu\text{Ci/L}$ =	$(\text{dpm}) (1000\text{mL/L}) (\text{DF}) (\text{DDF}) / ((\text{SS}) (2220000\text{dpm}/\mu\text{Ci}))$	
Date	H3 $\mu\text{Ci/mL}$ =	$\mu\text{Ci/L} / 1000\text{mL/L}$	
04/07/94			
Time			
0215			

RESULT Tritium Concentration in $\mu\text{Ci/L}$ = 1.07E+01

RESULT Tritium Concentration in $\mu\text{Ci/mL}$ = 1.07E-02

Data Entry by: <i>[Signature]</i>	Date: 10-Apr-94
Approved by: <i>[Signature]</i>	Date: 15 APR 94

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84
4-11

Serial No V 77.-5987	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination H3	Method/Standard LA-218-114	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 1 ml			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKED ID 3ml 141B51 SPIKE ID SPIKE VOLUME 1 ml COUNT AS uCi/L OUT FOR RERUN WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>William J. Williams</i>	Analyst - 2 <i>William J. Williams</i>	Analyst - 3 <i>Raymond</i>	Analyst - 4	Analyst - 5
Hrs 4-7-94	Hrs 4-7-94	Hrs 4-7-94	Hrs	Hrs
Date 4-7-94	Time Completed 0215	Lab Unit Mgr <i>Patrick J. Williams</i>		

54-6800-061 (R-10-83)

6

Serial No V 77.-5087	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination H3	Method/Standard LA-218-114	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 1 ml			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKE 3ml DUPLICATE SPIKE ID 141B51 SPIKE VOL 1 ml OUT FOR RERUN				
Analyst - 1 <i>William J. Williams</i>	Analyst - 2 <i>William J. Williams</i>	Analyst - 3 <i>Raymond</i>	Analyst - 4	Analyst - 5
Hrs 4-7-94	Hrs 4-7-94	Hrs 4-7-94	Hrs	Hrs
Date 4-7-94	Time Completed 0215	Lab Unit Mgr <i>Patrick J. Williams</i>		

54-6800-061 (R-10-83)

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USER: 1 ID:H-3 TRITIUM PRESET TIME: 50.00 THU 07 APR 1994 07:27
 SAMPLE REPEAT: 1 CYCLE REPEAT: 1 SCR:N RS232:N
 H#: 1 AQC:Y QCF:N RCM:Y 2 PHASE MONITOR:N
 RCM-TIME: 0.10 INT:999.95
 CHANNEL 1-LL: 0 UL: 400 2SIGMA: 0.10 BKG SUB: 0.00 BKG 2SIG: 0.00 LSR: C

SINGLE LABEL DPM SET UP ON 23 AUG 1993 14:46

UNKNOWN ID:H-3 TRITIUM UNKNOWN REPLICATES: 1
 UNKNOWN NORM FACTOR ISO1:Q 1.00000 WHC-SD-WM-DP-065, REV. 0
 UNKNOWN UNITS ISO1:DPM
 UNKNOWN HALF LIFE CORRECTION:N
 INDIVIDUAL UNKNOWN NORM FACTORS:N BACKGROUND QUENCH CURVES:Y
 STANDARD ID:BECKMAN. #001135 H3 QUENCH LIMITS LOW:0.000 HIGH:293.0
 HALF LIFE(DAYS) ISO1: 4503.410
 STANDARD DPM ISO1: 531082.0

SAM	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	ERR
B1	**-	1 1	24.06	5.77	50.00	51.64	91.0	0.22	

BACKGROUND QUENCH CURVES: CONSTANT

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CHANNEL 1
 QUENCH CURVE COEFFICIENTS
 A: 24.06000 B:0.00000000 C:0.00000000 D:0.00000000000

BACKGROUND QUENCH CURVE CORRELATION TABLE

BKG	H#	MEASURED CPM.	CALCULATED CPM.	PERCENT DIFF.	FLAG
1	91.0	24.06	24.06	0.00	

BACKGROUND QUENCH LIMITS LOW:0.000 HIGH:1000.
 TOTAL QUENCH LIMITS LOW:0.000 HIGH:293.0

SAM	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	ERR
1	**-	3 1	658.82	1.10	50.00	103.58	93.0	0.02	
		ISO1 %EFF CH1:41.00					ISO1 DPM	:1546.170	
2	**-	4 1	24.84	5.68	50.00	155.40	90.0	0.34	
		ISO1 %EFF CH1:41.77					ISO1 DPM	:1.867545	
3	**-	5 1	9770.20	0.29	50.00	207.37	93.0	0.00	
		ISO1 %EFF CH1:41.00					ISO1 DPM	:23770.94	
4	**-	6 1	32848.78	0.16	50.00	265.66	93.0	0.00	
		ISO1 %EFF CH1:41.00					ISO1 DPM	:80061.26	

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SAN	POS	CH	CPM	2518%	TIME	EL TIME	AVE H#	RCM%	ERF
5	**	7	1	9720.92	0.29	50.00	317.63	93.0	0.00
				ISO1 %EFF CH1:41.00				ISO1 DPM	:23650.99
6	**	8	1	31973.94	0.16	50.00	375.82	93.0	0.00
				ISO1 %EFF CH1:41.00				ISO1 DPM	:77927.73

WHC-SD-WM-DP-065, REV.0

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WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. V77	Customer ID: Comp
Analysis: C14	Sample Prep: UNDIGESTED

Instrument: W327818	Procedure/ Rev: LA-348-104 B-0
Technologist: <i>Patrick J. McCowan</i> PATRICK J. MCCOWAN	Date: 4/12/94
Starting Time: 10:30	Temperature NA
Ending Time: 15:15	Chemist: S. CATLOW ^K KAWABATA

Comments: _____

	Description	Lab ID		Description	Lab ID
1	LMCS	V75.-5588	11		
2	REAGENT BLANK	V76.-5688	12		
3	SAMPLE	V77.-5788	13		
4	SAMPLE DUPLICATE	V77.-5888	14		
5	SAMPLE SPIKED	V77.-5988	15		
6	SAMPLE SPIKE DUPLICATE	V77.-5088	16		
7			17		
8			18		
9			19		
10			20		

[illegible]

Baker 3026

Serial No V 75.-5588	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 0	Priority 26
Determination C14	Method/Standard LA-348-104	Result Units % RECOVERY	Charge Code N1A7F	Retuns 0
Sample Size 1 mL			Customer ID STD	
Remarks, Calculations, Results EDP R909 C14EDTA STD# 82351 RESULT 1.43 STD VAL 1.77 %REC 80.8% WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>McCown</i> Hrs	Analyst - 2 <i>D. Hampton</i> Hrs	Analyst - 3 <i>McBee</i> Hrs	Analyst - 4 Hrs	Analyst - 5 <i>Chen</i> Hrs
Date 4/12/94	Time Completed 15:15	Lab Unit Mgr <i>Robert</i>		

54-6800-061 (R-10-83)

C-14: LA-348-104 (B-0) Carbon-14 LIQUIDS

		STD
Type	Disintegrations per Minute from Counter (dpm)	3171.4
STD	Sample Volume in mL (SS)	1
Work List	Dilution Factor (DF)	1
3026	Digest Dilution Factor (DDF)	1
Test Code	Background Count Rate in Counts per Minute (BKG cpm)	44.7
	Background Count Time in Minutes (BKG time)	50
Matrix	Instrument Fractional Efficiency (EFF)	0.9135
LIQUID	Detection Limit (Ld)	4.88
Sample #	Critical Level (Lc)	2.20
V75-5588		
Instrument Code		
WB27818	Critical Level (Lc) = $2.33 \sqrt{\text{BKG cpm} / \text{BKG time}}$	
Analyst	Detection Limit (Ld) = $(2.72 / \text{BKG time}) + (2) (Lc) / \text{EFF}$	
MCCOWN	C-14 $\mu\text{Ci/L}$ = $(\text{dpm}) (1000\text{mL/L}) (DF) (DDF) / ((SS) (2220000\text{dpm}/\mu\text{Ci}))$	
Date	$\mu\text{Ci/mL}$ = $\mu\text{Ci/L} / 1000\text{mL/L}$	
04/12/94		
Time		
1515		

RESULT C-14 Concentration in $\mu\text{Ci/L}$ = 1.43E+00

RESULT C-14 Concentration in $\mu\text{Ci/mL}$ = 1.43E-03

Data Entry by: <i>Chen</i>	Date: 13-Apr-94
Approved by: <i>McCown</i>	Date: 18 Apr 94

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2

Serial No V 76.-5688	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination C14	Method/Standard LA-348-104	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 1 ML			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK COUNT AS uCi/L WHC-SD-WM-DP-065, REV. 0 <u>2.20E-6</u>				
Analyst - 1 <i>Robert J. McCown</i> Hrs	Analyst - 2 <i>D. Hamilton</i> Hrs	Analyst - 3 <i>M. B. B. B.</i> Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4/12/92	Time Completed 15:15	Lab Unit Mgr <i>Robert J. McCown</i>	<i>D. Hamilton</i>	

54-6800-061 (R-10-83)

C-14: LA-348-104 (B-0) Carbon-14 LIQUIDS

		BLK
Type	Disintegrations per Minute from Counter (dpm)	-2.42
BLK	Sample Volume in mL (SS)	1
Work List	Dilution Factor (DF)	1
3026	Digest Dilution Factor (DDF)	1
Test Code	Background Count Rate in Counts per Minute (BKG cpm)	44.7
	Background Count Time in Minutes (BKG time)	50
Matrix	Instrument Fractional Efficiency (EFF)	0.9152
LIQUID	Detection Limit (Ld)	4.87
Sample #	Critical Level (Lc)	2.20
V76-5688		
Instrument Code		
WB27818	Critical Level (Lc) = 2.33 (Square Root of (BKG cpm / BKG time))	
Analyst	Detection Limit (Ld) = (2.72 / BKG time) + (2) (Lc) / EFF	
MCCOWN	C-14 $\mu\text{Ci/L}$ = (dpm) (1000mL/L) (DF) (DDF) / ((SS) (2220000dpm/ μCi))	
Date	$\mu\text{Ci/mL}$ = $\mu\text{Ci/L} / 1000\text{mL/L}$	
04/12/94		
Time	NOTE: Reported result is a LESS THAN value calculated from the statistical Detection Limit (Ld).	
1515		

RESULT C-14 Concentration in $\mu\text{Ci/L}$ = < 2.20E-03

RESULT C-14 Concentration in $\mu\text{Ci/mL}$ = < 2.20E-06

Data Entry by: <i>Robert J. McCown</i>	Date: 13-Apr-94
Approved by: <i>D. Hamilton</i>	Date: 18 Apr 94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

3

Serial No V 77.-5788	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination C14	Method/Standard LA-348-104	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 1 mL			Customer ID COMP	
Remarks, Calculations, Results COUNT AS uCi/L WHC-SD-WM-DP-065, REV. 0 <u>2.19E-6</u>				
Analyst - 1 <i>Robert McCown</i> Hrs	Analyst - 2 <i>D. Hamilton</i> Hrs	Analyst - 3 <i>Bob Buehler</i> Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4/12/94	Time Completed 15:15	Lab Unit Mgr <i>Robert McCown</i>	<i>D. Hamilton</i>	

54-6800-061 (R-10-83)

C-14: LA-348-104 (B-0) Carbon-14 LIQUIDS

		SAMPLE
Type	Disintegrations per Minute from Counter (dpm)	4.25
SAMPLE	Sample Volume in mL (SS)	1
Work List	Dilution Factor (DF)	1
3026	Digest Dilution Factor (DDF)	1
Test Code	Background Count Rate in Counts per Minute (BKG cpm)	44.7
	Background Count Time in Minutes (BKG time)	50
Matrix	Instrument Fractional Efficiency (EFF)	0.9157
LIQUID	Detection Limit (Ld)	4.87
Sample #	Critical Level (Lc)	2.20
V77-5788		
Instrument Code		
WB27818	Critical Level (Lc) = $2.33 \sqrt{\text{BKG cpm} / \text{BKG time}}$	
Analyst	Detection Limit (Ld) = $(2.72 / \text{BKG time}) + (2) (Lc) / \text{EFF}$	
MCCOWN	C-14 $\mu\text{Ci/L}$ = $(\text{dpm}) (1000\text{mL/L}) (DF) (DDF) / ((SS) (2220000\text{dpm}/\mu\text{Ci}))$	
Date	$\mu\text{Ci/mL}$ = $\mu\text{Ci/L} / 1000\text{mL/L}$	
04/12/94		
Time		
1515		

NOTE: Reported result is a LESS THAN value calculated from the statistical Detection Limit (Ld).

RESULT C-14 Concentration in $\mu\text{Ci/L}$ = < 2.19E-03

RESULT C-14 Concentration in $\mu\text{Ci/mL}$ = < 2.19E-06

Data Entry by: <i>[Signature]</i>	Date: 13-Apr-94
Approved by: <i>[Signature]</i>	Date: 18 Apr 94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

4

Serial No V 77.-5888	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination C14	Method/Standard LA-348-104	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 1 ML			Customer ID COMP	
Remarks, Calculations, Results DUPLICATE SAMPLE WHC-SD-WM-DP-065, REV. 0 COUNT AS uCi/L 2.18E-6				
Analyst - 1 Patricia J. McCown	Analyst - 2 D. H. M. L. L. L.	Analyst - 3 L. M. L. L. L.	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4/12/94	Time Completed 15:15	Lab Unit Mgr Patricia J. McCown	Signature Patricia J. McCown	

54-6800-061 (R-10-83)

C-14: LA-348-104 (B-0) Carbon-14 LIQUIDS

		SAMPLE
Type	Disintegrations per Minute from Counter (dpm)	2.4
SAMPLE	Sample Volume in mL (SS)	1
Work List	Dilution Factor (DF)	1
3026	Digest Dilution Factor (DDF)	1
Test Code	Background Count Rate in Counts per Minute (BKG cpm)	44.7
	Background Count Time in Minutes (BKG time)	50
Matrix	Instrument Fractional Efficiency (EFF)	0.92
LIQUID	Detection Limit (Ld)	4.85
Sample #	Critical Level (Lc)	2.20
V77-5888		
Instrument Code		
WB27818	Critical Level (Lc) = $2.33 \sqrt{(BKG \text{ cpm} / BKG \text{ time})}$	
Analyst	Detection Limit (Ld) = $(2.72 / BKG \text{ time}) + (2) (Lc) / EFF$	
MCCOWN	C-14 $\mu\text{Ci/L}$ = $(dpm) (1000\text{mL/L}) (DF) (DDF) / ((SS) (2220000\text{dpm}/\mu\text{Ci}))$	
Date	$\mu\text{Ci/mL}$ = $\mu\text{Ci/L} / 1000\text{mL/L}$	
04/12/94		
Time	NOTE: Reported result is a LESS THAN value calculated from the statistical Detection Limit (Ld).	
1515		

RESULT C-14 Concentration in $\mu\text{Ci/L}$ = < 2.18E-03

RESULT C-14 Concentration in $\mu\text{Ci/mL}$ = < 2.18E-06

Data Entry by: <i>[Signature]</i>	Date: 13-Apr-94
Approved by: <i>[Signature]</i>	Date: 15 Apr 94

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5

Serial No V 77.-5988	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination C14	Method/Standard LA-348-104	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 1ML + 1ML SPIKE			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKED ID V 77.- 5 788 SPIKE ID 82B51 SPIKE VOLUME 1ML COUNT AS uCi/L WHC-SD-WM-DP-065, REV. 0 89.0%				
Analyst - 1 <i>Michael McCown</i> Hrs	Analyst - 2 <i>D. H. Williams</i> Hrs	Analyst - 3 <i>Emmanuel</i> Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4/12/94	Time Completed 15:15	Lab Unit Mgr <i>Rakha</i>	<i>D. H. Williams</i>	

54-6800-061 (R-10-83)

C-14: LA-348-104 (B-0)

CARBON-14

			SPIKE
Type	dpm of Sample from Counter	(dpm1)	4.25
SPIKE	dpm of Sample + Spike from Counter	(dpm2)	3497.3
Work List	Volume of Sample in Sample Vial in mL	(SS)	1.000
3026	Volume of Sample in Sample + Spike Vial in mL	(SPKD SS)	1.000
Test Code	Volume of Spike in mL	(SPK vol)	1.000
	Sample Dilution Factor	(SAM DF)	1
Matrix	Spike Dilution Factor	(SPK DF)	1
LIQUID	Spike Value in uCi/L	(SPK val)	1.77
Sample #	Background Count Rate in cpm	(BKG cpm)	44.7
V77-5988	Background Count Time in Minutes	(BKG time)	50
Instrument Code	Instrument Fractional Efficiency	(EFF)	0.9179
WB27818	Detection Limit	(Ld)	4.85
Analyst	C-14 uCi/L in Sample	(Rsam)	0.00E+00
MCCOWN	C-14 uCi/L in Sample + Spike	(Rs+s)	1.58E+00
Date	Critical Level (Lc) = 2.33 (Square Root of (BKG cpm / BKG Time))		
04/12/94	Detection Limit (Ld) = (2.72 / BKG Time) + (2) (Lc) / EFF		
Time	C-14 uCi/L in Sample = (dpm1) (1000mL/L) (DF) / (SS) (2220000dpm/uCi))		
1515	C-14 uCi/L in S+S = (dpm2) (1000mL/L) (DF) / (SS) (2220000dpm/uCi))		
	Spike Recovery = ((Rs+s - Rsam) ((SPK DF/SPK vol) / (SAM DF/SPKD SS)) / (SPK val)) 100		

RESULT Spike Recovery = 89.0%

Data Entry by: <i>W. J. O.</i>	Date: 13-Apr-94
Approved by: <i>O. J. K.</i>	Date: 18 Apr 94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

6

Serial No V 77.-5088	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination C14	Method/Standard LA-348-104	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 1 ML + 1 ML SPIKE			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKE DUPLICATE SPIKE ID ^{ADH} 4/12/94 82B51 SPIKE VOL 1 ML WHC-SD-WM-DP-065, REV. 0 85.4 %				
Analyst - 1 <i>Patrick McCown</i> Hrs	Analyst - 2 <i>D. H. Milina</i> Hrs	Analyst - 3 <i>Em Bowler</i> Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4/12/94	Time Completed 15:15	Lab Unit Mgr <i>Dakota</i>	<i>D. H. Milina</i>	

54-6600-061 (R-10-83)

C-14: LA-348-104 (B-0) CARBON-14		SPIKE
Type	dpm of Sample from Counter (dpm1)	2.4
SPIKE	dpm of Sample + Spike from Counter (dpm2)	3353.84
Work List	Volume of Sample in Sample Vial in mL (SS)	1.000
3026	Volume of Sample in Sample + Spike Vial in mL (SPKD SS)	1.000
Test Code	Volume of Spike in mL (SPK vol)	1.000
	Sample Dilution Factor (SAM DF)	1
Matrix	Spike Dilution Factor (SPK DF)	1
LIQUID	Spike Value in µCi/L (SPK val)	1.77
Sample #	Background Count Rate in cpm (BKG cpm)	44.7
V77-5088	Background Count Time in Minutes (BKG time)	50
Instrument Code	Instrument Fractional Efficiency (EFF)	0.9185
WB27818	Detection Limit (Ld)	4.85
Analyst	C-14 µCi/L in Sample (Rsam)	0.00E+00
MCCOWN	C-14 µCi/L in Sample + Spike (Rs+s)	1.51E+00
Date	Critical Level (Lc) = 2.33 (Square Root of (BKG cpm / BKG Time))	
04/12/94	Detection Limit (Ld) = (2.72 / BKG Time) + (2) (Lc) / EFF	
Time	C-14 µCi/L in Sample = (dpm1) (1000mL/L) (DF) / (SS) (2220000dpm/µCi))	
1515	C-14 µCi/L in S+S = (dpm2) (1000mL/L) (DF) / (SS) (2220000dpm/µCi))	
	Spike Recovery = ((Rs+s - Rsam) ((SPK DF/SPK vol) / (SAM DF/SPKD SS)) / (SPK val)) 100	

RESULT Spike Recovery = 85.4%

Data Entry by: <i>Patrick McCown</i>	Date: 13-Apr-94
Approved by: <i>D. H. Milina</i>	Date: 14 APR 94

METHOD:

LA-365-132

DATE START:

MAY 4, 1994

PREPARED BY:

J.L. SLIPPERN

DATE COMPLETE:

MAY 16, 1994

[illegible]

NARRATIVE:

X

NO SPECIAL PROBLEMS/VARIATIONS

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

RESULTS ARE ALL LESS THAN DETECTABLE LIMITS.

WHC-SD-WM-DP-065, REV. 0

SELENIUM ANALYSIS - ACID DIGESTION

2

Serial No. V 76.-8689	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination Se79	Method/Standard LA-365-132	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 5 ml			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK COUNT AS C14 $\frac{15(5)}{2.22 \times 10^6 (.92)} = \frac{1.22 \times 10^{-5} \text{ Ci}}{2.04 \times 10^6} \times 10^{-3-94}$ $< 1.00 \text{ E-5 } \mu\text{Ci/mL}$ <p>Alia Lewis</p>				
Analyst - 1	Analyst - 2 Raymond	Analyst - 3 H. S. S. S.	Analyst - 4	Analyst - 5
Hrs	Hrs 5-4-94	Hrs 5-5-94	Hrs	Hrs
Date 5-4-94	Time Completed	Lab Unit Mgr S. H. C. S.	S. H. C. S.	

54-6800-061 (R-10-83)

.7616
 7900
 $\frac{.7616}{7900} \times 10^{-3-94}$
 $\frac{.0184}{.92.0\%}$

10-3-94

1076-8689

SELENIUM ANALYSIS - ACID DIGESTION

3

Serial No V 77.-8789	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Se79	Method/Standard LA-365-132	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 5 ml			Customer ID COMP	
Remarks, Calculations, Results VOLUME MASS $\frac{45(5)}{2.22 \times 10^6 (.93)} = 4.21 \times 10^{-5} \text{ g/mL}$ OTR PREVIOUS SAMPLE NO. WHC-SD-WM-DP-065, REV. 0 Alita Lewis				
Analyst - 1	Analyst - 2 Raymond	Analyst - 3 [Signature]	Analyst - 4	Analyst - 5
Hrs	Hrs 5-4-94	Hrs 5-5-94	Hrs	Hrs
Date 5-4-94	Time Completed	Lab Unit Mgr [Signature]	[Signature]	

54-6800-061 (R-10-83)

7587

V77-8789

7773

10186

+93%

SELENIUM ANALYSIS - ACID DIGESTION

4

Serial No V 77.-8889	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Se79	Method/Standard LA-365-132	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 5 ml			Customer ID COMP	
Remarks, Calculations, Results DUPLICATE SAMPLE COUNT AS C14 $\frac{45(5)}{2.27616(.955)} = 1.18 \times 10^{-5} \text{ uCi/mL}$ WHC-SD-WM-DP-065, REV. 0 Alta Lupo				
Analyst - 1	Analyst - 2 <i>Raymond</i>	Analyst - 3 <i>Raymond</i>	Analyst - 4	Analyst - 5
Hrs	Hrs 5-4-94	Hrs 5-5-94	Hrs	Hrs
Date 5-4-94	Time Completed	Lab Unit Mon <i>SM</i>	<i>RS</i>	

54-6800-061 (R-10-83)

.7769
 .7960

 .01910 95.5%

V 77-8889

Balance 5-594

PAGE: 1

USER: 2 ID:C-14 : SE-79 PRESET TIME: 50.00 WED 04 MAY 1994 19:0
SAMPLE REPEAT: 1 CYCLE REPEAT: 1 SCR:N RS232:N
H#: 1 AQC:Y QCF:N RCM:Y 2 PHASE MONITOR:Y POST CHK:N VIAL:6 VOLUME:1
RCM-TIME: 0.10 INT:999.95
CHANNEL 1-LL: 0 UL: 700 2SIGMA: 0.10 BKG SUB: 0.00 BKG 2SIG: 0.00 LSR: 0

SINGLE LABEL DPM SET UP ON 24 AUG 1993 13:15

UNKNOWN ID:C-14 UNKNOWN REPLICATES: 1
UNKNOWN NORM FACTOR ISO1:0 1.00000
UNKNOWN UNITS ISO1:DPM
UNKNOWN HALF LIFE CORRECTION:N
INDIVIDUAL UNKNOWN NORM FACTORS:N BACKGROUND QUENCH CURVES:Y
STANDARD ID:BECKMAN LOT 000322 QUENCH LIMITS LOW:0.000 HIGH:299.0
HALF LIFE(DAYS) ISO1: 2092825.
STANDARD DPM ISO1: 158966.0

WHC-SD-WM-DP-065, REV.0

SAM	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	2P	ERR
B1	**	- 1 1	47.70	4.10	50.00	51.77	122.0	0.36	**	

BACKGROUND QUENCH CURVES: CONSTANT

BEST AVAILABLE COPY

CHANNEL 1
QUENCH CURVE COEFFICIENTS
A: 47.70000 B:0.00000000 C:0.00000000 D:0.00000000000

BACKGROUND QUENCH CURVE CORRELATION TABLE

BKG	H#	MEASURED CPM.	CALCULATED CPM.	PERCENT DIFF.	FLAG
----	-----	-----	-----	-----	-----
1	122.0	47.70	47.70	0.00	

BACKGROUND QUENCH LIMITS LOW:0.000 HIGH:1000.
TOTAL QUENCH LIMITS LOW:0.000 HIGH:299.0

SAM	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	2P	ERR
1	**	- 3 1	49.46	4.02	50.00	103.90	122.0	1.17	**	
		ISO1 %EFF CH1:91.33						ISO1 DPM	:1.926989	
2	**	- 4 1	48.30	4.07	50.00	155.90	126.0	1.28	**	
		ISO1 %EFF CH1:90.97						ISO1 DPM	:0.659586	
3	**	- 5 1	51.32	3.95	50.00	207.83	127.0	1.00	**	
		ISO1 %EFF CH1:90.87						ISO1 DPM	:3.983579	
4	**	- 6 1	49.02	4.04	50.00	259.81	126.0	0.76	**	
		ISO1 %EFF CH1:90.97						ISO1 DPM	:1.451092	

1075

WHC-SD-WM-DP-065, REV. 0

V 77

comp

TC 99

ACID DIGEST

41R27818

Procedure/ Rev: LA-438-101

PATRICK J. McCOWN

Date: 4/29/94

: 02:00

Temperature NA

07:20

Chemist: J. SLIPPERN

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

~~BEST AVAILABLE COPY~~

RERUN *Batch 3283*

Serial No. V 75.-8584		Sample Point 108-AP		Date 3-18-94	Time Issued 12: 0	Priority 26
Determination Tc99	Method/Standard LA-438-101	Result Units % RECOVERY		Charge Code N1A7F	Reruns 1	
Sample Size .250ML + .100ML SPIKE # 135851				Customer ID STD		
Remarks, Calculations, Results: EDP S363 TC99 STD# 138851 RESULT 2,2891 uCi/L STD VAL 2.35 uCi/L %REC 97.4% <div style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</div>						
Analyst - 1 <i>Patricia F. McLean</i>		Analyst - 2 <i>McL.</i>		Analyst - 3 <i>Em Barrow</i>		Analyst - 4
Hrs		Hrs		Hrs		Hrs
Date 4/29/94		Time Completed 07:20		Lab Unit Mgr <i>[Signature]</i>		<i>[Signature]</i>

Tc-99: LA-438-101 (D-1) LIQUIDS			STD
Type	Spike (Tracer) Book Number		135B51
STD	Activity for 100ul of Spike Added in dpm	(dm3)	8088
Work List	Volume of Sample in mL	(SS)	0.25
3283	Dilution Factor	(DF)	1
Test Code	Digest Dilution Factor	(DDF)	1
	dpm of Sample from Liquid Scintillation Counter	(dm1)	559.9554
Matrix	dpm of Sample+Spike from Liquid Scintillation Counter	(dm2)	4124.702
LIQUID	Background cpm	(BKG cpm)	54.3
Sample #	Background Time Counted in Minutes	(BKG time)	20
V75-8584	Instrument Fractional Efficiency	(EFF)	0.93
Instrument Code	% Counting Error		-0.2
WB27818	Detection Limit	(Ld)	8.40
Analyst	Critical Level	(Lc)	3.84
MCCOWN	Tc-99 Concentration in uCi/L	=	2.2891E+00
Date	Critical Level (Lc) = 2.33 * the Square Root of (BKG cpm / BKG time)		
04/29/94	Detection Limit (Ld) = ((2.72 / BKG time) + (2 * Lc)) / EFF		
Time	Detection Level = Ld * dm3 * DF * DDF / ((2220000dpm/uCi) * SS * (dm2 - dm1))		
17:20	Tc-99 uCi/L = (dm1 * (1000mL/L) * dm3 * DF * DDF) / ((2220000dpm/uCi) * SS * (dm2 - dm1))		
	Tc-99 uCi/mL = uCi/L / (1000mL/L)		
	Spike (Tracer) Recovery = (dm2 - dm1) * 1.5 * 100 / dm3		

RESULT	Tc-99 Concentration in uCi/L	=	2.29E+00	DETECTION LEVEL
	▽ RESULTS ▽			
	Tc-99 Concentration in uCi/mL	=	2.29E-03	
	% Counting Error	=	1.9 -0.2	3.44E-05
	Spike (Tracer) Recovery	=	66.1%	uCi/mL

Data Entry by: <i>[Signature]</i>	Date: 02-May-94
Approved by: <i>[Signature]</i>	Date: 5/3/94

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

34

RERUN

Serial No V 76.-8684	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination Tc99	Method/Standard LA-438-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ML + .100 ML SPIKE # 135 B51			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK				
WHC-SD-WM-DP-065, REV. 0 < 4.25E -5 uCi/mL				
Analyst - 1 <i>Robert McCown</i>	Analyst - 2 <i>M. G. ...</i>	Analyst - 3 <i>Em. B...</i>	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4/29/94	Time Completed 07:20	Lab Unit Mgr <i>[Signature]</i>		

Tc-99: LA-438-101 (D-1)

LIQUIDS

		BLK
Type	Spike (Tracer) Book Number	135B51
BLK	Activity for 100ul of Spike Added in dpm (dm3)	8088
Work List	Volume of Sample in mL (SS)	1
3283	Dilution Factor (DF)	5
Test Code	Digest Dilution Factor (DDF)	1
	dpm of Sample from Liquid Scintillation Counter (dm1)	3.9734
Matrix	dpm of Sample+Spike from Liquid Scintillation Counter (dm2)	3604.768
LIQUID	Background cpm (BKG cpm)	54.3
Sample #	Background Time Counted in Minutes (BKG time)	20
V76-8684	Instrument Fractional Efficiency (EFF)	0.9312
Instrument Code	% Counting Error	5.9 7.17
WB27818	Detection Limit (Ld)	8.39
Analyst	Critical Level (Lc)	3.84
MCCOWN	Tc-99 Concentration in uCi/L =	< 4.2453E-02
Date	Critical Level (Lc) = 2.33 * the Square Root of (BKG cpm / BKG time)	
04/29/94	Detection Limit (Ld) = ((2.72 / BKG time) + (2 * Lc)) / EFF	
Time	Detection Level = Ld * dm3 * DF * DDF / ((2220000dpm/uCi) * SS * (dm2 - dm1))	
17:20	Tc-99 uCi/L = (dm1 * (1000mL/L) * dm3 * DF * DDF) / ((2220000dpm/uCi) * SS * (dm2 - dm1))	
	Tc-99 uCi/mL = uCi/L / (1000mL/L)	
	Spike (Tracer) Recovery = (dm2 - dm1) * 1.5 * 100 / dm3	

NOTE: Reported result is a LESS THAN value calculated from the statistical Detection Limit (Ld).

RESULT	Tc-99 Concentration in uCi/L =	< 4.25E-02	DETECTION LEVEL
	RESULTS v		
	Tc-99 Concentration in uCi/mL =	< 4.25E-05	
	% Counting Error =	5.9 7.17	4.25E-05
	Spike (Tracer) Recovery =	66.8%	uCi/mL

Data Entry by: <i>[Signature]</i>	Date: 02-May-94
Approved by: <i>[Signature]</i>	Date: 5/3/94

Form L1 Rev. 1.0 Page 1 of 1

1079

RERUN

Signal No V 77.-8784	Sample Point 108-AP	Time Issued 3-18-94	Priority 26
Determination Tc99	Method/Standard LA-438-101	Result Units uCi/ML	Charge Code N1A7F
Sample Size 1 ML + .100ML SPIKE # 135 B51		Customer ID COMP	
Remarks, Calculations, Results WHC-SD-WM-DP-065, REV. 0 3.08E-4 uCi/mL			
Analyst - 1 <i>Patrick McCann</i>	Analyst - 2 <i>M. B. ...</i>	Analyst - 3 <i>Jim B...</i>	Analyst - 4
Hrs	Hrs	Hrs	Hrs
Date 4/29/94	Time Completed 07:20	Lab Unit Mgr <i>[Signature]</i>	<i>[Signature]</i>

Tc-99: LA-438-101 (D-1) LIQUIDS		SAM
Type	Spike (Tracer) Book Number	135B51
SAM	Activity for 100ul of Spike Added in dpm (dm3)	8088
Work List	Volume of Sample in mL (SS)	1
3283	Dilution Factor (DF)	5
Test Code	Digest Dilution Factor (DDF)	1
	dpm of Sample from Liquid Scintillation Counter (dm1)	61.72941
Matrix	dpm of Sample+Spike from Liquid Scintillation Counter (dm2)	3709.115
LIQUID	Background cpm (BKG cpm)	54.3
Sample #	Background Time Counted in Minutes (BKG time)	20
V77-8784	Instrument Fractional Efficiency (EFF)	0.9331
Instrument Code	% Counting Error	4.2 1.22
WB27818	Detection Limit (Ld)	8.37
Analyst	Critical Level (Lc)	3.84
MCCOWN	Tc-99 Concentration in uCi/L =	3.0830E-01
Date	Critical Level (Lc) = 2.33 * the Square Root of (BKG cpm / BKG time)	
04/29/94	Detection Limit (Ld) = ((2.72 / BKG time) + (2 * Lc)) / EFF	
Time	Detection Level = Ld * dm3 * DF * DDF / ((2220000dpm/uCi) * SS * (dm2 - dm1))	
17:20	Tc-99 uCi/L = (dm1 * (1000mL/L) * dm3 * DF * DDF) / ((2220000dpm/uCi) * SS * (dm2 - dm1))	
	Tc-99 uCi/mL = uCi/L / (1000mL/L)	
	Spike (Tracer) Recovery = (dm2 - dm1) * 1.5 * 100 / dm3	

RESULT	Tc-99 Concentration in uCi/L =	3.08E-01	DETECTION LEVEL
	▽ RESULTS ▽		
	Tc-99 Concentration in uCi/mL =	3.08E-04	
	% Counting Error =	4.2 5/3/94	4.18E-05
	Spike (Tracer) Recovery =	67.6%	uCi/mL

Data Entry by: <i>[Signature]</i>	Date: 02-May-94
Approved by: <i>Jennifer J. Shappert</i>	Date: 5/3/94

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1080

RERUN

Serial No V 77.-8884	Sample Point 108-AP	Time Issued 3-18-94	Priority 26
Determination Tc99	Method/Standard LA-43E-101	Result Units uCi/ML	Charge Code N1A7F
Sample Size 1ML + .100ML SPIKE# 135B51			Customer ID COMP
Remarks, Calculations, Results <p>Dup.</p> <p>3.07E-4 uCi/mL</p> <p>WHC-SD-WM-DP-065, REV. 0</p>			
Analyst - 1 <i>Michael McCown</i>	Analyst - 2 <i>MB</i>	Analyst - 3 <i>Jim Ballen</i>	Analyst - 4
Hrs	Hrs	Hrs	Hrs
Date 4/29/94	Time Completed 07:20	Lab Unit Mgr <i>J. J. Deppert</i>	

Tc-99: LA-438-101 (D-1) LIQUIDS		DUP
Type	Spike (Tracer) Book Number	135B51
DUP	Activity for 100ul of Spike Added in dpm (dm3)	8088
Work List	Volume of Sample in mL (SS)	1
3283	Dilution Factor (DF)	5
Test Code	Digest Dilution Factor (DDF)	1
	dpm of Sample from Liquid Scintillation Counter (dm1)	60.70679
Matrix	dpm of Sample+Spike from Liquid Scintillation Counter (dm2)	3664.577
LIQUID	Background cpm (BKG cpm)	54.3
Sample #	Background Time Counted in Minutes (BKG time)	20
V77-8884	Instrument Fractional Efficiency (EFF)	0.9307
Instrument Code	% Counting Error	4.3 0.78
WB27818	Detection Limit (Ld)	8.40
Analyst	Critical Level (Lc)	3.84
MCCOWN	Tc-99 Concentration in uCi/L =	3.0685E-01
Date	Critical Level (Lc) = 2.33 * the Square Root of (BKG cpm / BKG time)	
04/29/94	Detection Limit (Ld) = ((2.72 / BKG time) + (2 * Lc)) / EFF	
Time	Detection Level = Ld * dm3 * DF * DDF / ((2220000dpm/uCi) * SS * (dm2 - dm1))	
07:20	Tc-99 uCi/L = (dm1 * (1000mL/L) * dm3 * DF * DDF) / ((2220000dpm/uCi) * SS * (dm2 - dm1))	
	Tc-99 uCi/mL = uCi/L / (1000mL/L)	
	Spike (Tracer) Recovery = (dm2 - dm1) * 1.5 * 100 / dm3	

RESULT	Tc-99 Concentration in uCi/L =	3.07E-01	DETECTION LEVEL
	▽ RESULTS ▽		
	Tc-99 Concentration in uCi/mL =	3.07E-04	
	% Counting Error =	4.3 0.78	4.24E-05
	Spike (Tracer) Recovery =	66.8%	uCi/mL

Data Entry by: <i>MB</i>	Date: 02-May-94
Approved by: <i>Jennifer S. Deppert</i>	Date: 5/3/94

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Serial No V 77.-8984		Sample Point 108-AP		Time Issued 3-18-94		Priority 26	
Determination Tc99		Method/Standard LA-438-101		Result Units % RECOVERY		Charge Code N1A7F	
Sample Size 1ML + 250 STD # 138		Spike # 135B51		Customer ID COMP			
Remarks, Calculations, Results <p>SAMPLE SPIKED ID V 77-8784 SPIKE ID 138B51 SPIKE VOLUME .250 ML</p> <p>WHC-SD-WM-DP-065, REV.0 101.5%</p>							
Analyst - 1 Robert J. McCown		Analyst - 2 [Signature]		Analyst - 3 [Signature]		Analyst - 4	
Hrs		Hrs		Hrs		Hrs	
Date 4/29/94		Time Completed 07:20		Lab Unit Mgr [Signature]			

Tc-99: LA-438-101 (D-1) LIQUIDS

		SAM
Type	Spike (Tracer) Book Number	135B51
SAM	Activity for 100ul of Spike Added in dpm (dm3)	8088
Work List	Volume of Sample in mL (SS)	1
3283	Dilution Factor (DF)	5
Test Code	Digest Dilution Factor (DDF)	1
Matrix	dpm of Sample from Liquid Scintillation Counter (dm1)	643.7691
LIQUID	dpm of Sample+Spike from Liquid Scintillation Counter (dm2)	4208.431
Sample #	Background cpm (BKG cpm)	54.3
V77-8984	Background Time Counted in Minutes (BKG time)	20
Instrument Code	Instrument Fractional Efficiency (EFF)	0.9303
WB27818	% Counting Error	1.8
Analyst	Detection Limit (ld)	8.40
MCCOWN	Critical Level (lc)	3.84
Date	Tc-99 Concentration in uCi/L =	3.2898E+00
04/29/94	Critical Level (lc) = 2.33 * the Square Root of (BKG cpm / BKG time)	
Time	Detection Limit (ld) = ((2.72 / BKG time) + (2 * lc)) / EFF	
17:20	Detection Level = ld * dm3 * DF * DDF / ((2220000dpm/uCi) * SS * (dm2 - dm1))	

$$\text{Tc-99 } \mu\text{Ci/L} = (\text{dm1} * (1000\text{mL/L}) * \text{dm3} * \text{DF} * \text{DDF}) / ((2220000\text{dpm}/\mu\text{Ci}) * \text{SS} * (\text{dm2} - \text{dm1}))$$

$$\text{Tc-99 } \mu\text{Ci/mL} = \mu\text{Ci/L} / (1000\text{mL/L})$$

$$\text{Spike (Tracer) Recovery} = ((\text{dm2} - \text{dm1}) * 1.5 * 100 / \text{dm3}) * 100\% = 101.5\%$$

$$(3.2898 - .30830) * (1.35/5.1) * (1/2.35) * 100\%$$

RESULT	Tc-99 Concentration in uCi/L =	3.29E+00	DETECTION LEVEL
	▽ RESULTS ▽		
	Tc-99 Concentration in uCi/mL =	3.29E-03	
	% Counting Error =	1.8	4.29E-05
	Spike (Tracer) Recovery =	66.1%	uCi/mL

Data Entry by:	[Signature]	Date:	03-May-94
Approved by:	[Signature]	Date:	5/3/94

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

1112 Serial No V 77.-8084		Sample Point 108-AP		Time Issued 3-18-94		Priority 26
Determination Tc99	Method/Standard LA-438-101	Result Units % RECOVERY		Charge Code N1A7F	Reruns 1	
Sample Size 1ML + .100ML SPIKE # 135851				Customer ID COMP		
Remarks, Calculations, Results SAMPLE SPIKE DUPLICATE ✓ 77-8884 SPIKE ID 138851 SPIKE VOL .250 mL 100.9% WHC-SD-WM-DP-065, REV. 0						
Analyst - 1 <i>Patricia McCown</i> Hrs	Analyst - 2 <i>M. B. ...</i> Hrs	Analyst - 3 <i>Jim Bruck</i> Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs		
Date 4/29/94	Time Completed 07:20	Lab Unit Mgr <i>Jim Bruck</i>				

Tc-99: LA-438-101 (D-1) LIQUIDS		SAM
Type	Spike (Tracer) Book Number	135851
SAM	Activity for 100µl of Spike Added in dpm (dm3)	8088
Work List	Volume of Sample in mL (SS)	1
3283	Dilution Factor (DF)	5
Test Code	Digest Dilution Factor (DDF)	1
Matrix	dpm of Sample from Liquid Scintillation Counter (dm1)	646.7154
LIQUID	dpm of Sample+Spike from Liquid Scintillation Counter (dm2)	4247.371
Sample #	Background cpm (BKG cpm)	54.3
V77-8084	Background Time Counted in Minutes (BKG time)	20
Instrument Code	Instrument Fractional Efficiency (EFF)	0.9307
WB27818	% Counting Error	1.8
Analyst	Detection Limit (Ld)	8.40
MCCOWN	Critical Level (Lc)	3.84
Date	Tc-99 Concentration in µCi/L =	3.2718E+00
04/29/94	Critical Level (Lc) = 2.33 * the Square Root of (BKG cpm / BKG time)	
Time	Detection Limit (Ld) = ((2.72 / BKG time) + (2 * Lc)) / EFF	
17:20	Detection Level = Ld * dm3 * DF * DDF / ((2220000dpm/µCi) * SS * (dm2 - dm1))	

$$\begin{aligned}
 \text{Tc-99 } \mu\text{Ci/L} &= (\text{dm1} * (1000\text{mL/L}) * \text{dm3} * \text{DF} * \text{DDF}) / ((2220000\text{dpm}/\mu\text{Ci}) * \text{SS} * (\text{dm2} - \text{dm1})) \\
 \text{Tc-99 } \mu\text{Ci/mL} &= \mu\text{Ci/L} / (1000\text{mL/L}) \\
 \text{Spike (Tracer) Recovery} &= (\text{dm2} - \text{dm1}) * 1.5 * 100 / \text{dm3} \\
 (3.2718 - .30635) * (1.25 / 5.1) / 2.35 * 100\% &= 100.9\%
 \end{aligned}$$

RESULT	Tc-99 Concentration in µCi/L =	3.27E+00	DETECTION LEVEL
	▽ RESULTS ▽		
	Tc-99 Concentration in µCi/mL =	3.27E-03	
	% Counting Error =	1.8	4.25E-05
	Spike (Tracer) Recovery =	66.8%	µCi/mL

Data Entry by:	<i>Jennifer S. Slippin</i>	Date:	03-May-94
Approved by:	<i>J. Slippin</i>	Date:	5/3/94

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1083

Em Bauer
04/29/94

USED: 5 10:10 99 PRESET TIME: 20.00 FRI 29 APR 1994 13:39
SAMPLE REPEAT: 1 CYCLE REPEAT: 1 SCR:N RS232:N
H#: 1 AOC:Y QCF:N RCM:Y 2 PHASE MONITOR:N
RCM-TIME: 0.10 INT:999.95
CHANNEL 1-LL:150 UL: 800 2SIGMA: 0.10 BKG SUB: 0.00 PKG 2SIG: 0.20 LSK: 0

SINGLE LABEL DPM SET UP ON 20 DEC 1991 13:14

UNKNOWN ID:TC 99 UNKNOWN REPLICATES: 1
UNKNOWN NORM FACTOR ISO:0 1.00000
UNKNOWN UNITS ISO1:DPM
UNKNOWN HALF LIFE CORRECTION:N
INDIVIDUAL UNKNOWN NORM FACTORS:N BACKGROUND QUENCH CURVES:Y
STANDARD ID:131B28-A 1-10 QUENCH LIMITS LOW:73.67 HIGH:207.7
HALF LIFE (DAYS) ISO1:H
STANDARD DPM ISO1:0.00000000

WHC-SD-WM-DP-065, REV.0

SN#	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	ERR
1	**	1	54.34	0.1	20.00	42.13	166.0	0.20	

BACKGROUND QUENCH CURVES: LOW: 1.0

BEST AVAILABLE COPY

CHANNEL 1
QUENCH CURVE COEFFICIENTS
BKG SUB: 0.00 NORM FACTOR: 1.00000000 DELTA QCF: 0.00

END USER QUI QUENCH CURVE CORRELATION TABLE

DEVS	QCF	MEASURED CPM	CALCULATED CPM	PERCENT DIFF.	FLAG
1	166.0	54.34	54.20	0.25	

BACKGROUND QUENCH LIMITS LOW:0.000 HIGH:1000.
TOTAL QUENCH LIMITS LOW:73.67 HIGH:207.7

SN#	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	ERR
1	**	1	575.05	1.86	20.00	42.13	166.0	0.20	
			ISO1 XEFF CH1:93.00				ISO1 DPM	:559.9514	
2	**	4	3889.25	0.71	20.00	63.23	167.0	0.04	
			ISO1 XEFF CH1:92.47				ISO1 DPM	:559.9514	
3	**	5	50.06	5.07	20.00	64.01	166.0	0.10	
			ISO1 XEFF CH1:93.12				ISO1 DPM	:559.9514	
4	**	5	3413.40	0.75	20.00	105.34	166.0	0.04	
			ISO1 XEFF CH1:93.14				ISO1 DPM	:559.9514	

1084

DAY	TIME	CPN	2219Z	TIME	EL TIME	AVE HH	RCN%	ERI
5	1	111.90	4.21	20.00	126.47	113.0	1.22	
		ISO1 XEFF CH1:93.71					ISO1 DPM	:61.72941
6	1	3508.20	0.76	20.00	147.59	163.0	0.04	
		ISO1 XEFF CH1:93.12					ISO1 DPM	:3709.115
7	1	110.80	4.25	20.00	168.68	164.0	0.78	
		ISO1 XEFF CH1:93.07					ISO1 DPM	:60.70679
8	1	3452.30	0.76	20.00	185.71	166.0	0.05	
		ISO1 XEFF CH1:93.00					ISO1 DPM	:3664.577
9	1	183.20	1.75	20.00	210.70	165.0	0.26	
		ISO1 XEFF CH1:93.00					ISO1 DPM	:640.761
10	1	191.10	0.71	20.00	231.52	164.0	0.04	
		ISO1 XEFF CH1:93.07					ISO1 DPM	:4208.671
11	1	535.20	1.75	20.00	132.90	163.0	0.19	
		ISO1 XEFF CH1:93.07					ISO1 DPM	:846.715
12	1	543.20	0.71	20.00	274.06	163.0	0.06	
		ISO1 XEFF CH1:93.07					ISO1 DPM	:421.711

WHC-SD-WM-DP-065, REV.0

BEST AVAILABLE COPY

THE FOLLOWING ANALYSES ARE INCLUDED IN THE DATA PACKAGE BUT THE RESULTS HAVE NOT BEEN REPORTED IN THE FINAL SUMMARY REPORTS.

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.

Customer ID:

V75-77

COMP

Analysis:

Sample Prep:

TC99

ACID DIGEST

Instrument: WB 27818

Procedure/ Rev: LA-438-101

Technologist: J M VAN SANT

Date: 04/22/94

Starting Time: 0800

Temperature 25 C

Ending Time: 1530

Chemist: J SLIPPERN

Comments: BATCH # 3036

OUT FOR RERUN

	Description	Lab ID
1	LMCS	V75-8584
2	BLANK <i>9/28/94</i>	V75-8684
3	SAMPLE	V77-8784
4	SAMPLE DUP	V77-8884
5	SAMPLE SPIKE	V77-8984
6	SAMPLE SPIKE DUP	V77-8084
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

DATA
NOT USED
IN PACKAGE

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
138B51	.250ML			
SPIKE	135B51			
				1087

Serial No V 75.-8584	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 0	Priority 26
Determination Tc99	Method/Standard LA-438-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size .250 ml std + .100ml tracer			Customer ID STD	
Remarks. Calculations. Results EDP S363 TC99 STD# 138851 RESULT 2.3750 STD VAL 2.35 uCi/L %REC 101.06 2+2 135B51 WHC-SD-WM-DP-065, REV. 0 OUT FOR RERUN Van Sant				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4/22/94	Time Completed	Lab Unit		

54-6800-061 (R-10-83)

Tc-99: LA-438-101 (D-1) LIQUIDS

		STANDARD
Type	Spike (Tracer) Book Number	135B51
STANDARD	Activity for 100ul of Spike Added in dpm (dm3)	8088
Work List	Volume of Sample in mL (SS)	0.25
BATCH #3036	Dilution Factor (DF)	1
Test Code	Digest Dilution Factor (DDF)	1
Matrix	dpm of Sample from Liquid Scintillation Counter (dm1)	484.8
LIQUID	dpm of Sample+Spike from Liquid Scintillation Counter (dm2)	3459.54
Sample #	Background cpm (BKG cpm)	50.65
V75.-8584	Background Time Counted in Minutes (BKG time)	20
Instrument Code	Instrument Fractional Efficiency (EFF)	0.9533
	% Counting Error	1.98
Analyst	Detection Limit (Ld)	7.92
J. M. VAN SANT	Critical Level (Lc)	3.71
Date	Tc-99 Concentration in uCi/L =	2.3750E+00
04/22/94	Critical Level (Lc) = 2.33 * the Square Root of (BKG cpm / BKG time)	
Time	Detection Limit (Ld) = ((2.72 / BKG time) + (2 * Lc)) / EFF	
1530	Detection Level = Ld * dm3 * DF * DDF / ((2220000dpm/uCi) * SS * (dm2 - dm1))	
	Tc-99 uCi/L = (dm1 * (1000mL/L) * dm3 * DF * DDF) / ((2220000dpm/uCi) * SS * (dm2 - dm1))	
	Tc-99 uCi/mL = uCi/L / (1000mL/L)	
	Spike (Tracer) Recovery = (dm2 - dm1) * 1.5 * 100 / dm3	

RESULT	Tc-99 Concentration in $\mu\text{Ci/L}$	=	2.37E+00	DETECTION LEVEL
	▽ RESULTS ▽			
	Tc-99 Concentration in $\mu\text{Ci/mL}$	=	2.37E-03	
	% Counting Error	=	1.98	3.88E-05
	Spike (Tracer) Recovery	=	55.2 %	$\mu\text{Ci/mL}$

Date Entry by:	Date:	23-Apr-94
Approved by:	Date:	4/28/94
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4-5

Serial No V 77.-8784	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Tc99	Method/Standard LA-438-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 1ml + .100ml tracer			Customer ID COMP	
Remarks, Calculations, Results <p>3+9</p> <p>135B51</p> <p>OUT FOR RERUN 6.36E-5 uCi/mL</p> <p>WHC-SD-WM-DP-065, REV. 0</p>				
Analyst - 1 Van Sant	Analyst - 2 [Signature]	Analyst - 3 [Signature]	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-22-94	Time Completed	Lab Unit/No.		

54-6800-061 (R-10-83)

Tc-99: LA-438-101 (D-1) LIQUIDS

Type	Spike (Tracer) Book Number	135B51
SAMPLE	Activity for 100µl of Spike Added in dpm (dm3)	8088
Work List	Volume of Sample in mL (SS)	1
BATCH #3036	Dilution Factor (DF)	1
Test Code	Digest Dilution Factor (DDF)	1
	ipm of Sample from Liquid Scintillation Counter (dm1)	54.98
Matrix	ipm of Sample+Spike from Liquid Scintillation Counter (dm2)	3203.17
LIQUID	Background cpm (BKG cpm)	50.65
Sample #	Background Time Counted in Minutes (BKG time)	20
V77.-8784	Instrument Fractional Efficiency (EFF)	0.9524
Instrument Code	% Counting Error	0.8
	Detection Limit (Ld)	7.93
Analyst	Critical Level (Lc)	3.71
J. M. VAN SANT	Tc-99 Concentration in µCi/L =	6.3626E-02
Date	Critical Level (Lc) = 2.33 * the Square Root of (BKG cpm / BKG time)	
04/22/94	Detection Limit (Ld) = ((2.72 / BKG time) + (2 * Lc)) / EFF	
Time	Detection Level = Ld * dm3 * DF * DDF / ((2220000dpm/µCi) * SS * (dm2 - dm1))	
1530	Tc-99 µCi/L = (dm1 * (1000mL/L) * dm3 * DF * DDF) / ((2220000dpm/µCi) * SS * (dm2 - dm1))	
	Tc-99 µCi/mL = µCi/L / (1000mL/L)	
	Spike (Tracer) Recovery = (dm2 - dm1) * 1.5 * 100 / dm3	

RESULT	Tc-99 Concentration in µCi/L =	6.36E-02	DETECTION LEVEL
	▽ RESULTS ▽		
	Tc-99 Concentration in µCi/mL =	6.36E-05	
	% Counting Error =	0.8	9.18E-06
	Spike (Tracer) Recovery =	58.4%	µCi/mL

Data Entry by: [Signature]	Date: 23-Apr-94
Approved by: [Signature]	Date: 4/28/94

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6-7

Serial No V 77.-8884	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Tc99	Method/Standard LA-438-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 1ml + .100-ml tracer			Customer ID COMP	
Remarks, Calculations, Results Duplicate 135851 4.710 5.99E-5 uCi/mL OUT FOR RERUN WHC-SD-WM-DP-065, REV. 0 Vance				
Analyst - 1	Analyst - 2 J. M. Van Sant	Analyst - 3 J. M. Van Sant	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 4-22-94	Hrs	Hrs
Date 4-22-94	Time Completed	Lab Unit Mgr J. M. Van Sant		

54-6800-061 (R-10-83)

Tc-99: LA-438-101 (D-1) LIQUIDS

		SAMPLE-DUP
TYPE	Spike (Tracer) Book Number	135851
SAMPLE-DUP	Activity for 100ul of Spike Added in dpm (dm3)	8088
Work List	Volume of Sample in mL (SS)	1
BATCH #3036	Dilution Factor (DF)	1
Test Code	Digest Dilution Factor (DDF)	1
	ipm of Sample from Liquid Scintillation Counter (dm1)	50.87
Matrix	ipm of Sample+Spike from Liquid Scintillation Counter (dm2)	3144.4
LIQUID	Background cpm (BKG cpm)	50.65
Sample #	Background Time Counted in Minutes (BKG time)	20
V77.-8884	Instrument Fractional Efficiency (EFF)	0.952
Instrument Code	% Counting Error	0.81
	Detection Limit (Ld)	7.93
Analyst	Critical Level (Lc)	3.71
J. M. VAN SANT	Tc-99 Concentration in uCi/L =	5.9909E-02
Date	Critical Level (Lc) = 2.33 * the Square Root of (BKG cpm / BKG time)	
04/22/94	Detection Limit (Ld) = ((2.72 / BKG time) + (2 * Lc)) / EFF	
Time	Detection Level = Ld * dm3 * DF * DDF / ((2220000dpm/uCi) * SS * (dm2 - dm1))	
1530	Tc-99 uCi/L = (dm1 * (1000mL/L) * dm3 * DF * DDF) / ((2220000dpm/uCi) * SS * (dm2 - dm1))	
	Tc-99 uCi/mL = uCi/L / (1000mL/L)	
	Spike (Tracer) Recovery = (dm2 - dm1) * 1.5 * 100 / dm3	

RESULT	Tc-99 Concentration in uCi/L =	5.99E-02	DETECTION LEVEL
	▽ RESULTS ▽		
	Tc-99 Concentration in uCi/mL =	5.99E-05	9.34E-06 uCi/mL
	% Counting Error =	0.81	
	Spike (Tracer) Recovery =	57.4%	

Data Entry by: <i>J. M. Van Sant</i>	Date: 23-Apr-94
Approved by: <i>J. M. Van Sant</i>	Date: 4/28/94

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8-9

Serial No V 77.-8984	Sample Point 108-AP	Date 3-18-94	Time Issued 12:26	Priority 26
Determination Tc99	Method-Standard LA-438-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 1 ml + 100ul tracer			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKED ID 135B51 SPIKE ID SPIKE VOLUME 250ul 511 111.6% OUT FOR RERUN WHC-SD-WM-DP-065, REV. 0 Vando				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-22-94	Time Completed	Lab Unit		

54-6800-061 (R-10-83)

Tc-99: LA-438-101 (D-1) LIQUIDS

		SAMPLE-SPIKE
Type	Spike (Tracer) Book Number	135B51
SAMPLE-SPIKE	Activity for 100ul of Spike Added in dpm (dm3)	8088
Work List	Volume of Sample in mL (SS)	1
BATCH #3036	Dilution Factor (DF)	1
Test Code	Digest Dilution Factor (DDF)	1
Matrix	dpm of Sample from Liquid Scintillation Counter (dm1)	603.33
LIQUID	dpm of Sample+Spike from Liquid Scintillation Counter (dm2)	3659.92
Sample #	Background cpm (BKG cpm)	50.65
V77.-8984	Background Time Counted in Minutes (BKG time)	20
Instrument Code	Instrument Fractional Efficiency (EFF)	0.9529
	% Counting Error	0.75
	Detection Limit (ld)	7.93
Analyst	Critical Level (lc)	3.71
J. M. VAN SANT	Tc-99 Concentration in µCi/L =	7.1913E-01

Data
04/22/94
Time
1530

$$\begin{aligned}
 \text{Critical Level (lc)} &= 2.33 * \text{the Square Root of (BKG cpm / BKG time)} \\
 \text{Detection Limit (ld)} &= ((2.72 / \text{BKG time}) + (2 * lc)) / \text{EFF} \\
 \text{Detection Level} &= ld * dm3 * DF * DDF / ((2220000 \text{ dpm}/\mu\text{Ci}) * SS * (dm2 - dm1)) \\
 \text{Tc-99 } \mu\text{Ci/L} &= (dm1 * (1000 \text{ mL/L}) * dm3 * DF * DDF) / ((2220000 \text{ dpm}/\mu\text{Ci}) * SS * (dm2 - dm1)) \\
 \text{Tc-99 } \mu\text{Ci/mL} &= \mu\text{Ci/L} / (1000 \text{ mL/L}) \\
 \text{Spike (Tracer) Recovery} &= (dm2 - dm1) * 1.5 * 100 / dm3 \\
 &= ((7.1913E-01) - (6.3626E-02)) * (1.25 / 1.1) / 2.35 * 100\% = 111.6\%
 \end{aligned}$$

RESULT	Tc-99 Concentration in µCi/L =	7.19E-01	DETECTION LEVEL
	▽ RESULTS ▽		
	Tc-99 Concentration in µCi/mL =	7.19E-04	
	% Counting Error =	0.75	9.45E-06
	Spike (Tracer) Recovery =	56.7%	µCi/mL

Data Entry by: <i>[Signature]</i>	Date: 23-Apr-94
Approved by: <i>[Signature]</i>	Date: 4/28/94

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10-11

Serial No V 77.-8084	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Tc99	Method/Standard LA-438-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 1 ml + .100ml spike			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKE 135851 WHC-SD-WM-DP-065, REV. 0 DUPLICATE SPIKE ID 139851 SPIKE VOL .250ml std 6+12 110.2% OUT FOR RERUN				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-22-94	Time Completed	Lab Unit		

54-6800-061 (R-10-83)

Tc-99: LA-438-101 (D-1) LIQUIDS

Type	Spike (Tracer) Book Number	SAMPLE-SPIKE DU
SAMPLE-SPIKE DUP	Activity for 100µl of Spike Added in dpm (dm3)	135851
Work List	Volume of Sample in mL (SS)	8088
BATCH #3036	Dilution Factor (DF)	1
Test Code	Digest Dilution Factor (DDF)	1
Matrix	dpm of Sample from Liquid Scintillation Counter (dm1)	595.34
LIQUID	dpm of Sample+Spike from Liquid Scintillation Counter (dm2)	3662.11
Sample #	Background cpm (BKG cpm)	50.65
V77.-8084	Background Time Counted in Minutes (BKG time)	20
Instrument Code	Instrument Fractional Efficiency (EFF)	0.9532
	% Counting Error	0.75
	Detection Limit (Ld)	7.92
Analyst	Critical Level (Lc)	3.71
J. M. VAN SANT	Tc-99 Concentration in µCi/L =	7.0725E-01
Date	Critical Level (Lc) = 2.33 * the Square Root of (BKG cpm / BKG time)	
04/22/94	Detection Limit (Ld) = ((2.72 / BKG time) + (2 * Lc)) / EFF	
Time	Detection Level = Ld * dm3 * DF * DDF / ((2220000dpm/µCi) * SS * (dm2 - dm1))	
1530	Tc-99 µCi/L = (dm1 * (1000mL/L) * dm3 * DF * DDF) / ((2220000dpm/µCi) * SS * (dm2 - dm1))	
	Tc-99 µCi/mL = µCi/L / (1000mL/L)	
	Spike (Tracer) Recovery = (dm2 - dm1) * 1.5 * 100 / dm3	

RESULT	Tc-99 Concentration in µCi/L =	7.07E-01	DETECTION LEVEL
	▽ RESULTS ▽		
	Tc-99 Concentration in µCi/mL =	7.07E-04	
	% Counting Error =	0.75	9.41E-06
	Spike (Tracer) Recovery =	56.9%	µCi/mL

Data Entry by: <i>D. Honaker</i>	Date: 23-Apr-94
Approved by: <i>J. M. Van Sant</i>	Date: 4/28/94

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TECHNETIUM 99 ANALYSIS - ACID DIGESTION

3

Serial No V 76.-8684	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination Tc99	Method/Standard LA-438-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 1ml & .100ml tracer			Customer ID BLANK	
Remarks. Calculations. Results REAGENT BLANK 147 NO VALUE OUT FOR RERUN WHC-SD-WM-DP-065, REV. 0 135B51 4-22-94				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-22-94	Time Completed	Lab Unit Mgr		

54-6800-061 (R-10-83)

ID: TC 99

22 APR 1994 17:20

USER: 5

COMMENT:

PRESET TIME : 20.00
 DATA CALC : SL DPM H# : YES SAMPLE REPEATS: 1 PRINTER : STD
 COUNT BLANK : YES IC# : NO REPLICATES : 1 RS232 : EDIT
 TWO PHASE : YES AQC : NO CYCLE REPEATS : 1
 SCINTILLATOR: LIQUID LUMEX: YES LOW SAMPLE REJ: 0
 LOW LEVEL : NO HALF LIFE CORRECTION DATE: none

ISOTOPE 1: TC99 %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: Off

Quench Limits Low: 90.823 High: 343.63

SAM NO	POS	TIME MIN	H#	TC99		TC99 DPM	TC99 EFF-1	LUMEX %	ELAPSED TIME	2P
				CPM	%ERROR					
B1	** -1	20.00	152.6	50.65	6.34	53.14	95.31	1.77	21.02	2P
Blank Average				DPM for	TC99 :	53.14	COEF. OF VAR:		0.000	
1	** -3	20.00	152.0	512.80	1.98	484.80	95.33	0.19	12.40	2P
2	** -4	20.00	153.8	3346.90	0.77	3459.54	95.26	0.04	63.92	2P
3	** -5	20.00	153.1	3030.45	0.81	3126.82	95.30	0.04	85.38	2P
4	** -6	20.00	156.1	102.95	4.43	54.98	95.22	0.87	106.84	2P
5	** -7	20.00	155.2	3101.45	0.50	3203.17	95.24	0.04	128.00	2P
6	** -8	20.00	144.1	99.35	4.51	50.87	95.51	0.93	149.76	2P
7	** -9	20.00	156.9	3044.05	0.81	3144.40	95.20	0.03	171.20	2P
8	** -10	20.00	163.2	623.80	1.75	603.33	95.02	0.17	192.66	2P
9	** -11	20.00	153.5	3538.05	0.75	3659.92	95.29	0.02	214.05	2P
10	** -12	20.00	154.0	617.85	1.80	595.34	95.28	0.12	235.49	2P
11	** -1	20.00	152.2	3541.45	0.75	3662.11	95.32	0.02	257.00	2P

WHC-SD-WM-DP-065, REV. 0

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1095

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No		Sample ID		Date	Time Issued	Priority
V 75.-8586		108-AP		3-18-94	12: 0	26
Determination	Method/Standard	Result Units	Charge Code	Reruns		
Sr90	LA-220-101	% RECOVERY	N1A7F	1		
Sample Size				Customer ID		
1ml + 1ml SR CARRIER				STD		
Remarks Calculations, Results						
LMCS CHECK SAMPLE						
LMCS ID 130851						
STD CAL = 1.3523 uCi/L						
G. 7.8813						
T. 7.7937						
SEP TIME 0230						
SEP DATE 5-4-94						
N. 0.0876						
85.5%						
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5		
Hrs	Hrs	Hrs	Hrs	Hrs		
Date	Time Completed	Lab Unit Mgr	Hrs			
5-4-94	0445		5-13-94			

54-6800-061 (R-10-83)

Sr-89/90 LA-220-101(D-0),102(E-0),104(D-0),105(E-1) LIQUIDS

Type	DETECTOR NUMBER	12	CARRIER ADDED in mL (CVA)	1.000
STD	TOTAL COUNTS (TC)	10310	GROSS WEIGHT (W2)	7.8813
Work List	COUNT TIME in MINUTES (CT)	10	TARE WEIGHT (W1)	7.7937
3335	BACKGROUND in cpm (BKG)	15	NET WEIGHT (W3)	0.0876
Test Code	SAMPLE VOLUME in mL (SS)	1.000	DELTA TIME (hours) (DT)	7.00
	DILUTION FACTOR (DF)	1		
Matrix	HIGHEST DILUTION FACTOR (DDF)	1		
LIQUID	SAMPLE COUNT RATE (Rs)	1016.00	Sr-90 EFFICIENCY FACTOR (C1)	0.4180
Sample #	CRITICAL LEVEL (Lc)	2.86	Y-90 EFFICIENCY FACTOR (C2)	0.4660
V75-8586	SEPARATION TIME (ST)	02:30	Rmax	N/A
Instrument Code	SEPARATION DATE (SD)	05/04/94	DETECTION LIMIT (Ld)	5.99
	TIME OF COUNT (TOC)	09:30	Sr-89/90 CONC in uCi/L =	1.1560E+00
Analyst	DATE OF COUNT (DOC)	05/04/94		
HOLLIBAUGH				
Date	Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)			
05/04/94	Sr-89/90 uCi/L = Rs*1000mL/L * DF/DDF/			
Time	(C1 + C2 * (1 - e to the power of ((-natural log 2) / 64.2 * DT)) * SS*Rec*2220000dpm/uCi)			
04:45	NOTE 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA x 0.1000))			
	Sr-89/90 uCi/mL = (Sr-89/90 uCi/L) / 1000mL/L			
	Relative Counting Error = The Square Root of ((TC + BKG * CT) / (TC - BKG * CT))			
	Percent Carrier Recovery = (Net Weight / Expected Weight) * 100			
	NOTE: Expected Weight = CVA * 0.1			
	Detection Levels and Less Than Values are determined from Procedure LA-508-002.			
	Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100			

v RESULTS v

WHC-SD-WM-DP-065, REV.0

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Sr-89/90 CONCENTRATION	=	1.16E+00	uCi/L
Sr-89/90 CONCENTRATION	=	1.16E-03	uCi/mL
RELATIVE COUNTING ERROR	=	1.0%	
PERCENT CARRIER RECOVERY	=	87.6%	

DETECTION
LEVEL6.81E-06
uCi/mL

Data Entry by:	Date:	04-May-94
Approved by:	Date:	6-May-94

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STRONTIUM 90 ANALYSIS - ACID DIGESTION

12/2 5-4-94 0930. $\Delta T = 7.0$

V75-8586

10310
10

Sr Calculation (CRPC_CAL 2.0)
By: RA WILLIAMS, on 05-04-1994 at 10:28:40
Det #12 2-inch mount Sr eff : .418 Y eff : .466
Sample size : 1 mL Dilution : 1 Method : 1

Sample # V75-8586
Mount # 1 Decay time = 7.0 hrs

10310
----- - 15.0 = 1.01253+00 uCi/L strontium
10

WHC-SD-WM-DP-065, REV. 0

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE -

RERUN

Serial No V 76.-8686	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination Sr90	Method-Standard LA-220-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 1
Sample Size 0.050 ml + 1 ml SR CARRIER			Customer ID BLANK	
Remarks Calculations, Results REAGENT BLANK G. 7.9554 T. 7.8681 3.25E-4 uCi/ml N. 0.0873				
Analyst - 1 Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 5-4-94	Time Completed 0245	Lab Unit Mgr [Signature]	SEP TIME 0230 SEP DATE 5-4-94 [Signature]	

54 6800-061 (R-10-83)

Sr-89/90 LA-220-101(D-0),102(E-0),104(D-0),105(E-1) LIQUIDS

				BLK
Type	DETECTOR NUMBER	12	CARRIER ADDED in mL (CVA)	1.000
BLK	TOTAL COUNTS (TC)	150	GROSS WEIGHT (W2)	7.9554
Work List	COUNT TIME in MINUTES (CT)	10	FARE WEIGHT (W1)	7.8681
3335	BACKGROUND in cpm (BKG)	15	NET WEIGHT (W3)	0.0873
Test Code	SAMPLE VOLUME in mL (SS)	0.050	DELTA TIME (hours) (DT)	7.25
	DILUTION FACTOR (DF)	1		
Matrix	DIGEST DILUTION FACTOR (DDF)	5		
LIQUID	SAMPLE COUNT RATE (Rs)	0.00	SR-90 EFFICIENCY FACTOR (C1)	0.4180
Sample #	CRITICAL LEVEL (Lc)	2.86	Y-90 EFFICIENCY FACTOR (C2)	0.4660
V76-8686	SEPARATION TIME (ST)	02:30	tmax	2.86
Instrument Code	SEPARATION DATE (SD)	05/04/94	DETECTION LIMIT (Ld)	5.99
	TIME OF COUNT (TOC)	09:45	Sr-89/90 CONC in uCi/L =	3.2546E-01
Analyst	DATE OF COUNT (DOC)	05/04/94		
HOLLIBAUGH				
Date	Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)			
05/04/94	Sr-89/90 uCi/L = Rs*1000mL/L *DF*DDF/			
Time	(C1 + C2 * (1 - e to the power of ((-natural log 2) / 64.2 * DT)) * SS*Rec*2220000dpm/uCi)			
04:45	NOTE 64.2 = Half Life for Y-90 and Rec = Fractional Carrier Recovery ((W2-W1) / (CVA x 0.1000))			

$$\text{Sr-89/90 } \mu\text{Ci/mL} = (\text{Sr-89/90 } \mu\text{Ci/L}) / 1000\text{mL/L}$$

$$\text{Relative Counting Error} = \text{The Square Root of } ((\text{TC} + \text{BKG} \cdot \text{CT}) / (\text{TC} - \text{BKG} \cdot \text{CT}))$$

$$\text{Percent Carrier Recovery} = (\text{Net Weight} / \text{Expected Weight}) \cdot 100$$

$$\text{NOTE: Expected Weight} = \text{CVA} \cdot 0.1$$

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

$$\text{Delta Time (hours)} = ((\text{DOC} - \text{SD}) \cdot 24) + (\text{TOC} - \text{ST}) / 100$$

v RESULTS v

WHC-SD-WM-DP-065, REV.0

Sr-89/90 CONCENTRATION	=	< 3.25E-01	uCi/L
Sr-89/90 CONCENTRATION	=	< 3.25E-04	uCi/mL
LESS THAN Value was Determined from Rmax.			
RELATIVE COUNTING ERROR	=	500.0%	
PERCENT CARRIER RECOVERY	=	87.3%	

DETECTION
LEVEL6.82E-04
uCi/mL

Data Entry by: [Signature]	Date: 04-May-94
Approved by: [Signature]	Date: 6-May-94

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STRONTIUM 90 ANALYSIS - ACID DIGESTION

22/2 5-4-94 0945 BT = 7.25

Sr Calculation (CRPC_CAL 2.0)
By: RA WILLIAMS, on 05-04-1994 at 10:30:20
Det #12 2 -inch mount Sr eff : .418 Y eff : .466
Sample size : .05 mL Dilution : 1 Method : 1

150

10

Sample # V76-8686
Mount # 1 Decay time = 7.25 hrs

150

10

15.0 < 5.6816E-02 uCi/L strontium

V76-8686

WHC-SD-WM-DP-065, REV. 0

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 77.-8786	108-AP	3-18-94	12:18	26
Determination	Method-Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	uCi/ML	N1A7F	1
Sample Size	Customer ID			
.050 ml + 1 ml SR CARRIER	COMP			
Remarks, Calculations, Results				
WHC-SD-WM-DP-065, REV. 0 G. 7.9409 T. 7.8529 7.63E-2 uCi/ml N. 0.0880 SEP TIME 0230 SEP DATE 5-4-94 5-12-94 54 6800-061 (R-10-83)				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Laboratory	Manager	
5-4-94	0245			

Sr-89/90 LA-220-101(D-0),102(E-0),104(D-0),105(E-1) LIQUIDS

Sr-89/90 LA-220-101(D-0),102(E-0),104(D-0),105(E-1)				LIQUIDS		SAM	
Type	DETECTOR NUMBER		12	CARRIER ADDED in mL (CVA)	1.000		
SAM	TOTAL COUNTS (TC)		6913	GROSS WEIGHT (W2)	7.9409		
Work List	COUNT TIME in MINUTES (CT)		10	TARE WEIGHT (W1)	7.8529		
3335	BACKGROUND in cpm (BKG)		15	NET WEIGHT (W3)	0.0880		
Test Code	SAMPLE VOLUME in mL (SS)		0.050	DELTA TIME (hours) (DT)	7.42		
	DILUTION FACTOR (DF)		1				
Matrix	DIGEST DILUTION FACTOR (DDF)		5				
LIQUID	SAMPLE COUNT RATE (Rs)		676.30	Sr-90 EFFICIENCY FACTOR (C1)	0.4180		
Sample #	CRITICAL LEVEL (Lc)		2.86	Y-90 EFFICIENCY FACTOR (C2)	0.4660		
V77-8786	SEPARATION TIME (ST)		02:30	Rmax	N/A		
Instrument Code	SEPARATION DATE (SD)		05/04/94	DETECTION LIMIT (Id)	5.99		
	TIME OF COUNT (TOC)		09:55	Sr-89/90 CONC in µCi/L = 7.6275E+01			
Analyst	DATE OF COUNT (DOC)		05/04/94				
HOLLIBAUGH							
Date	Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)						
05/04/94	Sr-89/90 µCi/L = Rs*1000mL/L *DF*DDF/						
Time	(C1 + C2 * (1 - e to the power of ((-natural log 2) / 64.2 * DT)) * SS*Rec*2220000dpm/µCi)						
04:45	NOTE 64.2 = Half Life for Y-90 and Rec = Fractional Carrier Recovery ((W2-W1) / (CVA x 0.1000))						

$$\text{Sr-89/90 uCi/mL} = (\text{Sr-89/90 uCi/L}) / 1000\text{mL/L}$$

$$\text{Relative Counting Error} = \frac{\text{The Square Root of } ((\text{TC} + \text{BKG} * \text{CT}) / (\text{TC} - \text{BKG} * \text{CT}))}{1}$$

$$\text{Percent Carrier Recovery} = (\text{Net Weight} / \text{Expected Weight}) * 100$$

$$\text{NOTE: Expected Weight} = \text{CVA} * 0.1$$

Detection Levels and Less Than Values are determined from Procedure LA-500-002.

$$\text{Delta Time (hours)} = ((\text{DOC} - \text{SD}) * 24) + (\text{TOC} - \text{ST}) / 100$$

v RESULTS v

Sr-89/90 CONCENTRATION	=	7.63E+01	uCi/L
Sr-89/90 CONCENTRATION	=	7.63E-02	uCi/mL
RELATIVE COUNTING ERROR	=	1.2%	
PERCENT CARRIER RECOVERY	=	88.0%	

DETECTION
LEVEL6.75E-04
uCi/mL

Data Entry by: <i>[Signature]</i>	Date: 04-May-94
Approved by: <i>[Signature]</i>	Date: 6-May-94

STRONTIUM 90 ANALYSIS - ACID DIGESTION

12/2 5-4-94 09:55

DT = 7.42

Sr Calculation (CRPC_CAL 2.0)

By: RA WILLIAMS, on 05-04-1994 at 10:31:40

Det #12 2 -inch mount Sr eff : .418 Y eff : .466

Sample size : .05 mL Dilution : 1 Method : 1

6913 -15

10 Sample # V77-8786

Mount # 1 Decay time = 7.42 hrs

V77-8786

6913

----- 15.0 = 1.3422E+01 uCi/L strontium

10

WHC-SD-WM-DP-065, REV. 0

Serial No	Sample Point	Date	Time Issued	Priority
V 77.-8886	108-AP	3-18-94	12:26	26
Determination	Method/Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	uCi/ML	N1A7F	1
Sample Size	Customer ID			
0.050 me + 1ml SR CARRIER	COMP			
Remarks Calculations, Results				
DUPLICATE SAMPLE 7.80E-2 uCi/me G. 7.9131 T. 7.8284 N 0.0851 7.8474 9.24.94 SEP DATE 5-4-94 5-12-94 OK M. J.				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
5-4-94	0445			

54-6400-061 (R-10-83)

Sr-89/90 LA-220-101(D-0),102(E-0),104(D-0),105(E-1) LIQUIDS

Type	DETECTOR NUMBER	12	CARRIER ADDED in mL (CVA)	DUP
DUP	TOTAL COUNTS (TC)	6814	GROSS WEIGHT (W2)	1.000
Work List	COUNT TIME in MINUTES (CT)	10	TARE WEIGHT (W1)	7.9131
3335	BACKGROUND in cpm (BKG)	15	NET WEIGHT (W3)	7.8284
Test Code	SAMPLE VOLUME in mL (SS)	0.050	DELTA TIME (hours) (DT)	0.0847
	DILUTION FACTOR (DF)	1		7.58
Matrix	DIGEST DILUTION FACTOR (DDF)	5		
LIQUID	SAMPLE COUNT RATE (Rs)	666.40	Sr-90 EFFICIENCY FACTOR (C1)	0.4180
Sample #	CRITICAL LEVEL (Lc)	2.86	Y-90 EFFICIENCY FACTOR (C2)	0.4660
V77-8886	SEPARATION TIME (ST)	02:30	Rmax	N/A
Instrument Code	SEPARATION DATE (SD)	05/04/94	DETECTION LIMIT (Ld)	5.99
	TIME OF COUNT (TOC)	10:05	Sr-89/90 CONC in uCi/L =	7.7954E+01
Analyst	DATE OF COUNT (DOC)	05/04/94		
HOLLIBAUGH				
Date	Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)			
05/04/94	Sr-89/90 uCi/L = Rs*1000mL/L *DF*DDF/			
Time	(C1 + C2 * (1 - e to the power of ((-natural log 2) / 64.2 * DT)) * SS*Rec.*2220000dpm/uCi)			
04:45	NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA x 0.1000))			

$$\text{Sr-89/90 uCi/mL} = (\text{Sr-89/90 uCi/L}) / 1000\text{mL/L}$$

$$\text{Relative Counting Error} = \text{The Square Root of } ((\text{TC} + \text{BKG} * \text{CT}) / (\text{TC} - \text{BKG} * \text{CT}))$$

$$\text{Percent Carrier Recovery} = (\text{Net Weight} / \text{Expected Weight}) * 100$$

$$\text{NOTE: Expected Weight} = \text{CVA} * 0.1$$

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

$$\text{Delta Time (hours)} = ((\text{DOC} - \text{SD}) * 24) + (\text{TOC} - \text{ST}) / 100$$

v RESULTS v

WHC-SD-WM-DP-065, REV. 0

Sr-89/90 CONCENTRATION	=	7.80E+01	uCi/L
Sr-89/90 CONCENTRATION	=	7.80E-02	uCi/mL
RELATIVE COUNTING ERROR	=	1.3%	
PERCENT CARRIER RECOVERY	=	84.7%	

DETECTION
LEVEL7.00E-04
uCi/mL

Data Entry by:	Date:	04-May-94
Approved by:	Date:	6-May-94

STRONTIUM 90 ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

12/2 5-4-94 1005 $\Delta T = 7.58$

Sr Calculation (CEPC_CAL 2.0)
By: RA WILLIAMS, on 05-04-1994 at 10:31:11
Det #12 2 -inch mount Sr eff : .418 Y eff : .466
Sample size : .05 mL Dilution : 1 Method : 1

$\frac{6814}{10} - 15$

Sample # V77-8886
Mount # 1 Decay time = 7.58 hrs

V77-8886

6814
----- 15.0 = 1.3204E+01 uCi/L strontium
10

STRONTIUM 90 ANALYSIS - ACID DIGESTION

RERUN				
Serial No V 77.-8986	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Sr90	Method/Standard LA-220-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size .050 me + 1 ml SR CARRIER			Customer ID COMP	
Remarks Calculations, Results SAMPLE SPIKED ID G. 7.8049 SPIKE ID 130801 T. 7.7180 SPIKE VOLUME 1 ml $\frac{(36.739 - \frac{76.275}{5}) \times (.95 \times 1)}{1.3523} = 99.9\%$ N 0.869 SEP TIME 0230 SEP DATE 5-4-94				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-4-94	Time Completed 0445	Lab Unit Mgr	512399 AMarked	

54 6800-061 (R-10-83)

12/2 5-4-94 1015 6T = 7.75

Sr Calculation (CRFC_CAL 2.0)
 By: RA WILLIAMS, on 05-04-1994 at 10:32:08
 18725 12 2-inch mount Sr eff : .418 Y eff : .466
 Sample size: .505 mL Dilution : 1 Method : 1

Sample # V77-8986
 Mount # 1 Decay time = 7.75 hrs

V 77-8986

18725
 ----- 15.0 = 3.67392 ± 0.1 uCi/L strontium
 10

WHC-SD-WM-DP-065, REV. 0

STRONTIUM 90 ANALYSIS - ACID DIGESTION

RERUN

Serial No V 77.-8086	Sample Point 108-AP	Date 3-18-94	Time Issued 12:26	Priority 26
Determination Sr90	Method-Standard LA-220-101	Result Units % RECOVERY	Charge Code N1A7F	Repeats 1
Sample Size .050 ml + 1 ml SR CARRIER			Customer ID COMP	
Remarks, Calculations, Results DUPLICATE SPIKE SAM G 7.8960 SPIKE ID 136851 T 7.8079 SPIKE VOLUME 1 ml N 0.0881 $\left(\frac{38.014}{.881} - \frac{77.254}{5} \right) \left(\frac{.05}{1} \right) \left(\frac{1}{1} \right) \times 100 = 103.2\%$ 10.9% 1.3523 SEP TIME 0730 SEP DATE 5-4-94				
Analyst - 1 D. G. G. G.	Analyst - 2 P. G. G. G.	Analyst - 3 R. G. G. G.	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5-4-94	Time Completed 0445	Lab Unit Mgr [Signature]	5-12-94 AKM [Signature]	

54-6000-001 (R 10 83)

WHC-SD-WM-DP-065, REV. 0

12/2 5-4-94 1030

2528.0

Sr Calculation (CRPC_CAL 2.0)

By: RA WILLIAMS, on 05-04-1994 at 10:38:31

19421 Det #12 2 -inch mount Sr eff : .418 Y eff : .466

Sample size : .05 mL Dilution : 1 Method : 1

Sample # V77-8086

Mount # 1 Decay time = 8.0 hrs

V77-8086

19421

----- 15.0 = 3.8019E+01 uCi/L strontium

10

THE FOLLOWING ANALYSES ARE INCLUDED IN THE DATA PACKAGE BUT THE RESULTS HAVE NOT BEEN REPORTED IN THE FINAL SUMMARY REPORTS.

Batch 3035

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY
ANALYTICAL BATCH

WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No. V75 - V77	Customer ID: COMP
Analysis: Sr 90	Sample Prep: COMP RG4120194 Acid Digest

Instrument: WA 45676	Procedure/ Rev: LA-220-101-10-0
Technologist: R.A. Green	Date: 4-20-94
Starting Time: 16:30	Temperature N.A.
Ending Time: 23:10	Chemist: S. Fitzgerald

Comments: Rerun of batch requested spike recoveries out of limits

OUT FOR RERUN

	Description	Lab ID
1	INITIAL LMCS CHECK STD	V75-8586
2	REAGENT BLANK	V76-8686
3	Sample	V77-8786
4	Spike Sample	V77-8986
5	Duplicate sample	V77-8886
6	Duplicate Spike, smpl.	V77-8086
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

DATA
NOT USED
IN PACKAGE

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
ITS	136 B51/1ml			

BEST AVAILABLE COPY

[illegible]

NARRATIVE: NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

WHC-SD-WM-DP-065, REV. 0

Spike and spike duplicate recovery values are out of limits requiring rerun for batch.

lt ~~2/21~~ 4-25-94

Batch 3035

Serial No V 75.-8586	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 0	Priority 26
Determination Sr90	Method/Standard LA-220-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 1ml + 1ml Sr carrier			Customer ID STD	
Remarks, Calculations, Results LMCS CHECK SAMPLE LMCS ID <u>130851</u> STD Value <u>1.3537</u> STD Result <u>1.1898</u> STD Rec % <u>87.9</u> SEP TIME: 20:00 bare 7.9833 bare 7.8938 net wt <u>0.0905</u> <u>0.0895</u> OUT FOR RERUN Rae Ann Green				
Analyst - 1	Analyst - 2 DH Miller	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-20-94	Time Completed 23:15	Lab Dir Mgr		

54-6800-061 (R-10-83)

Sr-89/90 LA-220-101(D-0),102(E-0),104(D-0),105(E-1) LIQUIDS					STANDARD
Type	DETECTOR NUMBER	12	CARRIER ADDED in mL (CVA)		1.000
STANDARD	TOTAL COUNTS (TC)	10563	GROSS WEIGHT (W2)		7.9833
Work List	COUNT TIME in MINUTES (CT)	10	TARE WEIGHT (W1)		7.8938
3035	BACKGROUND in cpm (BKG)	14	NET WEIGHT (W3)		0.0895
Test Code	SAMPLE VOLUME in mL (SS)	1.000	DELTA TIME (hours) (DT)		4.67
Sr90	DILUTION FACTOR (DF)	1			
Matrix	DIGEST DILUTION FACTOR (DDF)	1			
LIQUID	SAMPLE COUNT RATE (Rs)	1042.30	Sr-90 EFFICIENCY FACTOR (C1)		0.4180
Sample #	CRITICAL LEVEL (Lc)	2.76	Y-90 EFFICIENCY FACTOR (C2)		0.4660
V75-8586	SEPARATION TIME (ST)	20:00	Rmax		N/A
Instrument Code	SEPARATION DATE (SD)	04/20/94	DETECTION LIMIT (Ld)		5.79
	TIME OF COUNT (TOC)	00:40	Sr-89/90 CONC in µCi/L =		1.1898E+00
Analyst	DATE OF COUNT (DOC)	04/21/94			
R. GREEN					
Date					
04/20/94					
Time					
23:15					

Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)

Sr-89/90 µCi/L = Rs * 1000mL/L * DF * DDF /

(C1 + C2 * (1 - e to the power of ((-natural log 2) / 64.2 * DT)) * SS * Rec * 2220000dpm/µCi)

NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA x 0.1000))

Sr-89/90 µCi/mL = (Sr-89/90 µCi/L) / 1000mL/L

Relative Counting Error = The Square Root of ((TC + BKG * CT) / (TC - BKG * CT))

Percent Carrier Recovery = (Net Weight / Expected Weight) * 100

NOTE: Expected Weight = CVA * 0.1

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100

▼ RESULTS ▼

WHC-SD-WM-DP-065, REV. 0

Sr-89/90 CONCENTRATION	=	1.19E+00	µCi/L
Sr-89/90 CONCENTRATION	=	1.19E-03	µCi/mL
RELATIVE COUNTING ERROR	=	1.0%	
PERCENT CARRIER RECOVERY	=	89.5%	

DETECTION
LEVEL

6.61E-06
µCi/mL

Data Entry by:		Date:	21-Apr-94
Approved by:		Date:	25-Apr-94

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Acid Dose DF = 5

Serial No V 76.-8686	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination Sr90	Method/Standard LA-220-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size .250-ml & 1-ml Sr carrier			Customer ID BLANK	
Remarks Calculations Results REAGENT BLANK SEPTIME: 20:00 7.8673 7.8130 -0543 4.41 E-4 uCi/ml OUT FOR RERUN Rae Ann Green				
Analyst - 1	Analyst - 2 DHMikie	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-20-94	Time Completed 23:15	Laboratory Mgr		

54-6800-061 (R-10-83)

Sr-89/90 LA-220-101(D-0),102(E-0),104(D-0),105(E-1) LIQUIDS				BLANK
Type	DETECTOR NUMBER	12	CARRIER ADDED in mL (CVA)	1.000
BLANK	TOTAL COUNTS (TC)	258	GROSS WEIGHT (W2)	7.8673
Work List	COUNT TIME in MINUTES (CT)	10	TARE WEIGHT (W1)	7.8130
3035	BACKGROUND in cpm (BKG)	14	NET WEIGHT (W3)	0.0543
Test Code	SAMPLE VOLUME in mL (SS)	0.250	DELTA TIME (hours) (DT)	5.22
Sr90	DILUTION FACTOR (DF)	1		
Matrix	DIGEST DILUTION FACTOR (DDF)	5		
LIQUID	SAMPLE COUNT RATE (Rs)	11.80	Sr-90 EFFICIENCY FACTOR (C1)	0.4180
Sample #	CRITICAL LEVEL (Lc)	2.76	Y-90 EFFICIENCY FACTOR (C2)	0.4660
V76-8686	SEPARATION TIME (ST)	20:00	Rmax	N/A
Instrument Code	SEPARATION DATE (SD)	04/20/94	DETECTION LIMIT (Ld)	5.79
	TIME OF COUNT (TOC)	01:13	Sr-89/90 CONC. in uCi/L =	4.4141E-01
Analyst	DATE OF COUNT (DOC)	04/21/94		
R. GREEN				
Date	Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)			
04/20/94	Sr-89/90 uCi/L = Rs*1000mL/L *DF*DDF/			
Time	(C1 + C2 * (1 - e to the power of ((-natural log 2) / 64.2 * DT)) * SS*Rec.*2220000dpm/uCi)			
23:15	NOTE 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA x 0.1000))			

Sr-89/90 uCi/mL = (Sr-89/90 uCi/L) / 1000mL/L

Relative Counting Error = The Square Root of ((TC + BKG * CT) / (TC - BKG * CT))

Percent Carrier Recovery = (Net Weight / Expected Weight) * 100

NOTE Expected Weight = CVA * 0.1

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100

v RESULTS v

WHC-SD-WM-DP-065, REV. 0

Sr-89/90 CONCENTRATION	=	4.41E-01	uCi/L
Sr-89/90 CONCENTRATION	=	4.41E-04	uCi/mL
RELATIVE COUNTING ERROR	=	16.9%	
PERCENT CARRIER RECOVERY	=	54.3%	

DETECTION
LEVEL2.17E-04
uCi/mL

Date Entry by: <i>[Signature]</i>	Date: 21-Apr-94
Approved by: <i>[Signature]</i>	Date: 25-Apr-94

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1112

Acid D65T DF=5

Serial No V 77.-8786	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Sr90	Method/Standard LA-220-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size .250ml + 1ml Sr carrier			Customer ID COMP	
Remarks, Calculations, Results SEP TIME 20:00 7.9863 7.8908 .0955 OUT FOR RERUN 6.46 E-2 uCi/mL R. Green DHM Date 4-20-94 Time Completed 23:15 Lab Unit Mg 54-6800-061 (R-10-83)				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mg		

Sr-89/90 LA-220-101(D-0),102(E-0),104(D-0),105(E-1) LIQUIDS					SAMPLE
Type	DETECTOR NUMBER	12	CARRIER ADDED in mL (CVA)		1.000
SAMPLE	TOTAL COUNTS (TC)	30402	GROSS WEIGHT (W2)		7.9863
Work List	COUNT TIME in MINUTES (CT)	10	TARE WEIGHT (W1)		7.8908
3035	BACKGROUND in cpm (BKG)	14	NET WEIGHT (W3)		0.0955
Test Code	SAMPLE VOLUME in mL (SS)	0.250	DELTA TIME (hours) (DT)		4.83
Sr90	DILUTION FACTOR (DF)	1			
Matrix	DIGEST DILUTION FACTOR (DDF)	5			
LIQUID	SAMPLE COUNT RATE (Rs)	3026.20	Sr-90 EFFICIENCY FACTOR (C1)		0.4180
Sample #	CRITICAL LEVEL (Lc)	2.76	Y-90 EFFICIENCY FACTOR (C2)		0.4660
V77-8786	SEPARATION TIME (ST)	20:00	Rmax		N/A
Instrument Code	SEPARATION DATE (SD)	04/20/94	DETECTION LIMIT (Ld)		5.79
	TIME OF COUNT (TOC)	00:50	Sr-89/90 CONC in uCi/L =		6.4632E+01
Analyst	DATE OF COUNT (DOC)	04/21/94			
R. GREEN					
Date	Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)				
04/20/94	Sr-89/90 uCi/L = Rs*1000mL/L *DF/DDF/				
Time	(C1 + C2 * (1 - e to the power of ((-natural log 2) / 64.2 * DT)) * SS*Rec.*2220000dpm/uCi)				
23:15	NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA x 0.1000))				
	Sr-89/90 uCi/mL = (Sr-89/90 uCi/L) / 1000mL/L				
	Relative Counting Error = The Square Root of ((TC + BKG * CT) / (TC - BKG * CT))				
	Percent Carrier Recovery = (Net Weight / Expected Weight) * 100				
	NOTE: Expected Weight = CVA * 0.1				
	Detection Levels and Less Than Values are determined from Procedure LA-508-002.				
	Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100				

v RESULTS v

WHC-SD-WM-DP-065, REV.0

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Sr-89/90 CONCENTRATION	=	6.46E+01	uCi/L
Sr-89/90 CONCENTRATION	=	6.46E-02	uCi/mL
RELATIVE COUNTING ERROR	=	0.6%	
PERCENT CARRIER RECOVERY	=	95.5%	

DETECTION
LEVEL1.24E-04
uCi/mL

Date Entry by: <i>[Signature]</i>	Date: 21-Apr-94
Approved by: <i>[Signature]</i>	Date: 25-Apr-94
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1113

Acid Digest DF=5

Serial No V 77.-8886	Sample Point 108-AP	Date 3-18-94	Time Issued 12:26	Priority 26
Determination Sr90	Method Standard LA-220-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size .250ml + 1ml Screen			Customer ID COMP	
Remarks, Calculations, Results DUPLICATE SAMPLE OUT FOR RERUN SEPTIME 20:05 <div style="text-align: center;"> $6.37E-2$ uCi/ml 7.8420 7.7459 0.0961 $6.38E-2$ uCi/ml </div>				
Analyst - 1	Analyst - 2 D. M. Green	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed 23:15	Lab Unit Mgr		

54-6800-061 (R-10-83)

Sr-89/90 LA-220-101(D-0),102(E-0),104(D-0),105(E-1) LIQUIDS

				DUPLICATE
Type	DETECTOR NUMBER	12	CARRIER ADDED in mL (CVA)	1.000
DUPLICATE	TOTAL COUNTS (TC)	30537	GROSS WEIGHT (W2)	7.8420
Work List	COUNT TIME in MINUTES (CT)	10	TARE WEIGHT (W1)	7.7459
3035	BACKGROUND in cpm (BKG)	14	NET WEIGHT (W3)	0.0961
Test Code	SAMPLE VOLUME in mL (SS)	0.250	DELTA TIME (hours) (DT)	5.92
Sr90	DILUTION FACTOR (DF)	1		
Matrix	DIGEST DILUTION FACTOR (DDF)	5		
LIQUID	SAMPLE COUNT RATE (Rs)	3039.70	Sr-90 EFFICIENCY FACTOR (C1)	0.4180
Sample #	CRITICAL LEVEL (Lc)	2.76	Y-90 EFFICIENCY FACTOR (C2)	0.4660
V77-8886	SEPARATION TIME (ST)	20:05	Rmax	N/A
Instrument Code	SEPARATION DATE (SD)	04/20/94	DETECTION LIMIT (Ld)	5.79
	TIME OF COUNT (TOC)	02:00	Sr-89/90 CONC in uCi/L =	6.3773E+01
Analyst	DATE OF COUNT (DOC)	04/21/94		
R. GREEN				
Date				
04/20/94				
Time				
23:15				

Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)

Sr-89/90 uCi/L = Rs * 1000 mL/L * DF * DDF /

(C1 + C2 * (1 - e to the power of ((-natural log 2) / 64.2 * DT)) * SS * Rec * 2220000 dpm/uCi)

NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2 - W1) / (CVA * 0.1000))

Sr-89/90 uCi/mL = (Sr-89/90 uCi/L) / 1000 mL/L

Relative Counting Error = The Square Root of ((TC + BKG * CT) / (TC - BKG * CT))

Percent Carrier Recovery = (Net Weight / Expected Weight) * 100

NOTE: Expected Weight = CVA * 0.1

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100

v RESULTS v

WHC-SD-WM-DP-065, REV. 0

Sr-89/90 CONCENTRATION	=	6.38E+01	uCi/L
Sr-89/90 CONCENTRATION	=	6.38E-02	uCi/mL
RELATIVE COUNTING ERROR	=	0.6%	
PERCENT CARRIER RECOVERY	=	96.1%	

DETECTION
LEVEL1.22E-04
uCi/mL

Date Entry by:	Date:	25-Apr-94
Approved by:	Date:	25-Apr-94

Form X1 Rev. 1.0

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1114

Acid Digest DF=4

Serial No V 77.-8988	Sample Point 108-AP	Date 3-18-94	Time Issued 12:26	Priority 26
Determination Sr90	Method/Standard LA-220-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 250ml + 1ml Sr carrier			Customer ID COMP	
Remarks, Calculations, Results SPIKE SAMPLE SPIKE ID 136851 SPIKE VOLUME 1ml $\left(\frac{11.301 \text{ mcg}}{.77} - \frac{64.632 \text{ mcg}}{5} \right) \left(\frac{1}{1 \text{ ml}} \right) \left(\frac{.25 \text{ ml}}{1} \right) 100 = \boxed{\text{Spike Rec. } 32.3\%}$ $\frac{1.3536 \text{ mcg}}{1.3536 \text{ mcg}} = 100\%$ SEPTIME 20:00 tare 7.9829 net 7.4059 .0770 OUT FOR RERUN Rae Ann Green				
Analyst - 1	Analyst - 2 D.H. Meline	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-20-94	Time Completed 23:15	Lab Unit Mgr [Signature]	4-25-94 [Signature]	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV.0

Acid Digest DF=4

Serial No V 77.-8086	Sample Point 108-AP	Date 3-18-94	Time Issued 12:26	Priority 26
Determination Sr90	Method/Standard LA-220-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 250ml + 1ml Sr carrier			Customer ID COMP	
Remarks, Calculations, Results DUPLICATE SPIKE SAM SPIKE ID 136851 SPIKE VOLUME 1ml OUT FOR RERUN $\left(\frac{13.781 \text{ mcg}}{.985} - \frac{65.773 \text{ mcg}}{5} \right) \left(\frac{1}{1 \text{ ml}} \right) \left(\frac{.25 \text{ ml}}{1} \right) 100 = \boxed{\text{Spike Rec. } 22.8\%}$ $\frac{1.3536 \text{ mcg}}{1.3536 \text{ mcg}} = 100\%$ SEPTIME 20:05 tare 7.9835 net 0.985 22.8% Rae Ann Green				
Analyst - 1	Analyst - 2 D.H. Meline	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-20-94	Time Completed 23:15	Lab Unit Mgr [Signature]	4-25-94 [Signature]	

54-6800-061 (R-10-83)

12/2 4-21-94 @ 0200 Dm

ΔT = 5.92

30537
10 -14

Sr Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 04-21-1994 at 02:53:40
Det #12 2 -inch mount Sr eff : .418 Y eff : .466
Sample size : .25 mL Dilution : 1 Method : 1

Sample # V-77
Mount # 1 Decay time = 5.92 hrs

30537

----- 14.0 = 1.2255E+01 uCi/L strontium
10

WHC-SD-WM-DP-065, REV.0

V-77-8886

ΔT = 4.67

12/2 4-21-94 @ 0211 Dm

ΔT = 6.10

34387
10 -14

Sr Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 04-21-1994 at 02:54:01
Det #12 2 -inch mount Sr eff : .418 Y eff : .466
Sample size : .25 mL Dilution : 1 Method : 1

Sample # V-77
Mount # 1 Decay time = 6.10 hrs

34387

----- 14.0 = 1.3781E+01 uCi/L strontium
10

V-77-8086

12/2 4-21-94 @ 0040 Dm

10563
10 -14

Sr Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 04-21-1994 at 02:51:41
Det #12 2 -inch mount Sr eff : .418 Y eff : .466
Sample size : 1 mL Dilution : 1 Method : 1

Sample # V-75
Mount # 1 Decay time = 4.67 hrs

10563

----- 14.0 = 1.0647E+02 uCi/L strontium

10

V-75-8586

12/2 4-21-94 @ 0050 Dm

ΔT = 4.83

30402
10 -14

Sr Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 04-21-1994 at 02:52:51
Det #12 2 -inch mount Sr eff : .418 Y eff : .466
Sample size : .25 mL Dilution : 1 Method : 1

Sample # V-77
Mount # 1 Decay time = 4.83 hrs

30402

----- 14.0 = 1.2344E+01 uCi/L strontium
10

V-77-8786

ΔT = 5.83

12/2 4-21-94 @ 0150 Dm

28143
10 -14

Sr Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 04-21-1994 at 02:53:14
Det #12 2 -inch mount Sr eff : .418 Y eff : .466
Sample size : .25 mL Dilution : 1 Method : 1

Sample # V-77
Mount # 1 Decay time = 5.83 hrs

1116

12/2 4-21-94 @ 0113 DM

$\Delta T = 5.22$

$\frac{258}{10} - 14$

Sr Calculation (CRPC_CAL 2.0)
 By: DH MILICIA, on 04-21-1994 at 02:52:22
 Det #12 2 -inch mount Sr eff : .418 Y eff : .466
 Sample size : .25 mL Dilution : 1 Method : 1

Sample # V-76
 Mount # 1 Decay time = 5.22 hrs

$\frac{258}{10} - 14.0 = 4.7930E-02$ uCi/L strontium

V 76-8686

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

6721 Batch 3027

Serial No V 75.-5585	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 0	Priority 26
Determination I129	Method-Standard LA-378-103	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 1 ml			Customer ID STD	
Remarks Calculations, Results EDP S928 ITANK STD# 63351 RESULT 8.14E-01 STD VAL 7.835E-01 %REC 103.9 GROSS WT. 2.7094 TARE WT. 2.7000 NET WT. 0.0094 WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 Hrs <i>L. Weston</i>	Analyst - 2 Hrs 4-9-94	Analyst - 3 Hrs <i>D. H. Miller</i>	Analyst - 4 Hrs	Analyst - 5 Hrs <i>Jay Hammer</i>
Date 4-9-94	Time Completed 0900	Lab Unit Mgr <i>V. K. K.</i>	<i>Jay Hammer</i>	

54-6800-061 (R-10-83)

I-129: LA-378-103 (B-3)

LIQUIDS

		STANDARD
Type	Gross Weight (wt2)	2.7094
STANDARD	Tare Weight (wt1)	2.7
Work List	Mass Precipitate (net wt)	0.0094
3027	I-129 μ Ci / Sample from GEA (I-129 GEA)	2.51E-4
Test Code	Sample Volume in mL (SS)	1
I129	Dilution Factor (DF)	1
Matrix	Digest Dilution Factor (DDF)	1
LIQUID	Carrier Fractional Recovery (Rec)	0.3082
Sample #		
V75-5585	IODINE 129 = 8.14E-01 μ Ci/L	
Instrument Code		
WB57237/WB57265	The carrier solution contains 0.281131 gm's of KI/mL. One mL of the solution is equivalent to 0.0305 grams.	
Analyst		
L. WESTON		
Date	Carrier Percent Recovery = $\frac{(wt2-wt1)(100)}{0.0305}$	
04/09/94		
Time		
0900	I-129 μ Ci/L = $\frac{(I-129 \text{ GEA})(1000\text{mL/L})(DF)(DDF)}{(Rec)(SS)}$	μ Ci/mL = $\frac{\mu\text{Ci/L}}{1000\text{mL/L}}$

RESULT IODINE 129 = 8.1E-04 μ Ci/mL

RESULT CARRIER PERCENT RECOVERY = 30.8%

Date Entry by: <i>Jay Hammer</i>	Date: 09-Apr-94
Approved by: <i>L. Weston</i>	Date: 18-Apr-94

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1120

6722

Serial No V 76.-5685	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination I129	Method Standard LA-378-103	Result Units uCi/ML	Charge Code N1A7F	Retuns 0
Sample Size 1 ml QH ₂ O			Customer ID BLANK	
Remarks Calculations, Results REAGENT BLANK COUNT AS uCi/L $\frac{2.7186}{2.7038} = 0.0148$ $< 5.90 \times 10^{-05} \text{ uCi/mL}$				
WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>David J. Weston</i> Hrs	Analyst - 2 <i>David J. Weston</i> Hrs	Analyst - 3 <i>David J. Weston</i> Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4-9-94	Time Completed 0900	Lab Unit Mgr <i>David J. Weston</i>		

54-6800-061 (R-10-83)

I-129: LA-378-103 (B-3)

LIQUIDS

Type	Gross Weight (wt2)	2.7186
BLANK	Tare Weight (wt1)	2.7038
Work List	Mass Precipitate (net wt)	0.0148
3027	I-129 μ Ci / Sample from GEA (I-129 GEA)	< 2.85E-05
Test Code	Sample Volume in mL (SS)	1
I129	Dilution Factor (DF)	1
Matrix	Digest Dilution Factor (DDF)	1
LIQUID	Carrier Fractional Recovery (Rec)	0.4852
Sample #	IODINE 129 = < 5.87E-02 μ Ci/L	
Instrument Code	The carrier solution contains 0.281131 gm's of KI/mL. One mL of the solution is equivalent to 0.0305 grams.	
WB57237/WB57265	Carrier Percent Recovery = $\frac{(wt2-wt1)(100)}{0.0305}$	
Analyst		
L. WESTON		
Date		
04/09/94		
Time		
0900	I-129 μ Ci/L = $\frac{(I-129 \text{ GEA})(1000\text{mL/L})(DF)(DDF)}{(Rec)(SS)}$	μ Ci/mL = $\frac{\mu\text{Ci/L}}{1000\text{mL/L}}$

RESULT IODINE 129	=	< 5.9E-05 μ Ci/mL
RESULT CARRIER PERCENT RECOVERY	=	48.5%

Data Entry by: <i>David J. Weston</i>	Date: 09-Apr-94
Approved by: <i>David J. Weston</i>	Date: 18-Apr-94

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1121

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

6723

Serial No V 77.-5785	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination I129	Method Standard LA-378-103	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 1 mL			Customer ID COMP	
Remarks, Calculations, Results COUNT AS uCi/L <div style="text-align: right; margin-right: 50px;"> 2.7404 2.7257 $\hline 0.0147$ </div> $< 6.30 \times 10^{-5} \text{ uCi/mL}$				
WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 <i>[Signature]</i> Hrs	Analyst - 3 <i>[Signature]</i> Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4.9.94	Time Completed 0900	Lab Unit Mgr <i>[Signature]</i>	<i>[Signature]</i>	

54-6800-061 (R-10-83)

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I-129: LA-378-103 (B-3) LIQUIDS		SAMPLE
Type	Gross Weight (wt2)	2.7404
SAMPLE	Tare Weight (wt1)	2.7257
Work List	Mass Precipitate (net wt)	0.0147
3027	I-129 μCi / Sample from GEA (I-129 GEA)	$< 3.02 \times 10^{-5}$
Test Code	Sample Volume in mL (SS)	1
I129	Dilution Factor (DF)	1
Matrix	Digest Dilution Factor (DDF)	1
LIQUID	Carrier Fractional Recovery (Rec)	0.4820
Sample #		
V77-5785	IODINE 129 = $< 6.27 \times 10^{-2} \mu\text{Ci/L}$	
Instrument Code		
WB57237/WB57265	<p>The carrier solution contains 0.281131 gm's of KI/mL. One mL of the solution is equivalent to 0.0305 grams.</p> <p>Carrier Percent Recovery = $\frac{(wt2-wt1)(100)}{0.0305}$</p>	
Analyst		
L. WESTON		
Date		
04/09/94		
Time		
0900	I-129 $\mu\text{Ci/L}$ = $\frac{(I-129 \text{ GEA}) (1000 \text{ mL/L}) (DF) (DDF)}{(Rec) (SS)}$	$\mu\text{Ci/mL} = \frac{\mu\text{Ci/L}}{1000 \text{ mL/L}}$

RESULT IODINE 129 = $< 6.3 \times 10^{-5} \mu\text{Ci/mL}$

RESULT CARRIER PERCENT RECOVERY = 48.2%

Data Entry by: <i>[Signature]</i>	Date: 09-Apr-94
Approved by: <i>[Signature]</i>	Date: 18 APR 94

Form L1 Rev. 1.0

Page 1 of 1

1122

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

6724

Serial No V 77.-5885	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination I129	Method-Standard LA-378-103	Result Units uCi/ML	Charge Code N1A7F	Retuns 0
Sample Size 1 mL			Customer ID COMP	
Remarks, Calculations, Results DUPLICATE SAMPLE COUNT AS uCi/L 2.7396 2.7242 $\frac{2.7396 - 2.7242}{0.0154} = 5.80 \times 10^{-5} \text{ uCi/mL}$				
Analyst - 1 <i>[Signature]</i>	Analyst - 2 <i>[Signature]</i>	Analyst - 3 <i>[Signature]</i>	Analyst - 4	Analyst - 5
Date 4.9.94	Time Completed 0900	Lab Unit Mgr <i>[Signature]</i>	<i>[Signature]</i>	

54-6800-061 (R-10-83)

I-129: LA-378-103 (B-3)

LIQUIDS

		DUPLICATE
Type	Gross Weight (wt2)	2.7396
DUPLICATE	Tare Weight (wt1)	2.7242
Work List	Mass Precipitate (net wt)	0.0154
3027	I-129 uCi / Sample from GEA (I-129 GEA)	<2.95E-05
Test Code	Sample Volume in mL (SS)	1
I129	Dilution Factor (DF)	1
Matrix	Digest Dilution Factor (DDF)	1
LIQUID	Carrier Fractional Recovery (Rec)	0.5049

Sample #	
V77-5885	IODINE 129 = < 5.84E-02 uCi/L

Instrument Code	
WB57237/WB57265	The carrier solution contains 0.281131 gm's of KI/mL. One mL of the solution is equivalent to 0.0305 grams.
Analyst	
L.WESTON	
Date	
04/09/94	Carrier Percent Recovery = $\frac{(wt2-wt1)(100)}{0.0305}$
Time	
0900	I-129 uCi/L = $\frac{(I-129 \text{ GEA})(1000 \text{ mL/L})(DF)(DDF)}{(Rec)(SS)}$ uCi/mL = $\frac{\text{uCi/L}}{1000 \text{ mL/L}}$

RESULT IODINE 129	=	< 5.8E-05 uCi/mL
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RESULT CARRIER PERCENT RECOVERY	=	50.5%
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Date Entry by: <i>[Signature]</i>	Date: 09-Apr-94
Approved by: <i>[Signature]</i>	Date: 18 Apr 94

Form L1 Rev. 1.0

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1123

6725

Serial No V 77.-5985	Sample Point 108-AP	Date 3-18-94	Time Issued 12:26	Priority 26
Determination I 129	Method-Standard LA-378-103	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 1 ml			Customer ID COMP	
Remarks, Calculations, Results SPIKE SAMPLE SPIKE ID 63851 SPIKE VOLUME 1 mL COUNT AS uCi/L <div style="text-align: right;"> 2.7363 2.7185 0.0178 <hr/> 94.3 $4/8/94$ 88.2% </div>				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 <i>[Signature]</i> Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4.9.94	Time Completed 0900	Lab Unit Mgr <i>[Signature]</i>		

WHC-SD-WM-DP-065, REV. 0

54-6800-061 (R-10-83)

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I-129: LA-378-103 (B-3) LIQUIDS

		SAMPLE
Type	Gross Weight (wt2)	2.7363
SAMPLE	Tare Weight (wt1)	2.7185
Work List	Mass Precipitate (net wt)	0.0178
3027	I-129 uCi / Sample from GEA (I-129 GEA)	4.03E-04
Test Code	Sample Volume in mL (SS)	1
I 129	Dilution Factor (DF)	1
Matrix	Digest Dilution Factor (DDF)	1
LIQUID	Carrier Fractional Recovery (Rec)	0.5836
Sample #	<div style="text-align: center;"> IODINE 129 = 6.91E-01 uCi/L </div>	
Instrument Code	The carrier solution contains 0.281131 gm's of KI/mL. One mL of the solution is equivalent to 0.0305 grams.	
WB57237/WB57265		
Analyst		
L. WESTON		
Date	Carrier Percent Recovery = $\frac{(wt2-wt1)(100)}{0.0305}$	
04/09/94		
Time		
0900	I-129 uCi/L = $\frac{(I-129 \text{ GEA})(1000\text{mL/L})(DF)(DDF)}{(Rec)(SS)}$	uCi/mL = $\frac{\text{uCi/L}}{1000\text{mL/L}}$

RESULT IODINE 129 = 6.9E-04 uCi/mL

RESULT CARRIER PERCENT RECOVERY = 58.4%

Date Entry-by: <i>[Signature]</i>	Date: 09-Apr-94
Approved by: <i>[Signature]</i>	Date: 18 Apr 94

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$$\frac{(6.91 \text{ E-01 } \mu\text{Ci/L} - 0)}{7.835 \text{ E-01 } \mu\text{Ci/L}} (100) = 88.2\%$$

[Signature] 10-3-94

1124

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

0726

Serial No V 77.-5085	Sample Point 108-AP	Date 3-18-94	Time Issued 12:26	Priority 26
Determination I129	Method/Standard LA-378-103	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 1mL			Customer ID COMP	
Remarks Calculations. Results DUPLICATE SPIKE SAM SPIKE ID 63851 SPIKE VOLUME 1mL COUNT AS $\mu\text{Ci/L}$ 2.7341 2.7183 0.0158 88.2 94.3%				
Analyst - 1 <i>L. Weston</i>	Analyst - 2 <i>D. Miller</i>	Analyst - 3	Analyst - 4	Analyst - 5
Date 4-9-94	Time Completed 0900	Lab Unit Mgr <i>P. K. K.</i>	<i>Stan Betz</i>	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

BEST AVAILABLE COPY

I-129: LA-378-103 (B-3) LIQUIDS

		SAMPLE
Type	Gross Weight (wt2)	2.7341
SAMPLE	Tare Weight (wt1)	2.7183
Work List	Mass Precipitate (net wt)	0.0158
3027	I-129 μCi / Sample from GEA (I-129 GEA)	3.83E-04
Test Code	Sample Volume in mL (SS)	1
I129	Dilution Factor (DF)	1
Matrix	Digest Dilution Factor (DDF)	1
LIQUID	Carrier Fractional Recovery (Rec)	0.5180
Sample #		
V77-5085	IODINE 129 = 7.39E-01 $\mu\text{Ci/L}$	
Instrument Code		
WB57237/WB57265	The carrier solution contains 0.281131 gm's of KI/mL. One mL of the solution is equivalent to 0.0305 grams.	
Analyst		
L. WESTON		
Date	Carrier Percent Recovery = $\frac{(wt2-wt1)(100)}{0.0305}$	
04/09/94		
Time		
0900	I-129 $\mu\text{Ci/L}$ = $\frac{(I-129 \text{ GEA})(1000\text{mL/L})(DF)(DDF)}{(Rec)(SS)}$	$\mu\text{Ci/mL} = \frac{\mu\text{Ci/L}}{1000\text{mL/L}}$

RESULT IODINE 129 = 7.4E-04 $\mu\text{Ci/mL}$

RESULT. CARRIER PERCENT RECOVERY = 51.8%

Date Entry by: *Greg Hammett* Date: 09-Apr-94
 Approved by: *[Signature]* Date: 18 Apr 94
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$$\frac{(7.39E-01 - 0) \mu\text{Ci/L}}{7.835E-04 \mu\text{Ci/L}} (100) = 94.3\%$$

— *Ken* 10-3-94

1125

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*
*      G A M M A   S P E C T R U M   A N A L Y S I S
*
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CANBERRA SPECTRAN-F V2.06 SOFTWARE

WHC-SD-WM-DP-065, REV. 0

09-APR-9419:18:42

ANALYSIS PARAMETERS

```

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 4.0
DETECTOR NUMBER: 6 / GEOMETRY NUMBER: 1
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 95.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

```

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLYING ANALYSIS PERFORMED

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY: VR

SAMPLE DESCRIPTION: V-75-5585
GEOMETRY DESCRIPTION: I-129/CULTURE TUBE
SAMPLE SIZE: 1.0000E+00 EA / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL129

COLLECT STARTED ON 9-APR-94 AT 11:32:59

```
COLLECT LIVE TIME: 3000. SECONDS
          REAL TIME: 3003. SECONDS
          DEAD TIME: 0.10 %
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DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 21-JUN-90
EFFICIENCY CALIBRATION PERFORMED 18-JUN-90

09-APR-9419:18:42

P E A K A N A L Y S I S

WHC-SD-WM-DP-065, REV. 0

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
PEAK AT CHANNEL 205.0 DROPPED FROM MULTIPLY ANALYSIS							
1?	148.11	29.48	1.64	718.	8631.	3.4	
2?	167.76	33.41	1.64	790.	1880.	10.3	CE-144
3C	198.12	39.48	1.24	336.	1088.	8.7	I-129,BI-212, CE-144
4	3308.55	662.06	2.00	25.	1726.	4.9	CS-137

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

C - MULTIPLY ANALYSIS CONVERGED NORMALLY
? - MULTIPLY ANALYSIS CONVERGED BUT GFIT > 4

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0024
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 5-JUN-90 AT 13:00:00
BACKGROUND LIVE TIME: 3000. SECONDS
BACKGROUND WAS INSIGNIFICANT

09-APR-9419:18:42

WHC-SD-WM-DP-065, REV. 0

SAMPLE: V-75-5585

TA COLLECTED ON 9-APR-94 AT 11:32:59
 LAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/EA				ENERGY COMPARISON	
	MEASURED	ERROR	DECAY CORRECTED	ERROR	(KEV) EXPECT	DIFF
AM-241	LLD<2.56E-06		LLD<2.56E-06		59.54	
AM-243	LLD<1.23E-06		LLD<1.23E-06		74.67	
I-129	2.51E-04	+/-2.19E-05	2.51E-04	+/-2.19E-05	39.60	-0.12
SB-125	LLD<2.61E-05		LLD<2.61E-05		176.33	
SE-75	LLD<2.13E-06		LLD<2.13E-06		136.00	
SN-113	LLD<6.33E-06		LLD<6.33E-06		391.67	

TOTAL	2.51E-04	+/-2.19E-05	2.51E-04	+/-2.19E-05		

EBAR = ***** MEV/DISINTEGRATION
 MAXIMUM PERMISSABLE ACTIVITY = 5.77E-03 UC/EA
 TOTAL MEASURED ACTIVITY = 2.51E-04 (+/-2.19E-05) UC/EA
 % TECH. SPEC. = 4.35 (+/-0.38)

ERROR QUOTATION AT 1.96 SIGMA
 LLD CONFIDENCE LEVEL AT 95.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
148.11	29.48	8631.	3.4	1.22E+01
167.76	33.41	1880.	10.3	1.82E+00
3308.55	662.06	1726.	4.9	7.38E+00

D. H. McIlwain
4-9-94

*
* GAMMA SPECTRUM ANALYSIS *
*

CANBERRA SPECTRAN-F V2.06 SOFTWARE

WHC-SD-WM-DP-065, REV. 0

09-APR-94 19:24:21

ANALYSIS PARAMETERS

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 4.0
DETECTOR NUMBER: 6 / GEOMETRY NUMBER: 1
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 95.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLY ANALYSIS PERFORMED

ANALYSIS OF SPECTRUM SAVED IN DISK FILE: SD6722
ANALYZED BY: VR

SAMPLE DESCRIPTION: V76-5685
GEOMETRY DESCRIPTION: I-129/CULTURE TUBE
SAMPLE SIZE: 1.0000E+00 EA / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL129

COLLECT STARTED ON 9-APR-94 AT 13:27:03

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3004. SECONDS
DEAD TIME: 0.13 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 21-JUN-90
EFFICIENCY CALIBRATION PERFORMED 18-JUN-90

09-APR-9419:24:21

P E A K A N A L Y S I S

K	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	159.51	31.76	1.07	257.	411.	18.5	
2C	3307.76	661.90	2.00	19.	1663.	4.9	CS-137

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

WHC-SD-WM-DP-065, REV. 0

C - MULTIPLET ANALYSIS CONVERGED NORMALLY

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0024
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 5-JUN-90 AT 13:00:00
BACKGROUND LIVE TIME: 3000. SECONDS
BACKGROUND WAS INSIGNIFICANT

09-APR-9419:24:21

WHC-SD-WM-DP-065, REV. 0

SAMPLE: V76-5685

DATA COLLECTED ON 9-APR-94 AT 13:27:03

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/EA				ENERGY COMPARISON	
	MEASURED	ERROR	DECAY CORRECTED	ERROR	(KEV) EXPECT	DIFF
AM-241	LLD<2.42E-06		LLD<2.42E-06		59.54	
AM-243	LLD<1.06E-06		LLD<1.06E-06		74.67	
I-129	LLD<2.85E-05		LLD<2.85E-05		39.60	
SB-125	LLD<2.35E-05		LLD<2.35E-05		176.33	
SE-75	LLD<2.17E-06		LLD<2.17E-06		136.00	
SN-113	LLD<5.66E-06		LLD<5.66E-06		391.67	

TOTAL	0.00E-01	+ -0.00E-01	0.00E-01	+ -0.00E-01		

ERROR QUOTATION AT 1.96 SIGMA

LLD CONFIDENCE LEVEL AT 95.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
159.51	31.76	411.	18.5	4.60E-01
3307.76	661.90	1663.	4.9	7.11E+00

D. H. M. K. K.
4-9-94

*
* G A M M A S P E C T R U M A N A L Y S I S *
*

CANBERRA SPECTRAN-F V2.06 SOFTWARE WHC-SD-WM-DP-065, REV. 0

09-APR-94 19:30:55

A N A L Y S I S P A R A M E T E R S

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 4.0
DETECTOR NUMBER: 6 / GEOMETRY NUMBER: 1
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 95.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLER ANALYSIS PERFORMED

ANALYSIS OF SPECTRUM SAVED IN DISK FILE: SD6723
ANALYZED BY: VR

SAMPLE DESCRIPTION: V77-5785
GEOMETRY DESCRIPTION: I-129/CULTURE TUBE
SAMPLE SIZE: 1.0000E+00 EA / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL129

COLLECT STARTED ON 9-APR-94 AT 14:26:34

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3002. SECONDS
DEAD TIME: 0.07 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 21-JUN-90
EFFICIENCY CALIBRATION PERFORMED 18-JUN-90

09-APR-9419:30:55

P E A K A N A L Y S I S

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	3309.18	662.19	1.96	15.	2090.	4.4	CS-137

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

WHC-SD-WM-DP-065, REV.0

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0024
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 5-JUN-90 AT 13:00:00
BACKGROUND LIVE TIME: 3000. SECONDS
BACKGROUND WAS INSIGNIFICANT

09-APR-94 19:30:55

WHC-SD-WM-DP-065, REV. 0

SAMPLE: V77-5785

TA COLLECTED ON 9-APR-94 AT 14:26:34
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN $\mu\text{Ci}/\text{EA}$				ENERGY COMPARISON	
	MEASURED	ERROR	DECAY CORRECTED	ERROR	(KEV) EXPECT	DIFF
AM-241	LLD<2.67E-06		LLD<2.67E-06		59.54	
AM-243	LLD<1.31E-06		LLD<1.31E-06		74.67	
I-129	LLD<3.02E-05		LLD<3.02E-05		39.60	
SB-125	LLD<2.77E-05		LLD<2.77E-05		176.33	
SE-75	LLD<2.10E-06		LLD<2.10E-06		136.00	
SN-113	LLD<6.22E-06		LLD<6.22E-06		391.67	

TOTAL	0.00E-01	+/-0.00E-01	0.00E-01	+/-0.00E-01		

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 95.0%

PEAKS NOT USED IN ANALYSIS

centroid	ENERGY	NET AREA	ERROR	GAMMAS/SEC
CHANNEL	KEV	COUNTS	%	
3309.18	662.19	2090.	4.4	8.94E+00

D. H. M. Ilicia
4-9-94

*
* GAMMA SPECTRUM ANALYSIS *
*

CANBERRA SPECTRAN-F V2.06 SOFTWARE WHC-SD-WM-DP-065, REV. 0

09-APR-9416:21:42

ANALYSIS PARAMETERS

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 4.0
DETECTOR NUMBER: 6 / GEOMETRY NUMBER: 1
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 95.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLY ANALYSIS PERFORMED

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY: VR

SAMPLE DESCRIPTION: V77-5885
GEOMETRY DESCRIPTION: I-129/CULTURE TUBE
SAMPLE SIZE: 1.0000E+00 EA / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL129

COLLECT STARTED ON 9-APR-94 AT 15:31:34

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3002. SECONDS
DEAD TIME: 0.07 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 21-JUN-90
EFFICIENCY CALIBRATION PERFORMED 18-JUN-90

09-APR-9416:21:42

P E A K A N A L Y S I S

WHC-SD-WM-DP-065, REV. 0

K	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1C	3308.07	661.96	1.86	26.	1699.	4.9	CS-137

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

C - MULTIPLET ANALYSIS CONVERGED NORMALLY

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0024
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 5-JUN-90 AT 13:00:00
BACKGROUND LIVE TIME: 3000. SECONDS
BACKGROUND WAS INSIGNIFICANT

09-APR-9416:21:42

WHC-SD-WM-DP-065, REV. 0

SAMPLE: V77-5885

DATA COLLECTED ON 9-APR-94 AT 15:31:34

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/EA				ENERGY COMPARISON	
	MEASURED	ERROR	DECAY CORRECTED	ERROR	(KEV) EXPECT	DIFF
AM-241	LLD<2.56E-06		LLD<2.56E-06		59.54	
AM-243	LLD<1.23E-06		LLD<1.23E-06		74.67	
I-129	LLD<2.95E-05		LLD<2.95E-05		39.60	
SB-125	LLD<2.23E-05		LLD<2.23E-05		176.33	
SE-75	LLD<2.06E-06		LLD<2.06E-06		136.00	
SN-113	LLD<5.42E-06		LLD<5.42E-06		391.67	

TOTAL	0.00E-01	+ -0.00E-01	0.00E-01	+ -0.00E-01		

ERROR QUOTATION AT 1.96 SIGMA

LLD CONFIDENCE LEVEL AT 95.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
3308.07	661.96	1699.	4.9	7.27E+00

D. H. Miller
4-9-94

*
* GAMMA SPECTRUM ANALYSIS *
*

CANBERRA SPECTRAN-F V2.06 SOFTWARE

WHC-SD-WM-DP-065, REV. 0

09-APR-9417:45:01

ANALYSIS PARAMETERS

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 4.0
DETECTOR NUMBER: 6 / GEOMETRY NUMBER: 1
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 95.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLY ANALYSIS PERFORMED

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY: DM

SAMPLE DESCRIPTION: V-77-5985 SPIKE
GEOMETRY DESCRIPTION: I-129/CULTURE TUBE
SAMPLE SIZE: 1.0000E+00 EA / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL129

COLLECT STARTED ON 9-APR-94 AT 16:54:52

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3002. SECONDS
DEAD TIME: 0.07 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 21-JUN-90
EFFICIENCY CALIBRATION PERFORMED 18-JUN-90

09-APR-9417:45:01

WHC-SD-WM-DP-065, REV. 0

P E A K A N A L Y S I S

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1?	148.22	29.50	1.60	1133.	13338.	3.1	
2?	167.90	33.44	1.60	1084.	3038.	10.2	CE-144
3	197.80	39.41	1.37	579.	1749.	7.3	I-129,BI-212, CE-144
4\$	3304.20	661.19	1.44	25.	490.	76.6	CS-137
5\$	3308.48	662.05	1.44	22.	1777.	22.3	CS-137
6\$	3313.65	663.08	1.44	19.	291.	95.4	CS-137

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

\$ - MULTIPLY ANALYSIS CONVERGED DUE TO LACK OF CHI-SQ IMPROVEMENT
? - MULTIPLY ANALYSIS CONVERGED BUT GFIT > 4

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0024
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 5-JUN-90 AT 13:00:00
BACKGROUND LIVE TIME: 3000. SECONDS
BACKGROUND WAS INSIGNIFICANT

09-APR-9417:45:01

WHC-SD-WM-DP-065, REV.0

SAMPLE: V-77-5985 SPIKE

TA COLLECTED ON 9-APR-94 AT 16:54:52

LAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN $\mu\text{Ci}/\text{EA}$				ENERGY COMPARISON	
	MEASURED		DECAY CORRECTED		(KEV) EXPECT	DIFF
AM-241	LLD<2.56E-06		LLD<2.56E-06		59.54	
AM-243	LLD<1.35E-06		LLD<1.35E-06		74.67	
I-129	4.03E-04 +-2.93E-05		4.03E-04 +-2.93E-05		39.60	-0.19
SB-125	LLD<2.59E-05		LLD<2.59E-05		176.33	
SE-75	LLD<2.35E-06		LLD<2.35E-06		136.00	
SN-113	LLD<6.22E-06		LLD<6.22E-06		391.67	

TOTAL	4.03E-04 +-2.93E-05		4.03E-04 +-2.93E-05			

EBAR = ***** MEV/DISINTEGRATION

MAXIMUM PERMISSABLE ACTIVITY = 5.77E-03 UC/EA

TOTAL MEASURED ACTIVITY = 4.03E-04 (+-2.93E-05) UC/EA

% TECH. SPEC. = 6.99 (+-0.51)

ERROR QUOTATION AT 1.96 SIGMA

LLD CONFIDENCE LEVEL AT 95.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
148.22	29.50	13338.	3.1	1.88E+01
167.90	33.44	3038.	10.2	2.93E+00
3304.20	661.19	490.	76.6	2.09E+00
3308.48	662.05	1777.	22.3	7.60E+00
3313.65	663.08	291.	95.4	1.25E+00

D. H. Milicia
4-9-94

*
* G A M M A S P E C T R U M A N A L Y S I S *
*

CANBERRA SPECTRAN-F V2.06 SOFTWARE

WHC-SD-WM-DP-065, REV. 0

09-APR-9418:49:27

ANALYSIS PARAMETERS

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 4.0
DETECTOR NUMBER: 6 / GEOMETRY NUMBER: 1
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 95.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPELLET ANALYSIS PERFORMED

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY: DM

SAMPLE DESCRIPTION: V-77-5085 DUP SPIKE
GEOMETRY DESCRIPTION: I-129/CULTURE TUBE
SAMPLE SIZE: 1.0000E+00 EA / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL129

COLLECT STARTED ON 9-APR-94 AT 17:59:18

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3002. SECONDS
DEAD TIME: 0.07 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 21-JUN-90
EFFICIENCY CALIBRATION PERFORMED 18-JUN-90

P E A K A N A L Y S I S

	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1?	148.18	29.50	1.58	973.	12406.	2.8	
2?	168.22	33.50	1.58	844.	2879.	8.5	CE-144
3	197.44	39.34	1.36	423.	1659.	6.9	I-129, BI-212
4C	3308.09	661.97	1.82	30.	1641.	5.0	CS-137

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

C - MULTIPLY ANALYSIS CONVERGED NORMALLY
? - MULTIPLY ANALYSIS CONVERGED BUT GFIT > 4

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0024
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 5-JUN-90 AT 13:00:00
BACKGROUND LIVE TIME: 3000. SECONDS
BACKGROUND WAS INSIGNIFICANT

09-APR-9418:49:27

WHC-SD-WM-DP-065, REV.0

SAMPLE: V-77-5085 DUP SPIKE

DATA COLLECTED ON 9-APR-94 AT 17:59:18

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/EA				ENERGY COMPARISON	
	MEASURED	ERROR	DECAY CORRECTED	ERROR	(KEV) EXPECT	DIFF
AM-241	LLD<2.67E-06		LLD<2.67E-06		59.54	
AM-243	LLD<1.22E-06		LLD<1.22E-06		74.67	
I-129	3.83E-04	+/-2.66E-05	3.83E-04	+/-2.66E-05	39.60	-0.26
SB-125	LLD<2.57E-05		LLD<2.57E-05		176.33	
SE-75	LLD<2.24E-06		LLD<2.24E-06		136.00	
SN-113	LLD<5.78E-06		LLD<5.78E-06		391.67	

TOTAL	3.83E-04	+/-2.66E-05	3.83E-04	+/-2.66E-05		

EBAR = ***** MEV/DISINTEGRATION

MAXIMUM PERMISSABLE ACTIVITY = 5.77E-03 UC/EA

TOTAL MEASURED ACTIVITY = 3.83E-04 (+/-2.66E-05) UC/EA

% TECH. SPEC. = 6.63 (+/-0.46)

ERROR QUOTATION AT 1.96 SIGMA

LLD CONFIDENCE LEVEL AT 95.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
148.18	29.50	12406.	2.8	1.75E+01
168.22	33.50	2879.	8.5	2.76E+00
3308.09	661.97	1641.	5.0	7.02E+00

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV.0

ANALYTICAL BATCH

Lab Segment Serial No.

~~V77~~ V77 10.3.94

Customer ID:

COMP

Analysis:

Np 237

Sample Prep:

ACID DIGEST

Instrument: WB 57237

Procedure/ Rev: LA-933-141 H-O

Technologist: Patrick J. McCown
PATRICK J. MCCOWN

Date: 4/20/94

Starting Time: 19:30

Temperature NA

Ending Time: 23:30

Chemist: S. CATLOW

Comments:

BEST AVAILABLE COPY

	Description	Lab ID
1	LMCS	V75-8583
2	REAGENT BLANK	V76-8683
3	SAMPLE	V77-8783
4	SAMPLE DUPLICATE	V77-8883
5	SAMPLE SPIKE	V77-8983
6	SAMPLE SPIKE DUPLICATE	V77-8083
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	71843/.250ML			
SPIKE	71843/.250ML			

ANALYTICAL BATCH SUMMARY SHEET

METHOD:

LA-933-141

DATE START:

April 20, 1994

PREPARED BY:

L. L. Fritts

DATE COMPLETE:

May 2, 1994

[illegible]

NARRATIVE:

X

NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

WHC-SD-WM-DP-065, REV. 0

54-6800-061 (R-10-83)

Sample Count Rate (Rs) = (Gc / Tc) - bkg
 Np-237 μ Ci/L = Rs * 1000mL/L * DF * 3 * MCF * DDF / (0.5 * SS * 2220000dpm/ μ Ci)
 WHERE: 3 is an Internal Procedure Dilution Factor and 0.5 is the Counting Efficiency Factor.
 Np-237 μ Ci/mL = Np-237 μ Ci/L / 1000mL/L
 Relative Counting Error = (The Square Root of (Gc + bkg * Tc) / (Gc - bkg * Tc)) * 1.96 * 100

DETECTION
LEVEL
6.02E-05
µCi/mL

1146

NEPTUNIUM 237 ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

#1 4-21-94 DN

$\frac{29257}{30} - 10$

V 75-8583

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 76.-8683	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination Np237	Method/Standard LA-933-141	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size .250 ML MT. 500 ML			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK WHC-SD-WM-DP-065, REV. 0 $< 2.01E^{-4} \text{ uCi/ML}$				
Analyst - 1 <i>P. McCown</i> Hrs	Analyst - 2 <i>D. H. Wilson</i> Hrs	Analyst - 3 <i>P. Arata</i> Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4/20/94	Time Completed 23:30	Lab Unit Mgr <i>[Signature]</i>	<i>[Signature]</i>	

54-6800-061 (R-10-83)

Np: LA-933-141 (H-0) Np-237 LIQUIDS		BLANK
Serial No.	Sample Type ? enter LIQUID or SOLID	LIQUID
V76-8683	Sample Volume in mL (SS)	0.250
Batch ID	Dilution Factor (DF)	1
3033	Mount FACTOR (1/Mount Volume in mL) (ML F)	2
Rerun No.	Digest Dilution Factor (DDF)	5
0	Gross Counts (Gc)	176
Analyst	Time counted in Minutes (Tc)	30
P. McCOWN	Background in cpm (bkg)	5
Date	Lc, Rmax, or Rs (Sample Rate) as Appropriate	1.86
04/20/94	uCi/L in Digest Solution =	< 4.0210E-02

Sample Count Rate (Rs) = (Gc / Tc) - bkg
Np-237 $\mu\text{Ci/L}$ = $R_s \cdot 1000 \text{ mL/L} \cdot \text{DF} \cdot 3 \cdot \text{ML F} \cdot \text{DDF} / (0.5 \cdot \text{SS} \cdot 2220000 \text{ dpm}/\mu\text{Ci})$
WHERE: 3 is an Internal Procedure Dilution Factor and 0.5 is the Counting Efficiency Factor.
Np-237 $\mu\text{Ci/mL}$ = Np-237 $\mu\text{Ci/L} / 1000 \text{ mL/L}$
Relative Counting Error = (The Square Root of (Gc + bkg * Tc) / (Gc - bkg * Tc)) * 1.96 * 100

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

Np-237 $\mu\text{Ci/L}$	=	< 2.01E-01
Np-237 $\mu\text{Ci/mL}$	=	< 2.01E-04
LESS THAN Value was Determined from Rmax.		
Relative Counting Error	=	136.1%

DETECTION LEVEL 2.16E-04 $\mu\text{Ci/mL}$

Data Entry by: <i>[Signature]</i>	Date: 21-Apr-94
Approved by: <i>[Signature]</i>	Date: 2 May 94

Form 1 Rev. 1.3 Page 1 of 1

1148

NEPTUNIUM 237 ANALYSIS - ACID DIGESTION

#2 4-21-94 DM

$\frac{176}{30} - 5$

V76-8683

WHC-SD-WM-DP-065, REV. 0

ACID Dig. = DF=45

Serial No V 77.-8783	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Page 26
Determination Np237	Method/Standard LA-933-141	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size .250 mL MT .500 mL			Customer ID COMP	
Remarks, Calculations, Results <div style="text-align: center;"> $< 1.64E^{-4} \text{ uCi/mL}$ WHC-SD-WM-DP-065, REV. 0 </div>				
Analyst - 1 <i>Patrick J. McCown</i>	Analyst - 2 <i>D. H. Milicia</i>	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4/20/94	Time Completed 23:30	Lab Unit <i>P. Abate</i>	<i>St. John</i>	

54-6800-061 (R-10-83)

Np: LA-933-141 (H-O) Np-237 LIQUIDS				SAMPLE
Serial No.	Sample Type ?	enter LIQUID or SOLID		LIQUID
V77-8783	Sample Volume in mL	(SS)		0.250
Batch ID	Dilution Factor	(DF)		1
3033	Mount FACTOR (1/Mount Volume in mL)	(ML F)		2
Rerun No.	Digest Dilution Factor	(DDF)		5
0	Gross Counts	(Gc)		305
Analyst	Time counted in Minutes	(Tc)		30
P. McCOWN	Background in cpm	(bkg)		10
Date	Lc, Rmax, or Rs (Sample Rate) as Appropriate			1.52
04/20/94	uCi/L in Digest Solution =			< 3.2854E-02

Sample Count Rate (Rs) = (Gc / Tc) - bkg
 Np-237 $\mu\text{Ci/L}$ = Rs * 1000mL/L * DF * 3 * ML F * DDF / (0.5 * SS * 2220000dpm/ μCi)
 WHERE: 3 is an Internal Procedure Dilution Factor and 0.5 is the Counting Efficiency Factor.
 Np-237 $\mu\text{Ci/mL}$ = Np-237 $\mu\text{Ci/L}$ / 1000mL/L
 Relative Counting Error = [The Square Root of (Gc + bkg * Tc) / (Gc - bkg * Tc)] * 1.96 * 100

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

Np-237 $\mu\text{Ci/L}$	=	< 1.64E-01
Np-237 $\mu\text{Ci/mL}$	=	< 1.64E-04
LESS THAN Value was Determined from Rmax.		
Relative Counting Error	=	500.0%

DETECTION LEVEL
3.01E-04 $\mu\text{Ci/mL}$

1150

Date Entry by: <i>John J. Hume</i>	Date: 21-Apr-94
Approved by: <i>P. J. Hume</i>	Date: 2 May 94

Form 1 Rev. 1.3 Page 1 of 1

NEPTUNIUM 237 ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

#1 4-21-98 DM

$\frac{305}{30} - 10$

V 77-8783

ACID D6ST DF=5

Serial No V 77.-8883	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Np237	Method/Standard LA-933-141	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 250 ML MT .500 ML			Customer ID COMP	
Remarks, Calculations, Results DUPLICATE SAMPLE $< 1.63E^{-4}$ uCi/mL WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>P. McCown</i> Hrs	Analyst - 2 <i>D. H. H. H.</i> Hrs	Analyst - 3 <i>P. McCown</i> Hrs	Analyst - 4 <i>P. McCown</i> Hrs	Analyst - 5 <i>P. McCown</i> Hrs
Date 4/20/94	Time Completed 23:30	Lab Unit Mgr <i>P. McCown</i>	<i>P. McCown</i>	

54-6800-061 (R-10-83)

Np: LA-933-141 (H-0) Np-237 LIQUIDS				DUPLICATE
Serial No.	Sample Type ?	enter LIQUID or SOLID		LIQUID
V77-8883	Sample Volume in mL	(SS)		0.250
Batch ID	Dilution Factor	(DF)		1
3033	Mount FACTOR (1/Mount Volume in mL)	(ML F)		2
Rerun No.	Digest Dilution Factor	(DDF)		5
0	Gross Counts	(Gc)		166
Analyst	Time counted in Minutes	(Tc)		30
P. McCOWN	Background in cpm	(bkg)		5
Date	Lc, Rmax, or Rs (Sample Rate) as Appropriate			1.51
04/20/94	uCi/L in Digest Solution	=	<	3.2671E-02

$$\text{Sample Count Rate (Rs)} = (Gc / Tc) - bkg$$

$$\text{Np-237 } \mu\text{Ci/L} = Rs \cdot 1000 \text{ mL/L} \cdot DF \cdot 3 \cdot ML F \cdot DDF / (0.5 \cdot SS \cdot 2220000 \text{ dpm}/\mu\text{Ci})$$

WHERE: 3 is an Internal Procedure Dilution Factor and 0.5 is the Counting Efficiency Factor.

$$\text{Np-237 } \mu\text{Ci/mL} = \text{Np-237 } \mu\text{Ci/L} / 1000 \text{ mL/L}$$

$$\text{Relative Counting Error} = \left(\frac{\text{The Square Root of } (Gc + bkg \cdot Tc)}{(Gc - bkg \cdot Tc)} \right) \cdot 1.96 \cdot 100$$

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

$$\text{Np-237 } \mu\text{Ci/L} = < 1.63E-01$$

$$\text{Np-237 } \mu\text{Ci/mL} = < 1.63E-04$$

LESS THAN Value was Determined from Rmax.

$$\text{Relative Counting Error} = 217.8\%$$

DETECTION
LEVEL

2.16E-04
 $\mu\text{Ci/mL}$

Date Entry by: <i>P. McCown</i>	Date: 21-Apr-94
Approved by: <i>P. McCown</i>	Date: 2 May 94

Form 1 Rev. 1.3

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1152

NEPTUNIUM 237 ANALYSIS - ACID DIGESTION

#2 4-21-84 Dm

$\frac{166}{30} - 5$

177-8883

WHC-SD-WM-DP-065, REV. 0

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

~~5.2.94~~ ~~ACID DIGEST~~ ~~DF=4~~

Serial No V 77.-8983	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Np237	Method/Standard LA-933-141	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size .250 mL MT .500 mL			Customer ID COMP	
Remarks, Calculations, Results SPIKE SAMPLE SPIKE ID 71843 SPIKE VOLUME .250 mL <div style="text-align: right; font-size: 1.5em;">82.4%</div> <div style="text-align: center; margin-top: 10px;">WHC-SD-WM-DP-065, REV.0</div>				
Analyst - 1 <i>P. McCown</i> Hrs	Analyst - 2 <i>H. M. Sullivan</i> Hrs	Analyst - 3 <i>Rabate</i> Hrs	Analyst - 4 <i>Healy</i> Hrs	Analyst - 5 <i>Healy</i> Hrs
Date 4/20/94	Time Completed 23:30	Lab Unit Mgr <i>Healy</i>		

54-6800-061 (R-10-83)

Np-237: LA-933-141 (H-0) SPIKED SAMPLE			SPIKE
Serial No.	Sample Volume in mL (SS)		0.250
V77-8983	Dilution Factor for Sample in Spiked Vial (DF)		5
Batch ID	Mount Factor (1/Mount Volume in mL) (Mt F)		2
3033	Gross Counts (Gc)		27988
Rerun No.	Time Counted in Minutes (Tc)		30
0	Background in cpm (bkg)		10
Analyst	Spike Volume in mL (Svol)		0.250
P MCCOWN	Spike Dilution Factor (SDF)		1
Date	Spike Value in µCi/L (Sval)		2.422E+01
04/20/94	Sample µCi/L in Sample or Digest as appropriate from Form #1		0.000E+00
	Sample + Spike µCi/L (S+S)		9.978E+01

$$\text{Sample Count Rate (Rs)} = (\text{Gc} / \text{Tc}) - \text{bkg}$$

$$\text{Sample + Spike } \mu\text{Ci/L (S+S)} = \text{Rs} * 1000 \text{ mL/L} * \text{DF} * 3 * \text{Mt F} / (0.5 * \text{SS} * 2220000 \text{ dpm}/\mu\text{Ci})$$

$$\text{Percent Spike Recovery} = ((\text{S+S}) - \text{Sample } \mu\text{Ci/L}) * ((\text{SDF/Svol}) / (\text{DF/SS}) / \text{Sval}) * 100$$

WHERE: 3 is an Internal Procedure Dilution Factor and 0.5 is the Counting Efficiency Factor.

NOTE: Original Sample result was a LESS THAN value. Zero (0) was subtracted from the spiked value for percent recovery calculation.

1154

PERCENT SPIKE RECOVERY = 82.4%

Data Entry by: <i>Healy</i>	Date: 02-May-94
Approved by: <i>Healy</i>	Date: 2 May 94

Form 2 Rev. 1.1 Page 1 of 1

NEPTUNIUM 237 ANALYSIS - ACID DIGESTION

#1 4-2194 DM

27988
30 -10

V 77-8983

WHC-SD-WM-DP-065, REV. 0

1155

223 5.2.94 A-10 D-11 DE-4

Serial No V 77.-8083	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Np237	Method/Standard LA-933-141	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size .250 mL MT .500 mL			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKE DUPLICATE SPIKE ID 71843 SPIKE VOL .250 mL <div style="text-align: right; font-size: 1.5em;">83.8%</div> <div style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</div>				
Analyst - 1 <i>P. J. McCown</i> Hrs	Analyst - 2 <i>D. H. Milne</i> Hrs	Analyst - 3 <i>P. J. McCown</i> Hrs	Analyst - 4 <i>P. J. McCown</i> Hrs	Analyst - 5 <i>P. J. McCown</i> Hrs
Date 4/20/94	Time Completed 23:30	Lab Unit Mgr <i>P. J. McCown</i>	<i>P. J. McCown</i>	

54-6800-061 (R-10-83)

Np-237: LA-933-141 (H-0) SPIKED SAMPLE			SPIKE
Serial No.	Sample Volume in mL (SS)		0.250
V77-8083	Dilution Factor for Sample in Spiked Vial (DF)		5
Batch ID	Mount Factor (1/Mount Volume in mL) (Mt F)		2
3033	Gross Counts (Gc)		28327
Rerun No.	Time Counted in Minutes (Tc)		30
0	Background in cpm (bkg)		5
Analyst	Spike Volume in mL (Svol)		0.250
P MCCOWN	Spike Dilution Factor (SDF)		1
Date	Spike Value in pCi/L (Sval)		2.422E+01
04/20/94	Sample pCi/L in Sample or Digest as appropriate from Form #1		0.000E+00
	Sample + Spike pCi/L (S+S)		1.015E+02

$$\text{Sample Count Rate (Rs)} = (\text{Gc} / \text{Tc}) - \text{bkg}$$

$$\text{Sample + Spike pCi/L (S+S)} = \text{Rs} * 1000 \text{ mL/L} * \text{DF} * 3 * \text{Mt F} / (0.5 * \text{SS} * 2220000 \text{ dpm/pCi})$$

$$\text{Percent Spike Recovery} = (((\text{S+S}) - \text{Sample pCi/L}) * ((\text{SDF/Svol}) / (\text{DF/SS})) / \text{Sval}) * 100$$

WHERE: 3 is an Internal Procedure Dilution Factor and 0.5 is the Counting Efficiency Factor.

NOTE: Original Sample result was a LESS THAN value. Zero (0) was subtracted from the spiked value for percent recovery calculation.

PERCENT SPIKE RECOVERY = 83.8%

1156

Data Entry by: <i>P. J. McCown</i>	Date: 02-May-94
Approved by: <i>P. J. McCown</i>	Date: 2 May 94

Form 2 Rev. 1.1 Page 1 of 1

NEPTUNIUM 237 ANALYSIS - ACID DIGESTION

#2 4-21-94 DM

$$\frac{28327}{30} - 5$$

V 77-8083

WHC-SD-WM-DP-065, REV. 0

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.

V75-77

Customer ID:

COMP

Analysis:

PU239/40

Sample Prep:

ACID DIGEST

Instrument: WB537237

Procedure/ Rev: LA-503-156 D-0

Technologist: J M VAN SANT

Date: 04/28/94

Starting Time: 0800

Temperature 25 C

Ending Time: 1530

Chemist: L FRITTS

Comments: BATCH #3031

	Description	Lab ID
1	LMCS	V75-8581
2	BLANK	V76-8681
3	SAMPLE	V77-8781
4	SAMPLE DUP	V77-8881
5	SAMPLE SPIKE	V77-8981
6	SAMPLE SPIKE DUP	V77-8081
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	83B43	.100-10-.100ML		
SPIKE	84B43	.100ML		

83 3868 **Batch 3031**

Serial No V 75.-8581	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 0	Priority 26
Determination Pu239/40	Method-Standard LA-503-156	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size .100mL - 10 - .100mL			Customer ID STD	
Remarks, Calculations, Results EDP R211 AROO1 STD# 83843 RESULT 1.46E-2 WHC-SD-WM-DP-065, REV.0 STD VAL. 1.42E-2%REC 102.8 .100mL 84843				
Analyst - 1 <i>[Signature]</i>	Analyst - 2 <i>[Signature]</i>	Analyst - 3 <i>[Signature]</i>	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 4-29-94	Hrs	Hrs <i>[Signature]</i>
Date 4-28-94	Time Completed 1645	Lab Unit Mgr <i>[Signature]</i>	<i>[Signature]</i>	

54-6800-061 (R-10-83)

Pu 238 & 239/240: LA-503-156 (D-0)**LIQUID****STANDARD**

Serial No	Date Counted	04/29/94	Pu 236 AEA Frac (C236)	0.423
V75-8581	Sample Volume in mL (SS)	0.100	Pu 238 AEA Frac (C238)	0.014
Batch ID	Sample D.F. (DF)	101	Pu 239 AEA Frac (C239)	0.556
3031	Tracer Volume in mL (SPKV)	0.100	Total AT Counts	3350
Reruns No	Digest D.F. (DDF)	1	AT Count Time (min) (TC)	30
0	Tracer Book No.	84843	Background in cpm (Bkg)	5
Analyst	Tracer Preparation Date	02/12/94	Pu 236 cpm	19.56
J. VAN SANT	Pu-236 Preparation Value (dpm/mL)	2566.9	Pu 238 cpm	0.63
Date	Pu-236 Decay Corr'd value (dpm/mL)	2440.23	Pu 239 cpm	25.7
04/28/94	Pu-238 Tracer Value (dpm/mL)	67.6	AEA Count Time (min)	480
Sample Type	LIQUID		Pu 239/240 µCi/L 1.4593E+02	

Decay Time = Date Counted - Tracer Preparation Date

Pu-238 Decay Corr'd Value = Pu-238 Preparation Value * $(e^{-\lambda \cdot \text{Decay Time}} / 1040.95)$

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-238 Decay Corr'd Value * SPKV

Pu-239/240 µCi/L = (C239 * Pu-238 Decay Corr'd Value * SPKV * DF * DOF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 238 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu-238 dpm * DF * DOF) / (Pu 238 Tracer Recovery / 100) * (2220000dpm/µCi) * SS

Relative Counting Error = Square Root of $(1 / (\text{Pu 238 cpm} * \text{min})) + (1 / (\text{Pu 238 or 239/240 cpm} * \text{min})) * 1.96 * 100$

Pu 239/240 µCi/mL	=	1.46E-01	DETECTION LEVELS in µCi/mL
Relative Counting Error	=	2.7%	
NOTE: Pu 238 Result is a LESS THAN Value.			Pu 239/240
Pu 238 µCi/mL	=	< 2.44E-02	2.13E-02
Relative Counting Error	=	11.5%	Pu 238
Pu 236 Tracer Recovery	=	37.0%	2.44E-02

Data Entry by: *[Signature]*
 Approved by: *[Signature]*

Date: 30-Apr-94

Date: 2 May 94

PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

V 15 - 8581

#2 4-28-74

3350 -5
30

WHC-SD-WM-DP-065, REV. 0

***9 1707**

Serial No V 76.-8681	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination Pu239/40	Method Standard LA-503-156	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size Int .1ml 5.2.94			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK COUNT AS uCi/L .100mL 84B43 < 1.01 X 10⁻³ uCi/ml 1.01 5.2.94 4-30-94				
Analyst - 1	Analyst - 2 AmBauer	Analyst - 3 Raymond	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 4.29.94	Hrs	Hrs
Date 4/20/94	Time Completed 1645	Lab Use 4-30-94		

54-6800-061 (R-10-83)

BEST AVAILABLE COPY

Pu 238 & 239/240: LA-503-156 (D-0)**LIQUID**

				BLANK
Serial No.	Date Counted	04/29/94	Pu 236 AEA Frac (C236)	0.965
V76-8681	Sample Volume in mL (SS)	0.100	Pu 238 AEA Frac (C238)	0
Batch ID	Sample D.F. (DF)	1	Pu 239 AEA Frac (C239)	0
3031	Tracer Volume in mL (SPKV)	0.100	Total AT Counts	939
Rerun No.	Digest D.F. (DDF)	5	AT Count Time (min) (TC)	30
0	Tracer Book No.	84B43	Background in cpm (Bkg)	10
Analyst	Tracer Preparation Date	02/12/94	Pu 236 cpm	9.72
J VAN SANT	Pu-236 Preparation Value (dpm/mL)	2566.9	Pu 238 cpm	0
Date	Pu-236 Decay Corr'd value (dpm/mL)	2440.23	Pu 239 cpm	0
04/28/94	Pu-238 Tracer Value (dpm/mL)	67.6	AEA Count Time (min)	480
Sample Type	LIQUID			
	<<<<<<<< Enter a Sample Type <<<<<<<<			Pu 239/240 uCi/L = < 1.0142E+00

Decay Time = Date Counted - Tracer Preparation Date

Pu-238 Decay Corr'd Value = Pu-238 Preparation Value * (e to the power of (-ln2 * Decay Time) / 1040.95)

Pu 238 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-238 Decay Corr'd Value * SPKV

Pu-239/240 uCi/L = (C239 * Pu-238 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C238 * SS * (2220000dpm/uCi))

Pu 238 dpm = (Total AT Counts / TC) - Bkg * 2 * C238 - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 uCi/mL = (Pu-238 dpm * DF * DDF) / (Pu 238 Tracer Recovery / 100) * (2220000dpm/uCi) * SS

Relative Counting Error = Square Root of ((1/(Pu 238 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))) * 1.96 * 100

WHC-SD-WM-DP-065, REV. 0

NOTE: Pu 239/240 Result is a LESS THAN Value.

Pu 239/240	µCi/mL	=	< 1.01E-03	DETECTION LEVELS in µCi/mL
Relative Counting Error		=	100.0%	
NOTE: Pu 238 Result is a LESS THAN Value.				
Pu 238	µCi/mL	=	< 1.17E-03	Pu 239/240
Relative Counting Error		=	100.0%	1.01E-03
Pu 236 Tracer Recovery		=	16.8%	Pu 238
				1.17E-03

Data Entry by: **AmBauer** Date: **02-May-94**
 Approved by: **AmBauer** Date: **2 May 94**

1162

PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

V76-8681

#1 4-28-94

$$\frac{939}{30} = 10$$

#4 4372

Serial No V 77.-8781	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Pu239/40	Method-Standard LA-503-156	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 100mL			Customer ID COMP	
Remarks. Calculations. Results COUNT AS uCi/L 100mL 84B43 WHC-SD-WM-DP-065, REV. 0 4.13 $< 5.65 \times 10^{-4}$ 304-30-94 uCi/mL VAS				
Analyst - 1	Analyst - 2 Emilia	Analyst - 3 Raymond	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 4-29-94	Hrs	Hrs
Date 4-28-94	Time Completed 1645	Lab Unit Mgr J. Pitts	Date 54-6800-061 (R-10-83)	

Pu 238 & 239/240: LA-503-156 (D-0)

LIQUID

				SAMPLE
Serial No.	Date Counted	04/29/94	Pu 236 AEA Frac. (C236)	0.969
V77-8781	Sample Volume in mL (SS)	0.100	Pu 238 AEA Frac. (C238)	0
Batch ID	Sample D.F. (DF)	1	Pu 239 AEA Frac. (C239)	0
3031	Tracer Volume in mL (SPKV)	0.100	Total AT Counts	1708
Rerun No.	Digest D.F. (DDF)	5	AT Count Time (min) (TC)	30
0	Tracer Book No.	84B43	Background in cpm (Bkg)	5
Analyst	Tracer Preparation Date	02/12/94	Pu 236 cpm	12.47
J. VAN SANT	Pu-236 Preparation Value (dpm/mL)	2566.9	Pu 238 cpm	0
Date	Pu-236 Decay Corr'd value (dpm/mL)	2440.23	Pu 239 cpm	0
04/28/94	Pu-238 Tracer Value (dpm/mL)	67.6	AEA Count Time (min)	480
Sample Type	LIQUID			
	<<<<<<<< Enter a Sample Type <<<<<<<<			
	Pu 239/240 uCi/L =			< 4.1255E-01

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * $e^{-(\ln 2 * \text{Decay Time}) / 1040.95 \text{ d}}$

Pu 238 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-238 Decay Corr'd Value * SPKV

Pu-239/240 uCi/L = (C239 - Pu-238 Decay Corr'd Value * SPKV * DF * DDF * (1000 mL/L)) / (C236 * SS * (2220000 dpm/uCi))

Pu 238 dpm = (Total AT Counts / TC) - Bkg * 2 * C2381 - (Pu-238 Tracer Value * SPKV * Pu 238 Tracer Recovery / 100)

Pu-238 uCi/mL = (Pu238 dpm * DF * DDF) / (Pu 238 Tracer Recovery / 100) * (2220000 dpm/uCi) * SS

Relative Counting Error = Square Root of $(1 / (\text{Pu 238 cpm} * \text{min})) + (1 / (\text{Pu 238 or 239/240 cpm} * \text{min})) * 1.96 * 100$

NOTE: Pu 239/240 Result is a LESS THAN Value.

Pu 239/240 uCi/mL	=	< 4.13E-04	DETECTION LEVELS in uCi/mL
Relative Counting Error	=	100.0%	
NOTE: Pu 238 Result is a LESS THAN Value.			Pu 239/240
Pu 238 uCi/mL	=	< 5.65E-04	4.13E-04
Relative Counting Error	=	100.0%	Pu 238
Pu 236 Tracer Recovery	=	41.2%	5.65E-04

Data Entry by: <i>J. Pitts</i>	Date: 30-Apr-94
Approved by: <i>J. Pitts</i>	Date: 2 May 94

PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

V77-8781

#3 4-28-94

1708 5
30

WHC-SD-WM-DP-065, REV. 0

#11 3567

Serial No V 77.-8881	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Pu239/40	Method-Standard LA-503-156	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size .100 mL			Customer ID COMP	
Remarks, Calculations, Results DUPLICATE SAMPLE WHC-SD-WM-DP-065, REV.0 COUNT AS uCi/L .100 mL 84843 $< \frac{5.10}{6.63E-04} \mu\text{Ci/mL}$ DH 4/29/94				
Analyst - 1 V. Sant	Analyst - 2 Em Buea	Analyst - 3 Raymond	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 4-29-94	Hrs	Hrs
Date 4-29-94	Time Completed 1645	Lab Unit J. Fitts	J. Hammond	

54-6300-061 (R-10-83)

Pu 238 & 239/240: LA-503-156 (D-0)

LIQUID

DUPLICATE

Serial No	Date Counted	04/29/94	Pu 236 AEA Frac. (C236)	0.952
V77-8881	Sample Volume in mL (SS)	0.100	Pu 238 AEA Frac. (C238)	0.036
Batch ID	Sample D.F. (DF)	1	Pu 239 AEA Frac. (C239)	0
3031	Tracer Volume in mL (SPKV)	0.100	Total AT Counts	1455
Rerun No	Digest D.F. (DDF)	5	AT Count Time (min) (TC)	30
0	Tracer Book No.	84B43	Background in cpm (Bkg)	5
Analyst	Tracer Preparation Date	02/12/94	Pu 236 cpm	14.01
J. VAN SANT	Pu-236 Preparation Value (dpm/mL)	2566.9	Pu 238 cpm	0.53
Date	Pu-236 Decay Corr'd value (dpm/mL)	2440.23	Pu 239 cpm	0
04/28/94	Pu-238 Tracer Value (dpm/mL)	67.6	AEA Count Time (min)	480
Sample Type	LIQUID <<<<<<<< Enter a Sample Type <<<<<<<< Pu 239/240 $\mu\text{Ci/L}$ = < 5.1028E-01			

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * (1 - $\ln 2$ * Decay Time) / 1040.95 []

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C238 * 100 / Pu-236 Decay Corr'd Value * SPKV

Pu-239/240 $\mu\text{Ci/L}$ = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000 mL/L)) / (C238 * SS * (2220000 dpm/ μCi))

Pu 238 cpm = (Total AT Counts / TC) - Bkg * 2 * C238 - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 $\mu\text{Ci/mL}$ = (Pu238 cpm * DF * DDF) / (Pu 238 Tracer Recovery / 100) * (2220000 dpm/ μCi) * SS

Relative Counting Error = Square Root of ((1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))) * 1.96 * 100

NOTE: Pu 239/240 Result is a LESS THAN Value.

Pu 239/240 $\mu\text{Ci/mL}$	=	< 5.10E-04	DETECTION LEVELS in $\mu\text{Ci/mL}$
Relative Counting Error	=	100.0%	
NOTE: Pu 238 Result is a LESS THAN Value.			
Pu 238 $\mu\text{Ci/mL}$	=	< 6.63E-04	Pu 239/240 5.10E-04
Relative Counting Error	=	12.5%	Pu 238 6.63E-04
Pu 236 Tracer Recovery	=	33.9%	

Data Entry by: J. Hammond

Date: 30-Apr-94

Approved by: J. Fitts

Date: 2 May 94

PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

V 77-8881

#2 4-28-74

$$\begin{array}{r} 1455 \\ \hline 30 \end{array} - 5$$

WHC-SD-WM-DP-065, REV. 0

#12 4504

Serial No V 77.-8981	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Pu239/40	Method-Standard LA-503-156	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size .100mL			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKED ID 83B43 .100mL SPIKE ID WHC-SD-WM-DP-065, REV. 0 SPIKE VOLUME $\frac{84843}{.100mL} (7.2912 - 0) \left(\frac{101}{.1} / \frac{(1)(5)}{.1} \right) (100)$ $142 = 103.7 \% Rec$				
Analyst - 1	Analyst - 2 Jm Bureau	Analyst - 3 Raymond	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 4.29.94	Hrs	Hrs
Date 4-28-94	Time Completed 1645	Lab Unit Mgr H. Fitts	Signature Jm Bureau	

54-6800-061 (R-10-83)

Pu 238 & 239/240: LA-503-156 (D-0)

LIQUID

CHK EXT NO.

Serial No.	Date Counted	04/29/94	Pu 236 AEA Frac. (C236)	0.398
V77-8981	Sample Volume in mL (SS)	0.100	Pu 238 AEA Frac. (C238)	0.029
Batch ID	Sample D.F. (DF)	1	Pu 239 AEA Frac. (C239)	0.528
3031	Tracer Volume in mL (SPKV)	0.100	Total AT Counts	2877
Rerun No.	Digest D.F. (DDF)	5	AT Count Time (min) (TC)	30
0	Tracer Book No.	84843	Background in cpm (Bkg)	10
Analyst	Tracer Preparation Date	02/12/94	Pu 236 cpm	15
J. VAN SANT	Pu-236 Preparation Value (dpm/mL)	2566.9	Pu 238 cpm	1.1
Date	Pu-236 Decay Corr'd value (dpm/mL)	2440.23	Pu 239 cpm	19.92
04/28/94	Pu-238 Tracer Value (dpm/mL)	67.6	AEA Count Time (min)	480
Sample Type	LIQUID			
	<<<<<<<<< Enter a Sample Type <<<<<<<<<<<<		Pu 239/240 µCi/L	7.2912E+00

Decay Time = Date Counted - Tracer Preparation Date

Pu-238 Decay Corr'd Value = Pu-238 Preparation Value * (e to the power of (-ln2 * Decay Time) / 1040.95 d)

Pu 238 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C238 * 100 / Pu-238 Decay Corr'd Value * SPKV

Pu-239/240 µCi/L = (C239 * Pu-238 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C238 * SS * (2220000dpm/µCi))

Pu 238 dpm = (Total AT Counts / TC) - Bkg * 2 * C2381 - (Pu-238 Tracer Value * SPKV * Pu 238 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / (Pu 238 Tracer Recovery / 100) * (2220000dpm/µCi) * SS

Relative Counting Error = Square Root of (1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min)) * 1.96 * 100

Pu 239/240 µCi/mL	=	7.29E-03	DETECTION LEVELS in µCi/mL
Relative Counting Error	=	3.1%	
NOTE: Pu 238 Result is a LESS THAN Value.			Pu 239/240
Pu 238 µCi/mL	=	< 1.63E-03	1.48E-03
Relative Counting Error	=	8.8%	Pu 238
Pu 236 Tracer Recovery	=	28.0%	1.63E-03

Data Entry by: Jm Bureau Date: 30-Apr-94
 Approved by: H. Fitts Date: 2 May 94

PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

V47-8981

#1 4-28-94

$$\frac{2877}{30} - 10$$

54-6800-061 (R-10-83)

Page 1 of 1

PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

V 77-8081 WHC-SD-WM-DP-065, REV. 0

#3 4-28-94

4049 - 5
30

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-065, REV. 0

SAMPLE
V75-8581

File ID: 3a3868.CNF

Counted on: 4/29/94 @ 1:14
Detector: AEA3
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	600.1	600.1	364.323	364.323	12.000	6.015	6.000	2.548
2	16.1	16.1	305.834	305.712	12.000	6.113	6.000	1.853
3	870.9	870.9	231.955	231.955	14.000	5.992	7.000	3.199

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea	
1	Pu236	0.423	5.756	5.757	-0.0010	0.03	19.56	2.0	136.1	0.613E-04	
2	Pu238	0.014	5.499	5.487	0.0120	0.03	0.63	12.0	6.0	0.269E-05	
	Am241		5.480	5.487	-0.007				4.6	0.206E-05	
3	Pu239	0.556	5.143	5.148	-0.0050	0.03	25.70	1.8	175.3	0.790E-04	
	Pu240		5.144	5.148	-0.004				175.3	0.790E-04	
Totals:		0.993	<--valid peaks only-->				45.89				

DETECTOR CALIBRATION

Energy(MEV) = 4.081 + (0.0046)*Channel
 Energy range (MeV): 4.081 TO 6.436
 Efficiency = 0.1466 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	22187.0	100.000
Smoothed	22187.0	100.000
Composite fit	22029.6	99.290
Residuals	157.4	0.710

Analyzed by:

[Signature] 10.3.94
VRSIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 1172 TO 1189.

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1 Legend: Raw = Modeled Peaks = 1,2,..., etc

Display Max.: 5306.8

WHC-SD-WM-DP-065, REV.0

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Raw Data Dump for AEA Spectrum: 3a3868.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
41	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
51	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
61	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
71	0.	0.	1.	0.	1.	0.	0.	0.	0.	1.
81	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
91	0.	1.	1.	0.	0.	0.	0.	0.	1.	0.
101	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
111	2.	0.	0.	0.	0.	1.	0.	0.	0.	0.
121	0.	0.	1.	1.	1.	1.	1.	1.	0.	1.
131	0.	0.	0.	1.	0.	1.	1.	0.	0.	2.
141	1.	1.	3.	2.	0.	0.	1.	1.	0.	1.
151	1.	3.	3.	2.	1.	0.	3.	1.	0.	3.
161	0.	2.	2.	2.	4.	3.	3.	3.	6.	2.
171	0.	3.	5.	5.	4.	0.	2.	2.	4.	4.
181	6.	5.	5.	8.	6.	7.	6.	5.	8.	5.
191	10.	8.	9.	12.	10.	8.	16.	15.	11.	7.
201	19.	14.	19.	17.	21.	22.	30.	32.	22.	43.
211	34.	53.	52.	68.	89.	89.	130.	151.	171.	219.
221	241.	287.	350.	388.	445.	486.	619.	701.	792.	888.
231	990.	989.	920.	847.	683.	547.	343.	241.	123.	65.
241	35.	20.	2.	4.	1.	1.	1.	0.	1.	1.
251	0.	0.	0.	0.	0.	0.	1.	1.	2.	1.
261	0.	1.	0.	0.	0.	0.	1.	1.	1.	1.
271	4.	0.	3.	0.	3.	1.	2.	3.	3.	3.
281	3.	3.	1.	1.	2.	3.	1.	1.	5.	3.
291	10.	6.	6.	7.	7.	12.	13.	8.	17.	10.
301	14.	20.	13.	12.	12.	24.	16.	14.	7.	13.
311	6.	5.	6.	4.	5.	7.	1.	4.	6.	3.
321	2.	6.	9.	6.	5.	6.	5.	4.	10.	8.
331	6.	15.	12.	19.	15.	13.	21.	18.	20.	21.
341	24.	18.	32.	37.	49.	54.	73.	96.	106.	111.
351	172.	189.	228.	258.	312.	338.	343.	414.	390.	493.
361	491.	625.	678.	615.	650.	658.	514.	403.	287.	206.
371	90.	52.	16.	11.	2.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	1.	0.	0.	0.	0.	1.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

WHC-SD-WM-DP-065, REV.0

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Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-065, REV.0

SAMPLE
V76-8681
File ID: 9a1707.CNFCounted on: 4/29/94 @ 1: 9
Detector: AEA9
Geometry number: 1
Count time: 28806. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	343.0	343.0	367.571	367.571	10.000	3.342	5.000	1.416

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid	Count Rate	%err @95	d/m	Activity uCi/ea	
		Exp.	Obs. Diff.	c/m				
1	Cm244	0.965	5.796	5.783	0.013	0.02	66.8	0.301E-04
	Cm243		5.786	5.783	0.003		91.5	0.412E-04
Totals:		0.965	<--valid peaks only-->			9.72		

DETECTOR CALIBRATION

Energy(MEV) = 4.092 + (0.0046)*Channel
 Energy range (MeV): 4.092 TO 6.448
 Efficiency = 0.1455 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	4836.0	100.000
Smoothed	4836.0	100.000
Composite fit	4668.0	96.527
Residuals	168.0	3.473

Analyzed by: _____

VR

WHC-SD-WM-DP-065, REV. 0

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Raw Data Dump for AEA Spectrum: 9a1707.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
91	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
131	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
151	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
161	1.	0.	0.	0.	0.	1.	0.	0.	0.	0.
171	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
181	1.	0.	0.	0.	0.	1.	0.	1.	0.	0.
191	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
201	0.	0.	0.	0.	0.	2.	0.	1.	1.	1.
211	0.	0.	0.	1.	0.	0.	3.	1.	1.	1.
221	1.	1.	0.	5.	2.	1.	1.	3.	1.	2.
231	1.	2.	2.	2.	1.	2.	3.	1.	0.	1.
241	3.	0.	1.	2.	3.	0.	5.	0.	2.	3.
251	1.	6.	1.	1.	0.	0.	1.	3.	1.	1.
261	1.	2.	1.	3.	0.	1.	2.	2.	0.	0.
271	2.	1.	2.	4.	2.	3.	2.	0.	2.	0.
281	1.	1.	1.	0.	2.	1.	1.	4.	3.	2.
291	0.	3.	6.	6.	3.	2.	4.	3.	2.	4.
301	3.	5.	4.	5.	6.	5.	5.	6.	6.	5.
311	3.	1.	0.	2.	4.	2.	2.	3.	1.	1.
321	1.	2.	4.	0.	2.	4.	4.	7.	6.	7.
331	4.	4.	11.	5.	5.	4.	5.	9.	4.	10.
341	8.	8.	12.	10.	11.	25.	23.	16.	22.	34.
351	45.	55.	70.	87.	122.	117.	142.	164.	158.	175.
361	188.	197.	226.	223.	299.	335.	406.	399.	388.	288.
371	165.	53.	25.	1.	1.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	1.	0.	0.	1.	0.	0.	0.	0.	0.
491	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

WHC-SD-WM-DP-065, REV.0

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-065, REV.0

SAMPLE

V77-8781

File ID: 4a4372.CNF

Counted on: 4/29/94 @ 1:15
 Detector: AEA4
 Geometry number: 1
 Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	385.3	385.3	363.413	363.413	12.000	4.731	6.000	1.812

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Cm244	0.969	5.796	5.784	0.012	0.02	12.47	2.5	162.9	0.734E-04
	Cm243		5.786	5.784	0.002				223.1	0.100E-03
otals:		0.969	<--valid peaks only-->				12.47			

DETECTOR CALIBRATION

Energy(MEV) = 4.076 + (0.0047)*Channel
 Energy range (MeV): 4.076 TO 6.482
 Efficiency = 0.0766 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	6180.0	100.000
Smoothed	6180.0	100.000
Composite fit	5988.6	96.903
Residuals	191.4	3.097

Analyzed by:

VR

1 Legend: Raw = Modeled Peaks = 1,2,..., etc

Display Max.: 2599.9

WHC-SD-WM-DP-065, REV.0

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Raw Data Dump for AEA Spectrum: 4a4372.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
41	0.	0.	1.	0.	0.	0.	1.	0.	0.	0.
51	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
61	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
101	0.	0.	0.	0.	1.	0.	0.	1.	0.	0.
111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
121	1.	0.	0.	0.	1.	0.	0.	0.	0.	1.
131	0.	1.	0.	1.	0.	0.	0.	0.	0.	1.
141	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
151	0.	1.	0.	0.	0.	1.	0.	0.	1.	0.
161	0.	0.	0.	1.	0.	0.	1.	0.	1.	1.
171	0.	1.	0.	0.	0.	0.	0.	0.	2.	1.
181	0.	0.	1.	0.	1.	0.	0.	1.	0.	0.
191	0.	1.	0.	1.	0.	1.	0.	1.	0.	0.
201	0.	0.	1.	0.	1.	1.	0.	1.	0.	0.
211	2.	1.	1.	0.	1.	1.	0.	0.	1.	1.
221	0.	0.	1.	0.	1.	0.	2.	1.	1.	0.
231	0.	5.	1.	5.	0.	0.	1.	1.	1.	1.
241	0.	0.	1.	1.	0.	1.	1.	0.	0.	0.
251	0.	1.	0.	0.	2.	1.	0.	1.	0.	4.
261	3.	1.	2.	1.	3.	3.	1.	3.	5.	3.
271	2.	2.	2.	3.	3.	2.	0.	2.	2.	2.
281	4.	4.	2.	3.	2.	4.	7.	7.	7.	6.
291	5.	4.	8.	4.	4.	5.	3.	1.	3.	4.
301	4.	5.	5.	3.	5.	2.	3.	2.	4.	3.
311	7.	7.	8.	5.	3.	9.	4.	6.	3.	6.
321	5.	10.	3.	8.	6.	6.	4.	7.	13.	13.
331	10.	8.	9.	10.	11.	13.	15.	19.	24.	22.
341	20.	27.	26.	32.	31.	47.	59.	70.	109.	132.
351	141.	149.	198.	204.	236.	226.	258.	218.	282.	330.
361	346.	404.	428.	449.	395.	321.	247.	148.	74.	29.
371	10.	3.	2.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	1.	0.	1.	0.	0.	0.	1.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	1.	1.	0.	1.	0.	0.	1.
481	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-065, REV.0

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Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-065, REV.0

SAMPLE
V77-8881

File ID: 11a3567.CNF

Counted on: 4/29/94 @ 1:10
Detector: AEA11
Geometry number: 1
Count time: 28804. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	433.7	433.7	362.348	362.348	12.000	3.913	6.000	1.405
2	8.7	8.7	303.849	303.635	16.000	9.013	8.000	1.529

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid			Count Rate c/m	%err @95	d/m	Activity uCi/ea
			Exp.	Obs.	Diff.				
1	Pu236	0.952	5.756	5.770	-0.014	14.01	2.4	112.5	0.507E-04
	Cm243		5.786	5.770	0.016			151.0	0.680E-04
2	Am241	0.036	5.480	5.500	-0.020	0.53	14.1	4.4	0.200E-05
	Pu238		5.499	5.500	-0.001			5.8	0.261E-05
Totals:		0.988	<--valid peaks only-->			14.54			

DETECTOR CALIBRATION

Energy(MEV) = 4.103 + (0.0046)*Channel
 Energy range (MeV): 4.103 TO 6.459
 Efficiency = 0.1271 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	7064.0	100.000
Smoothed	7064.0	100.000
Composite fit	6980.6	98.819
Residuals	83.4	1.181

Analyzed by: _____

VR

WHC-SD-WM-DP-065, REV.0

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1182

Raw Data Dump for AEA Spectrum: 11a3567.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	1.	0.
21	1.	0.	0.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	0.	0.	0.
41	1.	0.	0.	0.	1.	0.	0.	0.	0.
51	0.	0.	0.	0.	1.	0.	0.	1.	0.
61	0.	1.	0.	0.	0.	0.	1.	1.	0.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	0.	0.	0.	0.	0.	1.	0.	0.	0.
91	0.	0.	1.	0.	0.	0.	0.	0.	0.
101	0.	0.	1.	0.	0.	0.	0.	0.	1.
111	0.	0.	0.	0.	0.	0.	1.	0.	0.
121	1.	0.	0.	0.	0.	0.	0.	0.	0.
131	0.	1.	0.	1.	0.	0.	0.	1.	0.
141	0.	0.	0.	0.	0.	0.	1.	0.	1.
151	2.	1.	0.	0.	2.	0.	1.	1.	1.
161	0.	1.	1.	0.	0.	0.	0.	0.	0.
171	0.	1.	0.	0.	0.	0.	0.	0.	0.
181	0.	0.	0.	0.	0.	1.	0.	0.	0.
191	0.	0.	0.	0.	0.	0.	0.	0.	0.
201	0.	1.	0.	0.	0.	0.	1.	0.	1.
211	0.	1.	0.	0.	1.	0.	0.	2.	1.
221	0.	2.	0.	1.	0.	1.	3.	1.	1.
231	0.	1.	0.	2.	0.	1.	0.	1.	1.
241	0.	4.	3.	2.	0.	1.	1.	1.	0.
251	1.	0.	2.	2.	3.	4.	1.	0.	3.
261	0.	3.	2.	2.	3.	6.	3.	2.	3.
271	1.	5.	2.	2.	3.	2.	5.	3.	1.
281	1.	4.	4.	5.	6.	5.	4.	7.	2.
291	7.	3.	5.	5.	4.	8.	7.	11.	9.
301	8.	7.	11.	11.	14.	8.	3.	6.	3.
311	7.	5.	3.	9.	7.	7.	4.	6.	7.
321	13.	10.	9.	14.	18.	16.	14.	14.	17.
331	13.	24.	30.	19.	40.	39.	28.	34.	30.
341	47.	48.	54.	62.	80.	89.	80.	116.	116.
351	199.	217.	245.	262.	262.	278.	307.	290.	339.
361	431.	514.	508.	447.	330.	211.	118.	41.	19.
371	1.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	1.	0.	0.
391	1.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	2.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	1.	1.	0.	0.
481	0.	0.	0.	0.	0.	1.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.	0.	0.	0.	0.	0.	0.	0.

WHC-SD-WM-DP-065, REV.0

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT WHC-SD-WM-DP-065, REV. 0

SAMPLE
V77-8981
File ID: 12a4504.CNFCounted on: 4/29/94 @ 1:11
Detector: AEA12
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	550.3	550.3	363.679	363.679	10.000	3.381	5.000	1.544
2	13.5	13.5	304.987	304.892	20.000	50.466	10.000	10.813
3	795.5	795.5	229.995	229.995	12.000	3.761	6.000	2.147

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate	%err c/m @95	d/m	Activity uCi/ea
1	Pu236	0.398	5.756	5.776	-.020	0.02	15.00	2.3	129.5	0.583E-04
	Cm243		5.786	5.776	0.010				173.8	0.783E-04
2	Am241	0.029	5.480	5.505	-.025	0.23	1.10	12.2	9.9	0.445E-05
	Pu238		5.499	5.505	-.006				12.9	0.580E-05
3	Pu239	0.528	5.143	5.161	-.018	0.02	19.92	2.0	168.5	0.759E-04
	Pu240		5.144	5.161	-.017				168.5	0.759E-04
Totals:		0.955	<--valid peaks only-->				36.01			

DETECTOR CALIBRATION
Energy(MEV) = 4.103 + (0.0046)*Channel
Energy range (MeV): 4.103 TO 6.458
Efficiency = 0.1182 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	18098.0	100.000
Smoothed	18098.0	100.000
Composite fit	17285.5	95.511
Residuals	812.5	4.489

Analyzed by:

VR

Raw Data Dump for AEA Spectrum: 12a4504.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
21	1.	0.	0.	1.	0.	1.	1.	0.	1.	2.
31	1.	1.	0.	1.	0.	1.	0.	0.	0.	1.
41	0.	1.	1.	1.	0.	1.	0.	1.	1.	1.
51	2.	1.	1.	1.	0.	1.	1.	2.	2.	0.
61	0.	1.	3.	1.	1.	0.	2.	1.	3.	1.
71	1.	2.	0.	1.	0.	2.	0.	1.	0.	0.
81	3.	1.	1.	0.	2.	3.	2.	1.	0.	2.
91	1.	1.	0.	2.	3.	0.	0.	0.	3.	2.
101	1.	1.	2.	2.	0.	0.	2.	0.	2.	4.
111	4.	2.	2.	4.	0.	1.	3.	4.	2.	4.
121	1.	5.	5.	3.	6.	4.	2.	0.	4.	2.
131	4.	2.	3.	1.	4.	4.	2.	3.	4.	5.
141	3.	2.	3.	2.	1.	2.	2.	2.	4.	2.
151	2.	5.	3.	2.	3.	4.	7.	2.	8.	4.
161	5.	2.	4.	5.	7.	8.	5.	6.	9.	5.
171	8.	8.	8.	5.	5.	12.	8.	11.	16.	11.
181	9.	13.	11.	14.	9.	16.	11.	9.	11.	16.
191	13.	12.	15.	17.	16.	17.	20.	18.	26.	21.
201	32.	26.	27.	31.	30.	24.	37.	26.	38.	43.
211	52.	44.	76.	95.	84.	93.	149.	177.	163.	238.
221	240.	248.	359.	408.	454.	518.	662.	837.	849.	932.
231	915.	778.	516.	269.	140.	59.	23.	6.	1.	2.
241	4.	1.	2.	0.	3.	0.	0.	1.	3.	3.
251	0.	1.	1.	1.	2.	4.	4.	1.	1.	1.
261	3.	2.	1.	2.	2.	6.	2.	5.	3.	2.
271	3.	2.	5.	1.	3.	4.	2.	5.	3.	1.
281	6.	2.	4.	5.	4.	9.	11.	10.	7.	9.
291	5.	7.	11.	15.	13.	8.	5.	7.	15.	9.
301	13.	12.	11.	16.	16.	14.	14.	9.	12.	2.
311	9.	5.	10.	7.	2.	16.	9.	13.	11.	10.
321	16.	8.	9.	11.	12.	17.	10.	9.	5.	10.
331	15.	15.	11.	13.	21.	18.	21.	23.	24.	31.
341	25.	35.	30.	33.	44.	57.	68.	60.	97.	103.
351	149.	181.	203.	245.	248.	270.	282.	285.	312.	382.
361	483.	547.	597.	667.	603.	490.	270.	135.	43.	6.
371	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

WHC-SD-WM-DP-065, REV. 0

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT WHC-SD-WM-DP-065, REV.0

SAMPLE
V77-8081
File ID: 10a2604.CNFCounted on: 4/29/94 @ 1: 9
Detector: AEA10
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	700.9	700.9	366.789	366.789	10.000	3.705	5.000	1.321
2	16.8	16.8	308.551	308.198	14.000	10.718	7.000	2.214
3?	4.1	4.1	291.794	290.393	12.000	1.813	6.000	0.562
4	1049.8	1049.8	232.351	232.351	12.000	4.007	6.000	1.869

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid			Count Rate	%err @95	d/m	Activity uCi/ea
			Exp.	Obs.	Diff.	c/m			
1	Cm244	0.403	5.796	5.779	0.017	22.49	1.9	183.2	0.825E-04
	Cm243		5.786	5.779	0.007			250.9	0.113E-03
2	Am241	0.017	5.480	5.509	-0.029	0.92	11.0	8.0	0.361E-05
	Pu238		5.499	5.509	-0.010			10.5	0.471E-05
3		????		5.428		0.13	51.4		
4	Pu239	0.528	5.143	5.161	-0.018	29.44	1.6	239.7	0.108E-03
	Pu240		5.144	5.161	-0.017			239.7	0.108E-03
Totals:		0.948	<--valid peaks only-->			52.86			

DETECTOR CALIBRATION

Energy(MEV) = 4.092 + (0.0046)*Channel
Energy range (MeV): 4.092 TO 6.447
Efficiency = 0.1228 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	26778.0	100.000
Smoothed	26778.0	100.000
Composite fit	25435.5	94.986
Residuals	1342.5	5.014

Analyzed by: _____
VR

1 Legend: Raw = Modeled Peaks = 1,2,..., etc

Display Max.: 5822.9

WHC-SD-WM-DP-065, REV.0

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Raw Data Dump for AEA Spectrum: 10a2604.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	2.	0.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	0.	0.	1.
41	0.	1.	0.	0.	1.	0.	0.	0.	0.
51	0.	0.	0.	0.	2.	1.	1.	0.	1.
61	1.	1.	0.	0.	1.	0.	2.	1.	1.
71	3.	2.	0.	2.	0.	0.	0.	0.	0.
81	0.	2.	1.	2.	0.	0.	0.	1.	2.
91	1.	0.	1.	0.	1.	2.	0.	1.	1.
101	4.	2.	1.	0.	2.	3.	4.	2.	4.
111	2.	1.	2.	2.	3.	1.	3.	4.	4.
121	3.	4.	2.	2.	1.	1.	3.	3.	2.
131	1.	1.	0.	1.	4.	6.	2.	4.	3.
141	3.	2.	5.	3.	3.	4.	10.	2.	4.
151	6.	7.	6.	5.	8.	9.	8.	3.	6.
161	9.	8.	5.	4.	10.	3.	7.	9.	11.
171	10.	12.	9.	15.	6.	11.	11.	12.	16.
181	24.	20.	17.	28.	19.	18.	15.	24.	23.
191	38.	27.	37.	31.	39.	32.	31.	30.	45.
201	46.	51.	48.	70.	66.	74.	76.	85.	82.
211	96.	132.	106.	143.	126.	147.	185.	181.	217.
221	294.	331.	395.	456.	483.	493.	617.	690.	837.
231	1110.	1289.	1153.	1112.	814.	542.	284.	137.	50.
241	6.	3.	1.	2.	2.	1.	1.	0.	1.
251	1.	5.	1.	1.	1.	1.	2.	2.	3.
261	0.	5.	1.	3.	2.	5.	2.	5.	4.
271	6.	3.	1.	4.	4.	2.	8.	5.	1.
281	6.	5.	7.	7.	8.	9.	7.	9.	14.
291	11.	14.	12.	10.	8.	8.	8.	14.	12.
301	17.	11.	14.	15.	14.	16.	13.	27.	19.
311	19.	12.	12.	10.	7.	8.	17.	12.	8.
321	12.	13.	17.	13.	15.	17.	16.	26.	25.
331	21.	28.	34.	39.	38.	43.	48.	42.	49.
341	53.	64.	66.	66.	98.	115.	92.	100.	126.
351	132.	171.	211.	217.	293.	323.	371.	405.	397.
361	434.	466.	499.	571.	693.	806.	794.	788.	672.
371	214.	79.	24.	10.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	1.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	1.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	1.	0.	0.	0.
481	1.	0.	1.	0.	2.	0.	1.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.							

WHC-SD-WM-DP-065, REV.0

5 5521 **SUPER RUSH** *Butel 41534169*

Serial No V 75-8582	Sample Point 10B-A1	Date 5-18-94	Time Issued 12: 0	Priority 26
Determination Am-241	Method/Standard LA-503-156	Result Units % RECOVERY	Charge Code N1A7F	Reruns 4
Sample Size .100ML-10ML-1ML			Customer ID STE	
Remarks, Calculations, Results REP K201 AROO1 STD 83B43 RESULT 2.4577E+1 STD VAL 2.4087E+1 WREC 102.070 1ml 85H003 .1ml 87B43 <i>Alister Lewis</i>				
Analyst - 1	Analyst - 2 <i>Raymond</i>	Analyst - 3 <i>D. H. ...</i>	Analyst - 4 <i>...</i>	Analyst - 5
Date 8-5-94	Time Completed 15:00	Lab Unit <i>...</i>	<i>...</i>	

WHC-SD-WM-DP-065, REV. 0

54-6800-061 (R 10 83)

BEST AVAILABLE COPY

AM-241: LA-503-156 TD-D-1 *889* 9.30.94 LIQUID

Serial No	Spike (Tracer) Book Number	STANDARD
V75-8582	Activity of Am-243 Tracer in dpm/mL (SPKA)	87B43
Batch ID	Spike (Tracer) Volume in mL (SPKV)	9140
4169	Volume of Sample in mL (SS)	0.100
Run No	Dilution Factor (DF)	1.000
4	Digest Dilution Factor (DDF)	101
Analyst	Am-241 Area Peak Height from AEA (C241)	1
LEWIS	Am-243 Area Peak Height from AEA (C243)	1055
Date	Cm-243/244 Area Peak Height from AEA (CM)	1785
08/05/94	Total AT Count (ATOT)	3
Sample Type	AT Count Time in Minutes (MIN CTd)	12457
LIQUID	Background in CPM (BKG)	30
	Am 241 μ Ci/L =	2.4577E+01

$$\begin{aligned} \text{Cm-243/244 } \mu\text{Ci/L} &= \text{CM} \cdot \text{SPKA} \cdot \text{SPKV} \cdot \text{DF} \cdot \text{DDF} \cdot (1000\text{mL/L}) / (\text{C243} \cdot \text{SS} \cdot (2220000\text{dpm}/\mu\text{Ci})) \\ \text{Am-241 } \mu\text{Ci/L} &= \text{C241} \cdot \text{SPKA} \cdot \text{SPKV} \cdot \text{DF} \cdot \text{DDF} \cdot (1000\text{mL/L}) / (\text{C243} \cdot \text{SS} \cdot (2220000\text{dpm}/\mu\text{Ci})) \\ \text{Tracer \% Recovery} &= ((\text{ATOT} / \text{MIN CTd} - \text{BKG}) \cdot 2 \cdot (\text{C243} / (\text{C241} + \text{C243})) / (\text{SPKA} \cdot \text{SPKV})) \cdot 100 \\ \text{Relative Counting Error (Am-241)} &= \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) \cdot 1.96 \cdot 100 \\ \text{Relative Counting Error (Cm-243/244)} &= \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) \cdot 1.96 \cdot 100 \end{aligned}$$

Am 241 μ Ci/mL	=	2.46E-02	Detection
Cm 243/244 μ Ci/mL	=	< 3.67E-03	Level in
Relative counting error (Am-241)	=	7.6%	μ Ci/mL
Relative counting error (Cm-243/244)	=	113.3%	
Am-243 Tracer Recovery	=	56.7%	3.67E-03

Data Entry by: <i>...</i>	Date: 08-Aug-94
Approved by: <i>...</i>	Date: 8 Aug 94

AMERICIUM 241 ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

#1 R 8.5.94

12457
30 -3

175-8582

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#9 1964

Serial No V 76-8682	Sample Point 106-AL	Time Issued 12: 3	Priority 26
Determination Am-241	Method/Standard LA-503-156	Result Units uCi/ML	Charge Code N1A7F
Sample Size .500 ML	Customer ID BLANK		
Remarks, Calculations, Results REAGENT BLANK COUNT AS UCI/L .5ml Con H ₂ O ₃ 1ml 8-5-94 1ml 8-7-843 Am-241 < 3.11E-4 uCi/ml Cm-243/244 < 3.11E-4 uCi/ml WHC-SD-WM-DP-065, REV. 0 Alito Lewis			
Analyst - 1	Analyst - 2 Raymond	Analyst - 3 D. H. Miller	Analyst - 4
Hrs	Hrs 8-5-94	Hrs	Hrs
Date 8-5-94	Time Completed 15:00	Lab Unit Fitts	Signature E. J. Fitts

54 6807 161 (R 10-83)

BEST AVAILABLE COPY

AM-241: LA-503-156 (D-0) D-1 8-5-94 LIQUID			BLANK
Serial No V76-8682	Spike (Tracer) Book Number		87B43
Batch ID 4169	Activity of Am-243 Tracer in dpm/mL (SPKA)		9140
	Spike (Tracer) Volume in mL (SPKV)		0.100
	Volume of Sample in mL (SS)		0.500
Rerun No 4	Dilution Factor (DF)		1
	Digest Dilution Factor (DDF)		5
Analyst LEWIS	Am-241 Area Peak Height from AEA (C241)		52
	Am-243 Area Peak Height from AEA (C243)		3886
Date 08/05/94	Cm-243/244 Area Peak Height from AEA (CM)		5
Sample Type LIQUID	Total AT Count (ATOT)		9329
	AT Count Time in Minutes (MIN CTd)		30
	Background in CPM (BKG)		4
	Am 241 uCi/L =		3.1057E-01

$$\begin{aligned} \text{Cm-243/244 } \mu\text{Ci/L} &= \text{CM} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci})) \\ \text{Am-241 } \mu\text{Ci/L} &= \text{C241} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci})) \\ \text{Tracer \% Recovery} &= ((\text{ATOT} / \text{MIN CTd} - \text{BKG}) * 2 * (\text{C243} / (\text{C241} + \text{C243})) / (\text{SPKA} * \text{SPKV})) * 100 \\ \text{Relative Counting Error (Am-241)} &= \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) * 1.96 * 100 \\ \text{Relative Counting Error (Cm-243/244)} &= \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) * 1.96 * 100 \end{aligned}$$

NOTE: Am 241 Result is a LESS THAN Value

Am 241 uCi/mL	=	< 3.11E-04	Detection
Cm 243/244 uCi/mL	=	< 3.11E-04	Level in
Relative counting error (Am-241)	=	27.4%	uCi/mL
Relative counting error (Cm-243/244)	=	87.7%	
Am-243 Tracer Recovery	=	66.3%	3.11E-04

Data Entry by: <i>[Signature]</i>	Date: 08-Aug-94
Approved by: <i>[Signature]</i>	Date: 8 Aug 94

AMERICIUM 241 ANALYSIS - ACID DIGESTION

#2 R 8.5.94

WHC-SD-WM-DP-065, REV. 0

9329-4
30

✓ 96-8682

6 6361 SUPER RUSH

Serial No V 77-8782	Sample Point 108-AP	Time Issued 3-18-94	Priority 26
Determination Am-241	Method-Standard LA-503-156	Result Units uCi/ML	Charge Code N1A7F
Sample Size .500 ML	Customer ID COMP		
Remarks, Calculations, Results COUNT AS, uCi/L .5 ml Cm H203 .1 ml 87B43 1 ml 8 H203 WHC-SD-WM-DP-065, REV. 0 $< 2.87E-4 \mu\text{Ci}/\text{ml}$ Am-241 $< 2.87E-4 \mu\text{Ci}/\text{ml}$ Cm 243/44 Alita Lewis			
Analyst - 1	Analyst - 2 Raymond	Analyst - 3 D. H. ...	Analyst - 4 8-6-94
Hrs	Hrs 8-5-94	Hrs	Hrs
Date 8-5-94	Time Completed 15:00	Lab Unit No.	54 610-06 (R 0-83)

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AM-241: LA-503-156 ^{D-1} ~~40-01~~ 9.30-94 LIQUID

		SAMPLE
Serial No	Spike (Tracer) Book Number	87B43
V77-8782	Activity of Am-243 Tracer in dpm/mL (SPKA)	9140
Batch ID	Spike (Tracer) Volume in mL (SPKV)	0.100
4169	Volume of Sample in mL (SS)	0.500
Run No.	Dilution Factor (DF)	1
4	Digest Dilution Factor (DDF)	5
Analyst	Am-241 Area Peak Height from AEA (C241)	48
LEWIS	Am-243 Area Peak Height from AEA (C243)	3623
Date	Cm-243/244 Area Peak Height from AEA (CM)	2
08/05/94	Total AT Count (ATOT)	10175
Sample Type	AT Count Time in Minutes (MIN CTd)	30
LIQUID	Background in CPM (BKG)	7
Am 241 $\mu\text{Ci}/\text{L}$ = <		2.8697E-01

$\text{Cm-243/244 } \mu\text{Ci}/\text{L} = \text{CM} \cdot \text{SPKA} \cdot \text{SPKV} \cdot \text{DF} \cdot \text{DDF} \cdot (1000\text{mL}/\text{L}) / (\text{C243} \cdot \text{SS} \cdot (2220000\text{dpm}/\mu\text{Ci}))$
 $\text{Am-241 } \mu\text{Ci}/\text{L} = \text{C241} \cdot \text{SPKA} \cdot \text{SPKV} \cdot \text{DF} \cdot \text{DDF} \cdot (1000\text{mL}/\text{L}) / (\text{C243} \cdot \text{SS} \cdot (2220000\text{dpm}/\mu\text{Ci}))$
 $\text{Tracer \% Recovery} = ((\text{ATOT} / \text{MIN CTd} - \text{BKG}) \cdot 2 \cdot (\text{C243} / (\text{C241} + \text{C243})) / (\text{SPKA} \cdot \text{SPKV})) \cdot 100$
 $\text{Relative Counting Error (Am-241)} = \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) \cdot 1.96 \cdot 100$
 $\text{Relative Counting Error (Cm-243/244)} = \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) \cdot 1.96 \cdot 100$

NOTE: Am 241 Result is a LESS THAN Value

Am 241 $\mu\text{Ci}/\text{mL}$	=	< 2.87E-04	Detection Level in $\mu\text{Ci}/\text{mL}$
Cm 243/244 $\mu\text{Ci}/\text{mL}$	=	< 2.87E-04	
Relative counting error (Am-241)	=	28.5%	
Relative counting error (Cm-243/244)	=	138.6%	
Am-243 Tracer Recovery	=	71.7%	2.87E-04

Data Entry by:	Date: 08-Aug-94
Approved by: <i>[Signature]</i>	Date: 8 Aug 94

AMERICIUM 241 ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

#3 R 8.5.94
10175 - 7
30

V77-8782

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#10 2820

Serial No V 77-8882	Sample Point 108-AP	Pay SUPER RUSH	Time Issued 12:18	Priority 26
Determination Am-241	Method-Standard LA-503-156	Result Units uCi/mL	Charge Code NJA71	Retuns -1
Sample Size .500 mL			Customer ID COMP	
Remarks, Calculations, Results DUPLICATE SAMPLE Am-241 < 7.74E-4 uCi/mL COUNT AS uCi/L Cm 243/244 < 7.74E-4 uCi/mL .5 ml con H ₂ O ₂ 1 ml 8 th H ₂ O ₂ .1 ml 87B43 WHC-SD-WM-DP-065, REV. 0 Alta Lewis				
Analyst - 1	Analyst - 2 Raymond	Analyst - 3 D.H. Miller	Analyst - 4	Analyst - 5
Hrs	Hrs 8.5.94	Hrs	Hrs	Hrs
Date 8-5-94	Time Completed 15:00	Lab Unit Fitts	8/8	

54-560-051 (R 10-83)

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AM-241: LA-503-156 ~~D-1~~ 282 9.30.94 LIQUID

Serial No.	Spike (Tracer) Book Number	DUPLICATE
V77-8882	Activity of Am-241 Tracer in dpm/mL (SPKA)	87B43 9140
Batch ID	Spike (Tracer) Volume in mL (SPKV)	0.100
4169	Volume of Sample in mL (SS)	0.500
Run No.	Dilution Factor (DF)	1
4	Digest Dilution Factor (DDF)	5
Analyst	Am-241 Area Peak Height from AEA (C241)	25
LEWIS	Am-243 Area Peak Height from AEA (C243)	2000
Date	Cm-243/244 Area Peak Height from AEA (CM)	2
08/05/94	Total AT Count (ATOT)	3781
Sample Type	AT Count Time in Minutes (MIN CTd)	30
LIQUID	Background in CPM (BKG)	3
Am 241 uCi/L = <		7.7420E-01

$$\text{Cm-243/244 } \mu\text{Ci/L} = \text{CM} \cdot \text{SPKA} \cdot \text{SPKV} \cdot \text{DF} \cdot \text{DDF} \cdot (1000\text{mL/L}) / (\text{C243} \cdot \text{SS} \cdot (2220000\text{dpm}/\mu\text{Ci}))$$

$$\text{Am-241 } \mu\text{Ci/L} = \text{C241} \cdot \text{SPKA} \cdot \text{SPKV} \cdot \text{DF} \cdot \text{DDF} \cdot (1000\text{mL/L}) / (\text{C243} \cdot \text{SS} \cdot (2220000\text{dpm}/\mu\text{Ci}))$$

$$\text{Tracer \% Recovery} = ((\text{ATOT} / \text{MIN CTd} - \text{BKG}) \cdot 2 \cdot (\text{C243} / (\text{C241} + \text{C243})) / (\text{SPKA} \cdot \text{SPKV})) \cdot 100$$

$$\text{Relative Counting Error (Am-241)} = \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) \cdot 1.96 \cdot 100$$

$$\text{Relative Counting Error (Cm-243/244)} = \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) \cdot 1.96 \cdot 100$$
 NOTE: Am 241 Result is a LESS THAN Value

Am 241 uCi/mL	=	< 7.74E-04	Detection Level in uCi/mL
Cm 243/244 uCi/mL	=	< 7.74E-04	
Relative counting error (Am-241)	=	39.4%	
Relative counting error (Cm-243/244)	=	138.7%	
Am-243 Tracer Recovery	=	26.6%	7.74E-04

Data Entry by: <i>[Signature]</i>	Date: 08-Aug-94
Approved by: <i>[Signature]</i>	Date: 8 Aug 94

AMERICIUM 241 ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

#1 R 8.5.94
3781 - 3
30

V77-8882

7 7957

Serial No V 77.-8982	Sample Pouch 100-AL	Time Issued 12:18		Priority 26
Determination Am241	Method/Standard LA-503-156	Result Units % RECOVERY	Charge Code N1A7F	Retuns 4
Sample Size .500 ML			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKED ID SPIKE ID 83843 SPIKE VOLUME .1 ml - 10 ml - 1 ml .5 ml Con H003 .1 ml 83843 100.3% WHC-SD-WM-DP-065, REV. 0 alita Lewis				
Analyst - 1	Analyst - 2 Hrs 8-5-94	Analyst - 3 Hrs 8-5-94	Analyst - 4 Hrs 8-6-94	Analyst - 5
Date 8-5-94	Time Completed 15:00	Lab Input by J. Fritts		

BEST AVAILABLE COPY

AM-241: LA-503-156 (D-0) 9-30-94 Spiked Sample		SPIKE
Type	Spike (Tracer) Book Number	87B43
SPIKE	Activity of Am243 Tracer in dpm/mL (SPKA)	9140
Work List	Spike (Tracer) Volume in mL (SPKV)	0.100
4169	Volume of Sample in mL (SS)	0.500
Test Code	Sample Dilution Factor (DF)	1
	Digest Dilution Factor (DDF)	5
Matrix	Am-241 Area Peak Height from AEA (C241)	1319
LIQUID	Am-243 Area Peak Height from AEA (C243)	2271
Sample #	Spike (Matrix) Volume in mL (SMSS)	1
V77-8982	Spike (Matrix) Dilution Factor (SMDF)	101
Instrument Code	Spike (Matrix) Value in pCi/L (SMV)	24.087
	Am 241 pCi/L in Sample from Form 6 (Am1)	<2.8697E-1
Analyst	Am 241 pCi/L in Spiked Sample (Am2)	2.3912E+00
LEWIS	$\text{Am 241 pCi/L in Spiked Sample} = \frac{C241 \cdot SPKA \cdot SPKV \cdot DF \cdot DDF \cdot (1000 \text{ mL/L})}{C243 \cdot SS \cdot (2220000 \text{ dpm/pCi})}$	
Date 08/05/94	$\text{Percent Spike Recovery} = \frac{(Am2 - Am1) \cdot (SMDF/SMSS) / (DF \cdot DDF/SS) \cdot 100}{\text{Spike (Matrix) Value in pCi/L}}$	
Time 15:00		

Percent Spike Recovery	=	100.3%
------------------------	---	--------

Data Entry by: <i>[Signature]</i>	Date: 08-Aug-94
Approved by: <i>[Signature]</i>	Date: 8 Aug 94

Form L7 Rev. 1.1

Page 1 of 1

1200

AMERICIUM 241 ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

#3 12 8.5.94
12441
30 -7

V77-8982

8 8150

Serial No V 77-8082	Sample Point 108-A1	Super RUSH	Time Issued 12:26	Priority 26
Determination Am-241	Method/Standard LA-503-156	Result Units % RECOVERY	Charge Code N1A7F	Retuns 4
Sample Size .500 ML			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKE 83643 DUPLICATE SPIKE ID SPIKE VOL 1ml-10ml-1ml .5ml con H2O3 1ml 4.25 H2O3 1ml 87643 Alita Lewis WHC-SD-WM-DP-065, REV. 0 106.2%				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
	8:5-94		8:5-94	
Date 8-5-94	Time Completed 15:00	Lab Unit		

BEST AVAILABLE COPY

D-1 823
AM-241: LA-503-156 (D-0) 9:30-94 Spiked Sample

Type	SPIKE
SPIKE	87B43
Work List	
4169	
Test Code	
Matrix	
LIQUID	
Sample #	
V77-8082	
Instrument Code	
Analyst	
LEWIS	
Date	
08/05/94	
Time	

Activity	Value
Spike (Tracer) Book Number	87B43
Activity of Am243 Tracer in dpm/mL (SPKA)	9140
Spike (Tracer) Volume in mL (SPKV)	0.100
Volume of Sample in mL (SS)	0.500
Sample Dilution Factor (DF)	1
Digest Dilution Factor (DDF)	5
Am-241 Area Peak Height from AEA (C241)	1546
Am-243 Area Peak Height from AEA (C243)	2513
Spike (Matrix) Volume in mL (SMSS)	1
Spike (Matrix) Dilution Factor (SMDF)	101
Spike (Matrix) Value in µCi/L (SMV)	24.087
Am 241 µCi/L in Sample from Form 6 (Am1)	<7.742E-1
Am 241 µCi/L in Spiked Sample (Am2)	2.5329E+00

$$\text{Am 241 } \mu\text{Ci/L in Spiked Sample} = \frac{\text{C241} \cdot \text{SPKA} \cdot \text{SPKV} \cdot \text{DF} \cdot \text{DDF} \cdot (1000\text{mL/L})}{\text{C243} \cdot \text{SS} \cdot (2220000\text{dpm}/\mu\text{Ci})}$$

$$\text{Percent Spike Recovery} = \frac{(\text{Am2} - \text{Am1}) \cdot (\text{SMDF}/\text{SMSS}) / (\text{DF} \cdot \text{DDF}/\text{SS}) \cdot 100}{\text{Spike (Matrix) Value in } \mu\text{Ci/L}}$$

Percent Spike Recovery = 106.2%

Date Entry by: <i>[Signature]</i>	Date: 08-Aug-94
Approved by: <i>[Signature]</i>	Date: 8 Aug 94

Form L7 Rev. 1.1

Page 1 of 1

1202

AMERICIUM 241 ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

112 R 8.5.94
10014 - 4
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V77-8082

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT WHC-SD-WM-DP-065, REV.0

SAMPLE
V-75-8582
File ID: 5a5521.CNF

Counted on: 8/ 6/94 @ 0:39
Detector: AEA5
Geometry number: 1
Count time: 28800. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	1002.5	1002.5	304.082	304.082	30.000	30.154	15.000	6.165
2	1604.0	1604.0	257.436	257.144	24.000	27.744	12.000	10.198
3?	24.5	24.5	194.276	193.503	30.000	39.839	15.000	18.723
4?	19.8	19.8	166.568	165.415	46.000	27.630	23.000	23.500
5?	14.3	14.3	157.650	157.650	16.000	0.012	8.000	14.646
6	19.6	19.6	125.901	125.859	68.000	93.153	34.000	42.632
7?	1.7	1.7	118.236	117.920	4.000	0.000	2.000	1.843
8?	6.7	6.7	113.625	112.391	12.000	0.000	6.000	5.529
9?	7.3	7.3	105.126	102.802	28.000	5.855	14.000	14.377
10	13.1	13.1	88.139	87.580	16.000	7.576	8.000	0.254
11?	2.4	2.4	59.091	58.163	16.000	1.149	8.000	0.424

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid			Count Rate	%err @95	d/m	Activity uCi/ea
			Exp.	Obs.	Diff.				
1	Am241	0.424	5.480	5.497	-.017	70.63	1.1	524.4	0.236E-03
	Pu238		5.499	5.497	0.002			684.6	0.308E-03
2	Am243	0.545	5.276	5.276	0.000	90.64	1.0	638.9	0.288E-03
	Pu240		5.144	5.276	-.132			632.5	0.285E-03
3		????		4.977		1.56	14.0		
4		????		4.845		1.04	12.8		
5		????		4.809		0.01	692.		
6	Np237	0.011	4.640	4.659	-.019	1.89	8.6	219.3	0.988E-04
7		????		4.622		0.00	1000.		
8		????		4.596		0.00	1000.		
9		????		4.551		0.18	45.2		
10		0.011		4.479	0.04	1.78	7.3	12.4	0.560E-05
11		????		4.341		0.06	148.		
Totals:			0.991	<--valid peaks only-->			164.94		

DETECTOR CALIBRATION
Energy(MEV) = 4.068 + (0.0047)*Channel
Energy range (MeV): 4.068 TO 6.474

Efficiency = 0.1433 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	79877.0	100.000
Smoothed	79876.9	100.000
Composite fit	80538.6	100.828
Residuals	-661.6	-0.828

Analyzed by: _____

DM

WHC-SD-WM-DP-065, REV. 0

Display Max.: 12668.0

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Raw Data Dump for AEA Spectrum: 5a5521.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	4.	8.	12.
21	15.	11.	9.	6.	7.	6.	8.	9.	5.	9.
31	15.	7.	10.	6.	5.	4.	13.	6.	7.	9.
41	17.	7.	9.	7.	5.	12.	9.	11.	9.	8.
51	7.	15.	13.	13.	12.	14.	11.	10.	11.	15.
61	14.	5.	11.	6.	10.	9.	8.	14.	11.	9.
71	9.	14.	18.	14.	13.	17.	7.	11.	11.	21.
81	8.	6.	14.	9.	12.	13.	18.	19.	14.	14.
91	14.	13.	13.	6.	15.	7.	16.	11.	14.	14.
101	12.	15.	21.	12.	17.	18.	17.	13.	12.	10.
111	10.	19.	23.	11.	16.	15.	15.	26.	22.	14.
121	15.	17.	13.	14.	13.	20.	17.	12.	15.	20.
131	11.	8.	9.	10.	16.	18.	21.	14.	19.	13.
141	17.	16.	18.	9.	24.	23.	22.	12.	18.	16.
151	14.	18.	17.	19.	17.	16.	27.	21.	19.	18.
161	20.	13.	20.	18.	28.	17.	23.	22.	20.	23.
171	10.	17.	24.	23.	24.	20.	25.	31.	23.	20.
181	23.	26.	23.	16.	32.	23.	31.	24.	32.	23.
191	25.	29.	30.	36.	35.	25.	27.	37.	21.	24.
201	33.	25.	28.	35.	35.	43.	44.	27.	46.	31.
211	41.	43.	44.	46.	54.	45.	67.	43.	59.	66.
221	74.	71.	75.	68.	105.	122.	128.	116.	151.	173.
231	185.	210.	234.	269.	322.	362.	398.	517.	507.	576.
241	667.	748.	781.	876.	946.	1075.	1176.	1229.	1351.	1422.
251	1517.	1539.	1557.	1709.	1679.	1785.	1722.	1781.	1638.	1685.
261	1580.	1492.	1414.	1372.	1208.	1187.	1082.	1001.	865.	768.
271	724.	645.	520.	477.	446.	419.	360.	308.	342.	306.
281	355.	312.	330.	365.	341.	431.	459.	436.	545.	550.
291	625.	649.	762.	696.	788.	870.	861.	969.	988.	973.
301	1027.	1001.	1055.	1000.	1019.	1011.	975.	925.	878.	835.
311	787.	739.	597.	601.	524.	430.	392.	304.	324.	240.
321	213.	170.	162.	128.	88.	69.	65.	50.	42.	22.
331	22.	16.	21.	15.	5.	6.	6.	4.	5.	2.
341	1.	1.	1.	0.	1.	1.	1.	1.	0.	1.
351	3.	3.	0.	1.	0.	1.	0.	0.	1.	0.
361	1.	0.	1.	3.	1.	0.	1.	0.	0.	1.
371	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	1.	0.	0.	0.	0.	0.	0.	1.	0.	0.
411	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
421	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
431	1.	0.	0.	0.	1.	0.	0.	0.	0.	0.
441	0.	0.	0.	1.	1.	0.	1.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
471	1.	3.	1.	2.	0.	1.	0.	1.	1.	0.
481	0.	0.	1.	0.	1.	1.	0.	0.	1.	0.
491	0.	1.	0.	1.	1.	0.	1.	0.	1.	0.
511	0.	0.								

WHC-SD-WM-DP-065, REV. 0

1207

Westinghouse Hanford Co.

D. H. M. Sullivan
8-6-94

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-065, REV. 0

SAMPLE
V76-8682
File ID: 9a1964.CNF

Counted on: 8/ 5/94 @21:36
Detector: AEA9
Geometry number: 1
Count time: 28804. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	44.5	44.5	299.356	299.356	12.000	8.429	6.000	2.422
2	3547.3	3547.3	252.811	252.810	14.000	6.616	7.000	2.561

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid			Count Rate c/m	%err @95	d/m	Activity uCi/ea	
			Exp.	Obs.	Diff.					
1	Am241	0.015	5.480	5.484	-.0040.04	1.92	6.5	14.4	0.648E-05	
	Pu238		5.499	5.484	0.015			18.8	0.846E-05	
2	Am243	0.941	5.276	5.270	0.0060.03	123.76	0.8	881.0	0.397E-03	
Totals:			0.956	<--valid peaks only-->			125.68			

DETECTOR CALIBRATION
Energy(MEV) = 4.107 + (0.0046)*Channel
Energy range (MeV): 4.107 TO 6.462
Efficiency = 0.1419 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	63145.0	100.000
Smoothed	63145.0	100.000
Composite fit	60335.0	95.550
Residuals	2810.0	4.450

Analyzed by: _____

VR

1208

1 Legend: Raw = Modeled Peaks = 1,2,..., etc Display Max.: 25746.8

WHC-SD-WM-DP-065, REV. 0

1209

Raw Data Dump for AEA Spectrum: 9a1964.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	1.	2.	0.	2.	1.	0.	0.	0.
31	2.	1.	0.	2.	0.	0.	1.	1.	0.	0.
41	0.	1.	1.	0.	0.	0.	1.	0.	1.	0.
51	2.	1.	0.	0.	2.	2.	2.	1.	1.	2.
61	0.	2.	1.	1.	0.	1.	1.	0.	0.	2.
71	2.	2.	1.	0.	2.	2.	0.	1.	0.	1.
81	2.	2.	2.	0.	2.	1.	0.	2.	1.	2.
91	2.	0.	1.	2.	2.	3.	1.	2.	1.	4.
101	4.	1.	2.	1.	2.	2.	1.	4.	2.	1.
111	1.	4.	4.	2.	2.	1.	5.	1.	2.	6.
121	1.	2.	6.	2.	2.	2.	3.	4.	1.	1.
131	3.	4.	5.	4.	9.	6.	2.	6.	4.	1.
141	4.	7.	7.	4.	4.	4.	6.	5.	4.	9.
151	3.	5.	3.	1.	7.	9.	8.	7.	3.	5.
161	14.	8.	8.	10.	6.	5.	14.	9.	7.	7.
171	11.	12.	14.	9.	8.	15.	13.	13.	18.	8.
181	13.	16.	20.	19.	21.	23.	23.	22.	19.	28.
191	23.	26.	21.	28.	35.	30.	30.	39.	44.	31.
201	42.	46.	39.	54.	56.	70.	52.	77.	60.	75.
211	64.	72.	78.	87.	114.	117.	107.	135.	146.	116.
221	141.	156.	214.	183.	233.	247.	233.	285.	315.	369.
231	361.	397.	454.	531.	595.	684.	745.	852.	916.	1126.
241	1248.	1357.	1580.	1839.	2040.	2267.	2480.	2732.	3047.	3440.
251	3624.	3805.	3851.	3886.	3378.	2779.	1989.	1262.	802.	562.
261	430.	372.	311.	299.	268.	254.	229.	176.	123.	103.
271	54.	45.	14.	12.	8.	2.	8.	8.	6.	8.
281	9.	4.	7.	14.	11.	14.	13.	9.	18.	19.
291	28.	18.	27.	27.	46.	44.	46.	52.	48.	40.
301	51.	44.	32.	27.	18.	17.	4.	11.	8.	7.
311	4.	5.	5.	1.	1.	0.	1.	0.	0.	2.
321	2.	0.	0.	0.	0.	0.	0.	0.	0.	1.
331	0.	0.	2.	0.	0.	0.	1.	0.	1.	1.
341	0.	0.	1.	0.	0.	3.	1.	0.	0.	1.
351	1.	1.	1.	2.	0.	1.	1.	3.	0.	5.
361	1.	2.	1.	1.	2.	1.	4.	0.	1.	1.
371	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	1.	0.	0.	0.	2.	0.
481	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

WHC-SD-WM-DP-065, REV. 0

1210

Johnson 8-6-94

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-065, REV. 0

SAMPLE
V-77-8782
File ID: 6a6361.CNF

Counted on: 8/ 6/94 @ 0:40
Detector: AEA6
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	39.8	39.8	300.271	300.271	16.000	10.183	8.000	2.598
2	3333.1	3333.1	254.238	254.237	14.000	9.049	7.000	4.513

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate	%err @95	d/m	Activity uCi/ea
1	Am241	0.016	5.480	5.479	0.001	10.05	1.91	6.5	16.6	0.749E-05
	Pu238		5.499	5.479	0.020				21.7	0.977E-05
2	Am243	0.962	5.276	5.268	0.008	80.04	115.18	0.8	949.7	0.428E-03
Totals:		0.978	<--valid peaks only-->				117.09			

DETECTOR CALIBRATION
Energy(MEV) = 4.098 + (0.0046)*Channel
Energy range (MeV): 4.098 TO 6.453
Efficiency = 0.1225 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	57477.0	100.000
Smoothed	57477.6	100.001
Composite fit	56206.4	97.789
Residuals	1270.6	2.211

Analyzed by: _____
DM

Display Max.: 24051.5

WHC-SD-WM-DP-065, REV. 0

The diagram illustrates a sequence of points and lines. On the left, there is a vertical line of six '1's. A horizontal line of points extends to the right, with '2's at the ends and intersections. A diagonal line of points connects the '2's.

1212

Raw Data Dump for AEA Spectrum: 6a6361.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.
21	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.
31	0.	1.	0.	0.	0.	0.	0.	1.	0.	2.
41	0.	0.	0.	0.	0.	0.	1.	1.	2.	3.
51	1.	1.	1.	1.	0.	0.	2.	0.	0.	1.
61	2.	1.	0.	1.	0.	0.	0.	2.	1.	0.
71	0.	0.	1.	1.	0.	0.	0.	1.	0.	0.
81	0.	0.	1.	1.	1.	1.	0.	0.	1.	0.
91	0.	1.	0.	0.	0.	0.	1.	1.	3.	2.
101	0.	2.	0.	0.	0.	0.	2.	1.	2.	1.
111	4.	2.	0.	1.	1.	1.	2.	3.	3.	1.
121	2.	1.	0.	2.	1.	2.	0.	3.	2.	2.
131	0.	5.	2.	3.	3.	1.	2.	1.	0.	0.
141	2.	1.	0.	2.	2.	2.	3.	1.	4.	3.
151	0.	5.	2.	2.	2.	0.	1.	1.	3.	1.
161	3.	1.	4.	4.	2.	2.	1.	1.	3.	7.
171	2.	4.	3.	3.	2.	11.	11.	4.	3.	5.
181	7.	5.	4.	9.	5.	6.	8.	9.	10.	4.
191	9.	8.	11.	7.	15.	12.	16.	5.	13.	10.
201	13.	14.	8.	13.	13.	18.	17.	21.	24.	12.
211	26.	23.	22.	31.	27.	34.	36.	36.	45.	48.
221	55.	62.	51.	70.	74.	71.	87.	107.	126.	162.
231	167.	188.	211.	251.	288.	358.	419.	457.	577.	650.
241	791.	855.	1142.	1284.	1498.	1678.	1988.	2167.	2596.	2936.
251	3123.	3485.	3623.	3538.	3616.	3433.	2942.	2488.	1952.	1503.
261	1070.	806.	568.	440.	342.	313.	268.	228.	186.	160.
271	154.	108.	80.	43.	38.	22.	13.	9.	7.	4.
281	2.	4.	3.	3.	3.	10.	9.	10.	19.	24.
291	17.	22.	25.	28.	29.	28.	30.	41.	41.	41.
301	48.	42.	24.	29.	30.	21.	25.	17.	9.	6.
311	5.	3.	3.	2.	2.	1.	2.	1.	0.	0.
321	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
331	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.
341	2.	0.	0.	0.	1.	2.	1.	0.	0.	0.
351	0.	0.	0.	1.	0.	0.	0.	0.	1.	0.
361	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	1.	0.								

WHC-SD-WM-DP-065, REV. 0

D. H. Milicia
8-6-94

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT WHC-SD-WM-DP-065, REV. 0

SAMPLE
V77-8882
File ID: 10a2820.CNF

Counted on: 8/ 5/94 @21:37
Detector: AEA10
Geometry number: 1
Count time: 28800. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	18.8	18.8	301.158	301.158	12.000	5.007	6.000	2.415
2	1627.7	1627.7	254.640	254.640	10.000	4.145	5.000	2.579

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate	%err c/m @95	d/m	Activity uCi/ea
1	Pu238	0.013	5.499	5.493	0.006	0.02	0.55	12.1	6.1	0.275E-05
	Am241		5.480	5.493	-.013				4.7	0.211E-05
2	Am243	0.920	5.276	5.279	-.003	0.02	40.44	1.4	327.3	0.147E-03
Totals:		0.933	<--valid peaks only-->				40.99			

DETECTOR CALIBRATION
Energy(MEV) = 4.108 + (0.0046)*Channel
Energy range (MeV): 4.108 TO 6.463
Efficiency = 0.1248 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	21088.0	100.000
Smoothed	21088.0	100.000
Composite fit	19674.8	93.298
Residuals	1413.2	6.702

Analyzed by: _____

VR

1 Legend: Raw = Modeled Peaks = 1,2,..., etc

Display Max.: 10023.3

WHC-SD-WM-DP-065, REV.0

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2.
....2.
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1
1

Raw Data Dump for AEA Spectrum: 10a2820.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	1.	0.	0.	1.	0.	0.	1.	0.	0.	0.
31	1.	0.	0.	0.	0.	0.	0.	0.	1.	0.
41	1.	0.	2.	0.	0.	0.	1.	0.	1.	0.
51	0.	0.	0.	0.	0.	2.	1.	1.	0.	0.
61	0.	0.	1.	1.	0.	0.	0.	1.	0.	0.
71	1.	0.	0.	0.	0.	0.	1.	0.	1.	0.
81	1.	0.	0.	0.	0.	0.	1.	0.	1.	0.
91	0.	1.	0.	0.	1.	1.	1.	1.	1.	0.
101	0.	0.	1.	0.	0.	0.	0.	0.	0.	2.
111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
121	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
131	0.	1.	1.	0.	0.	1.	0.	1.	0.	1.
141	1.	1.	2.	1.	1.	0.	4.	1.	0.	0.
151	0.	1.	1.	0.	2.	1.	1.	0.	0.	1.
161	2.	0.	2.	1.	0.	1.	1.	0.	1.	0.
171	3.	3.	2.	0.	4.	3.	1.	3.	4.	3.
181	4.	2.	3.	3.	1.	3.	2.	0.	1.	2.
191	4.	2.	4.	2.	2.	5.	6.	4.	7.	10.
201	3.	6.	4.	7.	12.	2.	6.	7.	9.	8.
211	5.	8.	6.	11.	9.	10.	15.	15.	16.	20.
221	14.	15.	31.	34.	29.	31.	41.	36.	35.	39.
231	54.	87.	61.	80.	95.	117.	109.	143.	165.	197.
241	190.	234.	324.	390.	461.	509.	638.	662.	774.	890.
251	1128.	1317.	1642.	1940.	2000.	1771.	1323.	832.	457.	293.
261	187.	165.	143.	126.	130.	122.	111.	91.	72.	56.
271	44.	25.	11.	8.	3.	1.	0.	1.	1.	2.
281	1.	1.	3.	2.	0.	2.	0.	2.	4.	6.
291	7.	5.	7.	6.	7.	18.	12.	18.	13.	20.
301	25.	19.	16.	17.	6.	5.	5.	3.	4.	1.
311	2.	4.	0.	0.	1.	0.	0.	0.	0.	0.
321	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
331	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
341	0.	0.	1.	1.	1.	1.	2.	0.	0.	2.
351	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
361	1.	1.	0.	0.	0.	0.	1.	0.	0.	0.
371	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
471	0.	0.	0.	0.	0.	0.	0.	1.	0.	2.
481	0.	2.	1.	0.	0.	0.	1.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-065, REV. 0

At Johnson 8-6-84

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-065, REV.0

SAMPLE
V-77-8982
File ID: 7a7957.CNF

Counted on: 8/ 6/94 @ 0:40
Detector: AEA7
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	1213.5	1213.5	304.264	304.264	16.000	10.460	8.000	3.796
2	2027.7	2027.7	258.477	258.453	14.000	8.727	7.000	3.253

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate	%err c/m @95	d/m	Activity uCi/ea	
1	Am241	0.388	5.480	5.483	-.003	30.05	49.40	1.3	442.0	0.199E-03	
	Pu238		5.499	5.483	0.016				577.0	0.260E-03	
2	Am243	0.609	5.276	5.272	0.004	40.04	77.51	1.0	658.5	0.297E-03	
Totals:		0.997	<--valid peaks only-->				126.91				

DETECTOR CALIBRATION
Energy(MEV) = 4.083 + (0.0046)*Channel
Energy range (MeV): 4.083 TO 6.438
Efficiency = 0.1189 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	61075.0	100.000
Smoothed	61075.0	100.000
Composite fit	60920.4	99.747
Residuals	154.6	0.253

Analyzed by: _____
DM

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2
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1.....2..
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.....1
.....1
.....1.
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1218

Raw Data Dump for AEA Spectrum: 7a7957.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	1.	0.	0.	0.	1.	1.	1.	2.	0.	1.
31	0.	1.	0.	2.	0.	0.	1.	0.	1.	0.
41	1.	2.	0.	1.	2.	0.	0.	1.	1.	0.
51	2.	1.	1.	0.	1.	0.	0.	1.	0.	0.
61	1.	1.	1.	1.	1.	0.	0.	0.	0.	1.
71	0.	0.	1.	0.	0.	1.	0.	1.	1.	1.
81	0.	1.	1.	0.	1.	2.	0.	0.	0.	0.
91	2.	0.	1.	1.	0.	0.	1.	2.	0.	2.
101	1.	1.	1.	2.	1.	0.	2.	0.	1.	1.
111	1.	1.	3.	0.	0.	1.	1.	2.	1.	1.
121	1.	1.	0.	0.	2.	0.	1.	1.	1.	1.
131	1.	1.	1.	3.	4.	1.	1.	0.	3.	4.
141	0.	4.	2.	0.	4.	4.	0.	1.	2.	2.
151	1.	1.	0.	3.	6.	2.	5.	3.	3.	1.
161	1.	6.	5.	2.	3.	4.	0.	3.	1.	3.
171	4.	1.	3.	3.	4.	2.	1.	4.	3.	3.
181	1.	2.	5.	4.	4.	2.	2.	6.	4.	6.
191	3.	10.	1.	5.	5.	5.	5.	2.	9.	9.
201	9.	7.	12.	10.	3.	17.	9.	15.	14.	7.
211	16.	10.	17.	11.	14.	16.	17.	24.	26.	29.
221	28.	34.	36.	44.	48.	58.	55.	64.	75.	102.
231	94.	131.	142.	168.	169.	211.	247.	288.	330.	358.
241	416.	484.	537.	590.	695.	738.	859.	893.	1056.	1189.
251	1258.	1362.	1476.	1706.	1825.	2024.	2142.	2231.	2271.	2039.
261	1868.	1655.	1290.	1011.	733.	558.	400.	287.	252.	215.
271	180.	155.	170.	144.	125.	119.	110.	93.	99.	120.
281	134.	145.	167.	171.	197.	230.	253.	300.	347.	386.
291	418.	473.	555.	545.	663.	686.	826.	843.	981.	1070.
301	1150.	1258.	1286.	1271.	1319.	1235.	1068.	985.	797.	621.
311	511.	352.	285.	223.	193.	127.	113.	78.	52.	39.
321	25.	15.	14.	7.	3.	2.	0.	0.	0.	0.
331	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
341	0.	1.	0.	1.	0.	0.	1.	1.	2.	0.
351	0.	0.	2.	0.	0.	0.	2.	0.	0.	0.
361	0.	0.	0.	1.	0.	0.	0.	0.	1.	0.
371	1.	2.	1.	0.	0.	1.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	1.	0.	0.	0.	1.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	1.	0.	0.	0.	0.	0.	0.	1.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	2.	0.								

WHC-SD-WM-DP-065, REV. 0

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Shawyer 8-6-84

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-065, REV.0

SAMPLE
V-77-8082
File ID: 8a8150.CNF

Counted on: 8/ 6/94 @ 0:41
Detector: AEA8
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	1340.2	1340.2	303.002	303.002	16.000	8.938	8.000	5.298
2	2211.5	2211.5	257.363	257.360	16.000	7.702	8.000	4.329

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid			Count Rate c/m	%err @95	d/m	Activity uCi/ea
			Exp.	Obs.	Diff.				
1	Am241	0.383	5.480	5.508	-.028	43.88	1.4	422.9	0.190E-03
	Pu238		5.499	5.508	-.009			552.1	0.249E-03
2	Am243	0.607	5.276	5.293	-.017	69.65	1.1	637.3	0.287E-03
Totals:		0.990	<--valid peaks only-->			113.54			

DETECTOR CALIBRATION

Energy(MEV) = 4.084 + (0.0047)*Channel
Energy range (MeV): 4.084 TO 6.490
Efficiency = 0.1104 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	55048.0	100.000
Smoothed	55048.0	100.000
Composite fit	54499.0	99.003
Residuals	549.0	0.997

Analyzed by: _____
DM

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1 Legend: Raw = Modeled Peaks = 1,2,..., etc

Display Max.: 13494.3

WHC-SD-WM-DP-065, REV.0

2
....2
.....2
.....2.
..... 2
.....2...
1..
...1
.....1
.....1
.....1
...1..

Raw Data Dump for AEA Spectrum: 8a8150.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	1.	1.	0.	2.	1.	0.	2.	0.
31	1.	1.	0.	2.	0.	0.	1.	0.	0.	1.
41	2.	0.	0.	0.	0.	1.	1.	1.	0.	0.
51	0.	1.	1.	0.	0.	0.	2.	0.	0.	1.
61	0.	0.	1.	1.	2.	2.	2.	0.	2.	0.
71	1.	1.	0.	0.	0.	0.	0.	2.	0.	1.
81	0.	2.	0.	0.	0.	0.	1.	1.	2.	1.
91	0.	0.	2.	0.	1.	0.	1.	1.	0.	3.
101	0.	2.	0.	2.	1.	3.	3.	1.	0.	0.
111	0.	1.	0.	1.	2.	0.	1.	1.	0.	0.
121	2.	0.	1.	0.	2.	1.	0.	2.	1.	1.
131	1.	2.	0.	0.	2.	0.	2.	0.	1.	1.
141	1.	2.	3.	0.	2.	2.	1.	0.	1.	2.
151	1.	0.	1.	2.	1.	2.	3.	1.	3.	1.
161	1.	4.	0.	1.	2.	4.	3.	3.	0.	1.
171	2.	1.	3.	6.	1.	0.	2.	0.	1.	1.
181	6.	3.	1.	1.	1.	2.	5.	0.	1.	2.
191	1.	1.	4.	3.	3.	3.	3.	1.	3.	4.
201	3.	5.	2.	6.	5.	9.	4.	3.	2.	4.
211	6.	2.	4.	5.	8.	6.	8.	9.	9.	12.
221	2.	5.	16.	13.	17.	20.	23.	24.	33.	36.
231	52.	42.	52.	68.	67.	85.	113.	122.	157.	186.
241	219.	285.	309.	419.	489.	625.	706.	840.	1056.	1118.
251	1367.	1491.	1796.	1996.	2214.	2305.	2513.	2423.	2258.	1915.
261	1539.	1206.	856.	625.	390.	336.	253.	241.	184.	161.
271	152.	119.	104.	87.	49.	58.	53.	39.	50.	54.
281	40.	61.	73.	88.	106.	126.	160.	164.	219.	268.
291	306.	419.	429.	562.	625.	726.	852.	942.	1094.	1230.
301	1406.	1415.	1546.	1397.	1297.	1083.	879.	723.	569.	465.
311	392.	280.	213.	161.	120.	84.	58.	46.	24.	17.
321	10.	1.	2.	3.	0.	0.	0.	0.	0.	0.
331	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
341	0.	0.	0.	0.	0.	0.	2.	0.	1.	0.
351	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
361	0.	0.	0.	0.	0.	2.	2.	1.	0.	1.
371	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	1.	0.	1.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.
481	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

WHC-SD-WM-DP-065, REV. 0

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THE FOLLOWING ANALYSES ARE INCLUDED IN THE DATA PACKAGE BUT THE RESULTS HAVE NOT BEEN REPORTED IN THE FINAL SUMMARY REPORTS.

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.
V75-77Customer ID:
COMPAnalysis:
AM241Sample Prep:
ACID DIGEST

Instrument: WB537237

Procedure/ Rev: LA-503-¹⁵⁶~~106~~ D-0

Technologist: ALETA K LEWIS

Date: 05/03/94

Starting Time: 0800

Temperature 25 C

Ending Time: 1530

Chemist: L FRITTS

Comments: BATCH# 3367

Review! ALETA K LEWIS
No spike recovery ALETA K LEWIS

	Description	Lab ID
1	LMCS	V75-8582
2	BLANK	V76-8682
3	SAMPLE	V77-8782
4	SAMPLE DUP	V77-8882
5	SAMPLE SPIKE	V77-8982
6	SAMPLE SPIKE DUP	V77-8082
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

DATA
NOT USED
IN PACKAGE

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	83B43	.100-10-1ML		
SPIKE	87B43	.100ML		

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A-6000-881 (03/92)

12 4513 **RERUN** Kateh 3367

Serial No V 75.-8582	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 0	Priority 26
Determination Am241	Method-Standard LA-503-156	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size .100ML-10ML-1ML			Customer ID STD	
Remarks, Calculations Results EDP R201 AR001 STD# STD VAL 2,4097 1ml 87B43 RESULT 2,5703 E+1 %REC 106.7% OUT FOR RERUN G. Lewis				
Analyst - 1	Analyst - 2 <i>[Signature]</i>	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 5-4-94	Hrs	Hrs	Hrs
Date 5-3-94	Time Completed 1730	Lab Unit Mgr <i>[Signature]</i>		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV.0

AM-241: LA-503-156 (D-0)

LIQUID		STANDARD
Serial No.	Spike (Tracer) Book Number	87B43
V75-8582	Activity of Am243 Tracer in dpm/mL (SPKA)	9140
Batch ID	Spike (Tracer) Volume in mL (SPKV)	0.100
3367	Volume of Sample in mL (SS)	1.000
Rerun No.	Dilution Factor (DF)	101
1	Digest Dilution Factor (DDF)	1
Analyst	Am-241 Area Peak Height from AEA (C241)	157
LEWIS	Am-243 Area Peak Height from AEA (C243)	254
Date	Cm-243/244 Area Peak Height from AEA (CM)	4
05/03/94	Total AT Count (ATOT)	1720
Sample Type	AT Count Time in Minutes (MIN CTd)	30
LIQUID	Background in CPM (BKG)	9
Am 241 µCi/L =		2.5703E+01

$$\begin{aligned} \text{Cm-243/244 } \mu\text{Ci/L} &= \text{CM} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci})) \\ \text{Am-241 } \mu\text{Ci/L} &= \text{C241} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci})) \\ \text{Tracer \% Recovery} &= ((\text{ATOT} / \text{MIN CTd} - \text{BKG}) * 2 * (\text{C243} / (\text{C241} + \text{C243})) / (\text{SPKA} * \text{SPKV})) * 100 \\ \text{Relative Counting Error (Am-241)} &= \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) * 1.96 * 100 \\ \text{Relative Counting Error (Cm-243/244)} &= \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) * 1.96 * 100 \end{aligned}$$

Am 241 µCi/mL	=	2.57E-02	Detection Level in µCi/mL
Cm 243/244 µCi/mL	=	< 2.08E-02	
Relative counting error (Am-241)	=	19.9%	
Relative counting error (Cm-243/244)	=	98.8%	
Am-243 Tracer Recovery	=	6.5%	2.08E-02

Data Entry by: <i>[Signature]</i>	Date: 04-May-94
Approved by:	Date:

10 2612

RERUN

Serial No V 76.-8682	Sample Point 108-AP	Time Issued 3-18-94	Priority 12: 3	26
Determination Am241	Method-Standard LA-503-156	Result Units uCi/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ML 1 ml			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK COUNT AS uCi/L 1 ml 8 ^m H1003 1 ml 8 7343 <div style="text-align: right;">WHC-SD-WM-DP-065, REV. 0</div> <div style="text-align: center; font-size: 1.5em;">OUT FOR RERUN</div>				
Analyst - 1	Analyst - 2	Analyst - 3 <i>[Signature]</i>	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 5-4-94	Hrs	Hrs
Date 5-3-94	Time Completed 1730	Lab Unit Mgr <i>[Signature]</i>	<i>[Signature]</i>	

54-6800-061 (R-10-83)

AM-241: LA-503-156 (D-0)

LIQUID

			BLANK
Serial No	Spike (Tracer) Book Number		87B43
V76-8682	Activity of Am243 Tracer in dpm/mL	(SPKA)	9140
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.100
3367	Volume of Sample in mL	(SS)	0.100
Rerun No	Dilution Factor	(DF)	1
1	Digest Dilution Factor	(DDF)	5
Analyst	Am-241 Area Peak Height from AEA	(C241)	3
LEWIS	Am-243 Area Peak Height from AEA	(C243)	16
Date	Cm-243/244 Area Peak Height from AEA	(CM)	2
05/03/94	Total AT Count	(ATOT)	1206
Sample Type	AT Count Time in Minutes	(MIN CTd)	30
LIQUID	Background in CPM	(BKG)	5
Am 241. uCi/L = <			1.0293E+01

$$\text{Cm-243/244 } \mu\text{Ci/L} = \text{CM} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$$

$$\text{Am-241 } \mu\text{Ci/L} = \text{C241} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$$

$$\text{Tracer \% Recovery} = ((\text{ATOT} / \text{MIN CTd} - \text{BKG}) * 2 * (\text{C243} / (\text{C241} + \text{C243})) / (\text{SPKA} * \text{SPKV})) * 100$$

$$\text{Relative Counting Error (Am-241)} = \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) * 1.96 * 100$$

$$\text{Relative Counting Error (Cm-243/244)} = \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) * 1.96 * 100$$

NOTE: Am 241 Result is a LESS THAN Value

Am 241 uCi/mL	=	< 1.03E-02	Detection
Cm 243/244 uCi/mL	=	< 1.03E-02	Level in
Relative counting error (Am-241)	=	123.3%	uCi/mL
Relative counting error (Cm-243/244)	=	147.0%	
Am-243 Tracer Recovery	=	6.5%	1.03E-02

Data Entry by:	Date: 05-May-94
Approved by:	Date:

RERUN

Serial No V 77.-8782	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Am241	Method-Standard LA-503-156	Result Units uCi/ML	Charge Code N1A7F	Reruns 1
Sample Size .100 ML			Customer ID COMP	
Remarks Calculations Results COUNT AS uCi/L 1 ml. 8 ^m 1-110 ₃ .1 ml 87843 WHC-SD-WM-DP-065, REV. 0 OUT FOR RERUN Alita Lewis				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 5-4-94	Hrs	Hrs
Date 5-3-94	Time Completed 1730	Lab Unit Mgr Ruketi		

54-6800-061 (R-10-83)

AM-241: LA-503-156 (D-0)
LIQUID

		SAMPLE
Serial No	Spike (Tracer) Book Number	87843
V77-8782	Activity of Am243 Tracer in dpm/mL (SPKA)	9140
Batch ID	Spike (Tracer) Volume in mL (SPKV)	0.100
3367	Volume of Sample in mL (SS)	0.100
Rerun No	Dilution Factor (DF)	1
1	Digest Dilution Factor (DDF)	5
Analyst	Am-241 Area Peak Height from AEA (C241)	3
LEWIS	Am-243 Area Peak Height from AEA (C243)	164
Date	Cm-243/244 Area Peak Height from AEA (CM)	3
05/03/94	Total AT Count (ATOT)	957
Sample Type	AT Count Time in Minutes (MIN CTd)	30
LIQUID	Background in CPM (BKG)	5
Am 241 uCi/L = <		1.0293E+01

$$\text{Cm-243/244 } \mu\text{Ci/L} = \text{CM} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$$

$$\text{Am-241 } \mu\text{Ci/L} = \text{C241} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$$

$$\text{Tracer \% Recovery} = ((\text{ATOT} / \text{MIN CTd} - \text{BKG}) * 2 * (\text{C243} / (\text{C241} + \text{C243})) / (\text{SPKA} * \text{SPKV})) * 100$$

$$\text{Relative Counting Error (Am-241)} = \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) * 1.96 * 100$$

$$\text{Relative Counting Error (Cm-243/244)} = \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) * 1.96 * 100$$

NOTE: Am 241 Result is a LESS THAN Value

Am 241 uCi/mL	=	< 1.03E-02	Detection
Cm 243/244 uCi/mL	=	< 1.03E-02	Level in
Relative counting error (Am-241)	=	114.2%	uCi/mL
Relative counting error (Cm-243/244)	=	114.2%	
Am-243 Tracer Recovery	=	5.8%	1.03E-02

Data Entry by:	Date: 05-May-94
Approved by:	Date:

RERUN

Serial No V 77.-8082	Sample Point 108-AP	Time Issued 3-18-94	Priority 26
Determination Am241	Method/Standard LA-503-156	Result Units % RECOVERY	Charge Code N1A7F
Sample Size .100 ML	Customer ID COMP		
Remarks, Calculations, Results SAMPLE SPIKE DUPLICATE SPIKE ID SPIKE VOL .1 ml 87843 1 ml std sp. Alita Jones <div style="text-align: center; font-size: 1.2em;">OUT FOR RERUN</div>			
Analyst - 1	Analyst - 2 <i>[Signature]</i>	Analyst - 3	Analyst - 4
Hrs	Hrs 5-4-94	Hrs	Hrs
Date 5-3-94	Time Completed 1730	Lab Unit Mgr <i>[Signature]</i>	<i>[Signature]</i>

54-6800-061 (R-10-83)

1228

#2 2825 **RERUN**

Serial No V 77.-8982	Sample Point 108-AP	3-18-94		Time Issued 12:18	Priority 26
Determination Am241	Method Standard LA-503-156	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1	
Sample Size .100 ML			Customer ID COMP		
Remarks Calculations Results SAMPLE SPIKED ID SPIKE ID SPIKE VOLUME .1 ml 87843 1 ml std sp Alita Lewis OUT FOR RERUN					
Analyst - 1	Analyst - 2 <i>[Signature]</i>	Analyst - 3	Analyst - 4	Analyst - 5	
Hrs	Hrs 5-4-94	Hrs	Hrs	Hrs	
Date 5-3-94	Time Completed 1730	Lab Unit Mgr <i>[Signature]</i>		<i>[Signature]</i>	

54-6800-061 (R-10-83)

3879 **RERUN**

Serial No V 77.-8882	Sample Point 108-AP	3-18-94		Time Issued 12:18	Priority 26
Determination Am241	Method Standard LA-503-156	Result Units uCi/ML	Charge Code N1A7F	Reruns 1	
Sample Size .100 ML			Customer ID COMP		
Remarks Calculations Results DUPLICATE SAMPLE COUNT AS uCi/L 1 ml 8 m HNO ₃ .1 ml 87843 Alita Lewis OUT FOR RERUN					
Analyst - 1	Analyst - 2 <i>[Signature]</i>	Analyst - 3	Analyst - 4	Analyst - 5	
Hrs	Hrs 5-4-94	Hrs	Hrs	Hrs	
Date 5-3-94	Time Completed 1730	Lab Unit Mgr <i>[Signature]</i>		<i>[Signature]</i>	

54-6800-061 (R-10-83)

#1 5-3-94 2L

$$\frac{1720}{30} - 9$$

V 15-8582

#2 5-3-94 2L

$$\frac{1206}{30} - 5$$

V 16-8682

#3 5-3-94 2L

$$\frac{957}{30} - 5$$

V 17-8882 ^{NEW} 9/30/94
8782

#3 5-3-94 2L

$$\frac{841}{30} - 5$$

V 17-8882

#1 5-3-94 2L

$$\frac{4031}{30} - 9$$

V 17-8082

#2 5-3-94 2L

$$\frac{2175}{30} - 5$$

Adhansen 5-4-94

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-065, REV. 0

SAMPLE
V75-8582
File ID: 12a4513.CNF

Counted on: 5/ 3/94 @20:58
Detector: AEA12
Geometry number: 1
Count time: 28804. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	138.8	138.8	302.388	302.388	12.000	7.550	6.000	1.435
2	208.5	208.5	257.149	257.091	10.000	4.062	5.000	0.658
3?	43.0	43.0	248.826	247.509	8.000	1.252	4.000	1.064
4	54.1	54.1	231.091	230.363	8.000	1.674	4.000	0.354

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid			Count Rate	%err @95	d/m	Activity uCi/ea
		Exp.	Obs.	Diff.	FWHM	c/m			
1	Am241	0.356	5.480	5.495	-.0150.03	7.61	3.2	59.6	0.268E-04
	Pu238		5.499	5.495	0.004			77.8	0.350E-04
2	Am243	0.558	5.276	5.286	-.0100.02	11.94	2.7	88.7	0.400E-04
3		????		5.242		0.67	42.2		
4	Pu239	0.107	5.143	5.163	-.0200.01	2.30	10.2	16.9	0.761E-05
	Pu240		5.144	5.163	-.019			16.9	0.761E-05

Totals:		1.022	<--valid peaks only-->			21.86			

DETECTOR CALIBRATION
Energy(MEV) = 4.104 + (0.0046)*Channel
Energy range (MeV): 4.104 TO 6.459
Efficiency = 0.1360 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	10267.0	100.000
Smoothed	10267.0	100.000
Composite fit	10812.8	105.316
Residuals	-545.8	-5.316

Analyzed by: JLA

WHC-SD-WM-DP-065, REV. 0

2
2
42
4 2
.4 2
...4..2
.....4..2.....
.....4..2.....
1.....4..2.....
34.....2.....
.1.....3.....2.....
.3.....2.....
...1.....2.....
.2.....1.....
..... 1
..... 1
.....1.....
.....1
..... 1
.1..

Raw Data Dump for AEA Spectrum: 12a4513.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.
41	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
61	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
91	1.	1.	1.	0.	0.	1.	2.	0.	1.	1.
101	0.	0.	1.	0.	0.	0.	0.	1.	0.	1.
111	0.	0.	0.	1.	1.	1.	0.	0.	0.	2.
121	0.	0.	0.	1.	0.	2.	0.	1.	0.	0.
131	0.	1.	1.	0.	0.	0.	2.	0.	0.	1.
141	0.	2.	0.	0.	0.	0.	0.	0.	1.	0.
151	2.	1.	0.	0.	1.	1.	0.	0.	4.	0.
161	1.	0.	1.	2.	2.	2.	1.	0.	0.	1.
171	1.	0.	1.	1.	2.	0.	2.	1.	1.	1.
181	4.	1.	4.	2.	1.	4.	2.	6.	3.	7.
191	4.	4.	2.	3.	8.	5.	11.	7.	12.	11.
201	13.	12.	13.	20.	23.	19.	29.	18.	38.	41.
211	41.	41.	41.	56.	59.	57.	68.	69.	76.	81.
221	97.	94.	85.	87.	88.	84.	96.	109.	117.	127.
231	142.	135.	123.	95.	70.	69.	72.	96.	117.	107.
241	122.	138.	151.	167.	161.	176.	191.	217.	215.	191.
251	175.	163.	188.	200.	191.	225.	233.	254.	234.	178.
261	93.	60.	43.	29.	25.	23.	22.	24.	29.	29.
271	24.	15.	15.	17.	16.	25.	23.	30.	27.	30.
281	33.	40.	51.	56.	62.	55.	73.	66.	79.	98.
291	90.	111.	113.	133.	136.	107.	124.	105.	135.	128.
301	131.	143.	149.	157.	116.	88.	65.	42.	38.	32.
311	32.	20.	22.	12.	4.	12.	5.	2.	1.	0.
321	1.	0.	0.	0.	0.	0.	1.	0.	0.	0.
331	1.	1.	0.	0.	0.	0.	0.	0.	1.	0.
341	0.	1.	1.	0.	1.	0.	0.	1.	2.	1.
351	2.	1.	1.	1.	1.	3.	4.	4.	0.	2.
361	0.	1.	1.	3.	1.	2.	1.	2.	0.	0.
371	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

WHC-SD-WM-DP-065, REV. 0

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Adams 5-4-94

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-065, REV. 0

SAMPLE
V76-8682
File ID: 10a2612.CNF

Counted on: 5/ 3/94 @20:57
Detector: AEA10
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	12.2	12.2	251.230	253.301	20.000	3.495	10.000	0.494

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid			Count Rate c/m	%err @95	d/m	Activity uCi/ea
			Exp.	Obs.	Diff.				
1	Am243	0.769	5.276	5.259	0.017	0.77	10.2	6.3	0.282E-05
Totals:		0.769	<--valid peaks only-->			0.77			

DETECTOR CALIBRATION

Energy(MEV) = 4.094 + (0.0046)*Channel
Energy range (MeV): 4.094 TO 6.450
Efficiency = 0.1239 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	480.0	100.000
Smoothed	479.9	99.986
Composite fit	369.0	76.873
Residuals	111.0	23.127

Analyzed by:

JLA

1234

1 Legend: Raw = Modeled Peaks = 1,2,..., etc Display Max.: 89.0

[illegible]

1235

Raw Data Dump for AEA Spectrum: 10a2612.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
21	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.
31	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.
41	0.	0.	0.	0.	0.	1.	1.	0.	0.	0.
51	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
71	1.	0.	0.	0.	1.	0.	0.	0.	1.	0.
81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
91	1.	1.	0.	0.	0.	0.	0.	0.	1.	0.
101	0.	0.	0.	0.	1.	1.	0.	0.	0.	1.
111	4.	1.	0.	0.	0.	0.	0.	0.	0.	0.
121	0.	1.	2.	2.	0.	1.	0.	0.	0.	0.
131	0.	0.	0.	2.	0.	2.	0.	1.	1.	1.
141	0.	0.	1.	1.	1.	0.	1.	0.	1.	1.
151	0.	1.	0.	0.	0.	1.	1.	0.	0.	2.
161	1.	0.	1.	0.	0.	2.	1.	0.	0.	0.
171	2.	1.	1.	0.	1.	4.	0.	1.	0.	0.
181	0.	0.	4.	2.	0.	1.	3.	4.	2.	1.
191	3.	2.	0.	0.	3.	3.	1.	1.	2.	1.
201	3.	3.	3.	2.	0.	4.	4.	3.	1.	3.
211	2.	8.	3.	2.	4.	1.	3.	2.	5.	3.
221	2.	4.	3.	3.	5.	4.	4.	8.	3.	5.
231	1.	2.	6.	8.	6.	7.	6.	3.	7.	10.
241	10.	9.	6.	13.	14.	11.	7.	9.	16.	12.
251	12.	11.	12.	14.	13.	4.	2.	0.	0.	0.
261	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.
271	0.	0.	2.	1.	1.	0.	0.	0.	0.	0.
281	0.	1.	2.	0.	0.	0.	1.	2.	0.	3.
291	1.	3.	1.	1.	2.	2.	1.	0.	1.	1.
301	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
311	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
321	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
331	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
341	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.
351	0.	2.	1.	0.	0.	0.	0.	0.	1.	2.
361	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
431	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
481	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

WHC-SD-WM-DP-065, REV. 0

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Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-065, REV. 0

SAMPLE
V77-8782
File ID: 9a1715.CNF

Counted on: 5/ 3/94 @20:56
Detector: AEA9
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	133.6	133.6	258.452	258.452	10.000	4.478	5.000	1.137
2	19.9	19.9	199.281	199.118	68.000	399.878	34.000	109.120

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid			Count Rate c/m	%err @95	d/m	Activity uCi/ea
			Exp.	Obs.	Diff.				
1	Am243	0.554	5.276	5.291	-.015	5.53	3.8	42.5	0.191E-04
2		0.395		5.018	1.84	3.95	7.0	30.0	0.135E-04
Totals:		0.949	<--valid peaks only-->			9.48			

DETECTOR CALIBRATION

Energy(MEV) = 4.102 + (0.0046)*Channel
Energy range (MeV): 4.102 TO 6.458
Efficiency = 0.1316 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	4796.0	100.000
Smoothed	4796.0	100.000
Composite fit	4550.9	94.890
Residuals	245.1	5.110

Analyzed by: JLA

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Spectrum 9a1715.CNF

1 Legend: Raw = Modeled Peaks = 1,2,..., etc

Display Max.:

806.9

WHC-SD-WM-DP-065, REV. 0

[illegible]

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Raw Data Dump for AEA Spectrum: 9a1715.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	2.	4.	4.
21	2.	2.	1.	3.	3.	4.	1.	3.	5.	3.
31	3.	1.	2.	3.	3.	3.	1.	3.	2.	3.
41	4.	1.	5.	3.	5.	3.	1.	4.	4.	3.
51	3.	7.	4.	7.	2.	2.	4.	4.	5.	5.
61	3.	4.	2.	6.	6.	4.	6.	7.	5.	5.
71	6.	5.	2.	4.	5.	4.	4.	5.	5.	4.
81	4.	2.	2.	1.	9.	1.	4.	7.	4.	2.
91	5.	1.	8.	4.	2.	4.	7.	4.	5.	5.
101	4.	7.	9.	9.	8.	7.	4.	8.	4.	7.
111	8.	7.	2.	6.	7.	11.	5.	6.	7.	4.
121	7.	4.	6.	11.	11.	6.	11.	7.	5.	5.
131	10.	3.	10.	6.	7.	5.	6.	5.	15.	6.
141	10.	6.	11.	9.	8.	12.	17.	5.	12.	6.
151	4.	16.	9.	11.	10.	6.	7.	7.	8.	8.
161	1.	6.	10.	5.	13.	8.	13.	11.	8.	8.
171	11.	15.	16.	14.	11.	15.	24.	7.	16.	11.
181	19.	13.	15.	12.	14.	14.	18.	8.	13.	12.
191	18.	15.	11.	16.	15.	13.	15.	23.	26.	24.
201	17.	16.	16.	16.	24.	26.	27.	27.	14.	30.
211	25.	24.	26.	29.	32.	21.	30.	26.	32.	37.
221	25.	34.	34.	35.	25.	35.	39.	43.	49.	50.
231	44.	51.	50.	40.	41.	44.	53.	46.	56.	49.
241	45.	46.	47.	57.	77.	56.	56.	67.	61.	73.
251	74.	75.	77.	91.	97.	115.	137.	149.	164.	133.
261	117.	60.	36.	25.	16.	16.	14.	7.	13.	11.
271	5.	10.	5.	10.	4.	3.	5.	3.	0.	1.
281	1.	1.	2.	2.	2.	0.	1.	1.	2.	0.
291	1.	0.	3.	0.	0.	3.	0.	0.	0.	2.
301	1.	3.	2.	1.	3.	2.	2.	0.	2.	2.
311	0.	2.	1.	0.	0.	1.	0.	0.	0.	0.
321	1.	0.	1.	0.	0.	1.	0.	0.	1.	2.
331	0.	2.	0.	0.	0.	1.	0.	0.	2.	1.
341	0.	0.	0.	0.	1.	0.	1.	1.	2.	2.
351	2.	2.	0.	1.	1.	2.	0.	1.	2.	3.
361	0.	2.	1.	3.	2.	2.	2.	0.	3.	0.
371	1.	1.	1.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-065, REV.0

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AG Hansen 5-4-94

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-065, REV.0

SAMPLE
V77-8082
File ID: 11a3578.CNF

Counted on: 5/ 3/94 @20:57
Detector: AEA11
Geometry number: 1
Count time: 28800. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	72.8	72.8	301.330	301.330	28.000	7.007	14.000	0.605
2	108.4	108.4	255.785	255.685	10.000	3.440	5.000	0.566
3	49.6	49.6	244.860	242.148	28.000	4.486	14.000	14.417
4	111.7	111.7	229.554	229.033	32.000	5.123	16.000	16.025
5	112.0	112.0	218.381	217.273	14.000	5.149	7.000	1.598

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate	%err @95	d/m	Activity uCi/ea
1	Am241	0.336	5.480	5.484	-.004	0.03	7.37	3.3	60.0	0.270E-04
	Pu238		5.499	5.484	0.015				78.4	0.353E-04
2	Am243	0.276	5.276	5.274	0.002	0.02	6.04	4.4	46.7	0.211E-04
3		0.048		5.212		0.02	1.04	24.5	8.0	0.360E-05
4	Pu239	0.115	5.143	5.151	-.008	0.02	2.51	9.9	19.3	0.867E-05
	Pu240		5.144	5.151	-.007				19.3	0.867E-05
5		0.190		5.097		0.02	4.17	6.4	32.0	0.144E-04
Totals:		0.965	<--valid peaks only-->				21.13			

DETECTOR CALIBRATION

Energy(MEV) = 4.098 + (0.0046)*Channel
Energy range (MeV): 4.098 TO 6.453
Efficiency = 0.1305 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	10515.0	100.000
Smoothed	10515.0	100.000
Composite fit	10144.0	96.472
Residuals	371.0	3.528

Analyzed by: _____

1240

WHC-SD-WM-DP-065, REV. 0

1 Legend: Raw = Modeled Peaks = 1,2,..., etc

Display Max.:

1104.3

WHC-SD-WM-DP-065, REV. 0

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Raw Data Dump for AEA Spectrum: 11a3578.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	2.	1.
21	2.	2.	1.	1.	0.	4.	1.	0.	1.
31	4.	0.	1.	2.	1.	3.	1.	1.	2.
41	1.	1.	1.	2.	4.	2.	1.	2.	6.
51	0.	4.	4.	0.	2.	1.	2.	3.	3.
61	4.	0.	0.	6.	2.	1.	4.	5.	1.
71	3.	2.	2.	6.	3.	2.	3.	2.	3.
81	3.	3.	6.	1.	4.	0.	7.	4.	6.
91	5.	1.	4.	4.	2.	5.	3.	11.	6.
101	2.	3.	5.	11.	4.	6.	5.	4.	8.
111	5.	11.	5.	7.	6.	5.	9.	7.	11.
121	6.	3.	7.	4.	8.	4.	7.	4.	6.
131	6.	9.	13.	9.	12.	10.	5.	9.	9.
141	9.	8.	9.	12.	10.	6.	11.	11.	9.
151	11.	18.	7.	8.	10.	15.	11.	8.	11.
161	14.	11.	18.	10.	14.	14.	18.	14.	15.
171	14.	15.	19.	29.	14.	11.	23.	15.	18.
181	33.	21.	27.	18.	23.	27.	22.	19.	19.
191	33.	29.	36.	33.	39.	30.	35.	38.	33.
201	40.	44.	53.	54.	64.	53.	70.	83.	98.
211	105.	118.	115.	124.	138.	138.	158.	159.	152.
221	143.	132.	130.	125.	123.	111.	125.	126.	147.
231	137.	130.	108.	90.	89.	84.	78.	89.	91.
241	124.	117.	127.	118.	125.	129.	103.	122.	125.
251	96.	94.	104.	122.	144.	150.	145.	130.	82.
261	40.	31.	27.	22.	20.	25.	28.	27.	23.
271	29.	21.	18.	23.	28.	26.	23.	40.	32.
281	36.	56.	58.	57.	51.	51.	60.	61.	59.
291	82.	70.	74.	86.	67.	60.	59.	58.	58.
301	77.	86.	58.	72.	52.	27.	29.	19.	15.
311	6.	6.	4.	8.	1.	1.	1.	1.	0.
321	0.	0.	0.	0.	0.	0.	0.	0.	0.
331	0.	0.	0.	0.	0.	0.	0.	0.	1.
341	2.	2.	0.	1.	0.	1.	0.	2.	0.
351	0.	0.	1.	2.	1.	1.	1.	1.	0.
361	2.	0.	0.	1.	2.	0.	0.	0.	0.
371	0.	0.	0.	1.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	0.	1.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.							

WHC-SD-WM-DP-065, REV. 0

Alphause 5-4-94

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT WHC-SD-WM-DP-065, REV. 0

SAMPLE
V77-8882
File ID: 3a3878.CNF

Counted on: 5/ 3/94 @20:52
Detector: AEA3
Geometry number: 1
Count time: 28800. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	139.8	139.8	252.324	252.324	22.000	17.693	11.000	4.763

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid			Count Rate c/m	%err @95	d/m	Activity uCi/ea	
			Exp.	Obs.	Diff.					
1	Am243	0.911	5.276	5.242	0.034	0.08	7.52	3.3	51.5	0.232E-04
	Pu240		5.144	5.242	-0.098				51.0	0.230E-04
Totals:			0.911	<--valid peaks only-->			7.52			

DETECTOR CALIBRATION
Energy(MEV) = 4.081 + (0.0046)*Channel
Energy range (MeV): 4.081 TO 6.437
Efficiency = 0.1473 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	3962.0	100.000
Smoothed	3962.0	100.000
Composite fit	3607.6	91.054
Residuals	354.4	8.946

Analyzed by: JLA

WHC-SD-WM-DP-065, REV. 0

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Raw Data Dump for AEA Spectrum: 3a3878.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
21	1.	0.	0.	0.	0.	0.	1.	0.	0.	0.
31	0.	1.	0.	0.	0.	1.	0.	2.	1.	0.
41	0.	0.	1.	0.	0.	0.	1.	1.	1.	1.
51	0.	1.	0.	1.	0.	0.	0.	0.	0.	1.
61	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.
71	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.
81	0.	0.	0.	0.	0.	1.	0.	1.	1.	1.
91	2.	0.	0.	0.	0.	1.	0.	1.	1.	1.
101	0.	0.	2.	1.	1.	2.	2.	2.	2.	2.
111	3.	3.	3.	1.	1.	1.	2.	0.	2.	1.
121	0.	1.	5.	0.	0.	2.	2.	1.	2.	0.
131	1.	3.	0.	0.	0.	1.	1.	0.	2.	0.
141	2.	2.	4.	1.	0.	4.	2.	5.	1.	2.
151	1.	4.	4.	2.	3.	4.	1.	3.	2.	2.
161	7.	0.	0.	2.	3.	2.	2.	4.	3.	1.
171	3.	3.	2.	1.	6.	3.	5.	3.	3.	4.
181	2.	3.	0.	6.	5.	4.	7.	9.	3.	2.
191	9.	11.	5.	7.	4.	4.	4.	7.	2.	5.
201	12.	11.	8.	10.	8.	7.	5.	6.	7.	7.
211	11.	13.	19.	15.	8.	12.	19.	14.	16.	28.
221	28.	18.	18.	23.	19.	31.	33.	35.	38.	32.
231	25.	41.	28.	40.	51.	46.	50.	66.	60.	67.
241	75.	64.	79.	107.	92.	121.	145.	118.	136.	139.
251	153.	147.	141.	147.	130.	124.	109.	113.	104.	83.
261	81.	62.	39.	28.	18.	16.	15.	7.	7.	11.
271	7.	5.	8.	5.	2.	1.	1.	1.	0.	0.
281	1.	0.	1.	0.	2.	3.	1.	2.	2.	2.
291	1.	0.	2.	0.	2.	1.	1.	0.	1.	0.
301	1.	2.	1.	0.	1.	0.	0.	1.	0.	2.
311	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
321	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
331	1.	0.	0.	0.	1.	0.	0.	0.	0.	0.
341	0.	0.	1.	0.	0.	0.	0.	0.	1.	0.
351	2.	1.	1.	0.	0.	0.	0.	1.	1.	0.
361	0.	0.	2.	0.	1.	0.	0.	0.	0.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

WHC-SD-WM-DP-065, REV. 0

1246

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-065, REV. 0

SAMPLE
V77-8982
File ID: 2a2825.CNF*R. L. L. L.*
5-4-94Counted on: 5/ 4/94 @ 5:50
Detector: AEA2
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	61.1	61.1	298.818	298.818	38.000	17.092	19.000	19.860
2?	44.4	44.4	294.101	294.101	16.000	0.039	8.000	19.860
3	450.7	450.7	225.420	225.420	30.000	41.041	15.000	4.845
4?	0.0	0.1	114.398	114.398	0.000	0.100	0.000	0.100

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid	Count	%err	Activity
			Exp. Obs. Diff. FWHM	Rate c/m	@95	d/m uCi/ea
1	Am241	0.049	5.480 5.486 -.006	2.51	5.6	24.7 0.111E-04
	Pu238		5.499 5.486 0.013			32.2 0.145E-04
2		????	5.464	0.10	95.9	
3	Pu239	0.894	5.143 5.141 0.002	45.39	1.3	418.8 0.189E-03
	Pu240		5.144 5.141 0.003			418.8 0.189E-03
4		????	4.619	0.00	9284.	
Totals:		0.943	<--valid peaks only-->		47.91	

DETECTOR CALIBRATION

Energy(MEV) = 4.082 + (0.0047)*Channel
 Energy range (MeV): 4.082 TO 6.488
 Efficiency = 0.1084 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	24381.0	100.000
Smoothed	24381.3	100.001
Composite fit	23041.8	94.507
Residuals	1339.2	5.493

Analyzed by:

ALJ

1247

1 Legend: Raw = Modeled Peaks = 1,2,..., etc

Display Max.: 3421.3

WHC-SD-WM-DP-065, REV. 0

The image displays a large, intricate fractal-like pattern constructed from a grid of dots and numbers. The pattern is highly symmetrical and recursive, resembling a Sierpinski triangle or a similar fractal structure. The numbers (1, 2, 3, 4) are placed at specific grid locations, often forming smaller versions of the overall pattern within the larger one. The pattern is composed of dots and numbers arranged in a grid, with the numbers 1, 2, 3, and 4 appearing at various positions. The pattern is highly symmetrical and recursive, with the numbers often forming smaller versions of the overall pattern within the larger one. The pattern is composed of dots and numbers arranged in a grid, with the numbers 1, 2, 3, and 4 appearing at various positions. The pattern is highly symmetrical and recursive, with the numbers often forming smaller versions of the overall pattern within the larger one.

Raw Data Dump for AEA Spectrum: 2a2825.CNF										
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	1.	3.
21	4.	3.	2.	2.	1.	2.	1.	1.	2.	2.
31	0.	0.	1.	0.	3.	3.	1.	2.	2.	2.
41	1.	1.	3.	1.	0.	4.	3.	4.	1.	4.
51	5.	4.	3.	3.	6.	2.	2.	3.	3.	5.
61	2.	8.	2.	4.	2.	5.	3.	3.	1.	4.
71	2.	5.	2.	4.	2.	3.	1.	6.	8.	4.
81	2.	4.	4.	10.	5.	1.	10.	12.	4.	4.
91	5.	11.	5.	9.	1.	4.	3.	8.	9.	14.
101	3.	11.	8.	7.	5.	7.	7.	8.	10.	6.
111	7.	11.	11.	20.	9.	14.	10.	8.	4.	5.
121	9.	13.	14.	15.	17.	21.	13.	10.	15.	12.
131	19.	19.	15.	23.	12.	22.	23.	13.	25.	16.
141	21.	19.	30.	36.	26.	15.	21.	26.	24.	28.
151	29.	34.	34.	22.	34.	48.	41.	35.	48.	35.
161	47.	34.	41.	48.	53.	45.	55.	61.	54.	58.
171	63.	68.	61.	70.	78.	76.	75.	82.	90.	99.
181	99.	97.	96.	114.	113.	135.	119.	131.	145.	136.
191	157.	173.	161.	191.	184.	184.	187.	216.	231.	277.
201	247.	258.	265.	311.	329.	318.	335.	324.	338.	352.
211	370.	380.	358.	396.	431.	416.	407.	409.	420.	443.
221	436.	448.	432.	489.	430.	447.	472.	442.	427.	388.
231	364.	334.	322.	314.	278.	232.	207.	190.	162.	146.
241	120.	133.	119.	121.	91.	94.	107.	102.	96.	101.
251	105.	90.	103.	106.	95.	93.	78.	77.	88.	46.
261	58.	59.	43.	56.	44.	45.	45.	41.	36.	49.
271	39.	43.	33.	37.	46.	45.	45.	51.	54.	65.
281	38.	56.	38.	64.	55.	55.	67.	55.	63.	67.
291	62.	51.	52.	57.	59.	57.	50.	59.	59.	62.
301	55.	51.	50.	40.	42.	38.	37.	23.	17.	20.
311	15.	7.	15.	9.	4.	3.	1.	2.	3.	1.
321	4.	0.	1.	1.	0.	0.	0.	0.	0.	1.
331	1.	0.	0.	0.	1.	0.	0.	0.	0.	0.
341	0.	0.	2.	2.	0.	4.	0.	2.	2.	1.
351	2.	2.	0.	1.	0.	1.	0.	0.	1.	0.
361	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	1.	0.	0.	0.	1.
401	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	1.	0.	0.	1.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	1.	0.	1.	0.	0.	0.
461	0.	0.	0.	2.	0.	2.	0.	0.	1.	0.
471	1.	0.	2.	1.	0.	1.	3.	1.	0.	0.
481	2.	1.	0.	0.	0.	0.	1.	1.	1.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-065, REV. 0

WHC-SD-WM-DP-065, REV. 0

Instrument: WB537237	Procedure/ Rev: LA-503-156/D0
Technologist: J M VAN SANT	Date: 04/29/94
Starting Time: 0800	Temperature 25 C
Ending Time: 1530	Chemist: L. FRITTS

Recur -- Separation between P_n and A_m incomplete!

	Description	Lab ID
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[illegible]

2818

Batch 3032

Serial No V 75.-8582	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 0	Priority 26
Determination Am241	Method/Standard LA-503-156	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size .100ml - 10 - 1ml			Customer ID STD	
Remarks, Calculations Results EDP R201 AR001 STD# 83843 RESULT 2.536 STD VAL 24.097 %REC 105.2% .100ml 87843 OUT FOR RERUN Van Sant Analyst - 1 Analyst - 2 Analyst - 3 Analyst - 4 Analyst - 5 Hrs Hrs Hrs Hrs Hrs Date 4-29-94 Time Completed 1700 Lab Unit Mgr R. Abate 54-6800-061 (R-10-83)				

AM-241: LA-503-156 (D-0)

LIQUID

Serial No.	Spike (Tracer) Book Number	STANDARD
V75-8582	Activity of Am243 Tracer in dpm/mL (SPKA)	87B43
Batch ID	Spike (Tracer) Volume in mL (SPKV)	9140
3032	Volume of Sample in mL (SS)	0.100
Rerun No.	Dilution Factor (DF)	1.000
0	Digest Dilution Factor (DDF)	101
Analyst	Am-241 Area Peak Height from AEA (C241)	1
VAN SANT	Am-243 Area Peak Height from AEA (C243)	569
Date	Cm-243/244 Area Peak Height from AEA (CM)	933
04/29/94	Total AT Count (ATOT)	10
Sample Type	AT Count Time in Minutes (MIN CTd)	13223
LIQUID	Background in CPM (BKG)	30
	Am 241 µCi/L =	6
		2.5360E+01

$$\text{Cm-243/244 } \mu\text{Ci/L} = \text{CM} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$$

$$\text{Am-241 } \mu\text{Ci/L} = \text{C241} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$$

$$\text{Tracer \% Recovery} = ((\text{ATOT} / \text{MIN CTd} - \text{BKG}) * 2 * (\text{C243} / (\text{C241} + \text{C243})) / (\text{SPKA} * \text{SPKV})) * 100$$

$$\text{Relative Counting Error (Am-241)} = \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) * 1.96 * 100$$

$$\text{Relative Counting Error (Cm-243/244)} = \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) * 1.96 * 100$$

Am 241 µCi/mL	=	2.54E-02	Detection
Cm 243/244 µCi/mL	=	< 3.52E-03	Level in
Relative counting error (Am-241)	=	10.4%	µCi/mL
Relative counting error (Cm-243/244)	=	62.3%	
Am-243 Tracer Recovery	=	59.1%	3.52E-03

Data Entry by: <i>[Signature]</i>	Date: 02-May-94
Approved by: <i>[Signature]</i>	Date: 2-MAY-94

Form 6 Rev. 1.3

Page 1 of 1
10/4/94 1251

3824

Serial No V 76.-8682	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination Am241	Method/Standard LA-503-156	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 1ml			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK WHC-SD-WM-DP-065, REV. 0 COUNT AS uCi/L .100mL 87B43 OUT FOR RERUN Van Sant Analyst - 1 <i>Van Sant</i> Analyst - 2 <i>Emmanuel</i> Analyst - 3 <i>MB</i> Analyst - 4 <i>Phan</i> Analyst - 5 Hrs Hrs Hrs Hrs Hrs 5-2-94 Date Time Completed Lab Unit Mgr 3-29-94 1700 <i>Rabate</i> <i>ChP</i> 54-6800-061 (R-10-83)				

AM-241: LA-503-156 (D-0)		LIQUID	BLANK
Serial No.	Spike (Tracer) Book Number		87B43
V76-8682	Activity of Am243 Tracer in dpm/mL (SPKA)		9140
Batch ID	Spike (Tracer) Volume in mL (SPKV)		0.100
3032	Volume of Sample in mL (SS)		1.000
Rerun No.	Dilution Factor (DF)		5
0	Digest Dilution Factor (DDF)		1
Analyst	Am-241 Area Peak Height from AEA (C241)		8
VAN SANT	Am-243 Area Peak Height from AEA (C243)		2387
Date	Cm-243/244 Area Peak Height from AEA (CM)		3
04/29/94	Total AT Count (ATOT)		4898
Sample Type	AT Count Time in Minutes (MIN CT'd)		30
LIQUID	Background in CPM (BKG)		9
Am 241 uCi/L = <			3.0594E-01

$\text{Cm-243/244 } \mu\text{Ci/L} = \text{CM} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$
 $\text{Am-241 } \mu\text{Ci/L} = \text{C241} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$
 $\text{Tracer \% Recovery} = ((\text{ATOT} / \text{MIN CT'd} - \text{BKG}) * 2 * (\text{C243} / (\text{C241} + \text{C243})) / (\text{SPKA} * \text{SPKV})) * 100$
 $\text{Relative Counting Error (Am-241)} = \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) * 1.96 * 100$
 $\text{Relative Counting Error (Cm-243/244)} = \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) * 1.96 * 100$
 NOTE: Am 241 Result is a LESS THAN Value

Am 241 uCi/mL	=	< 3.06E-04	Detection Level in uCi/mL
Cm 243/244 uCi/mL	=	< 3.06E-04	
Relative counting error (Am-241)	=	69.4%	
Relative counting error (Cm-243/244)	=	113.2%	
Am-243 Tracer Recovery	=	33.6%	3.06E-04

Data Entry by: <i>Phan</i>	Date: 02-May-94
Approved by: <i>P. Rabate</i>	Date: 2-MAY-94

10 2608

Serial No V 77.-8782	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Am241	Method/Standard LA-503-156	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size .100mL			Customer ID COMP	
Remarks, Calculations, Results COUNT AS uCi/L .100mL 87843 OUT FOR RERUN WHC-SD-WM-DP-065, REV. 0 Van Sant				
Analyst - 1	Analyst - 2 Gm Blue	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 2-29-94	Time Completed 1700	Lab Unit Mgr Rabata		

54-6800-061 (R-10-83)

AM-241: LA-503-156 (D-0)		LIQUID	SAMPLE
Serial No	Spike (Tracer) Book Number		87843
V77-8782	Activity of Am243 Tracer in dpm/mL	(SPKA)	9140
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.100
3032	Volume of Sample in mL	(SS)	0.100
Rerun No	Dilution Factor	(DF)	1
0	Digest Dilution Factor	(DDF)	5
Analyst	Am-241 Area Peak Height from AEA	(C241)	28
VAN SANT	Am-243 Area Peak Height from AEA	(C243)	2409
Date	Am-243/244 Area Peak Height from AEA	(CM)	41
04/29/94	Total AT Count	(ATOT)	6236
Sample Type	AT Count Time in Minutes	(MIN CT'd)	30
LIQUID	Background in CPM	(BKG)	9
Am 241 uCi/L = <		2.3928E+00	

$$\text{Cm-243/244 } \mu\text{Ci/L} = \text{CM} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$$

$$\text{Am-241 } \mu\text{Ci/L} = \text{C241} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$$

$$\text{Tracer \% Recovery} = ((\text{ATOT} / \text{MIN CT'd} - \text{BKG}) * 2 * (\text{C243} / (\text{C241} + \text{C243})) / (\text{SPKA} * \text{SPKV})) * 100$$

$$\text{Relative Counting Error (Am-241)} = \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) * 1.96 * 100$$

$$\text{Relative Counting Error (Cm-243/244)} = \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) * 1.96 * 100$$

NOTE: Am 241 Result is a LESS THAN Value

Am 241 uCi/mL	=	< 2.39E-03	Detection
Cm 243/244 uCi/mL	=	< 2.39E-03	Level in
Relative counting error (Am-241)	=	37.3%	uCi/mL
Relative counting error (Cm-243/244)	=	30.9%	
Am-243 Tracer Recovery	=	43.0%	2.39E-03

Data Entry by: <i>[Signature]</i>	Date: 02-May-94
Approved by: <i>[Signature]</i>	Date: 2-MAY-94

4378

Serial No V 77.-8882	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Am241	Method/Standard LA-503-156	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size .100ml			Customer ID COMP	
Remarks, Calculations, Results DUPLICATE SAMPLE COUNT AS uCi/L .100ml 87843 OUT FOR RERUN WHC-SD-WM-DP-065, REV. 0 Van Sant				
Analyst - 1	Analyst - 2 <i>EmBauer</i>	Analyst - 3 <i>MB</i>	Analyst - 4 <i>Shaw</i>	Analyst - 5
Hrs	Hrs	Hrs	Hrs 5-2-94	Hrs
Date 4-29-94	Time Completed 1700	Lab Unit Mgr <i>Rabute</i>	<i>Shaw</i>	

54-6800-061 (R-10-83)

AM-241: LA-503-156 (D-0)

LIQUID

			DUPLICATE
Serial No	Spike (Tracer) Book Number		87843
V77-8882	Activity of Am243 Tracer in dpm/mL	(SPKA)	9140
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.100
3032	Volume of Sample in mL	(SS)	0.100
Rerun No.	Dilution Factor	(DF)	1
0	Digest Dilution Factor	(DDF)	5
Analyst	Am-241 Area Peak Height from AEA	(C241)	893
VAN SANT	Am-243 Area Peak Height from AEA	(C243)	1483
Date	Cm-243/244 Area Peak Height from AEA	(CM)	2
04/29/94	Total AT Count	(ATOT)	13909
Sample Type	AT Count Time in Minutes	(MIN CTd)	30
LIQUID	Background in CPM	(BKG)	9
Am 241 uCi/L =			1.2396E+01

$$\text{Cm-243/244 } \mu\text{Ci/L} = \text{CM} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$$

$$\text{Am-241 } \mu\text{Ci/L} = \text{C241} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$$

$$\text{Tracer \% Recovery} = ((\text{ATOT} / \text{MIN CTd} - \text{BKG}) * 2 * (\text{C243} / (\text{C241} + \text{C243})) / (\text{SPKA} * \text{SPKV})) * 100$$

$$\text{Relative Counting Error (Am-241)} = \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) * 1.96 * 100$$

$$\text{Relative Counting Error (Cm-243/244)} = \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) * 1.96 * 100$$

Am 241 uCi/mL	=	1.24E-02	Detection Level in uCi/mL
Cm 243/244 uCi/mL	=	< 1.66E-03	
Relative counting error (Am-241)	=	8.3%	
Relative counting error (Cm-243/244)	=	138.7%	
Am-243 Tracer Recovery	=	62.1%	

Data Entry by: <i>P. Shaw</i>	Date: 02-May-94
Approved by: <i>P. Rabute</i>	Date: 2 MAY-94

5284

Serial No V 77.-8982	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Am241	Method/Standard LA-503-156	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size .100mL			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKED ID 83B43 mL OUT FOR RERUN SPIKE ID SPIKE VOLUME 87843 .100mL WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 <i>Van Sant</i>	Analyst - 2 <i>Im Bureau</i>	Analyst - 3 <i>AB</i>	Analyst - 4 <i>AD</i>	Analyst - 5
Hrs	Hrs	Hrs	Hrs 5-2-94	Hrs
Date 4-29-94	Time Completed 1700	Lab Unit Mgr <i>Raketa</i>	<i>AD</i>	

54-6800-061 (R-10-83)

AM-241: LA-503-156 (D-0)

Spiked Sample

		SPIKE
Type	Spike (Tracer) Book Number	87B43
SPIKE	Activity of Am243 Tracer in dpm/mL (SPKA)	9140
Work List	Spike (Tracer) Volume in mL (SPKV)	0.100
3032	Volume of Sample in mL (SS)	0.100
Test Code	Sample Dilution Factor (DF)	1
	Digest Dilution Factor (DDF)	4
Matrix	Am-241 Area Peak Height from AEA (C241)	680
LIQUID	Am-243 Area Peak Height from AEA (C243)	1181
Sample #	Spike (Matrix) Volume in mL (SMSS)	1
V77-8982	Spike (Matrix) Dilution Factor (SMDF)	1
Instrument Code	Spike (Matrix) Value in µCi/L (SMV)	24.090
	Am 241 µCi/L in Sample from Form 6 (Am1)	1.2396E+01
Analyst	Am 241 µCi/L in Spiked Sample (Am2)	9.4823E+00
VAN SANT		
Date	Am 241 µCi/L = $\frac{C241 \cdot SPKA \cdot SPKV \cdot DF \cdot DDF \cdot (1000\text{mL/L})}{C243 \cdot SS \cdot (2220000\text{dpm}/\mu\text{Ci})}$	
04/29/94	in Spiked Sample	
Time	Percent Spike Recovery = $\frac{(Am2 - Am1) \cdot (SMDF/SMSS)}{(DF \cdot DDF/SS)} \cdot 100$	
17:00	Spike (Matrix) Value in µCi/L	

Percent Spike Recovery = -0.3%

Data Entry by: <i>AD</i>	Date: 02-May-94
Approved by: <i>R. Raketa</i>	Date: 2-MAY-94

Form L7 Rev. 1.1

Page 1 of 1

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9 1711							
Serial No	V 77.-8082	Sample Point	108-AP	Date	3-18-94	Time Issued	12:26
Priority	26						
Determination	Am241	Method/Standard	LA-503-156	Result Units	% RECOVERY	Charge Code	N1A7F
Reruns	0						
Sample Size	. 100ml			Customer ID			
COMP							
Remarks, Calculations, Results SAMPLE SPIKE 83843 1ml DUPLICATE SPIKE ID 82843 SPIKE VOL .100ml OUT FOR RERUN Van Sand							
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5			
	<i>Am Barela</i>						
Hrs.	Hrs	Hrs	Hrs	Hrs			
Date	Time Completed	Lab Unit Mgr					
4-29-94	1700	<i>Deke</i>		<i>ChB</i>			

54-6800-061 (R-10-83)

#3 4-29-94

V 75-8582

$\frac{13223}{30} - 6$

WHC-SD-WM-DP-065, REV. 0

#1 4-29-94

V 76-8682

$\frac{4898}{30} - 9$

#2 4-29-94

$\frac{6236}{30} - 9$

V 77-8782

V 77-8982

#2 4-29-94

$\frac{13909}{30} - 9$

V 77-8882

#3 4-29-94

$\frac{15701}{30} - 6$

#1 4-29-94

$\frac{5812}{30} - 9$

V 77-8082

#3

1257

Spencer 5-2-94

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT WHC-SD-WM-DP-065, REV. 0

SAMPLE
V75-8582
File ID: 2a2818.CNF

Counted on: 5/ 1/94 @15: 8
Detector: AEA2
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	542.4	542.4	298.984	298.984	24.000	20.135	12.000	4.364
2	835.3	835.3	254.042	253.774	20.000	16.480	10.000	0.809
3	1065.3	1065.3	228.534	228.104	18.000	11.559	9.000	6.049
4?	0.0	0.1	86.493	86.493	0.000	0.100	0.000	0.100
5?	0.0	0.1	72.447	72.447	0.000	0.100	0.000	0.100

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid			Count Rate	%err @95	d/m	Activity uCi/ea
			Exp.	Obs.	Diff. FWHM				
1	Am241	0.195	5.480	5.500	-.0200.09	33.40	1.5	312.8	0.141E-03
	Pu238		5.499	5.500	-.001			408.4	0.184E-03
2	Am243	0.829	5.276	5.287	-.0110.08	141.76	0.8	1260.5	0.568E-03
	Pu240		5.144	5.287	-.143			1247.9	0.562E-03
3	Pu239	0.232	5.143	5.167	-.0240.05	39.63	2.8	348.8	0.157E-03
	Pu240		5.144	5.167	-.023			348.8	0.157E-03
4		????		4.501		0.00	*****		
5		????		4.435		0.00	*****		
Totals:			1.256	<--valid peaks only-->		214.79			

DETECTOR CALIBRATION

Energy(MEV) = 4.095 + (0.0047)*Channel
Energy range (MeV): 4.095 TO 6.501
Efficiency = 0.1136 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	82086.0	100.000
Smoothed	82086.0	100.000
Composite fit	103103.1	125.604
Residuals	-21017.1	-25.604

Analyzed by:

MB

WHC-SD-WM-DP-065, REV. 0

WHC-SD-WM-DP-065, REV. 0

Raw Data Dump for AEA Spectrum: 2a2818.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	5.	6.	3.
21	3.	5.	4.	5.	3.	2.	3.	5.	6.	6.
31	7.	7.	10.	2.	4.	1.	4.	4.	6.	9.
41	3.	6.	4.	11.	5.	6.	3.	5.	12.	0.
51	10.	3.	3.	12.	5.	4.	7.	9.	5.	9.
61	6.	8.	10.	8.	10.	8.	12.	9.	10.	11.
71	10.	18.	14.	14.	10.	5.	11.	7.	17.	11.
81	5.	5.	15.	16.	14.	18.	14.	16.	14.	8.
91	12.	8.	17.	19.	16.	17.	13.	16.	13.	16.
101	16.	15.	15.	14.	20.	18.	13.	27.	16.	16.
111	19.	20.	25.	21.	24.	22.	31.	22.	34.	15.
121	29.	24.	30.	36.	29.	22.	40.	27.	22.	22.
131	29.	31.	45.	35.	21.	34.	38.	36.	38.	32.
141	32.	32.	39.	46.	39.	45.	49.	42.	45.	39.
151	45.	48.	48.	53.	64.	45.	76.	58.	67.	67.
161	59.	61.	58.	62.	84.	79.	98.	66.	83.	92.
171	88.	84.	104.	89.	123.	80.	110.	103.	124.	130.
181	135.	120.	137.	135.	155.	172.	138.	149.	163.	171.
191	192.	193.	204.	200.	251.	238.	233.	237.	264.	287.
201	334.	356.	366.	416.	419.	439.	513.	468.	484.	562.
211	620.	710.	712.	814.	831.	894.	970.	988.	1115.	1265.
221	1264.	1337.	1421.	1588.	1564.	1706.	1760.	1747.	1750.	1636.
231	1652.	1572.	1358.	1325.	1216.	1136.	999.	865.	839.	717.
241	698.	709.	706.	689.	680.	717.	784.	775.	859.	845.
251	839.	885.	831.	933.	895.	855.	829.	763.	668.	589.
261	587.	499.	419.	348.	267.	283.	246.	206.	180.	155.
271	149.	163.	146.	156.	165.	164.	168.	160.	181.	187.
281	218.	201.	285.	279.	272.	270.	348.	337.	337.	390.
291	431.	420.	486.	517.	530.	518.	551.	563.	569.	556.
301	526.	514.	488.	476.	448.	349.	332.	251.	244.	185.
311	133.	117.	95.	65.	73.	39.	41.	35.	20.	7.
321	6.	5.	2.	0.	5.	2.	3.	3.	0.	0.
331	0.	0.	2.	1.	2.	2.	2.	2.	3.	2.
341	2.	3.	3.	2.	3.	2.	2.	10.	5.	1.
351	7.	7.	6.	7.	8.	6.	5.	7.	6.	4.
361	8.	6.	5.	3.	3.	1.	3.	3.	3.	0.
371	0.	0.	0.	2.	0.	1.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
401	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
411	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
431	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
451	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.
461	1.	0.	0.	0.	0.	0.	0.	1.	0.	0.
471	0.	0.	0.	2.	1.	1.	0.	1.	0.	0.
481	1.	0.	0.	0.	1.	1.	1.	0.	0.	0.
491	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-065, REV.0

5-2-84

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT WHC-SD-WM-DP-065, REV. 0

SAMPLE
V76-8682
File ID: 3a3874.CNF

Counted on: 5/ 1/94 @15: 9
Detector: AEA3
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	2109.2	2109.2	257.360	257.360	14.000	7.220	7.000	3.895

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Exp.	Obs.	Diff.	FWHM	Count Rate	%err @95	d/m	Activity uCi/ea	
1	Am243	0.945	5.276	5.282	-.0060	0.03	65.84	1.1	463.2	0.209E-03	
Totals:		0.945	<--valid peaks only-->				65.84				

DETECTOR CALIBRATION
Energy(MEV) = 4.098 + (0.0046)*Channel
Energy range (MeV): 4.098 TO 6.453
Efficiency = 0.1436 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	33452.0	100.000
Smoothed	33452.0	100.000
Composite fit	31606.0	94.482
Residuals	1846.0	5.518

Analyzed by: _____

MB

1 Legend: Spectrum 3a3874.CNF
Raw = Modeled Peaks = 1,2,..., etc Display Max.: 12683.3

Display Max.: 12683.3

WHC-SD-WM-DP-065, REV. 0

[illegible]

1263

Raw Data Dump for AEA Spectrum: 3a3874.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	1.	0.	0.	0.	0.	0.	1.	2.	0.
31	1.	0.	0.	0.	0.	1.	0.	1.	1.	0.
41	0.	0.	1.	1.	0.	0.	0.	1.	0.	0.
51	0.	1.	0.	1.	1.	2.	0.	0.	0.	1.
61	0.	1.	1.	0.	0.	0.	0.	1.	1.	1.
71	0.	0.	0.	1.	1.	0.	0.	1.	1.	1.
81	1.	0.	0.	0.	1.	0.	0.	3.	1.	0.
91	0.	0.	0.	1.	1.	0.	0.	0.	0.	1.
101	1.	1.	3.	3.	0.	0.	1.	0.	3.	1.
111	3.	0.	0.	0.	1.	1.	0.	0.	1.	1.
121	1.	0.	1.	2.	0.	0.	2.	0.	1.	1.
131	1.	2.	3.	0.	2.	3.	0.	1.	2.	4.
141	3.	0.	3.	2.	3.	2.	0.	1.	3.	3.
151	2.	0.	4.	2.	2.	3.	2.	3.	3.	3.
161	4.	3.	1.	1.	3.	2.	5.	0.	2.	5.
171	2.	3.	4.	2.	5.	1.	2.	3.	8.	1.
181	2.	4.	10.	7.	5.	5.	7.	5.	5.	5.
191	8.	13.	6.	7.	12.	11.	13.	9.	9.	7.
201	14.	14.	17.	16.	9.	21.	11.	6.	16.	19.
211	11.	20.	31.	17.	32.	15.	23.	32.	36.	34.
221	41.	38.	46.	47.	56.	50.	70.	57.	57.	72.
231	72.	89.	90.	100.	113.	131.	165.	163.	206.	200.
241	263.	283.	355.	418.	475.	525.	637.	819.	876.	1046.
251	1193.	1361.	1658.	1838.	2049.	2297.	2387.	2369.	2141.	1811.
261	1405.	1083.	796.	483.	382.	306.	226.	233.	214.	168.
271	171.	118.	108.	86.	89.	35.	19.	18.	5.	8.
281	3.	0.	0.	0.	1.	0.	2.	1.	2.	0.
291	1.	3.	3.	1.	3.	3.	2.	4.	0.	8.
301	5.	7.	3.	6.	4.	2.	2.	2.	0.	1.
311	1.	2.	0.	0.	0.	1.	0.	0.	0.	0.
321	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
331	0.	0.	1.	0.	0.	0.	0.	0.	0.	1.
341	0.	0.	0.	0.	1.	1.	0.	1.	0.	1.
351	0.	1.	1.	3.	0.	1.	1.	0.	0.	2.
361	3.	1.	2.	1.	0.	1.	1.	2.	0.	0.
371	0.	0.	0.	1.	0.	0.	0.	1.	1.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
471	1.	0.	0.	0.	0.	0.	0.	1.	1.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-065, REV. 0

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-065, REV.0

SAMPLE

V-77-8782

File ID: 10a2608.CNF

Counted on: 4/30/94 @19: 7
 Detector: AEA10
 Geometry number: 1
 Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	33.5	33.5	365.695	365.695	12.000	4.625	6.000	1.824
2	21.4	21.4	305.692	305.687	10.000	6.134	5.000	2.231
3	2094.5	2094.5	258.836	258.836	12.000	4.874	6.000	2.133

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Exp.	Obs.	Diff.	FWHM	Count Rate	%err @95	d/m	Activity uCi/ea
1	Cm244	0.015	5.796	5.779	0.017	0.02	1.06	8.7	8.7	0.391E-05
	Cm243		5.786	5.779	0.007				11.9	0.535E-05
2	Pu238	0.011	5.499	5.503	-0.004	0.03	0.76	10.3	8.6	0.386E-05
	Am241		5.480	5.503	-0.023				6.6	0.296E-05
3	Am243	0.889	5.276	5.288	-0.012	0.02	63.67	1.1	525.4	0.237E-03
Totals:		0.914	<--valid peaks only-->				65.49			

DETECTOR CALIBRATION

Energy(MEV) = 4.097 + (0.0046)*Channel
 Energy range (MeV): 4.097 TO 6.452
 Efficiency = 0.1224 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	34396.0	100.000
Smoothed	34396.0	100.000
Composite fit	31435.2	91.392
Residuals	2960.8	8.608

Analyzed by:

EMB

1265

Raw Data Dump for AEA Spectrum: 10a2608.CNF										
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	1.	2.	5.
21	2.	4.	2.	1.	2.	1.	0.	0.	0.	1.
31	1.	0.	0.	0.	1.	0.	1.	0.	0.	1.
41	0.	0.	1.	0.	1.	3.	0.	1.	0.	1.
51	0.	0.	0.	0.	0.	1.	0.	0.	0.	2.
61	1.	0.	0.	2.	0.	0.	0.	1.	0.	1.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
81	1.	1.	1.	2.	2.	0.	0.	0.	1.	0.
91	0.	1.	0.	1.	1.	1.	2.	1.	1.	0.
101	0.	1.	0.	2.	1.	0.	2.	2.	0.	1.
111	2.	0.	2.	0.	2.	2.	4.	0.	1.	1.
121	2.	1.	0.	0.	0.	2.	1.	1.	2.	1.
131	4.	4.	4.	3.	8.	2.	5.	3.	5.	4.
141	8.	3.	6.	10.	6.	8.	4.	7.	5.	7.
151	5.	7.	4.	7.	6.	9.	6.	9.	11.	6.
161	3.	4.	3.	5.	2.	8.	3.	5.	7.	6.
171	6.	7.	6.	3.	4.	7.	8.	5.	8.	3.
181	7.	9.	8.	7.	5.	7.	11.	11.	5.	18.
191	12.	10.	5.	15.	12.	7.	11.	13.	22.	17.
201	25.	23.	10.	24.	26.	29.	10.	20.	24.	27.
211	19.	27.	24.	27.	36.	56.	49.	62.	60.	60.
221	77.	80.	70.	94.	106.	118.	132.	145.	167.	168.
231	181.	198.	186.	209.	215.	202.	203.	180.	195.	201.
241	237.	271.	313.	393.	423.	488.	614.	715.	810.	934.
251	1045.	1253.	1352.	1422.	1548.	1801.	2022.	2315.	2409.	2362.
261	1936.	1338.	818.	477.	294.	246.	189.	187.	130.	175.
271	156.	139.	119.	84.	77.	43.	29.	21.	13.	6.
281	1.	2.	2.	0.	0.	0.	3.	5.	4.	5.
291	7.	8.	6.	9.	6.	8.	8.	14.	15.	21.
301	12.	7.	22.	25.	24.	20.	28.	19.	13.	10.
311	3.	5.	6.	2.	4.	6.	5.	3.	1.	1.
321	1.	1.	0.	1.	0.	0.	0.	1.	1.	0.
331	0.	2.	2.	1.	1.	0.	1.	0.	1.	2.
341	1.	2.	3.	3.	1.	1.	6.	7.	3.	2.
351	9.	9.	6.	12.	7.	12.	16.	26.	34.	21.
361	29.	32.	38.	25.	29.	41.	36.	27.	22.	18.
371	5.	3.	0.	0.	0.	3.	1.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-065, REV.0

Johnson 5-2-94

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT WHC-SD-WM-DP-065, REV.0

SAMPLE
V77-8882
File ID: 4a4378.CNF

Counted on: 5/ 1/94 @15: 9
Detector: AEA4
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	757.0	757.0	303.074	303.074	12.000	5.397	6.000	3.147
2	1250.7	1250.7	257.620	257.618	12.000	5.044	6.000	2.987
3	1190.2	1190.2	231.320	231.261	14.000	5.480	7.000	2.301
4	42.6	42.6	117.813	117.813	192.000	1.000	96.000	0.100
5?	5.1	5.1	104.649	103.590	4.000	0.065	2.000	1.913
6?	12.2	12.2	92.687	92.092	12.000	0.721	6.000	6.049
7?	12.2	12.2	82.741	82.068	12.000	4.225	6.000	0.444
8?	9.5	9.5	52.489	51.600	12.000	7.816	6.000	1.200
9?	5.9	5.9	28.067	26.989	14.000	3.734	7.000	3.928

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid			FWHM	Count		%err @95	d/m	Activity uCi/ea
			Exp.	Obs.	Diff.		Rate	c/m			
1	Pu238	0.185	5.499	5.489	0.010	0.02	20.92		2.0	396.9	0.179E-03
	Am241		5.480	5.489	-.009					304.0	0.137E-03
2	Am243	0.298	5.276	5.280	-.004	0.02	33.64		1.5	464.3	0.209E-03
3	Pu239	0.336	5.143	5.159	-.016	0.03	38.03		1.5	519.5	0.234E-03
	Pu240		5.144	5.159	-.015					519.5	0.234E-03
4	Np237	0.029	4.640	4.637	0.003	0.00	3.30		4.9	751.5	0.339E-03
5		????		4.572			0.01		1057.		
6		????		4.519			0.10		117.		
7		????		4.473			0.92		15.6		
8		????		4.332			0.55		21.5		
9		????		4.219			0.12		64.7		
Totals:			0.849	<--valid peaks only-->			95.89				

DETECTOR CALIBRATION

Energy(MEV) = 4.095 + (0.0046)*Channel
Energy range (MeV): 4.095 TO 6.450
Efficiency = 0.0732 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	54249.0	100.000
Smoothed	54249.0	100.000
Composite fit	46850.6	86.362
Residuals	7398.4	13.638

Analyzed by: _____

MB

WHC-SD-WM-DP-065, REV. 0

1. Legend: Raw = Modeled Peaks = 1,2,..., etc

Display Max.:

7577.4

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Raw Data Dump for AEA Spectrum: 4a4378.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	4.	15.	10.
21	13.	9.	8.	13.	14.	20.	14.	17.	15.
31	14.	10.	19.	12.	10.	12.	9.	15.	17.
41	13.	14.	25.	16.	21.	20.	19.	11.	12.
51	25.	16.	29.	17.	20.	23.	19.	13.	22.
61	19.	17.	11.	19.	17.	15.	28.	15.	15.
71	17.	27.	23.	28.	20.	28.	26.	23.	21.
81	28.	25.	34.	30.	20.	29.	25.	19.	25.
91	22.	38.	25.	32.	20.	28.	23.	28.	17.
101	30.	23.	32.	36.	32.	34.	30.	28.	17.
111	37.	36.	45.	30.	39.	43.	46.	39.	54.
121	37.	43.	37.	33.	37.	39.	43.	54.	37.
131	50.	43.	59.	48.	42.	57.	48.	46.	47.
141	64.	49.	46.	57.	58.	60.	56.	50.	66.
151	66.	76.	47.	70.	79.	60.	73.	62.	64.
161	70.	94.	80.	70.	72.	75.	80.	82.	67.
171	88.	87.	73.	66.	94.	89.	92.	87.	104.
181	92.	108.	94.	92.	119.	124.	120.	110.	103.
191	113.	112.	125.	121.	109.	153.	144.	134.	128.
201	156.	157.	150.	144.	185.	147.	162.	180.	178.
211	174.	175.	183.	210.	226.	228.	283.	304.	321.
221	431.	439.	487.	526.	594.	686.	817.	1049.	1177.
231	1382.	1387.	1223.	993.	769.	526.	364.	264.	212.
241	193.	182.	183.	231.	263.	271.	301.	364.	405.
251	489.	579.	738.	863.	1093.	1375.	1456.	1483.	1371.
261	746.	526.	309.	211.	149.	129.	123.	135.	125.
271	106.	104.	99.	85.	53.	61.	75.	77.	62.
281	68.	70.	79.	67.	81.	99.	97.	114.	111.
291	133.	176.	181.	249.	257.	290.	301.	449.	487.
301	731.	892.	893.	852.	715.	564.	367.	263.	177.
311	121.	89.	80.	46.	36.	29.	14.	16.	12.
321	0.	1.	0.	0.	0.	0.	0.	0.	0.
331	0.	0.	0.	0.	1.	0.	0.	0.	0.
341	1.	0.	1.	1.	0.	2.	2.	0.	2.
351	0.	2.	1.	0.	0.	0.	1.	0.	0.
361	1.	1.	0.	1.	1.	0.	0.	1.	0.
371	0.	0.	0.	0.	0.	1.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	1.	0.	1.
481	0.	0.	1.	1.	0.	0.	0.	1.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.							

WHC-SD-WM-DP-065, REV. 0

1271

Handwritten: 5-2-94

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT WHC-SD-WM-DP-065, REV. 0

SAMPLE
V77-8982
File ID: 5a5284.CNF

Counted on: 5/ 1/94 @15:10
Detector: AEA5
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	635.1	635.1	304.012	304.012	20.000	17.090	10.000	4.547
2	1066.3	1066.3	257.035	256.918	24.000	20.110	12.000	2.622
3	1265.6	1265.6	230.648	229.931	20.000	12.388	10.000	3.728
4	99.4	99.4	81.648	81.600	214.000	1.000	107.000	0.100
5	40.5	40.5	57.341	56.529	30.000	1.000	15.000	0.100
6?	28.1	28.1	39.350	39.350	24.000	0.741	12.000	0.044

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Am241	0.155	5.480	5.505	-.025	0.08	33.99	1.5	270.3	0.122E-03
	Pu238		5.499	5.505	-.006				352.8	0.159E-03
2	Am243	0.404	5.276	5.284	-.008	0.09	88.37	1.0	667.2	0.301E-03
	Pu240		5.144	5.284	-.140				660.5	0.298E-03
3	Pu239	0.268	5.143	5.157	-.014	0.06	58.67	1.6	438.5	0.198E-03
	Pu240		5.144	5.157	-.013				438.5	0.198E-03
4		0.033		4.460		0.00	7.16	3.4	53.5	0.241E-04
5		0.012		4.342		0.00	2.57	8.8	19.2	0.866E-05
6		????		4.261			1.74	11.8		

Totals: 0.873 <--valid peaks only--> 190.77

DETECTOR CALIBRATION

Energy(MEV) = 4.076 + (0.0047)*Channel
Energy range (MeV): 4.076 TO 6.483
Efficiency = 0.1338 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	104954.0	100.000
Smoothed	104953.9	100.000
Composite fit	92408.1	88.046
Residuals	12545.9	11.954

1272

Analyzed by: _____
MB

WHC-SD-WM-DP-065, REV. 0

1 Legend: Raw = Modeled Peaks = 1,2,..., etc

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WHC-SD-WM-DP-065, REV. 0

1274

Raw Data Dump for AEA Spectrum: 5a5284.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	32.	67.	71.	70.
21	63.	64.	64.	51.	66.	49.	76.	62.	66.	83.
31	68.	85.	65.	61.	73.	85.	69.	70.	75.	80.
41	79.	62.	70.	60.	77.	65.	82.	75.	94.	87.
51	65.	71.	88.	75.	71.	84.	101.	92.	75.	79.
61	84.	80.	74.	89.	73.	92.	96.	78.	83.	78.
71	99.	95.	78.	90.	88.	110.	102.	99.	89.	104.
81	105.	97.	112.	93.	93.	95.	95.	78.	98.	106.
91	105.	107.	114.	93.	99.	101.	112.	109.	99.	128.
101	97.	110.	113.	105.	113.	120.	109.	115.	115.	127.
111	126.	107.	107.	115.	110.	131.	130.	121.	122.	116.
121	106.	142.	132.	129.	140.	140.	116.	126.	146.	140.
131	144.	153.	134.	166.	144.	153.	123.	163.	134.	160.
141	150.	138.	152.	137.	146.	156.	150.	165.	165.	168.
151	142.	154.	177.	152.	153.	179.	183.	168.	181.	157.
161	193.	205.	182.	186.	195.	188.	193.	199.	212.	194.
171	189.	209.	217.	198.	207.	203.	238.	261.	212.	235.
181	237.	233.	245.	254.	225.	242.	260.	247.	278.	246.
191	233.	275.	291.	282.	271.	290.	254.	292.	296.	317.
201	303.	324.	334.	366.	369.	369.	381.	404.	451.	428.
211	529.	527.	581.	572.	661.	702.	775.	854.	936.	992.
221	1108.	1202.	1287.	1342.	1503.	1588.	1668.	1719.	1759.	1788.
231	1734.	1740.	1624.	1605.	1478.	1402.	1234.	1118.	1000.	959.
241	816.	793.	721.	696.	708.	672.	675.	737.	796.	837.
251	907.	928.	1019.	1078.	1107.	1114.	1181.	1088.	1062.	1007.
261	1009.	909.	798.	791.	662.	567.	507.	437.	407.	306.
271	278.	206.	186.	197.	163.	160.	121.	154.	154.	123.
281	154.	164.	158.	132.	164.	190.	220.	245.	266.	242.
291	264.	325.	359.	443.	442.	497.	516.	522.	593.	610.
301	644.	645.	645.	680.	629.	628.	613.	534.	494.	401.
311	339.	348.	257.	221.	185.	143.	120.	93.	69.	67.
321	49.	44.	19.	15.	18.	5.	6.	3.	2.	1.
331	2.	1.	1.	3.	0.	1.	0.	1.	0.	0.
341	1.	1.	1.	1.	2.	0.	1.	0.	1.	1.
351	4.	2.	4.	2.	3.	2.	2.	4.	1.	5.
361	3.	4.	5.	1.	2.	3.	1.	0.	0.	2.
371	3.	0.	0.	0.	0.	1.	0.	0.	0.	0.
381	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
391	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
431	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
441	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	1.	0.	1.	1.	1.	1.	0.
481	0.	1.	2.	0.	0.	1.	1.	0.	2.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
511	0.	0.								

WHC-SD-WM-DP-065, REV.0

1275

McBroom 5/1/94

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT WHC-SD-WM-DP-065, REV.0

SAMPLE
V-77-8082
File ID: 9a1711.CNF

Counted on: 4/30/94 @19: 6
Detector: AEA9
Geometry number: 1
Count time: 28804. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	791.4	791.4	259.041	259.041	12.000	4.445	6.000	1.624
2	203.7	203.7	214.349	213.835	54.000	72.710	27.000	32.511
3	132.3	132.3	198.359	198.359	26.000	11.290	13.000	13.474
4	172.7	172.7	177.777	176.116	40.000	24.705	20.000	0.947
5?	4.5	4.5	65.418	64.856	4.000	0.146	2.000	2.683
6?	6.0	6.0	49.474	48.786	6.000	0.693	3.000	1.291
7?	6.9	6.9	38.708	38.137	18.000	1.057	9.000	0.330
8?	2.4	2.4	34.766	33.665	4.000	0.189	2.000	0.288

PEAK RESULTS

Peak Error Limit: 25%

Peak		AEA		Peak Centroid			Count		%err @95	d/m	Activity uCi/ea
ID	Isotope	Frac	Exp.	Obs.	Diff.	FWHM	Rate	c/m			
1	Am243	0.335	5.276	5.293	-.017	0.02	25.96	1.8		191.3	0.862E-04
2	Pu239	0.224	5.143	5.085	0.058	0.33	17.34	3.3		126.5	0.570E-04
	Pu240		5.144	5.085	0.059					126.5	0.570E-04
3		0.057		5.014		0.05	4.43	7.9		32.3	0.146E-04
4	Np237	0.426	4.781	4.911	-.130	0.11	33.00	1.8		276.7	0.125E-03
5		????		4.400			0.02	1241.			
6		????		4.326			0.06	319.			
7		????		4.277			0.20	82.7			
8		????		4.256			0.02	808.			
Totals:		1.042	<--valid peaks only-->				80.73				

DETECTOR CALIBRATION

Energy(MEV) = 4.101 + (0.0046)*Channel
Energy range (MeV): 4.101 TO 6.456
Efficiency = 0.1371 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	37202.0	100.000
Smoothed	37202.0	100.000

Composite fit
Residuals

38895.6
-1693.6

104.552
-4.552

Analyzed by: _____

EMB

WHC-SD-WM-DP-065, REV. 0

WHC-SD-WM-DP-065, REV. 0

Raw Data Dump for AEA Spectrum: 9a1711.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	12.	28.
21	36.	31.	44.	34.	19.	33.	42.	41.	40.
31	42.	34.	52.	44.	49.	46.	38.	50.	48.
41	42.	37.	44.	45.	51.	35.	47.	53.	59.
51	51.	52.	40.	50.	51.	52.	43.	42.	47.
61	47.	59.	50.	51.	70.	53.	58.	55.	40.
71	69.	60.	58.	70.	55.	55.	61.	67.	77.
81	63.	60.	64.	71.	70.	56.	58.	67.	72.
91	66.	66.	64.	72.	64.	79.	73.	90.	71.
101	75.	79.	85.	75.	82.	88.	84.	82.	81.
111	96.	99.	74.	74.	83.	77.	95.	117.	104.
121	90.	93.	113.	119.	106.	88.	125.	95.	109.
131	110.	94.	90.	114.	120.	102.	108.	113.	119.
141	132.	132.	111.	121.	123.	143.	123.	121.	134.
151	135.	135.	140.	135.	126.	128.	154.	148.	164.
161	144.	139.	145.	165.	168.	170.	169.	173.	151.
171	185.	156.	165.	197.	175.	189.	197.	196.	184.
181	186.	191.	176.	172.	208.	193.	177.	192.	195.
191	185.	196.	210.	203.	212.	201.	200.	225.	211.
201	211.	169.	201.	186.	195.	190.	200.	217.	191.
211	221.	189.	207.	211.	224.	205.	201.	199.	181.
221	204.	173.	182.	184.	181.	191.	178.	159.	184.
231	178.	168.	186.	174.	203.	174.	179.	183.	172.
241	184.	190.	214.	193.	197.	218.	230.	251.	322.
251	355.	386.	372.	422.	504.	605.	815.	862.	921.
261	756.	538.	296.	181.	114.	96.	88.	79.	64.
271	52.	61.	44.	45.	39.	17.	9.	10.	1.
281	1.	0.	2.	2.	1.	0.	1.	0.	1.
291	1.	2.	2.	1.	1.	0.	1.	1.	2.
301	1.	1.	0.	1.	5.	4.	4.	2.	1.
311	0.	3.	3.	1.	1.	1.	1.	0.	0.
321	0.	0.	0.	1.	1.	0.	0.	0.	0.
331	0.	0.	0.	1.	2.	1.	1.	0.	0.
341	1.	0.	3.	0.	1.	1.	0.	1.	2.
351	2.	2.	2.	1.	1.	2.	2.	0.	0.
361	1.	3.	1.	2.	2.	2.	1.	0.	2.
371	0.	2.	0.	1.	0.	1.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	1.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	1.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.							

WHC-SD-WM-DP-065, REV.0

1279

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY
ANALYTICAL BATCH

WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No.
V 75, V 76, V 77Customer ID:
STD, BLANK, COMPAnalysis:
Am241Sample Prep:
ACID DIGEST

Instrument: WB537237

Procedure/ Rev: LA-503-156/D1

Technologist: MC JONES

Date: 08/04/94

Starting Time: 1600

Temperature 25 C

Ending Time: 0130

Chemist: L. FRITTS

Comments: BATCH #4153

*Run -- Spike duplicate out of QC. Low trans
recovery! ~~AT~~ OUT FOR RERUN*

	Description	Lab ID
1	LMCS STANDARD	V 75-8582
2	BLANK	V 76-8682
3	SAMPLE	V 77-8782
4	SAMPLE DUPLICATE	V 77-8882
5	SAMPLE SPIKE	V 77-8982
6	SAMPLE SPIKE DUP	V 77-8082
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

DATA
NOT USED
IN PACKAGE

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	83B43	.100ML-10ML-1ML		
SPIKE	87B43	.100ML		

1280

[illegible]

11/11/2016

The results for the standard are in uCi/L.

WHC-SD-WM-DP-065, REV. 0

1281

7 7950 SUPER RUSH Batch 4153

Serial No V 75-8582	Sample Point 100-AP	Date 8-18-94	Time Issued 12:00	Priority LH
Determination Am241	Method/Standard LA-503-156	Result Units % RECOVERY	Charge Code N1A7F	Reruns 3
Sample Size .100ML-10ML-1ML +.100ml Spike # 87B43			Customer ID STD	
Remarks, Calculations, Results EDP R201 AR001 STD# 83B43 RESULT 3.0083 ^{E+1} <i>alpha - 245</i> STD VAL 2,4087 ^{E+1} <i>Beta Gamma - 243</i> WREC 124.9 <i>20</i> WHC-SD-WM-DP-065, REV. 0 OUT FOR RERUN				
Analyst - 1 <i>Mike Jones</i>	Analyst - 2 <i>Emmanuel</i>	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8/14/94	Time Completed	Lab Unit Mgr <i>[Signature]</i>		

54-6800-06 (R-10-83)

BEST AVAILABLE COPY

AM-241: LA-503-156 (D-0)		LIQUID	STANDARD
Serial No	Spike (Tracer) Book Number		87B43
V75-8582	Activity of Am243 Tracer in dpm/mL	(SPKA)	9140
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.100
4153	Volume of Sample in mL	(SS)	1.000
Rerun No.	Dilution Factor	(DF)	101
3	Digest Dilution Factor	(DDF)	1
Analyst	Am-241 Area Peak Height from AEA	(C241)	1172
JONES	Am-243 Area Peak Height from AEA	(C243)	1620
Date	Cm-243/244 Area Peak Height from AEA	(CM)	7
08/04/94	Total AT Count	(ATOT)	9647
Sample Type	AT Count Time in Minutes	(MIN CTd)	30
LIQUID	Background in CPM	(BKG)	3
Am 241 µCi/L =			3.0083E+01

$$\begin{aligned} \text{Cm-243/244 } \mu\text{Ci/L} &= \text{CM} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci})) \\ \text{Am-241 } \mu\text{Ci/L} &= \text{C241} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci})) \\ \text{Tracer \% Recovery} &= ((\text{ATOT} / \text{MIN CTd} - \text{BKG}) * 2 * (\text{C243} / (\text{C241} + \text{C243})) / (\text{SPKA} * \text{SPKV})) * 100 \\ \text{Relative Counting Error (Am-241)} &= \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) * 1.96 * 100 \\ \text{Relative Counting Error (Cm-243/244)} &= \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) * 1.96 * 100 \end{aligned}$$

Am 241 µCi/mL	=	3.01E-02	Detection Level in µCi/mL
Cm 243/244 µCi/mL	=	< 5.14E-03	
Relative counting error (Am-241)	=	7.5%	
Relative counting error (Cm-243/244)	=	74.2%	
Am-243 Tracer Recovery	=	40.4%	5.14E-03

Data Entry by: <i>[Signature]</i>	Date: 04-Aug-94
Approved by: <i>[Signature]</i>	Date: 8 Aug 94

6 6355 SUPER RUSH

Serial No V 76-8682	Sample Point 106-AF	Date 8-18-94	Time Issued 11: 3	Priority 3
Determination Am241	Method/Standard LA-503-156	Result Units uCi/ML	Charge Code NJA7P	Reruns 3
Sample Size .200 ML + .100ml spike# 87B43			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK COUNT AS uCi/L .200ml Con HNO ₃ 1ml 8M HNO ₃ WHC-SD-WM-DP-065, REV.0 alpha -12 B.L. -276 <5.13 8.8-94 <5.15E-03 8.8-94 RERUN				
Analyst - 1 <i>Mike Jones</i>	Analyst - 2 <i>Enoch</i>	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8/14/94	Time Completed	Lab Unit Mgr <i>Robert</i>		

54-6800-06 (R-10-83)

BEST AVAILABLE COPY

AM-241: LA-503-156 (D-0)

LIQUID

		BLANK
Serial No	Spike (Tracer) Book Number	87B43
V76-8682	Activity of Am243 Tracer in dpm/mL (SPKA)	9140
Batch ID	Spike (Tracer) Volume in mL (SPKV)	0.100
4153	Volume of Sample in mL (SS)	0.200
Rerun No	Dilution Factor (DF)	1
3	Digest Dilution Factor (DDF)	5
Analyst	Am-241 Area Peak Height from AEA (C241)	1
JONES	Am-243 Area Peak Height from AEA (C243)	275
Date	Cm-243/244 Area Peak Height from AEA (CM)	2
08/04/94	Total AT Count (ATOT)	968
Sample Type	AT Count Time in Minutes (MIN CTd)	30
LIQUID	Background in CPM (BKG)	4
Am 241 uCi/L = <		5.1464E+00

$$\text{Cm-243/244 } \mu\text{Ci/L} = \text{CM} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$$

$$\text{Am-241 } \mu\text{Ci/L} = \text{C241} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$$

$$\text{Tracer \% Recovery} = ((\text{ATOT} / \text{MIN CTd} - \text{BKG}) * 2 * (\text{C243} / (\text{C241} + \text{C243})) / (\text{SPKA} * \text{SPKV})) * 100$$

$$\text{Relative Counting Error (Am-241)} = \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) * 1.96 * 100$$

$$\text{Relative Counting Error (Cm-243/244)} = \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) * 1.96 * 100$$

NOTE: Am 241 Result is a LESS THAN Value

Am 241 uCi/mL	=	< 5.15E-03	Detection Level in uCi/mL
Cm 243/244 uCi/mL	=	< 5.15E-03	
Relative counting error (Am-241)	=	196.4%	
Relative counting error (Cm-243/244)	=	139.1%	
Am-243 Tracer Recovery	=	6.2%	5.15E-03

Data Entry by: <i>[Signature]</i>	Date: 04-Aug-94
Approved by: <i>[Signature]</i>	Date: 8 Aug 94

3 3108 SUPER RUSH

Serial No V 77.-8782	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Am-241	Method/Standard LA-503-156	Result Units uCi/ML	Charge Code N1A7F	Reruns 3
Sample Size .200 ML + .100ml spike #87843			Customer ID COMF	
Remarks, Calculations, Results COUNT AS uCi/L .200 ml con HNO ₃ 1 ml 8M HNO ₃ alpha-26 B.H. - 400 <5.15E-3 uCi/ml				
BEST AVAILABLE COPY				
Analyst - 1 Mike Jones	Analyst - 2 Em Buller	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8/4/94	Time Completed	Lab Unit Fits		
54-6800-061 (R-10-83)				

WHC-SD-WM-DP-065, REV. 0

AM-241: LA-503-156 (D-0)		LIQUID	SAMPLE
Serial No.	Spike (Tracer) Book Number		87B43
V77-8782	Activity of Am-243 Tracer in dpm/mL	(SPKA)	9140
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.100
4153	Volume of Sample in mL	(SS)	0.200
Rerun No.	Dilution Factor	(DF)	1
3	Digest Dilution Factor	(DDF)	5
Analyst	Am-241 Area Peak Height from AEA	(C241)	4
JONES	Am-243 Area Peak Height from AEA	(C243)	319
Date	Cm-243/244 Area Peak Height from AEA	(CM)	3
08/04/94	Total AT Count	(ATOT)	1283
Sample Type	AT Count Time in Minutes	(MIN CTd)	30
LIQUID	Background in CPM	(BKG)	3
Am 241 uCi/L = <			5.1464E+00

$$\begin{aligned} \text{Cm-243/244 } \mu\text{Ci/L} &= \text{CM} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci})) \\ \text{Am-241 } \mu\text{Ci/L} &= \text{C241} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci})) \\ \text{Tracer \% Recovery} &= ((\text{ATOT} / \text{MIN CTd} - \text{BKG}) * 2 * (\text{C243} / (\text{C241} + \text{C243}))) / (\text{SPKA} * \text{SPKV}) * 100 \\ \text{Relative Counting Error (Am-241)} &= \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) * 1.96 * 100 \\ \text{Relative Counting Error (Cm-243/244)} &= \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) * 1.96 * 100 \end{aligned}$$

NOTE: Am 241 Result is a LESS THAN Value

Am 241 uCi/mL	=	< 5.15E-03	Detection Level in uCi/mL
Cm 243/244 uCi/mL	=	< 5.15E-03	
Relative counting error (Am-241)	=	98.6%	
Relative counting error (Cm-243/244)	=	113.7%	
Am-243 Tracer Recovery	=	8.6%	5.15E-03

Data Entry by: <i>[Signature]</i>	Date: 04-Aug-94
Approved by: <i>[Signature]</i>	Date: 8 Aug 94

2 2378

SUPER RUSH

Serial No V 77-8882	Sample Point 106-AP	Date 3-18-94	Time Issued 11:18	Priority CIS
Determination Am241	Method-Standard LA 503-156	Result Units pCi/mL	Charge Code N1A74	Reruns 3
Sample Size 200 mL + .100 ml Spike #87843			Customer ID COMP	
Remarks, Calculations, Results DUPLICATE SAMPLE COUNT AS pCi/L .200 ml con HNO ₃ 1 ml 8M HNO ₃ WHC-SD-WM-DP-065, REV.0 alpha - 25 B.L. - 397 < 5.15E-3 mCi/ml OUT FOR RERUN				
Analyst - 1 Mike Jones	Analyst - 2 Em Bach	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8/4/94	Time Completed	Lab Unit Mgr J. Fitts	E. Key	

BEST AVAILABLE COPY

54-6800-061 (Rev. 8-83)

AM-241: LA-503-156 (D-0)

LIQUID

DUPLICATE		
Serial No	Spike (Tracer) Book Number	87843
V77-8882	Activity of Am241 Tracer in dpm/mL (SPKA)	9140
Batch ID	Spike (Tracer) Volume in mL (SPKV)	0.100
4153	Volume of Sample in mL (SS)	0.200
Rerun No	Dilution Factor (DF)	1
3	Digest Dilution Factor (DDF)	5
Analyst	Am-241 Area Peak Height from AEA (C241)	4
JONES	Am-243 Area Peak Height from AEA (C243)	236
Date	Cm-243/244 Area Peak Height from AEA (CM)	1
08/04/94	Total AT Count (ATOT)	1240
Sample Type	AT Count Time in Minutes (MIN CTd)	30
LIQUID	Background in CPM (BKG)	4
Am 241 pCi/L = <		5.1464E+00

$$\text{Cm-243/244 pCi/L} = \text{CM} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm/pCi}))$$

$$\text{Am-241 pCi/L} = \text{C241} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm/pCi}))$$

$$\text{Tracer \% Recovery} = ((\text{ATOT} / \text{MIN CTd} - \text{BKG}) * 2 * (\text{C243} / (\text{C241} + \text{C243})) / (\text{SPKA} * \text{SPKV})) * 100$$

$$\text{Relative Counting Error (Am-241)} = \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) * 1.96 * 100$$

$$\text{Relative Counting Error (Cm-243/244)} = \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) * 1.96 * 100$$

NOTE: Am 241 Result is a LESS THAN Value

Am 241 pCi/mL	=	< 5.15E-03	Detection
Cm 243/244 pCi/mL	=	< 5.15E-03	Level in
Relative counting error (Am-241)	=	98.8%	pCi/mL
Relative counting error (Cm-243/244)	=	196.4%	
Am-243 Tracer Recovery	=	8.0%	5.15E-03

Data Entry by: <i>[Signature]</i>	Date: 04-Aug-94
Approved by: <i>[Signature]</i>	Date: 8 Aug 94

4 4620 SUPER RUSH

Serial No V 77-8982	Sample Point 105-AP	Date 8-18-94	Time Issued 12:18	Priority 20
Determination Am241	Method/Standard LA-503-156	Result Units % RECOVERY	Charge Code N1A7F	Reruns 3
Sample Size .200 ML +.200ml Tracer #87843			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKED ID V77 SPIKE ID 83843 SPIKE VOLUME 1.00-10-1ml mc98394 .200ml Con HNO ₃ alpha-38 B. 12.-358 117.0% BEST AVAILABLE COP WHC-SD-WM-DP-065, REV.0 OUT FOR RETURN				
Analyst - 1 Mike Jones	Analyst - 2 Em Basler	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8/4/94	Time Completed	Lab Unit		

54-6800-061 (R-10-83)

AM-241: LA-503-156 (D-0)		Spiked Sample	SPIKE
Type	Spike (Tracer) Book Number		87843
SPIKE	Activity of Am243 Tracer in dpm/mL (SPKA)		9140
Work List	Spike (Tracer) Volume in mL (SPKV)		0.200
4153	Volume of Sample in mL (SS)		0.200
Test Code	Sample Dilution Factor (DF)		1
	Digest Dilution Factor (DDF)		5
Matrix	Am-241 Area Peak Height from AEA (C241)		143
LIQUID	Am-243 Area Peak Height from AEA (C243)		422
Sample #	Spike (Matrix) Volume in mL (SMSS)		1
V77-8982	Spike (Matrix) Dilution Factor (SMDF)		101
Instrument Code	Spike (Matrix) Value in pCi/L (SMV)		24.087
WB537237	Am 241 pCi/L in Sample from Form 6 (Am1)		<5.1464
Analyst	Am 241 pCi/L in Spiked Sample (Am2)		6.9757E+00
JONES			
Date	Am 241 pCi/L = $\frac{C241 \cdot SPKA \cdot SPKV \cdot DF \cdot DDF \cdot (1000\text{mL/L})}{C243 \cdot SS \cdot (2220000\text{dpm/pCi})}$		
08/04/94	in Spiked Sample		
Time	Percent Spike Recovery = $\frac{(Am2 - Am1) \cdot (SMDF/SMSS) / (DF \cdot DDF/SS) \cdot 100}{\text{Spike (Matrix) Value in pCi/L}}$		
01:30			

Percent Spike Recovery = 117.0%

Date Entry by: <i>[Signature]</i>	Date: 08-Aug-94
Approved by: <i>[Signature]</i>	Date: 8 Aug 94

Form L7 Rev. 1.1 Page 1 of 1

1286

5 5515 SUPER RUS-1

Serial No 7 77-8082	Sample Point 101 AP	Date 8-10-94	Time Issued 10:10	Priority 26
Determination Am241	Method/Standard LA-503-156	Result Units % RECOVERY	Charge Code N1A7F	Reruns 3
Sample Size .200 mL + .200ml Tracer #87843			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKE DUPLICATE SPIKE ID 83843 SPIKE VOL .100-10-1ml .200 ml con HNO ₃ alpha -65 B-18-372 143.7% OUT FOR RERUN				
Analyst - 1 Mike Jones	Analyst - 2 Mike Jones	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8/4/94	Time Completed	Lab Unit Mfr		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV.0

AM-241: LA-503-156 (D-0)

Spiked Sample

Type	Spike (Tracer) Book Number	SPIKE
SPIKE	Activity of Am243 Tracer in dpm/mL (SPKA)	87843
Work List	Spike (Tracer) Volume in mL (SPKV)	9140
4153	Volume of Sample in mL (SS)	0.200
Test Code	Sample Dilution Factor (DF)	0.200
	Digest Dilution Factor (DDF)	1
Matrix	Am-241 Area Peak Height from AEA (C241)	5
LIQUID	Am-243 Area Peak Height from AEA (C243)	134
Sample #	Spike (Matrix) Volume in mL (SMSS)	322
V77-8082	Spike (Matrix) Dilution Factor (SMDF)	1
Instrument Code	Spike (Matrix) Value in pCi/L (SMV)	101
WB537237	Am 241 pCi/L in Sample from Form 6 (Am1)	24.087
Analyst	Am 241 pCi/L in Spiked Sample (Am2)	<5.1464
JONES		8.5667E+00
Date	Am 241 pCi/L = $\frac{C241 \cdot SPKA \cdot SPKV \cdot DF \cdot DDF \cdot (1000 \text{ mL/L})}{C243 \cdot SS \cdot (2220000 \text{ dpm/pCi})}$	
08/04/94	in Spiked Sample	
Time	Percent Spike Recovery = $\frac{(Am2 - Am1) \cdot (SMDF/SMSS) \cdot (DF \cdot DDF/SS) \cdot 100}{\text{Spike (Matrix) Value in pCi/L}}$	
01:30		

Percent Spike Recovery = 143.7%

Date Entry by: <i>Mike Jones</i>	Date: 08-Aug-94
Approved by: <i>Mike Jones</i>	Date: 8 Aug 94

Form L7 Rev. 1.1

Page 1 of 1

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#1 8-4-94

V75 8582

$\frac{9647}{30} -3$

WHC-SD-WM-DP-065, REV. 0

#2 8-4-94

V76-8682

$\frac{968}{30} -4$

#1 8-4-94

V77-8782

$\frac{1283}{30} -3$

#2 8-4-94

V77-8882

$\frac{1240}{30} -4$

#2 8-4-94

V77-8982

$\frac{1867}{30} -4$

#1 8-4-94

V77-8082

$\frac{2719}{30} -3$

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
V-75-8582
File ID: 7a7950.CNF

WHC-SD-WM-DP-065, REV. 0

Counted on: 8/ 4/94 @ 5:46
Detector: AEA7
Geometry number: 1
Count time: 28804. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	1038.3	1038.3	303.985	303.985	18.000	10.672	9.000	3.076
2	1441.0	1441.0	258.084	258.023	16.000	9.867	8.000	2.998

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp. Obs. Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Am241	0.418	5.480 5.482 -0.002	0.05	47.30	1.3	502.7	0.226E-03
	Pu238		5.499 5.482 0.017				656.3	0.296E-03
2	Am243	0.553	5.276 5.271 0.005	0.05	62.69	1.2	632.6	0.285E-03
Totals:		0.971	<--valid peaks only-->		110.00			

DETECTOR CALIBRATION

Energy(MEV) = 4.084 + (0.0046)*Channel
Energy range (MeV): 4.084 TO 6.439
Efficiency = 0.1001 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	54381.0	100.000
Smoothed	54378.4	99.995
Composite fit	52806.1	97.104
Residuals	1574.9	2.896

Analyzed by:

EMB

WHC-SD-WM-DP-065, REV. 0

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1290

Raw Data Dump for AEA Spectrum: 7a7950.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	1.	1.	3.
21	5.	1.	5.	2.	2.	0.	1.	2.	1.	3.
31	1.	0.	3.	2.	3.	2.	1.	5.	1.	0.
41	1.	0.	1.	1.	2.	3.	2.	3.	2.	2.
51	2.	1.	2.	1.	3.	1.	4.	2.	2.	4.
61	3.	4.	2.	2.	1.	2.	5.	2.	1.	0.
71	4.	2.	1.	4.	4.	0.	4.	3.	1.	1.
81	2.	1.	2.	2.	3.	2.	2.	3.	5.	5.
91	1.	3.	3.	2.	1.	4.	1.	3.	1.	2.
101	1.	2.	0.	1.	4.	2.	2.	4.	1.	2.
111	1.	1.	1.	2.	3.	3.	2.	5.	3.	2.
121	5.	0.	4.	5.	0.	0.	4.	2.	3.	1.
131	2.	1.	1.	3.	3.	5.	2.	4.	3.	5.
141	6.	5.	4.	6.	2.	3.	9.	8.	4.	1.
151	7.	6.	4.	4.	7.	8.	5.	3.	4.	6.
161	9.	11.	3.	6.	4.	3.	4.	7.	8.	9.
171	9.	12.	6.	10.	8.	10.	8.	11.	10.	9.
181	10.	9.	9.	6.	12.	10.	3.	15.	8.	8.
191	10.	13.	13.	9.	11.	12.	15.	18.	24.	29.
201	26.	23.	18.	24.	34.	29.	29.	33.	26.	39.
211	46.	53.	51.	46.	57.	57.	68.	81.	65.	94.
221	88.	127.	107.	130.	143.	163.	128.	168.	176.	207.
231	211.	236.	255.	292.	321.	321.	331.	344.	371.	389.
241	400.	477.	498.	514.	561.	564.	636.	704.	735.	853.
251	1027.	1007.	1151.	1190.	1414.	1536.	1620.	1573.	1582.	1438.
261	1315.	1153.	912.	731.	620.	443.	354.	308.	252.	215.
271	208.	210.	182.	171.	172.	190.	156.	196.	215.	218.
281	217.	220.	265.	241.	304.	266.	334.	333.	349.	380.
291	400.	445.	477.	545.	537.	633.	686.	780.	874.	905.
301	987.	1081.	1172.	1088.	1086.	1067.	916.	719.	668.	525.
311	407.	330.	259.	193.	155.	113.	85.	75.	49.	40.
321	22.	17.	8.	7.	4.	3.	1.	2.	0.	0.
331	0.	0.	1.	0.	0.	1.	0.	0.	2.	2.
341	1.	1.	1.	0.	1.	2.	1.	1.	3.	1.
351	1.	0.	4.	2.	3.	0.	1.	2.	3.	4.
361	2.	1.	1.	7.	3.	1.	7.	1.	2.	1.
371	0.	1.	0.	0.	0.	1.	0.	0.	2.	0.
381	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
391	0.	1.	0.	0.	1.	0.	0.	1.	0.	0.
401	1.	0.	0.	0.	1.	0.	0.	0.	0.	0.
411	1.	0.	0.	0.	0.	1.	0.	1.	1.	1.
421	0.	0.	0.	0.	1.	0.	1.	1.	0.	0.
431	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.
441	0.	1.	0.	0.	1.	0.	0.	0.	1.	0.
451	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.
461	0.	0.	1.	2.	1.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	1.	0.	3.
481	0.	0.	1.	1.	2.	0.	0.	1.	0.	0.
491	0.	0.	4.	2.	2.	2.	3.	1.	3.	3.
511	68.	0.								

WHC-SD-WM-DP-065, REV. 0

1291

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
V-76-8682
File ID: 6a6355.CNF

WHC-SD-WM-DP-065, REV.0

Counted on: 8/ 4/94 @ 5:46
Detector: AEA6
Geometry number: 1
Count time: 28804. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	249.3	249.3	255.492	255.492	14.000	8.292	7.000	3.234

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Exp.	Peak Centroid Obs.	Diff.	FWHM	Count Rate	%err c/m @95	d/m	Activity uCi/ea
1	Am243	0.953	5.276	5.275	0.0010	0.04	9.21	2.9	75.8	0.341E-04
Totals:		0.953	<--valid peaks only-->				9.21			

DETECTOR CALIBRATION

Energy(MEV) = 4.099 + (0.0046)*Channel
Energy range (MeV): 4.099 TO 6.455
Efficiency = 0.1227 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	4637.0	100.000
Smoothed	4637.3	100.006
Composite fit	4419.8	95.316
Residuals	217.2	4.684

Analyzed by:

EMB

1 Legend: Spectrum 6a6355.CNF
Raw = Modeled Peaks = 1,2,..., etc Display Max.: 1689.3

Display Max.: 1689.3

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Raw Data Dump for AEA Spectrum: 6a6355.CNF										
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
51	0.	0.	1.	0.	1.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.
71	0.	1.	0.	0.	0.	0.	0.	1.	0.	0.
81	1.	0.	0.	0.	0.	1.	1.	0.	0.	0.
91	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.
101	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
111	1.	1.	2.	0.	0.	0.	2.	0.	0.	1.
121	1.	0.	0.	0.	0.	1.	0.	0.	0.	1.
131	0.	1.	1.	0.	1.	0.	2.	1.	0.	1.
141	0.	0.	1.	1.	0.	0.	1.	0.	0.	0.
151	0.	1.	0.	0.	0.	2.	0.	1.	0.	0.
161	0.	1.	0.	0.	1.	0.	0.	0.	0.	0.
171	0.	0.	1.	1.	1.	0.	1.	1.	2.	1.
181	0.	2.	1.	0.	3.	1.	2.	1.	2.	2.
191	1.	0.	2.	3.	2.	0.	1.	0.	1.	1.
201	3.	2.	2.	3.	1.	4.	1.	3.	1.	2.
211	0.	12.	2.	4.	7.	4.	7.	8.	8.	11.
221	11.	16.	13.	9.	12.	11.	9.	25.	14.	18.
231	26.	26.	21.	29.	30.	44.	46.	50.	55.	63.
241	41.	73.	90.	104.	91.	116.	132.	136.	178.	180.
251	223.	214.	244.	275.	264.	270.	260.	230.	198.	148.
261	112.	75.	51.	40.	36.	26.	23.	17.	17.	23.
271	12.	11.	9.	3.	6.	1.	0.	1.	1.	0.
281	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
291	1.	0.	1.	0.	0.	0.	1.	0.	0.	0.
301	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
311	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
321	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
331	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.
341	0.	0.	0.	1.	0.	0.	0.	2.	0.	0.
351	0.	0.	1.	0.	1.	0.	1.	0.	0.	0.
361	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
371	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	1.	0.	0.	1.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

WHC-SD-WM-DP-065, REV. 0

1294

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
V-77-8782
File ID: 3a3108.CNF

WHC-SD-WM-DP-065, REV. 0

Counted on: 8/ 4/94 @ 5:44
Detector: AEA3
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	305.4	305.4	253.499	253.499	18.000	14.366	9.000	4.459

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid			Count Rate c/m	%err @95	d/m	Activity uCi/ea
			Exp.	Obs.	Diff.				
1	Am243	0.948	5.276	5.269	0.007	14.55	2.3	120.3	0.542E-04
	Pu240		5.144	5.269	-.125			119.1	0.536E-04
Totals:		0.948	<--valid peaks only-->			14.55			

DETECTOR CALIBRATION
Energy(MEV) = 4.103 + (0.0046)*Channel
Energy range (MeV): 4.103 TO 6.458
Efficiency = 0.1222 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	7366.0	100.000
Smoothed	7366.0	100.000
Composite fit	6985.7	94.837
Residuals	380.3	5.163

Analyzed by: _____
EMB

1 Legend: Spectrum 3a3108.CNF Display Max.: 2358.9
Raw = Modeled Peaks = 1,2,..., etc

Display Max.:

2358.9

WHC-SD-WM-DP-065, REV. 0

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Raw Data Dump for AEA Spectrum: 3a3108.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
21	0.	0.	1.	0.	0.	0.	1.	0.	0.	0.
31	0.	1.	0.	0.	0.	0.	0.	0.	0.	1.
41	3.	1.	0.	0.	0.	1.	1.	1.	1.	0.
51	0.	1.	1.	1.	0.	0.	0.	1.	0.	1.
61	0.	1.	1.	1.	2.	1.	0.	1.	1.	1.
71	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.
81	0.	2.	1.	0.	0.	0.	0.	0.	1.	1.
91	0.	0.	3.	0.	1.	1.	0.	1.	0.	1.
101	1.	0.	3.	1.	0.	0.	0.	0.	0.	2.
111	1.	3.	0.	2.	2.	0.	0.	3.	0.	2.
121	0.	0.	2.	1.	4.	1.	2.	0.	0.	3.
131	4.	1.	2.	0.	1.	3.	1.	3.	0.	1.
141	3.	5.	4.	2.	1.	2.	2.	0.	2.	1.
151	0.	2.	3.	1.	3.	2.	0.	4.	3.	3.
161	1.	2.	2.	3.	0.	2.	0.	5.	4.	5.
171	7.	4.	8.	1.	4.	2.	3.	3.	4.	5.
181	6.	6.	5.	6.	2.	4.	4.	3.	6.	7.
191	8.	6.	8.	5.	8.	2.	7.	6.	6.	6.
201	4.	4.	9.	11.	3.	10.	7.	5.	11.	10.
211	8.	5.	10.	17.	12.	17.	11.	9.	11.	15.
221	14.	27.	29.	25.	17.	28.	36.	32.	41.	28.
231	44.	56.	52.	79.	68.	99.	91.	88.	100.	154.
241	164.	172.	166.	210.	211.	266.	232.	298.	297.	309.
251	310.	305.	319.	315.	312.	296.	277.	233.	248.	166.
261	165.	96.	69.	62.	38.	32.	22.	19.	30.	18.
271	11.	22.	7.	7.	6.	3.	3.	0.	0.	0.
281	0.	0.	1.	0.	0.	0.	1.	1.	2.	0.
291	1.	2.	2.	1.	1.	2.	1.	2.	1.	4.
301	1.	0.	1.	1.	0.	3.	0.	1.	0.	0.
311	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
321	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
331	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
341	0.	0.	0.	0.	0.	1.	0.	1.	0.	0.
351	1.	1.	0.	3.	0.	0.	0.	1.	0.	0.
361	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	1.	1.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

WHC-SD-WM-DP-065, REV.0

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
V-77-8882
File ID: 2a2378.CNF

WHC-SD-WM-DP-065, REV.0

Counted on: 8/ 4/94 @ 5:44
Detector: AEA2
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	215.3	215.3	256.399	256.399	20.000	13.790	10.000	4.005

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid			FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
			Exp.	Obs.	Diff.					
1	Am243	0.987	5.276	5.276	0.0000	0.06	10.44	2.8	91.2	0.411E-04
Totals:		0.987	<--valid peaks only-->				10.44			

DETECTOR CALIBRATION
Energy(MEV) = 4.096 + (0.0046)*Channel
Energy range (MeV): 4.096 TO 6.451
Efficiency = 0.1157 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	5081.0	100.000
Smoothed	5081.0	100.000
Composite fit	5013.2	98.665
Residuals	67.8	1.335

Analyzed by:

EMB

WHC-SD-WM-DP-065, REV.0

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Raw Data Dump for AEA Spectrum: 2a2378.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
21	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
31	1.	1.	0.	0.	0.	0.	0.	0.	1.	0.
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	0.	1.	1.	1.	1.	0.	0.	0.
61	0.	1.	0.	1.	0.	1.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.
81	0.	0.	0.	0.	0.	0.	1.	2.	0.	0.
91	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
101	0.	0.	0.	0.	2.	1.	0.	0.	1.	1.
111	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.
121	1.	0.	0.	1.	1.	1.	0.	0.	1.	0.
131	0.	1.	0.	0.	1.	1.	0.	0.	0.	0.
141	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
151	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
161	2.	1.	1.	1.	0.	1.	0.	1.	0.	0.
171	3.	1.	0.	2.	0.	2.	1.	1.	0.	1.
181	2.	1.	0.	1.	1.	2.	1.	0.	1.	2.
191	2.	0.	2.	2.	3.	1.	1.	2.	1.	0.
201	2.	4.	2.	2.	1.	4.	2.	2.	1.	7.
211	2.	7.	7.	4.	4.	5.	2.	6.	5.	6.
221	9.	9.	14.	18.	15.	11.	19.	23.	19.	17.
231	27.	23.	39.	28.	55.	51.	49.	63.	74.	78.
241	74.	101.	95.	128.	121.	122.	137.	166.	164.	191.
251	191.	226.	205.	203.	211.	236.	215.	224.	200.	181.
261	158.	111.	101.	82.	83.	72.	53.	31.	27.	22.
271	28.	17.	13.	13.	6.	2.	2.	3.	3.	2.
281	0.	2.	5.	1.	1.	2.	1.	0.	1.	0.
291	1.	0.	2.	2.	1.	1.	3.	3.	0.	4.
301	0.	1.	2.	0.	0.	1.	1.	0.	1.	1.
311	1.	0.	1.	0.	0.	3.	0.	0.	0.	0.
321	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
331	0.	1.	0.	0.	1.	0.	0.	0.	1.	0.
341	0.	0.	1.	0.	0.	1.	0.	0.	1.	0.
351	1.	1.	0.	0.	0.	0.	0.	1.	0.	0.
361	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	1.	0.	0.	1.	0.	0.	0.	0.	0.	0.
431	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
471	1.	0.	0.	0.	2.	1.	1.	0.	1.	1.
481	1.	0.	0.	1.	0.	0.	0.	2.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-065, REV. 0

1300

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
V-77-8982
File ID: 4a4620.CNF

WHC-SD-WM-DP-065, REV.0

Counted on: 8/ 4/94 @ 5:45
Detector: AEA4
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	117.1	117.1	300.068	300.068	12.000	5.219	6.000	2.988
2	337.9	337.9	254.979	254.978	12.000	4.035	6.000	2.372

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate	%err c/m @95	d/m	Activity uCi/ea
1	Pu238	0.260	5.499	5.507	-.0080	0.02	3.22	5.0	50.5	0.227E-04
	Am241		5.480	5.507	-.027				38.7	0.174E-04
2	Am243	0.687	5.276	5.295	-.0190	0.02	8.52	3.1	97.0	0.437E-04
Totals:		0.948	<--valid peaks only-->				11.74			

DETECTOR CALIBRATION

Energy(MEV) = 4.097 + (0.0047)*Channel
Energy range (MeV): 4.097 TO 6.503
Efficiency = 0.0887 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	5949.0	100.000
Smoothed	5949.0	100.000
Composite fit	5637.2	94.759
Residuals	311.8	5.241

Analyzed by:

EMB

1 Legend: Raw = Modeled Peaks = 1,2,..., etc

Display Max.: 2026.6

WHC-SD-WM-DP-065, REV. 0

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Raw Data Dump for AEA Spectrum: 4a4620.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
41	0.	1.	0.	0.	0.	0.	0.	0.	1.	0.
51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
91	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.
101	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.
111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
121	0.	0.	0.	1.	0.	0.	0.	1.	1.	0.
131	0.	0.	2.	1.	0.	0.	1.	0.	1.	2.
141	3.	1.	0.	0.	1.	0.	0.	1.	0.	0.
151	0.	1.	0.	0.	0.	0.	0.	1.	0.	0.
161	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.
171	3.	0.	0.	1.	0.	2.	1.	0.	0.	1.
181	0.	0.	1.	0.	0.	0.	1.	2.	0.	1.
191	1.	1.	0.	1.	0.	5.	2.	0.	2.	0.
201	1.	1.	0.	1.	0.	1.	1.	2.	1.	3.
211	3.	3.	2.	0.	4.	4.	5.	4.	1.	4.
221	8.	2.	5.	3.	12.	8.	10.	8.	5.	11.
231	15.	10.	13.	26.	24.	24.	23.	29.	37.	38.
241	56.	40.	79.	88.	92.	95.	124.	147.	144.	178.
251	221.	281.	308.	365.	422.	389.	289.	212.	137.	59.
261	42.	31.	23.	19.	19.	22.	15.	16.	17.	13.
271	10.	5.	2.	1.	7.	4.	7.	5.	9.	8.
281	12.	7.	4.	14.	13.	25.	20.	27.	25.	35.
291	42.	41.	63.	49.	56.	87.	91.	106.	134.	143.
301	131.	109.	80.	54.	39.	32.	22.	11.	13.	12.
311	4.	7.	2.	5.	2.	0.	1.	0.	0.	0.
321	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
331	0.	0.	1.	0.	0.	0.	0.	0.	0.	1.
341	0.	0.	1.	0.	0.	0.	0.	0.	1.	0.
351	0.	0.	0.	0.	2.	0.	1.	1.	1.	0.
361	0.	1.	0.	0.	2.	1.	0.	0.	0.	0.
371	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	1.	0.	0.	0.	0.	1.	0.
431	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	1.	0.	0.	1.	0.	0.	0.	1.	0.
481	2.	1.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-065, REV. 0

1303

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
V-77-8082
File ID: 5a5515.CNF

WHC-SD-WM-DP-065, REV.0

Counted on: 8/ 4/94 @ 5:45
Detector: AEA5
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	118.1	118.1	292.794	292.794	44.000	90.706	22.000	34.007
2	298.0	298.0	252.754	251.271	32.000	44.269	16.000	7.788

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid	Count Rate	%err @95	d/m	Activity uCi/ea
			Exp. Obs. Diff. FWHM	c/m			
1	Th228	0.321	5.430 5.448 -.018	11.25	2.7	111.5	0.502E-04
	Am241		5.480 5.448 0.032			84.2	0.379E-04
2	Am243	0.712	5.276 5.253 0.023	24.98	2.0	177.6	0.800E-04
	Pu240		5.144 5.253 -.109			175.8	0.792E-04
Totals:		1.033	<--valid peaks only-->		36.23		

DETECTOR CALIBRATION

Energy(MEV) = 4.072 + (0.0047)*Channel
Energy range (MeV): 4.072 TO 6.479
Efficiency = 0.1421 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	16834.0	100.000
Smoothed	16834.0	100.000
Composite fit	17393.4	103.323
Residuals	-559.4	-3.323

Analyzed by: EMB

[illegible]

Raw Data Dump for AEA Spectrum: 5a5515.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	1.	1.	2.
21	0.	0.	0.	1.	0.	2.	0.	0.	0.	0.
31	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
41	0.	0.	0.	0.	0.	1.	0.	0.	1.	1.
51	1.	0.	0.	1.	0.	1.	2.	0.	2.	0.
61	1.	0.	0.	0.	0.	2.	1.	0.	0.	0.
71	0.	0.	0.	0.	1.	1.	0.	0.	0.	3.
81	0.	0.	0.	2.	1.	1.	1.	2.	0.	0.
91	2.	1.	1.	0.	0.	1.	0.	1.	2.	0.
101	0.	0.	1.	0.	1.	4.	0.	0.	2.	0.
111	1.	0.	0.	2.	1.	2.	2.	0.	0.	0.
121	1.	0.	0.	0.	1.	0.	3.	2.	2.	4.
131	2.	3.	1.	0.	1.	1.	6.	3.	3.	2.
141	0.	1.	1.	2.	0.	3.	3.	2.	3.	3.
151	0.	1.	1.	3.	4.	9.	1.	4.	2.	3.
161	2.	3.	2.	3.	3.	1.	5.	2.	2.	3.
171	3.	3.	3.	5.	5.	7.	6.	8.	9.	1.
181	7.	5.	5.	5.	9.	9.	4.	9.	6.	12.
191	8.	12.	11.	11.	12.	16.	11.	18.	14.	20.
201	16.	18.	24.	22.	21.	21.	34.	26.	41.	41.
211	46.	47.	45.	51.	43.	62.	74.	49.	83.	76.
221	75.	97.	93.	126.	94.	144.	134.	128.	167.	136.
231	176.	182.	191.	194.	208.	206.	221.	189.	254.	246.
241	261.	304.	320.	275.	290.	293.	325.	297.	315.	308.
251	289.	317.	315.	296.	322.	279.	289.	267.	253.	246.
261	253.	211.	225.	196.	185.	179.	189.	129.	159.	139.
271	127.	128.	98.	110.	116.	115.	89.	88.	88.	100.
281	75.	95.	112.	122.	85.	108.	118.	79.	104.	102.
291	116.	134.	120.	124.	114.	93.	114.	92.	110.	78.
301	110.	101.	103.	85.	95.	87.	89.	77.	72.	72.
311	77.	61.	40.	44.	47.	35.	37.	25.	14.	27.
321	10.	20.	15.	9.	6.	5.	5.	2.	3.	2.
331	2.	2.	2.	2.	1.	0.	0.	1.	0.	0.
341	1.	0.	0.	1.	2.	1.	2.	2.	2.	0.
351	2.	1.	2.	2.	0.	0.	0.	0.	1.	0.
361	1.	0.	0.	0.	0.	1.	0.	0.	0.	1.
371	0.	2.	0.	1.	0.	0.	0.	1.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
411	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	1.	0.	1.	0.	1.
431	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
441	1.	0.	0.	0.	1.	1.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
461	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
471	0.	0.	1.	0.	1.	0.	0.	0.	0.	0.
481	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.
491	1.	0.	0.	2.	0.	1.	0.	0.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-065, REV. 0

1306

39

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. V75-77	Customer ID: 108-AP
Analysis: Am241	Sample Prep: ACID DIGEST

Instrument: WB537237	Procedure/ Rev: LA-503-156/D0
Technologist: ALETA LEWIS	Date: 05/13/94
Starting Time: 0800	Temperature 25 C
Ending Time: 1530	Chemist: L. FRITTS

Comments: BATCH #3348 3421

88m 1/27/94

	Description	Lab ID		Description	Lab ID
1	LMCS	V75-858282	1		
2	BLANK	V76-8682	12		
3	SAMPLE	V77-8782	13		
4	SAMPLE DUP	V77-8882	14		
5	SAMPLE SPIKE	V77-8982	15		
6	SAMPLE DUP SPIKE	V77-8082	16		
7			17		
8			18		
9			19		
10			20		

DATA
NOT USED
IN PACKAGE

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	83B43	.100ML-10ML-1ML		
SPIKE	87B43	.100ML		

1357

ANALYTICAL BATCH SUMMARY SHEET

METHOD:

LA-503-156

DATE START:

May 13, 1994

PREPARED BY:

L. L. Fritts

DATE COMPLETE:

May 23, 1994

[illegible]

NARRATIVE:

NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

WHC-SD-WM-DP-065, REV. 0

**Pu-239/240 separation on spike duplicate not achieved. Value is suspect.
Sample results are less than, this is the third run--no rerun requested.**

#2 2850 Batch 3421

Serial No V 75.-8582	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 0	Priority 26
Determination Am241	Method/Standard LA-503-156	Result Units % RECOVERY	Charge Code N1A7F	Reruns 2
Sample Size .100ML-10ML-1ML			Customer ID STD	
Remarks, Calculations, Results EDF R201 AR001 STD# 83843 RESULT 2.5505 E+1 STD VAL 2.4095 E+1 %REC 105.82 1 ml 87B43 1 ml 87B43 HNO ₃ Alita Lewis WHC-SD-WM-DP-065, REV. 0				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
	5-13-94	5-14-94	5-14-94	
Date 5/13/94	Time Completed 3:30	Lab Use		

AM-241: LA-503-156 (D-0)

LIQUID

STANDARD

Serial No	Spike (Tracer) Book Number	STANDARD
V75-8582	Activity of Am243 Tracer in dpm/mL (SPKA)	87B43
Batch ID	Spike (Tracer) Volume in mL (SPKV)	9140
3348-242	Volume of Sample in mL (SS)	0.100
Rerun No	Dilution Factor (DF)	1.000
2	Digest Dilution Factor (DDF)	101
Analyst	Am-241 Area Peak Height from AEA (C241)	717
A LEWIS	Am-243 Area Peak Height from AEA (C243)	1169
Date	Cm-243/244 Area Peak Height from AEA (CM)	3
05/13/94	Total AT Count (ATOT)	14304
Sample Type	AT Count Time in Minutes (MIN CTd)	30
LIQUID	Background in CPM (BKG)	10
	Am 241 µCi/L =	2.5505E+01

$$\text{Cm-243/244 } \mu\text{Ci/L} = \text{CM} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$$

$$\text{Am-241 } \mu\text{Ci/L} = \text{C241} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$$

$$\text{Tracer \% Recovery} = ((\text{ATOT} / \text{MIN CTd} - \text{BKG}) * 2 * (\text{C243} / (\text{C241} + \text{C243}))) / (\text{SPKA} * \text{SPKV}) * 100$$

$$\text{Relative Counting Error (Am-241)} = \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) * 1.96 * 100$$

$$\text{Relative Counting Error (Cm-243/244)} = \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) * 1.96 * 100$$

Am 241 µCi/mL	=	2.55E-02	Detection
Cm 243/244 µCi/mL	=	< 3.28E-03	Level in
Relative counting error (Am-241)	=	9.3%	µCi/mL
Relative counting error (Cm-243/244)	=	113.3%	
Am-243 Tracer Recovery	=	63.3%	3.28E-03

Data Entry by: <i>[Signature]</i>	Date: 18-May-94
Approved by: <i>[Signature]</i>	Date: 23 May 94

3

3904

Serial No V 76.-8682	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination Am241	Method/Standard LA-503-156	Result Units uCi/ML	Charge Code N1A7F	Reruns 2
Sample Size .100 ML			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK COUNT AS uCi/L .1 ml 87B43 1 ml 8m HNO3 Altaz Lewis $< 2.41E-3 \text{ uCi/ml Cm 243/244}$ $< 4.82 \text{ SKMS-19-94}$ $< 2.41E-3 \text{ uCi/me Am241}$				
Analyst - 1	Analyst - 2 D.H. Milicia	Analyst - 3 A. Blum	Analyst - 4 Raymond	Analyst - 5
Hrs	Hrs	Hrs 5-14-94	Hrs 5-14-94	Hrs
Date 5/13/94	Time Completed 3:30	Lab Unit Mgr J. F. Fitts		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

AM-241: LA-503-156 (D-0)

LIQUID

BLANK

Serial No.	Spike (Tracer) Book Number		87B43
V76-8682	Activity of Am243 Tracer in dpm/mL	(SPKA)	9140
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.100
3421	Volume of Sample in mL	(SS)	0.100
Rerun No.	Dilution Factor	(DF)	1
2	Digest Dilution Factor	(DDF)	5
Analyst	Am-241 Area Peak Height from AEA	(C241)	11
A LEWIS	Am-243 Area Peak Height from AEA	(C243)	1316
Date	Cm-243/244 Area Peak Height from AEA	(CM)	1
05/13/94	Total AT Count	(ATOT)	6080
Sample Type	AT Count Time in Minutes	(MIN CTd)	30
LIQUID	Background in CPM	(BKG)	6
Am 241 uCi/L = <			2.4118E+00

$$\text{Cm-243/244 } \mu\text{Ci/L} = \text{CM} \cdot \text{SPKA} \cdot \text{SPKV} \cdot \text{DF} \cdot \text{DDF} \cdot (1000 \text{ mL/L}) / (\text{C243} \cdot \text{SS} \cdot (2220000 \text{ dpm}/\mu\text{Ci}))$$

$$\text{Am-241 } \mu\text{Ci/L} = \text{C241} \cdot \text{SPKA} \cdot \text{SPKV} \cdot \text{DF} \cdot \text{DDF} \cdot (1000 \text{ mL/L}) / (\text{C243} \cdot \text{SS} \cdot (2220000 \text{ dpm}/\mu\text{Ci}))$$

$$\text{Tracer \% Recovery} = ((\text{ATOT} / \text{MIN CTd} - \text{BKG}) \cdot 2 \cdot (\text{C243} / (\text{C241} + \text{C243})) / (\text{SPKA} \cdot \text{SPKV})) \cdot 100$$

$$\text{Relative Counting Error (Am-241)} = \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) \cdot 1.96 \cdot 100$$

$$\text{Relative Counting Error (Cm-243/244)} = \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) \cdot 1.96 \cdot 100$$

NOTE: Am 241 Result is a LESS THAN Value

Am 241 uCi/mL	=	< 2.41E-03	Detection
Cm 243/244 uCi/mL	=	< 2.41E-03	Level in
Relative counting error (Am-241)	=	59.3%	uCi/mL
Relative counting error (Cm-243/244)	=	196.1%	
Am-243 Tracer Recovery	=	42.7%	2.41E-03

Data Entry by: <i>[Signature]</i>	Date: 19-May-94
Approved by: <i>[Signature]</i>	Date: 23 May 94

#4 4405

Serial No V 77.-8782	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Am241	Method-Standard LA-503-156	Result Units uCi/ML	Charge Code N1A7F	Reruns 2
Sample Size .100 ML			Customer ID COMP	
Remarks, Calculations, Results COUNT AS uCi/L .1 ml 87B43 1 ml 8 ^u H103 $5.58 E-3 \text{ uCi/ml Am-241}$ $< 5.58 E-3 \text{ uCi/ml Cm 243/44}$ Alta Lewis				
Analyst - 1	Analyst - 2 Raymond	Analyst - 3 Raymond	Analyst - 4 Raymond	Analyst - 5
Hrs	Hrs 5-13-94	Hrs 5-14-94	Hrs 5-14-94	Hrs
Date 5/13/94	Time Completed 3:30	Lab Unit Mgr J. Little	5-14-94 J. Little	

54-6800-061 (R-10-83)

AM-241: LA-503-156 (D-0)		LIQUID	SAMPLE
Serial No	Spike (Tracer) Book Number		87B43
V77-8782	Activity of Am243 Tracer in dpm/mL	(SPKA)	9140
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.100
3348 3421	Volume of Sample in mL	(SS)	0.100
Rerun No	Dilution Factor	(DF)	1
2	Digest Dilution Factor	(DDF)	5
Analyst	Am-241 Area Peak Height from AEA	(C241)	6
A LEWIS	Am-243 Area Peak Height from AEA	(C243)	407
Date	Cm-243/244 Area Peak Height from AEA	(CM)	3
05/13/94	Total AT Count	(ATOT)	2744
Sample Type	AT Count Time in Minutes	(MIN CT'd)	30
LIQUID	Background in CPM	(BKG)	6
Am 241 uCi/L = <			5.5848E+00

$\text{Cm-243/244 } \mu\text{Ci/L} = \text{CM} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$
 $\text{Am-241 } \mu\text{Ci/L} = \text{C241} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$
 $\text{Tracer \% Recovery} = ((\text{ATOT} / \text{MIN CT'd} - \text{BKG}) * 2 * (\text{C243} / (\text{C241} + \text{C243})) / (\text{SPKA} * \text{SPKV})) * 100$
 $\text{Relative Counting Error (Am-241)} = \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) * 1.96 * 100$
 $\text{Relative Counting Error (Cm-243/244)} = \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) * 1.96 * 100$
 NOTE: Am 241 Result is a LESS THAN Value

Am 241 uCi/mL	=	< 5.58E-03	Detection
Cm 243/244 uCi/mL	=	< 5.58E-03	Level in
Relative counting error (Am-241)	=	80.6%	uCi/mL
Relative counting error (Cm-243/244)	=	113.6%	
Am-243 Tracer Recovery	=	18.4%	5.58E-03

Date Entry by: <i>[Signature]</i>	Date: 18-May-94
Approved by: <i>[Signature]</i>	Date: 23 May 94

#1 7739

Serial No V 77.-8982	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Am241	Method/Standard LA-503-156	Result Units % RECOVERY	Charge Code N1A7F	Reruns 2
Sample Size .100 ML			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKED ID SPIKE ID SPIKE VOLUME +ml ⁹² .1ml -10ml -1ml 83B43 spike .1ml 87B43 10 3.570 Alita Lewis				
Analyst - 1	Analyst - 2 D.H. Malina	Analyst - 3 J. Hansen	Analyst - 4 Raymond	Analyst - 5
Hrs	Hrs	Hrs 5-14-94	Hrs 5-14-94	Hrs
Date 5/13/94	Time Completed 3:30	Lab Unit Mgr K. Fitts	5-19-94 K. Myer	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

AM-241: LA-503-156 (D-0)		Spiked Sample	SPIKE
Type	Spike (Tracer) Book Number		87B43
SPIKE	Activity of Am243 Tracer in dpm/mL	(SPKA)	9140
Work List	Spike (Tracer) Volume in mL	(SPKV)	0.100
3421	Volume of Sample in mL	(SS)	0.100
Test Code	Sample Dilution Factor	(DF)	1
	Digest Dilution Factor	(DDF)	5
Matrix	Am-241 Area Peak Height from AEA	(C241)	369
LIQUID	Am-243 Area Peak Height from AEA	(C243)	615
Sample #	Spike (Matrix) Volume in mL	(SMSS)	1
V77-8982	Spike (Matrix) Dilution Factor	(SMDF)	101
Instrument Code	Spike (Matrix) Value in µCi/L	(SMV)	24.095
	Am 241 µCi/L in Sample from Form 6	(Am1)	<5.5848
Analyst	Am 241 µCi/L in Spiked Sample	(Am2)	1.2351E+01
A LEWIS			
Date	Am 241 µCi/L = $\frac{C241 \cdot SPKA \cdot SPKV \cdot DF \cdot DDF \cdot (1000 \text{ mL/L})}{C243 \cdot SS \cdot (2220000 \text{ dpm/µCi})}$		
05/13/94	in Spiked Sample		
Time	Percent Spike Recovery = $\frac{[(Am2 - Am1) \cdot (SMDF/SMSS) / (DF \cdot DDF/SS)] \cdot 100}{\text{Spike (Matrix) Value in µCi/L}}$		
03:30			

Percent Spike Recovery = 103.5%

Date Entry by: <i>K. Myer</i>	Date: 19-May-94
Approved by: <i>K. Fitts</i>	Date: 23 May 94

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#6 6204

Serial No V 77.-8882	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination Am241	Method/Standard LA-503-156	Result Units uCi/ML	Charge Code N1A7F	Reruns 2
Sample Size .100 ML			Customer ID COMP	
Remarks. Calculations Results DUPLICATE SAMPLE COUNT AS uCi/L • 1ml 87B43 1 ml 8 ^m H1003 alter Lewis <div style="float: right;"> $< 2.29E-3$ uCi/ml Am-241 $< 2.29E-3$ uCi/ml Cm 243/44 </div>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5/13/94	Time Completed 3:30	Lab. Out. Date 5-14-94	5-14-94	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

AM-241: LA-503-156 (D-0)

LIQUID

DUPLICATE

Serial No.	Spike (Tracer) Book Number	
V77-8882	Activity of Am243 Tracer in dpm/mL (SPKA)	87B43
Batch ID	Spike (Tracer) Volume in mL (SPKV)	
3348 3421	Volume of Sample in mL (SS)	0.100
Rerun No.	Dilution Factor (DF)	
2	Digest Dilution Factor (DDF)	1
Analyst	Am-241 Area Peak Height from AEA (C241)	
A LEWIS	Am-243 Area Peak Height from AEA (C243)	13
Date	Cm-243/244 Area Peak Height from AEA (CM)	1332
05/13/94	Total AT Count (ATOT)	2
Sample Type	AT Count Time in Minutes (MIN CTd)	6363
LIQUID	Background in CPM (BKG)	30
	Am 241 uCi/L = <	2.2934E+00

SKM
5-19-94

$$\text{Cm-243/244 } \mu\text{Ci/L} = \text{CM} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$$

$$\text{Am-241 } \mu\text{Ci/L} = \text{C241} * \text{SPKA} * \text{SPKV} * \text{DF} * \text{DDF} * (1000\text{mL/L}) / (\text{C243} * \text{SS} * (2220000\text{dpm}/\mu\text{Ci}))$$

$$\text{Tracer \% Recovery} = ((\text{ATOT} / \text{MIN CTd} - \text{BKG}) * 2 * (\text{C243} / (\text{C241} + \text{C243})) / (\text{SPKA} * \text{SPKV})) * 100$$

$$\text{Relative Counting Error (Am-241)} = \text{Square Root of } ((1 / \text{C241}) + (1 / \text{C243})) * 1.96 * 100$$

$$\text{Relative Counting Error (Cm-243/244)} = \text{Square Root of } ((1 / \text{CM}) + (1 / \text{C243})) * 1.96 * 100$$

NOTE: Am 241 Result is a LESS THAN Value

Am 241 uCi/mL	=	< 2.29E-03	Detection
Cm 243/244 uCi/mL	=	< 2.29E-03	Level in
Relative counting error (Am-241)	=	54.6%	uCi/mL
Relative counting error (Cm-243/244)	=	138.7%	
Am-243 Tracer Recovery	=	44.9%	2.29E-03

Data Entry by: <i>[Signature]</i>	Date: 18-May-94
Approved by: <i>[Signature]</i>	Date: 23 May 94

#5 5310

Serial No V 77.-8082	Sample Point 108-AP	Date 3-18-94	Time Issued 12:26	Priority 26
Determination Am241	Method/Standard LA-503-156	Result Units % RECOVERY	Charge Code N1A7F	Reruns 2
Sample Size .100 ML			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKE .1ml-10ml .1ml 83B43 spike DUPLICATE .1ml 87B43 SPIKE ID SPIKE VOL 105.1% Glita Lewis				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
	5-13-94	5-14-94	5-14-94	
Date 5/13/94	Time Completed 3:30	Lab Unit Mgr [Signature]	5-19-94 [Signature]	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV.0

AM-241: LA-503-156 (D-0)		Spiked Sample	SPIKE
Type	Spike (Tracer) Book Number		87B43
SPIKE	Activity of Am243 Tracer in dpm/mL	(SPKA)	9140
Work List	Spike (Tracer) Volume in mL	(SPKV)	0.100
3421	Volume of Sample in mL	(SS)	0.100
Test Code	Sample Dilution Factor	(DF)	1
	Digest Dilution Factor	(DDF)	5
Matrix	Am-241 Area Peak Height from AEA	(C241)	385
LIQUID	Am-243 Area Peak Height from AEA	(C243)	632
Sample #	Spike (Matrix) Volume in mL	(SMSS)	1
V77-8082	Spike (Matrix) Dilution Factor	(SMDF)	101
Instrument Code	Spike (Matrix) Value in µCi/L	(SMV)	24.095
	Am 241 µCi/L in Sample from Form 6	(Am1)	<2.2934
Analyst	Am 241 µCi/L in Spiked Sample	(Am2)	1.2540E+01
A LEWIS			
Date	Am 241 µCi/L = $\frac{C241 \cdot SPKA \cdot SPKV \cdot DF \cdot DDF \cdot (1000 \text{ mL/L})}{C243 \cdot SS \cdot (2220000 \text{ dpm/µCi})}$		
05/13/94	in Spiked Sample		
Time	Percent Spike Recovery = $\frac{[(Am2 - Am1) \cdot (SMDF/SMSS) / (DF \cdot DDF/SS)] \cdot 100}{\text{Spike (Matrix) Value in µCi/L}}$		
03:30			

Percent Spike Recovery = 105.1%

Date Entry by: [Signature]	Date: 19-May-94
Approved by: [Signature]	Date: 23 May 94

Form L7 Rev. 1.1

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#1 R 5-13-94

$\frac{14304}{30} - 10$

V 75-8582

#7 5-14-94 DM

$\frac{6080}{30} - 6$

V 76-8682

WHC-SD-WM-DP-065, REV. 0

#3 5-13-94 R

$\frac{2744}{30} - 6$

V 77-8782

#2 5-14-94 DM

$\frac{6363}{30} - 5$

V 77-8882

V 77-8082

#2 5-14-94 DM

$\frac{3123}{30} - 5$

V 77-8982

#2 R 5-13-94

$\frac{18593}{30} - 5$

Raymond
5-14-94

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
V75-8582
File ID: 2a2850.CNF

WHC-SD-WM-DP-065, REV. 0

Counted on: 5/14/94 @ 8:35
Detector: AEA2
Geometry number: 1
Count time: 28805. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	680.2	680.2	296.046	296.046	22.000	20.169	11.000	3.775
2	1064.1	1064.1	250.466	250.027	22.000	19.559	11.000	1.593
3	593.0	593.0	225.114	223.926	20.000	11.985	10.000	4.821
4	12.6	12.6	82.234	81.634	30.000	83.464	15.000	3.240

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp. Obs. Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Am241	0.237	5.480 5.488 -.008	0.09	45.24	1.3	420.7	0.189E-03
	Pu238		5.499 5.488 0.011				549.2	0.247E-03
2	Am243	0.647	5.276 5.271 0.005	0.09	123.38	0.8	1089.3	0.491E-03
	Pu240		5.144 5.271 -.127				1078.5	0.486E-03
3	Pu239	0.127	5.143 5.149 -.006	0.06	24.18	4.0	211.4	0.952E-04
	Pu240		5.144 5.149 -.005				211.4	0.952E-04
4	U 235	0.010	4.396 4.480 -.084	0.39	1.99	13.7	30.5	0.138E-04
Totals:		1.021	<--valid peaks only-->		194.78			

DETECTOR CALIBRATION

Energy(MEV) = 4.096 + (0.0047)*Channel
Energy range (MeV): 4.096 TO 6.503
Efficiency = 0.1144 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	91588.0	100.000
Smoothed	91588.0	100.000
Composite fit	93512.4	102.101
Residuals	-1924.4	-2.101

Analyzed by:

ALJ

```
1 Legend:  Raw = ....  Modeled Peaks = 1,2,.., etc      Display Max.:  9267.7
```

WHC-SD-WM-DP-065, REV. 0

Raw Data Dump for AEA Spectrum: 2a2850.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	4.	17.	8.	10.
21	14.	11.	10.	11.	17.	13.	9.	11.	5.	13.
31	18.	8.	21.	11.	21.	14.	27.	16.	14.	20.
41	19.	21.	31.	23.	16.	19.	22.	25.	25.	21.
51	12.	21.	13.	32.	23.	23.	26.	21.	25.	22.
61	27.	18.	33.	27.	26.	24.	32.	27.	32.	27.
71	33.	42.	26.	27.	25.	26.	27.	37.	28.	39.
81	40.	40.	40.	36.	37.	27.	30.	40.	29.	44.
91	47.	39.	43.	43.	38.	36.	50.	37.	32.	32.
101	51.	41.	49.	56.	55.	57.	51.	62.	50.	52.
111	44.	44.	54.	60.	59.	51.	62.	59.	54.	53.
121	60.	61.	60.	73.	55.	64.	64.	72.	60.	75.
131	78.	83.	78.	82.	91.	79.	77.	82.	94.	86.
141	77.	83.	95.	87.	79.	89.	98.	91.	112.	116.
151	125.	111.	109.	130.	124.	115.	127.	133.	146.	111.
161	114.	142.	125.	128.	154.	131.	150.	150.	158.	162.
171	159.	162.	186.	175.	169.	205.	170.	172.	182.	185.
181	187.	189.	199.	210.	251.	229.	217.	243.	264.	274.
191	258.	290.	286.	289.	331.	341.	361.	357.	357.	369.
201	402.	443.	464.	478.	520.	544.	509.	585.	636.	629.
211	721.	780.	769.	837.	888.	967.	982.	990.	1125.	1049.
221	1145.	1196.	1277.	1276.	1278.	1209.	1226.	1164.	1187.	1106.
231	1056.	1075.	940.	902.	887.	784.	822.	843.	879.	864.
241	940.	923.	937.	1048.	1089.	1095.	1129.	1169.	1156.	1116.
251	1169.	1157.	1120.	1038.	1000.	950.	858.	737.	654.	595.
261	503.	392.	352.	344.	309.	267.	252.	225.	195.	210.
271	194.	219.	227.	238.	253.	243.	276.	273.	312.	316.
281	350.	365.	407.	451.	432.	482.	500.	579.	607.	598.
291	619.	717.	670.	708.	710.	653.	700.	694.	661.	604.
301	530.	464.	456.	411.	310.	318.	258.	188.	150.	131.
311	111.	93.	64.	45.	35.	16.	16.	14.	6.	6.
321	4.	4.	2.	1.	0.	0.	1.	1.	0.	0.
331	0.	0.	3.	0.	0.	0.	3.	1.	0.	1.
341	1.	0.	2.	1.	0.	3.	0.	1.	2.	0.
351	1.	3.	1.	0.	1.	0.	0.	0.	1.	0.
361	0.	0.	0.	1.	0.	0.	0.	0.	1.	0.
371	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	1.	0.	0.	1.	1.	0.
431	1.	0.	0.	1.	0.	1.	2.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
451	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
461	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
471	1.	2.	0.	1.	0.	0.	0.	1.	0.	0.
481	0.	0.	3.	0.	0.	0.	0.	1.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-065, REV. 0

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Raymond
5-14-94

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
V76-8682
File ID: 3a3904.CNF WHC-SD-WM-DP-065, REV. 0

Counted on: 5/14/94 @ 8:37
Detector: AEA3
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	1261.5	1261.5	256.571	256.571	22.000	20.683	11.000	4.172
2	15.0	15.0	118.072	117.985	184.000	1.000	92.000	0.100
3?	10.5	10.5	114.944	114.944	202.000	1.000	101.000	0.100
4?	0.0	0.1	100.139	100.139	0.000	0.100	0.000	0.100
5?	0.0	0.1	95.562	95.562	0.000	0.100	0.000	0.100

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Am243	0.915	5.276	5.271	0.005	0.10	81.09	1.0	572.8	0.258E-03
	Pu240		5.144	5.271	-.127				567.1	0.255E-03
2	Np237	0.013	4.640	4.633	0.007	0.00	1.16	8.4	135.0	0.608E-04
3		????		4.619			0.81	15.5		
4		????		4.551			0.00	*****		
5		????		4.530			0.00	*****		
Totals:		0.928	<--valid peaks only-->				82.25			

DETECTOR CALIBRATION
Energy(MEV) = 4.090 + (0.0046)*Channel
Energy range (MeV): 4.090 TO 6.446
Efficiency = 0.1430 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	42550.0	100.000
Smoothed	42550.0	100.000
Composite fit	39874.3	93.712
Residuals	2675.7	6.288

Analyzed by:

ALJ

1319

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WHC-SD-WM-DP-065, REV.0

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Raw Data Dump for AEA Spectrum: 3a3904.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	1.	3.	3.
21	1.	1.	1.	3.	2.	3.	1.	3.	6.	3.
31	4.	4.	1.	2.	5.	2.	3.	2.	6.	0.
41	1.	4.	3.	5.	1.	5.	3.	4.	3.	2.
51	1.	2.	5.	5.	1.	6.	2.	3.	6.	6.
61	5.	6.	8.	2.	4.	4.	5.	3.	3.	4.
71	3.	4.	7.	5.	5.	3.	3.	10.	5.	6.
81	9.	8.	6.	5.	7.	9.	5.	7.	4.	9.
91	1.	7.	10.	12.	10.	11.	8.	7.	11.	15.
101	14.	8.	10.	5.	8.	6.	11.	7.	13.	11.
111	8.	8.	13.	15.	10.	11.	11.	13.	13.	13.
121	8.	9.	8.	9.	17.	16.	19.	16.	23.	8.
131	11.	18.	14.	14.	25.	15.	10.	26.	22.	21.
141	15.	31.	26.	22.	27.	26.	26.	18.	20.	35.
151	27.	22.	27.	24.	25.	42.	23.	40.	35.	28.
161	35.	40.	42.	31.	30.	30.	32.	47.	42.	43.
171	35.	44.	42.	49.	43.	48.	64.	40.	52.	50.
181	43.	58.	63.	49.	60.	70.	74.	59.	80.	70.
191	67.	91.	91.	66.	92.	93.	84.	89.	97.	94.
201	113.	102.	120.	109.	125.	115.	124.	132.	113.	144.
211	155.	151.	145.	161.	163.	165.	182.	209.	170.	190.
221	227.	217.	240.	244.	247.	236.	247.	323.	253.	301.
231	367.	350.	372.	395.	413.	464.	469.	526.	556.	517.
241	633.	642.	702.	733.	829.	877.	923.	1000.	1067.	1171.
251	1159.	1233.	1260.	1291.	1310.	1263.	1274.	1316.	1217.	1181.
261	1166.	1064.	991.	847.	783.	609.	480.	377.	271.	224.
271	167.	128.	116.	88.	78.	70.	51.	40.	26.	29.
281	22.	16.	12.	4.	12.	7.	2.	3.	6.	5.
291	7.	8.	2.	8.	3.	5.	11.	4.	8.	8.
301	8.	9.	9.	6.	5.	5.	7.	8.	2.	6.
311	3.	2.	2.	0.	2.	2.	3.	3.	1.	0.
321	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
331	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
341	0.	1.	0.	0.	0.	1.	0.	0.	0.	0.
351	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
361	0.	0.	0.	1.	0.	0.	1.	0.	0.	0.
371	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

WHC-SD-WM-DP-065, REV.0

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Raymond
5-14-94

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
V77-8782
File ID: 4a4405.CNF

WHC-SD-WM-DP-065, REV. 0

Counted on: 5/14/94 @ 8:38
Detector: AEA4
Geometry number: 1
Count time: 28805. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	377.2	377.2	255.728	255.728	14.000	7.996	7.000	2.288
2	29.5	29.5	187.955	187.856	78.000	279.066	39.000	93.262
3?	0.0	0.1	173.945	173.945	0.000	0.100	0.000	0.100
4?	0.0	0.1	155.586	155.586	0.000	0.100	0.000	0.100

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid			Count Rate c/m	%err @95	d/m	Activity uCi/ea
			Exp.	Obs.	Diff.				
1	Am243	0.753	5.276	5.271	0.0050.04	16.13	2.2	222.0	0.100E-03
2	Np237	0.229	4.781	4.959	-.1781.28	4.91	8.4	76.8	0.346E-04
3		????		4.895		0.00	*****		
4		????		4.810		0.00	9094.		
Totals:		0.982	<--valid peaks only-->			21.04			

DETECTOR CALIBRATION

Energy(MEV) = 4.095 + (0.0046)*Channel
Energy range (MeV): 4.095 TO 6.450
Efficiency = 0.0734 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	10283.0	100.000
Smoothed	10283.0	100.000
Composite fit	10102.4	98.243
Residuals	180.6	1.757

Analyzed by:

ALJ

1322

1 Legend: Raw = Modeled Peaks = 1,2,..., etc

Display Max.: 2608.7

WHC-SD-WM-DP-065, REV. 0

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Raw	Data	Dump	for	AEA	Spectrum:	4a4405.CNF					
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.
21	1.	3.	1.	1.	1.	0.	3.	0.	2.	1.	1.
31	1.	4.	4.	3.	4.	1.	0.	4.	1.	2.	2.
41	3.	6.	1.	2.	2.	2.	2.	4.	2.	1.	1.
51	2.	1.	1.	0.	5.	4.	2.	2.	3.	2.	2.
61	2.	2.	1.	2.	2.	1.	4.	6.	3.	6.	6.
71	4.	4.	3.	4.	2.	8.	3.	3.	2.	5.	5.
81	5.	4.	5.	5.	4.	8.	9.	1.	3.	3.	3.
91	3.	5.	5.	3.	9.	6.	2.	5.	5.	8.	8.
101	3.	2.	3.	9.	6.	2.	7.	3.	5.	0.	0.
111	9.	9.	9.	4.	8.	6.	11.	7.	8.	11.	11.
121	8.	8.	13.	10.	3.	10.	7.	8.	9.	7.	7.
131	8.	10.	5.	11.	5.	10.	7.	9.	8.	9.	9.
141	9.	11.	9.	10.	14.	8.	18.	11.	12.	11.	11.
151	16.	19.	10.	9.	24.	20.	14.	13.	13.	7.	7.
161	21.	11.	10.	20.	21.	12.	22.	17.	10.	20.	20.
171	20.	27.	20.	23.	25.	21.	17.	21.	23.	17.	17.
181	17.	20.	21.	26.	21.	34.	24.	40.	36.	25.	25.
191	20.	22.	24.	34.	24.	30.	24.	22.	30.	38.	38.
201	32.	33.	24.	46.	41.	40.	32.	39.	40.	32.	32.
211	46.	43.	40.	45.	53.	52.	42.	47.	43.	49.	49.
221	57.	53.	60.	45.	75.	50.	54.	49.	65.	79.	79.
231	70.	62.	74.	80.	82.	90.	91.	89.	101.	107.	107.
241	136.	128.	170.	163.	191.	202.	210.	228.	291.	306.	306.
251	316.	325.	374.	407.	404.	394.	399.	372.	318.	272.	272.
261	178.	119.	83.	56.	40.	31.	22.	25.	24.	18.	18.
271	10.	5.	12.	9.	3.	4.	4.	1.	0.	0.	0.
281	0.	0.	1.	0.	2.	0.	1.	1.	3.	2.	2.
291	1.	2.	0.	2.	4.	2.	4.	4.	4.	3.	3.
301	6.	4.	0.	0.	0.	1.	0.	4.	0.	1.	1.
311	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.
321	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
331	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
341	0.	0.	1.	0.	1.	2.	0.	1.	1.	3.	3.
351	1.	2.	0.	0.	0.	0.	1.	1.	0.	0.	0.
361	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
481	0.	0.	0.	0.	1.	3.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

WHC-SD-WM-DP-065, REV. 0

1324

Raymond
5-14-94

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE V77-8882 WHC-SD-WM-DP-065, REV.0
File ID: 6a6204.CNF

Counted on: 5/14/94 @ 8:39
Detector: AEA6
Geometry number: 1
Count time: 28800. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	1230.5	1230.5	252.777	252.777	24.000	24.812	12.000	5.751
2	22.5	22.5	151.201	150.941	130.000	1.000	65.000	0.100

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea	
1	Am243	0.930	5.276	5.249	0.027	0.12	77.68	1.0	619.3	0.279E-03	
	Pu240		5.144	5.249	-.105				613.1	0.276E-03	
2	Np237	0.021	4.781	4.770	0.011	0.00	1.79	6.9	16.2	0.730E-05	
Totals:		0.952	<--valid peaks only-->				79.47				

DETECTOR CALIBRATION

Energy(MEV) = 4.061 + (0.0047)*Channel
Energy range (MeV): 4.061 TO 6.467
Efficiency = 0.1267 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	40075.0	100.000
Smoothed	40076.3	100.003
Composite fit	38145.6	95.186
Residuals	1929.4	4.814

Analyzed by: _____
ALJ

[illegible]

Raw Data Dump for AEA Spectrum: 6a6204.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	2.	1.	2.
21	3.	5.	2.	1.	1.	3.	0.	2.	4.	2.
31	0.	2.	3.	5.	0.	1.	4.	1.	4.	5.
41	5.	3.	4.	3.	3.	3.	1.	3.	3.	4.
51	1.	4.	4.	2.	4.	3.	4.	1.	2.	2.
61	3.	5.	3.	3.	0.	4.	2.	5.	5.	5.
71	6.	2.	6.	6.	4.	7.	5.	7.	12.	7.
81	4.	8.	2.	5.	2.	5.	8.	3.	5.	4.
91	6.	3.	4.	9.	6.	8.	11.	8.	3.	11.
101	4.	11.	7.	9.	3.	6.	6.	8.	11.	10.
111	8.	14.	8.	12.	7.	10.	11.	10.	11.	7.
121	12.	16.	16.	18.	6.	14.	10.	14.	17.	11.
131	12.	12.	14.	20.	10.	14.	13.	17.	18.	17.
141	23.	15.	23.	17.	30.	26.	19.	19.	20.	24.
151	29.	27.	20.	20.	26.	24.	19.	20.	14.	24.
161	25.	33.	27.	28.	21.	38.	35.	29.	31.	29.
171	33.	37.	48.	38.	40.	52.	35.	61.	36.	42.
181	31.	42.	50.	56.	45.	62.	58.	68.	69.	74.
191	52.	61.	69.	71.	82.	74.	74.	95.	88.	84.
201	96.	94.	79.	89.	113.	111.	118.	121.	111.	118.
211	129.	136.	125.	141.	143.	161.	159.	189.	176.	157.
221	204.	208.	214.	219.	202.	261.	271.	293.	295.	330.
231	333.	354.	440.	521.	497.	500.	559.	589.	678.	712.
241	776.	849.	919.	968.	1011.	1060.	1069.	1117.	1210.	1221.
251	1254.	1222.	1332.	1195.	1210.	1142.	1095.	964.	887.	803.
261	744.	630.	616.	515.	449.	387.	353.	250.	269.	181.
271	146.	115.	108.	79.	56.	47.	26.	37.	25.	29.
281	17.	16.	9.	5.	5.	7.	6.	3.	3.	5.
291	13.	2.	6.	3.	5.	6.	1.	3.	5.	2.
301	0.	2.	6.	4.	3.	4.	3.	2.	2.	0.
311	2.	0.	1.	0.	0.	1.	0.	3.	0.	2.
321	0.	0.	1.	0.	1.	0.	1.	2.	0.	0.
331	1.	0.	0.	1.	1.	2.	1.	0.	0.	1.
341	1.	1.	1.	0.	1.	1.	0.	1.	0.	0.
351	1.	1.	1.	0.	1.	0.	1.	0.	0.	1.
361	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.
371	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
431	0.	0.	1.	0.	0.	0.	0.	0.	0.	1.
441	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
451	0.	0.	1.	0.	0.	0.	0.	1.	0.	0.
461	0.	1.	0.	1.	0.	0.	1.	0.	1.	0.
471	1.	0.	2.	0.	2.	0.	2.	0.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	1.	1.	1.	2.	3.	4.	1.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-065, REV. 0

1327

Westinghouse Hanford Co.

Raymond
5-14-94

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
V77-8982
File ID: 7a7739.CNF WHC-SD-WM-DP-065, REV.0

Counted on: 5/14/94 @ 8:40
Detector: AEA7
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	322.6	322.6	301.686	301.686	18.000	12.259	9.000	6.938
2	541.9	541.9	256.158	256.152	16.000	10.529	8.000	5.548
3	93.3	93.3	231.384	229.960	16.000	7.780	8.000	2.178

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid				Count Rate	%err @95	d/m	Activity uCi/ea	
			Exp.	Obs.	Diff.	FWHM	c/m				
1	Am241	0.323	5.480	5.480	0.0000	0.06	12.06	2.6	96.4	0.434E-04	
	Pu238		5.499	5.480	0.019				125.9	0.567E-04	
2	Am243	0.521	5.276	5.270	0.0060	0.05	19.44	2.0	147.6	0.665E-04	
3	Pu239	0.108	5.143	5.150	-.0070	0.04	4.02	6.0	30.2	0.136E-04	
	Pu240		5.144	5.150	-.006				30.2	0.136E-04	
Totals:			0.953	<--valid peaks only-->				35.51			

DETECTOR CALIBRATION
Energy(MEV) = 4.092 + (0.0046)*Channel
Energy range (MeV): 4.092 TO 6.447
Efficiency = 0.1330 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	17892.0	100.000
Smoothed	17892.0	100.000
Composite fit	17047.3	95.279
Residuals	844.7	4.721

Analyzed by:

ALJ

1328

1 Legend: Raw = Modeled Peaks = 1,2,..., etc Display Max.: 3475.9

[illegible]

Raw Data Dump for AEA Spectrum: 7a7739.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	0.	2.	0.
21	1.	0.	0.	0.	0.	1.	2.	0.	3.	1.
31	1.	0.	2.	2.	0.	2.	0.	1.	3.	1.
41	0.	1.	0.	0.	2.	3.	3.	4.	3.	1.
51	1.	2.	3.	0.	2.	1.	2.	5.	2.	1.
61	2.	1.	2.	1.	1.	2.	2.	2.	2.	1.
71	3.	2.	1.	0.	0.	5.	2.	3.	3.	3.
81	2.	3.	5.	6.	2.	4.	3.	1.	1.	4.
91	1.	1.	0.	2.	4.	1.	6.	2.	5.	1.
101	2.	4.	3.	2.	0.	3.	3.	2.	4.	5.
111	3.	2.	2.	1.	4.	2.	1.	6.	4.	4.
121	5.	5.	4.	7.	7.	2.	3.	3.	2.	4.
131	5.	8.	4.	5.	4.	8.	4.	8.	7.	7.
141	6.	3.	5.	3.	7.	5.	7.	7.	1.	4.
151	6.	9.	5.	3.	10.	3.	8.	6.	3.	7.
161	7.	3.	11.	6.	6.	3.	9.	8.	5.	10.
171	8.	7.	10.	9.	15.	2.	14.	9.	14.	11.
181	5.	8.	7.	10.	9.	15.	10.	12.	13.	16.
191	6.	7.	11.	8.	14.	10.	9.	14.	17.	15.
201	8.	17.	12.	17.	18.	27.	13.	23.	19.	16.
211	21.	29.	37.	27.	40.	32.	45.	32.	45.	58.
221	74.	63.	67.	85.	78.	95.	96.	115.	114.	120.
231	123.	120.	101.	109.	120.	94.	79.	69.	87.	84.
241	77.	111.	116.	146.	158.	185.	198.	271.	322.	344.
251	415.	474.	532.	582.	615.	565.	585.	533.	515.	418.
261	386.	270.	219.	149.	132.	96.	85.	67.	55.	53.
271	45.	40.	42.	36.	38.	31.	35.	22.	22.	18.
281	41.	21.	34.	30.	38.	48.	64.	67.	79.	103.
291	93.	126.	159.	176.	180.	201.	262.	288.	300.	359.
301	350.	369.	316.	284.	299.	263.	213.	192.	139.	133.
311	87.	80.	51.	61.	34.	29.	21.	17.	4.	6.
321	7.	2.	3.	2.	1.	0.	0.	1.	1.	0.
331	0.	1.	0.	0.	0.	0.	0.	0.	1.	0.
341	0.	1.	0.	0.	1.	0.	1.	1.	2.	0.
351	0.	0.	0.	0.	1.	1.	2.	0.	1.	0.
361	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	1.	0.	0.	0.	1.	0.	0.
481	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	4.	0.								

WHC-SD-WM-DP-065, REV. 0

1330

Raymond
5-14-94

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
V77-8082
File ID: 5a5310.CNF

WHC-SD-WM-DP-065, REV.0

Counted on: 5/14/94 @ 8:39
Detector: AEA5
Geometry number: 1
Count time: 28804. Sec

PEAK ANALYSIS

Peak ID	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	365.4	365.4	303.314	303.314	24.000	22.387	12.000	3.489
2	3815.1	3815.1	231.116	231.100	24.000	26.917	12.000	9.794
3?	14.8	14.8	132.451	132.403	110.000	1.000	55.000	0.100

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid		Count Rate	%err @95	d/m	Activity uCi/ea
			Exp.	Obs. Diff. FWHM	c/m			
1	Am241	0.109	5.480	5.485 -.005	27.60	1.7	215.7	0.972E-04
	Pu238		5.499	5.485 0.014			281.7	0.127E-03
2	Pu239	0.842	5.143	5.146 -.003	213.51	0.6	1568.8	0.707E-03
	Pu240		5.144	5.146 -.002			1568.8	0.707E-03
3		????		4.682	1.16	8.4		
Totals:			0.951	<--valid peaks only-->		241.11		

DETECTOR CALIBRATION

Energy(MEV) = 4.060 + (0.0047)*Channel
Energy range (MeV): 4.060 TO 6.466
Efficiency = 0.1361 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	121681.0	100.000
Smoothed	121681.1	100.000
Composite fit	116306.1	95.583
Residuals	5374.9	4.417

Analyzed by: ALJ

www.wwn.co.uk

WHC-SD-WM-DP-065, REV. 0

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Raw Data Dump for AEA Spectrum: 5a5310.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	2.	6.	5.
21	5.	1.	2.	5.	6.	2.	3.	2.	5.	3.
31	4.	2.	7.	7.	3.	5.	3.	3.	4.	2.
41	3.	3.	4.	4.	5.	0.	3.	2.	1.	2.
51	2.	3.	3.	2.	3.	3.	4.	4.	6.	4.
61	1.	3.	0.	3.	3.	3.	3.	4.	5.	1.
71	4.	6.	6.	4.	4.	6.	5.	4.	7.	6.
81	6.	3.	3.	5.	3.	6.	2.	4.	6.	5.
91	6.	8.	4.	7.	5.	3.	4.	6.	6.	8.
101	5.	9.	7.	7.	4.	8.	4.	7.	3.	6.
111	10.	9.	3.	11.	6.	11.	11.	11.	7.	9.
121	13.	9.	7.	8.	11.	15.	13.	17.	14.	7.
131	7.	17.	18.	13.	7.	7.	13.	16.	22.	8.
141	12.	15.	23.	19.	18.	18.	19.	17.	28.	24.
151	34.	23.	35.	22.	26.	25.	24.	26.	37.	41.
161	34.	41.	34.	40.	24.	47.	37.	50.	52.	45.
171	73.	47.	56.	67.	60.	84.	70.	62.	83.	82.
181	95.	93.	89.	91.	121.	106.	111.	117.	122.	128.
191	156.	142.	180.	180.	189.	207.	194.	225.	258.	280.
201	319.	370.	384.	400.	464.	478.	545.	628.	716.	758.
211	862.	988.	1072.	1269.	1405.	1504.	1685.	1831.	2092.	2239.
221	2642.	2822.	2983.	3151.	3378.	3589.	3745.	3819.	3906.	3912.
231	3994.	3916.	3833.	3614.	3406.	3229.	3000.	2737.	2373.	2181.
241	1832.	1651.	1421.	1283.	1047.	944.	832.	695.	708.	648.
251	632.	587.	540.	606.	571.	564.	585.	579.	503.	479.
261	484.	470.	440.	370.	354.	265.	293.	249.	206.	194.
271	145.	145.	114.	113.	100.	92.	97.	77.	91.	76.
281	80.	91.	85.	83.	97.	115.	134.	135.	152.	225.
291	206.	222.	220.	232.	291.	313.	328.	300.	376.	380.
301	363.	355.	380.	385.	371.	340.	301.	298.	290.	266.
311	223.	231.	181.	135.	145.	114.	107.	94.	60.	55.
321	38.	41.	25.	23.	13.	13.	6.	7.	6.	3.
331	0.	1.	1.	2.	1.	1.	0.	2.	0.	0.
341	0.	0.	0.	1.	0.	1.	0.	3.	0.	1.
351	1.	0.	0.	2.	0.	1.	0.	1.	0.	0.
361	0.	0.	0.	0.	1.	0.	0.	0.	2.	1.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	1.	0.	0.	0.	0.	0.	1.	0.
401	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
411	1.	0.	1.	1.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
431	0.	0.	1.	0.	0.	1.	2.	0.	0.	0.
441	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
461	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
471	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
481	2.	2.	0.	0.	1.	0.	0.	2.	0.	0.
491	0.	1.	2.	1.	0.	0.	1.	0.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-065, REV. 0

WHC-SD-WM-DP-065, REV. 0

A-6000-881 (03/92)

of

DATE START:

JULY 23, 1994

DATE COMPLETE:

JULY 25, 1994

[illegible]

NARRATIVE:

NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

No duplicate was run for this batch however, no rerun is required (approved by project coordinator).

WHC-SD-WM-DP-065, REV. 0

7-20-94

1335

18/2

7-24-94 AG ... mark program 10 ml
V71-8520

45786
30

Beta Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, on 07-24-1994 at 05:19:58
Det #18 2-inch mount Beta eff. : .3151
Sample size : 10 mL Dilution : 1

46434
30

Sample # V71 Mount # 1

45786
----- 11.0 = 2.1661E-01 uCi/L beta
30

Sample # V71 Mount # 2

46434
----- 11.0 = 2.1969E-01 uCi/L beta
30

BEST AVAILABLE COPY

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Falten 3023

Serial No	V 71.-8525	Sample Point	108AP FLDBLK	Date	3-18-94	Time Issued	11: 1	Priority	26
Determination	AT	Method-Standard	LA-508-101	Result Units	% RECOVERY	Charge Code	N1A7F	Reruns	0
Sample Size	10 ml					Customer ID	STD		
Remarks Calculations Results S510 EV-CRB STD# 21852 RESULT 9.55E-03 STD VAL 9.75E-03 %REC 98.0 <p style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</p>									
Analyst	Analyst - 2		Analyst - 3		Analyst - 4		Analyst - 5		
Hrs	Hrs		Hrs		Hrs		Hrs		
Date	Time Completed		Lab Mgr						
7-23-94	1030								

54-6800-061 (R-10-83)

LA-508-101 D-0 D-1 AT: LIQUIDS/SOLIDS

	STANDARD	REPLICATE
Type	18	18
STANDARD	2	2
Work List	1384	1312
3023	30	30
AT or TB?	0.5	0.5
AT	10.000	10.000
Test Code	1	1
AT	1	1
Matrix	0.2095	0.2095
LIQUID	45.633	43.233
Sample #	9.81E-03	
V71-8525	9.30E-03	
Instrument Code		
WB27809	9.5537E-03	
Analyst		
Susie Fulton	Rs (Sample Count Rate) = (TC / CT) - BKG	
Date	ALPHA TOTAL μ Ci/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/ μ Ci)	
07/23/94	ALPHA TOTAL μ Ci/mL = ALPHA TOTAL μ Ci/L / 1000mL/L	
Time	Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT) * 1.96 * 100	
10:30	Detection Levels and Less Than Values are determined from Procedure LA-508-002.	

▼ RESULTS ▼

ALPHA TOTAL	in μ Ci/mL	(Average) =	9.55E-06	DETECTION LEVEL
				1.49E-07
RELATIVE COUNTING ERROR		=	5.5%	μ Ci/mL

Data Entry by:	Date:	24-Jul-94
Approved by:	Date:	25-Jul-94

Form C Rev. 1.0

1337

TOTAL ALPHA ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

18/2

1384 - .5 V71-8525
30

1312
30

Alpha Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, : , on 07-24-1994 at 05:19:59
Det #18 2 -inch mount Alpha eff. : .2095
Sample size : 10 mL Dilution : 1

Sample # V71 Mount # 1

1384

30 0.5 = 9.8117E-03 uCi/L alpha

Sample # V71 Mount # 2

1312

30 0.5 = 9.2957E-03 uCi/L alpha

BEST AVAILABLE COPY

1338

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 72.-8625	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 5	Priority 26
Determination AT	Method-Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0ml 250ml SMF 7-23-94			Customer ID BLANK	
Remarks Calculations Results COUNT AS uCi/L USE 13,14,15 OR 16 WHC-SD-WM-DP-065, REV. 0 $< 6.48E-06$ uCi/mL				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 <i>[Signature]</i> Hrs	Analyst - 3 <i>[Signature]</i> Hrs 7-24-94	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 7-23-94	Time Completed 1030	Lab. Mgr. <i>[Signature]</i>	<i>[Signature]</i> 54-6800-061 (R-10-83)	

SLF
10-4-94

LA-508-101 D-1 AT: LIQUIDS/SOLIDS

		BLANK	REPLICATE
Type	DETECTOR NUMBER	18	18
BLANK	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	1	3
3023	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	0.5	0.5
AT	SAMPLE SIZE in mL (SS)	1.000	1.000
Test Code	DILUTION FACTOR (DF)	1	1
AT	DIGEST DILUTION FACTOR (DDF)	10	10
Matrix	EFFICIENCY FACTOR (EFF)	0.2095	0.2095
LIQUID	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE	0.301	0.301
Sample #	Sample Concentration in μ Ci/L	$< 6.48E-03$	
V72-8625	Replicate Concentration in μ Ci/L	$< 6.48E-03$	
Instrument Code			
WB27809	Maximum Concentration in μ Ci/L	$< 6.4772E-03$	
Analyst			
Susie Fulton	Rs (Sample Count Rate) = (TC / CT) - BKG		
Date	ALPHA TOTAL μ Ci/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/ μ Ci)		
07/23/94	ALPHA TOTAL μ Ci/mL = ALPHA TOTAL μ Ci/L / 1000mL/L		
Time	Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT) * 1.96 * 100		
10:30	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		

RESULTS

ALPHA TOTAL	in μ Ci/mL (Maximum) =	$< 6.48E-06$	DETECTION LEVEL
LESS Than Value was Determined from Lc.			
RELATIVE COUNTING ERROR	=	69.3%	1.49E-05 μ Ci/mL

Data Entry by: <i>[Signature]</i>	Date: 24-Jul-94
Approved by: <i>[Signature]</i>	Date: 25-Jul-94

Form C Rev. 1.0

TOTAL ALPHA ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

18/2

V 72-8625

$\frac{1}{30}$

$\frac{3}{30}$

Alpha Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, on 07-24-1994 at 05:21:42
Det #18 2 -inch mount Alpha eff. : .2095
Sample size : 1 ea Dilution : 1

Sample # V72 Mount # 1

1
----- 0.5 < 6.4676E-07 uCi/EA alpha
30

Sample # V72 Mount # 2

3
----- 0.5 < 6.4676E-07 uCi/EA alpha
30

DL
7-24-94

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1340

TOTAL BETA ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV.

18/2

7-24-94 Hg

V 72-8620

No sample size on
card -
Calc. as uCi/ea
SLF
10-4-94

540
30

-11

Beta Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, on 07-24-1994 at 05:21:41
Det #18 2-inch mount Beta eff. : .3151
Sample size : 1 ea Dilution : 1

Sample # V72 Mount # 1

540

30

11.0 = 1.0007E-05 uCi/EA beta

Sample # V72 Mount # 2

541

30

11.0 = 1.0054E-05 uCi/EA beta

DK
7-24-94

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1341

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No V 73.-8725	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination AT	Method-Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0ml			Customer ID 108AP-FB	
Remarks, Calculations, Results COUNT AS uCi/L USE 13,14,15 OR 16 WHC-SD-WM-DP-065, REV. 0 $< 6.48E^{-06} \text{ uCi/mL}$				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 <i>[Signature]</i> Hrs	Analyst - 3 <i>[Signature]</i> Hrs 7-24-94	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 7-23-94	Time Completed 1030	Lab. Mgr. <i>[Signature]</i>	<i>[Signature]</i> 54-6800-061 (R-10-83)	

LA-508-101 D-0 D-1 ^{SLF 10-4-94} AT: LIQUIDS/SOLIDS

		SAMPLE	REPLICATE
Type	DETECTOR NUMBER	18	18
SAMPLE	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	11	7
3023	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	0.5	0.5
AT	SAMPLE SIZE in mL (SS)	1.000	1.000
Test Code	DILUTION FACTOR (DF)	1	1
AT	DIGEST DILUTION FACTOR (DDF)	10	10
Matrix	EFFICIENCY FACTOR (EFF)	0.2095	0.2095
LIQUID	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE	0.301	0.301
Sample #	Sample Concentration in uCi/L	< 6.48E-03	
V73-8725	Replicate Concentration in uCi/L	< 6.48E-03	
Instrument Code			
WB27809	Maximum Concentration in uCi/L	< 6.4772E-03	
Analyst			
Susie Fulton	Rs (Sample Count Rate) = (TC / CT) - BKG		
Date	ALPHA TOTAL uCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/uCi)		
07/23/94	ALPHA TOTAL uCi/mL = ALPHA TOTAL uCi/L / 1000mL/L		
Time	Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT) * 1.96 * 100		
10:30	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		

v RESULTS v

ALPHA TOTAL	in uCi/mL (Maximum) =	< 6.48E-06	DETECTION LEVEL
LESS Than Value was Determined from Lc.			1.49E-05
RELATIVE COUNTING ERROR	=	249.9%	uCi/mL

Date Entry by: <i>[Signature]</i>	Date: 24-Jul-94
Approved by: <i>[Signature]</i>	Date: 25-Jul-94

Form C Rev. 1.0 Page 1 of 1

1342

TOTAL ALPHA ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

18/2

V73-8725

$\frac{11}{30}$

$\frac{7}{30}$

Alpha Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, on 07-24-1994 at 05:22:39
Det #18 2 -inch mount Alpha eff. : .2095
Sample size : 1 ea Dilution : 1

Sample # V73 Mount # 1

11
----- 0.5 < 6.4676E-07 uCi/EA alpha
30

Sample # V73 Mount # 2

7
----- 0.5 < 6.4676E-07 uCi/EA alpha
30

DW 7-2494

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TOTAL BETA ANALYSIS - ACID DIGESTION

18/2 7-24-94 AG

no sample sign on card
Calc. as uCi/each.

V73-8720

747
30

Beta Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, on 07-24-1994 at 05:22:39
Det #18 2 -inch mount Beta eff.: .3151
Sample size : 1 ea Dilution : 1/

556
30

Sample # V73 Mount # 1 WHC-SD-WM-DP-065, REV. 0

747
----- 11.0 = 1.9871E-05 uCi/EA beta
30

Sample # V73 Mount # 2
556
----- 11.0 = 1.0769E-05 uCi/EA beta
30

24 7-27-94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

1-2 Data 3023

Serial No V 71-8520	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 1	Priority 26
Determination TB	Method-Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 10 ml			Customer ID STD	
Remarks, Calculations, Results S515 EV-CRB STD# 21852 RESULT 2.18E-01 STD VAL 2.45E-01 %REC 89.0 WHC-SD-WM-DP-065, REV. 0				
Analyst 1 Susie Fulton	Analyst 2 Em Breen	Analyst 3 J. H. Hume	Analyst 4	Analyst 5
Hrs	Hrs	Hrs 7-24-94	Hrs	Hrs
Date 7-23-94	Time Completed 10 30	Lab Init Mail	J. H. Hume	

54-6800-061 (R-10-83)

SLF 10-4-94

LA-508-101 D-0 D-1 TB: LIQUIDS/SOLIDS

		STANDARD	REPLICATE
Type	DETECTOR NUMBER	18	18
STANDARD	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	45786	46434
3023	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	11	11
TB	SAMPLE SIZE in mL (SS)	10.000	10.000
Test Code	DILUTION FACTOR (DF)	1	1
TB	DIGEST DILUTION FACTOR (DDF)	1	1
Matrix	EFFICIENCY FACTOR (EFF)	0.3151	0.3151
LIQUID	ie, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE	1515.200	1536.800
Sample #	Sample Concentration in $\mu\text{Ci/L}$	2.17E-01	
V71-8520	Replicate Concentration in $\mu\text{Ci/L}$	2.20E-01	
Instrument Code			
WB27809	Average Concentration in $\mu\text{Ci/L}$	2.1815E-01	
Analyst			
Susie Fulton	Rs (Sample Count Rate) = $(TC / CT) - BKG$		
Date	TOTAL BETA $\mu\text{Ci/L}$ = $Rs * 1000\text{mL/L} * DF * DDF / (EFF * SS * 2220000\text{dpm}/\mu\text{Ci})$		
07/23/94	TOTAL BETA $\mu\text{Ci/mL}$ = $TOTAL BETA \mu\text{Ci/L} / 1000\text{mL/L}$		
Time	Relative Counting Error = $(\sqrt{\text{The Square Root of } TC + BKG * CT} / (TC - BKG * CT)) * 1.96 * 100$		
10:30	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		

v RESULTS v			
TOTAL BETA	in $\mu\text{Ci/mL}$	(Average) =	2.18E-04
			DETECTION LEVEL
			4.17E-07
RELATIVE COUNTING ERROR	=	0.9%	$\mu\text{Ci/mL}$

Date Entry by: <i>[Signature]</i>	Date: 24-Jul-94
Approved by: <i>[Signature]</i>	Date: 25-Jul-94

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3-4 *no sample sign card used*

Serial No V 72.-8620	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11: 5	Priority 26
Determination TB	Method-Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0 ml <i>250 ml SMF 7-23-94</i>			Customer ID BLANK	
Remarks, Calculations, Results COUNT AS uCi/L USE 13,14,15 OR 16 1.00 E-04 uCi/mL WHC-SD-WM-DP-065, REV.0				
Analyst <i>Susie Fulton</i> Hrs	Analyst - 2 <i>Emile</i> Hrs	Analyst - 3 <i>John</i> Hrs 7-24-94	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 7-23-94	Time Completed 1030	Lab Unit Mgr <i>John</i>	<i>Darryl</i>	

54-6800-061 (R-10-83)

LA-508-101 D-0 D-1 ^{SLF 10-4-94} TB: LIQUIDS/SOLIDS

		BLANK	REPLICATE
Type	DETECTOR NUMBER	18	18
BLANK	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	540	541
3023	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	11	11
TB	SAMPLE SIZE in mL (SS)	1.000	1.000
Test Code	DILUTION FACTOR (DF)	1	1
TB	DIGEST DILUTION FACTOR (DDF)	10	10
Matrix	EFFICIENCY FACTOR (EFF)	0.3151	0.3151
LIQUID	LC, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE	7.000	7.033
Sample #	Sample Concentration in uCi/L	1.00E-01	
V72-8620	Replicate Concentration in uCi/L	1.01E-01	
Instrument Code			
WB27809	Average Concentration in uCi/L	1.0031E-01	
Analyst			
Susie Fulton	Rs (Sample Count Rate) = (TC / CT) - BKG		
Date	TOTAL BETA uCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/uCi)		
07/23/94	TOTAL BETA uCi/mL = TOTAL BETA uCi/L / 1000mL/L		
Time	Relative Counting Error = 1 (The Square Root of TC + BKG * CT) / (TC - BKG * CT) * 1.96 * 100		
10:30	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		

v RESULTS v

TOTAL BETA	in uCi/mL (Average)	=	1.00E-04	DETECTION LEVEL
				4.17E-05
RELATIVE COUNTING ERROR		=	27.5%	uCi/mL

Date Entry by: <i>Susie Fulton</i>	Date: 24-Jul-94
Approved by: <i>[Signature]</i>	Date: 25-Jul-94

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

566

Serial No V 73.-8720	Sample Point 108AP FLDBLK	Date 3-18-94	Time Issued 11:16	Priority 26
Determination TB	Method-Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size 1.0 ml 25 ml 7-23-94			Customer ID 108AP-FB	
Remarks, Calculations, Results COUNT AS uCi/L USE 13,14,15 OR 16 WHC-SD-WM-DP-065, REV. 0 1.53E-04 uCi/mL				
Analyst - 1 Susie Fulton	Analyst - 2 Emilio	Analyst - 3 A. Johnson	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 7-24-94	Hrs	Hrs
Date 7-23-94	Time Completed 10 30	Lab Unit Mgr J. H. H.	J. H. H.	

54 6800-061 (R-10 83)

SLF 10-4-94

LA-508-101 D-0 D-1 TB: LIQUIDS/SOLIDS

		SAMPLE	REPLICATE
Type	DETECTOR NUMBER	18	18
SAMPLE	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	747	556
3023	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	11	11
TB	SAMPLE SIZE in mL (SS)	1.000	1.000
Test Code	DILUTION FACTOR (DF)	1	1
TB	DIGEST DILUTION FACTOR (DDF)	10	10
Matrix	EFFICIENCY FACTOR (EFF)	0.3151	0.3151
LIQUID	L, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE	13.900	7.533
Sample #	Sample Concentration in uCi/L	1.99E-01	
V73-8720	Replicate Concentration in uCi/L	1.08E-01	
Instrument Code			
WB27809	Average Concentration in uCi/L	1.5320E-01	
Analyst			
Susie Fulton	Rs (Sample Count Rate) = (TC / CT) - BKG		
Date	TOTAL BETA uCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/uCi)		
07/23/94	TOTAL BETA uCi/mL = TOTAL BETA uCi/L / 1000mL/L		
Time	Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT) * 1.96 * 100		
10:30	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		

RESULTS

TOTAL BETA	in uCi/mL	(Average)	=	1.53E-04	DETECTION LEVEL
					4.17E-05
RELATIVE COUNTING ERROR			=	25.8%	uCi/mL

Data Entry by: <i>[Signature]</i>	Date: 24-Jul-94
Approved by: <i>[Signature]</i>	Date: 25-Jul-94

01
25

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.
V75-77

Customer ID:
108-AP

Analysis: **BEST AVAILABLE COPY**
AT

Sample Prep:
ACID DIGEST

Instrument: WA 45709

Procedure/ Rev: LA-508-101 / D-0

Technologist: ALETA K LEWIS

Date: 05/10/94

Starting Time: 12:00

Temperature 25 C

Ending Time: 14:30

Chemist: S. FITZGERALD

Comments: BATCH# 3444

	Description	Lab ID
1	LMCS	V75-8525
2	BLANK	V76-8625
3	SAMPLE	V77-8725
4	SAMPLE DUP	V77-8825
5	SAMPLE SPIKE	V77-8925
6	SAMPLE DUP SPIKE	V77-8025
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
EV-CRB	142B51	10ML		

1346

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN Batch 3444

Serial No V 75.-8525	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 0	Priority 26
Determination AT	Method: Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 2
Sample Size ? 10 ml			Customer ID STD	
Remarks, Calculations, Results S510 EV-CRB STD# 142851 STD VAL 1,0398 RESULT 9.2502 E-3 %REC 88.96% 5-12-94				
WHC-SD-WM-DP-065, REV. 0				
Analyst - 1 Hrs	Analyst - 2 188 Hrs	Analyst - 3 D. H. Millican Hrs	Analyst - 4 Hrs	Analyst - 5 5-12-94 Hrs
Date 5/10/94	Time Completed 14:30	Laboratory Mgr J. E. Miller	5-12-94 J. E. Miller	

54-6800-061 IR

AT: LA-508-101 (D-0) LIQUIDS

		STD	REPLICATE
Type	DETECTOR NUMBER	13	13
STD	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	1460	1431
3444	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	0.5	0.5
AT	SAMPLE SIZE in mL (SS)	10.000	10
Test Code	DILUTION FACTOR (DF)	1	1
	DIGEST DILUTION FACTOR (DDF)	1	1
Matrix	EFFICIENCY FACTOR (EFF)	0.2322	0.2322
LIQUID	L _s , R _{max} , or R _s (SAMPLE RATE) as APPROPRIATE	48.167	47.200
Sample #	SAMPLE CONCENTRATION in µCi/L	9.34E-03	9.16E-03
V75-8525	AVG. µCi/L in SAMPLE and REPLICATE =	9.2502E-03	
Instrument Code	$R_s \text{ (Sample Count Rate)} = (TC / CT) - BKG$ $ALPHA \text{ TOTAL } \mu Ci/L = R_s * 1000 mL/L * DF * DDF / (EFF * SS * 2220000 dpm/\mu Ci)$ $ALPHA \text{ TOTAL } \mu Ci/mL = ALPHA \text{ TOTAL } \mu Ci/L / 1000 mL/L$ $Relative \text{ Counting Error} = 1 * (The \text{ Square Root of } TC + BKG * CT) / (TC - BKG * CT) * 1.96 * 100$ Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Analyst	v RESULTS v		
LEWIS	ALPHA TOTAL in µCi/L (AVERAGE) =	9.25E-03	DETECTION LEVEL 2.18E-07 µCi/mL
Date	ALPHA TOTAL in µCi/mL (AVERAGE) =	9.25E-06	
05/10/94	RELATIVE COUNTING ERROR =	5.3%	
Time			
14:30			

Data Entry by: <i>[Signature]</i>	Date: 12-May-94
Approved by: <i>[Signature]</i>	Date: 16-May-94

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TOTAL ALPHA ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

13/2 5-10-94 mrs

132

V75-8525

1469 Alpha Calculation (CRPC_CAL 2.0)
 By: DH MILICIA, on 05-10-1994 at 18:04:50
 Det #13 2 -inch mount Alpha eff. : .2322
 Sample size : 10 mL Dilution : 1

1431
 Sample # V-75 Mount # 1

1460
 ----- 0.5 = 9.3440E-03 uCi/L alpha
 30

Sample # V-75 Mount # 2

1431
 ----- 0.5 = 9.1564E-03 uCi/L alpha
 30

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1351

34 **RERUN**

Serial No V 76.-8625	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination AT	Method/Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 2
Sample Size ? .100 ml			Customer ID BLANK	
Remarks, Calculations, Results COUNT AS uCi/L USE 13,14,15 OR 16 WHC-SD-WM-DP-065, REV. 0 < 4.13E-5 uCi/ml <i>Alta Lewis</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5/10/94	Time Completed 14:30	Lab Unit Mgr <i>[Signature]</i>	5-12-94 <i>[Signature]</i>	

54-6800-061 (R-10-83)

AT: LA-508-101 (D-0) LIQUIDS

	BLK	REPLICATE
Type	13	13
DETECTOR NUMBER		
BLK	2	2
DISH SIZE 1, 2, or 5 (MS)		
Work List	9	8
TOTAL COUNTS (TC)		
3444	30	30
COUNT TIME in MINUTES (CT)		
AT or TB ?	0.5	0.5
BACKGROUND in cpm (BKG)		
AT	0.100	0.1
SAMPLE SIZE in mL (SS)		
Test Code	1	1
DILUTION FACTOR (DF)		
DIGEST DILUTION FACTOR (DDF)	5	5
Matrix		
EFFICIENCY FACTOR (EFF)	0.2322	0.2322
LIQUID		
Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE	0.426	0.426
Sample #		
SAMPLE CONCENTRATION in uCi/L	4.13E-02	4.13E-02
V76-8625		
AVG. uCi/L in DIGEST SOLUTION =	<	8.2646E-03
Instrument Code		
Rs (Sample Count Rate) = (TC / CT) - BKG		
Analyst		
LEWIS		
ALPHA TOTAL uCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/uCi)		
ALPHA TOTAL uCi/mL = ALPHA TOTAL uCi/L / 1000mL/L		
Date		
05/10/94		
Time		
14:30		

ALPHA TOTAL	in uCi/L (AVERAGE) =	< 4.13E-02	DETECTION LEVEL 1.09E-04 uCi/mL
ALPHA TOTAL	in uCi/mL (AVERAGE) =	< 4.13E-05	
LESS Than Value was Determined from Lc.			
RELATIVE COUNTING ERROR	=	160.0%	

Data Entry by:	Date:	12-May-94
Approved by:	Date:	16-May-94

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TOTAL ALPHA ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

13/2 5-10-94 MS

V-76-8625

34

9 Alpha Calculation (CRPC_CAL 2.0)
 By: DH M. [signature], on 05-10-1994 at 18:05:31
 Det #13 2-inch mount Alpha eff. : .2322
 Sample size : .1 mL Dilution : 1

8 Sample # V-76 Mount # 1
 9
 30 ----- 0.5 < 5.8353E-03 uCi/L alpha
 30

Sample # V-76 Mount # 2
 8
 ----- 0.5 < 5.8353E-03 uCi/L alpha
 30

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RERUN 56

Serial No V 77.-8725	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination AT	Method/Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 2
Sample Size ? 100ml			Customer ID COMP	
Remarks, Calculations, Results COUNT AS uCi/L USE 13,14,15 OR 16 WHC-SD-WM-DP-065, REV. 0 <div style="text-align: center; font-size: 1.2em;">2.93E-4 uci/me</div> <div style="text-align: center; font-size: 1.5em; margin-top: 10px;">Alto Lewis</div>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5/10/94	Time Completed 14:30	Lab Unit Mon [Signature]	5-12-94 [Signature]	

54-6800-061 (R-10-83)

AT: LA-508-101 (D-0) LIQUIDS

		SAM	REPLICATE
Type	DETECTOR NUMBER	13	13
SAM	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	104	107
3444	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	0.5	0.5
AT	SAMPLE SIZE in mL (SS)	0.100	0.1
Test Code	DILUTION FACTOR (DF)	1	1
	DIGEST DILUTION FACTOR (DDF)	5	5
Matrix	EFFICIENCY FACTOR (EFF)	0.2322	0.2322
LIQUID	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE	2.967	3.067
Sample #	SAMPLE CONCENTRATION in uCi/L	2.88E-01	2.97E-01
V77-8725	AVG. uCi/L in DIGEST SOLUTION =	5.8521E-02	
Instrument Code	$R_s \text{ (Sample Count Rate)} = (TC / CT) - BKG$		
Analyst	$\text{ALPHA TOTAL } \mu\text{Ci/L} = R_s * 1000\text{mL/L} * DF * DDF / (EFF * SS * 2220000\text{dpm}/\mu\text{Ci})$		
LEWIS	$\text{ALPHA TOTAL } \mu\text{Ci/mL} = \text{ALPHA TOTAL } \mu\text{Ci/L} / 1000\text{mL/L}$		
Date	$\text{Relative Counting Error} = 1 \left(\frac{\text{The Square Root of } TC + BKG * CT}{TC - BKG * CT} \right) * 1.96 * 100$		
05/10/94	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Time	v RESULTS v		
14:30	ALPHA TOTAL in uCi/L (AVERAGE) =	2.93E-01	DETECTION LEVEL 1.09E-04 uCi/mL
	ALPHA TOTAL in uCi/mL (AVERAGE) =	2.93E-04	
	RELATIVE COUNTING ERROR =	24.0%	

Data Entry by: [Signature]	Date: 12-May-94
Approved by: [Signature]	Date: 16-May-94

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TOTAL ALPHA ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

13/2 5-10-94 MS V77-8725 S, 6

104
30
Alpha Calculation (CRPC_CAL 2.0)
By: DH HICIA, on 05-10-1994 at 18:06:01
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .1 mL Dilution : 1

107
30
Sample # V-77-8725 Mount # 1
104

----- 0.5 = 5.7551E-02 uCi/L alpha
30

Sample # V-77-8725 Mount # 2

107
----- 0.5 = 5.9491E-02 uCi/L alpha
30

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RERUN 78

Serial No V 77.-8825	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination AT	Method-Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 2
Sample Size ? 100 ml			Customer ID COMP	
Remarks Calculations, Results COUNT AS uCi/L USE 13,14,15 OR 16 WHC-SD-WM-DP-065, REV. 0 <div style="text-align: center; font-size: 1.2em;">2.70E-4 uCi/ml</div> <div style="text-align: center; font-family: cursive; font-size: 1.2em;">Alta Lewis</div>				
Analyst - 1	Analyst - 2 <i>AKM</i>	Analyst - 3 <i>AKM</i>	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5/10/95	Time Completed 14:30	Lab Unit Mgr <i>AKM</i>	5-12-94 <i>AKM</i>	

54-6800-061 (R-10 83)

AT: LA-508-101 (D-0) LIQUIDS

		SAMPLE	REPLICATE
Type	DETECTOR NUMBER	13	13
DUP	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	102	95
3444	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	0.5	0.5
AT	SAMPLE SIZE in mL (SS)	0.100	0.1
Test Code	DILUTION FACTOR (DF)	1	1
	DIGEST DILUTION FACTOR (DDF)	5	5
Matrix	EFFICIENCY FACTOR (EFF)	0.2322	0.2322
LIQUID	μ , Rmax, or Rs (SAMPLE RATE) as APPROPRIATE	2.900	2.667
Sample #	SAMPLE CONCENTRATION in μ Ci/L	2.81E-01	2.59E-01
V77-8825	AVG. μ Ci/L in DIGEST SOLUTION =	5.3995E-02	
Instrument Code	R_s (Sample Count Rate) = $(TC / CT) - BKG$ α ALPHA TOTAL μ Ci/L = $R_s * 1000 \text{ mL/L} * DF * DDF / (EFF * SS * 2220000 \text{ dpm}/\mu\text{Ci})$ α ALPHA TOTAL μ Ci/mL = ALPHA TOTAL μ Ci/L / 1000 mL/L Relative Counting Error = $(\text{The Square Root of } TC + BKG * CT) / (TC - BKG * CT) * 1.96 * 100$ Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Analyst	v RESULTS v		
LEWIS	ALPHA TOTAL in μ Ci/L (AVERAGE) =	2.70E-01	DETECTION LEVEL 1.09E-04 μ Ci/mL
Date	ALPHA TOTAL in μ Ci/mL (AVERAGE) =	2.70E-04	
05/10/94	RELATIVE COUNTING ERROR =	25.7%	
Time			
14:30			

Data Entry by: <i>AKM</i>	Date: 12-May-94
Approved by: <i>AKM</i>	Date: 16-May-94

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1356

TOTAL ALPHA ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

13/2 5-10-94 MB

V77-8825

38

102
30

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILLER, on 05-10-1994 at 18:06:29
Det #13 2-inch mount Alpha eff. : .2322
Sample size : .1 mL Dilution : 1

Sample # V-77-8825 Mount # 1

95

102
30

0.5 = 5.6258E-02 uCi/L alpha

Sample # V-77-8825 Mount # 2

95

0.5 = 5.1731E-02 uCi/L alpha

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-RERUN- 910

Serial No V 77.-8925	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination AT	Method/Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 2
Sample Size ? 100 ml			Customer ID COMP	
Remarks, Calculations Results SAMPLE SPIKED ID SPIKE ID SPIKE VOLUME 10 ml 142B51 90.0% 88.57% recovery SLF 5-16-94 Alta Lewis				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5/10/94	Time Completed 14:30	Lab Unit Mgr JH	5-12-94 OKM/Garcia	

54 6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

AT: LA-508-101 (D-0) SPIKED SAMPLE

		SPIKE	REPLICATE
Type	DETECTOR NUMBER	13	13
SPIKE	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	1517	1587
3443	COUNT TIME in MINUTES (CT)	30	30
AT 6-TB-7	BACKGROUND in cpm (BKG)	0.5	0.5
AT	SAMPLE VOLUME in mL (Spiked Vial) (SS)	0.100	0.100
Test Code	SAMPLE DILUTION FACTOR (Spiked Vial) (DF)	1	1
	SPIKE VOLUME in mL (SVol)	10.000	10.000
Matrix	SPIKE DILUTION FACTOR (SDF)	1	1
LIQUID	SPIKE VALUE in pCi/L (SVal)	0.010398	0.010398
Sample #	INSTRUMENT EFFICIENCY FACTOR (EFF)	0.2322	0.2322
V77-8925	SAMPLE + SPIKE pCi/L (S+S)	9.71E-01	1.02E+00
Instrument Code	AVG. SAMPLE or DIGEST pCi/L from FORM #1	5.85E-02	
Analyst	R_s (Sample Count Rate) = $(TC / CT) - BKG$ $SAMPLE + SPIKE \mu Ci/L = R_s * 1000 mL/L * DF / (EFF * SS * 2220000 dpm/\mu Ci)$ $AVG. PERCENT SPIKE RECOVERY = (((S+S \mu Ci/L (Spike) + S+S \mu Ci/L (Replicate))/2) - Sample \mu Ci/L) * ((SDF/SVol)/(DF/SS)))$		
LEWIS			
Date			
05/10/94			
Time			
14:30			

RESULT **AVG. PERCENT SPIKE RECOVERY = 90.0%**

Data Entry by:	Date:	16-May-94
Approved by:	Date:	16-May-94

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1358

TOTAL ALPHA ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

13/2 5-10-94 V77-8925 310

Alpha Calculation (CRPC_CAL 2.0)
 By: DH MILICIA, on 05-10-1994 at 19:57:31
 Det #13- 25-inch mount Alpha eff. : .2322
 Sample size : .1 mL Dilution : 1

1517
 30

Sample # V-77-8925 Mount # 1

1587
 30

1517
 ----- 0.5 = 9.7126E-01 uCi/L alpha
 30

Sample # V-77-8925 Mount # 2

1587
 ----- 0.5 = 1.0165E+00 uCi/L alpha
 30

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1359

RERUN

Serial No V 77.-8025	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination AT	Method Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 2
Sample Size ? 100 ml			Customer ID COMP	
Remarks, Calculations Results SAMPLE SPIKE DUPLICATE WHC-SD-WM-DP-065, REV. 0 SPIKE ID SPIKE VOL 10 ml 142 B51 91.9% recovery SLF 5-16-94 93.2% Alita Lewis				
Analyst - 1	Analyst - 2 D.H. Wilson	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5/10/94	Time Completed 14:30	Laboratory Unit Manager J. M. Lawrence		

54-6800-061 (R-10-83)

AT: LA-508-101 (D-0) SPIKED SAMPLE

		SPIKE	REPLICATE
Type	DETECTOR NUMBER	13	13
SPIKE	DESH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	1626	1569
3443	COUNT TIME in MINUTES (CT)	30	30
AT or TB-2	BACKGROUND in cpm (BKG)	0.5	0.5
AT	SAMPLE VOLUME in mL (Spiked Vial) (SS)	0.100	0.100
Test Code	SAMPLE DILUTION FACTOR (Spiked Vial) (DF)	1	1
	SPIKE VOLUME in mL (SVol)	10.000	10.000
Matrix	SPIKE DILUTION FACTOR (SDF)	1	1
LIQUID	SPIKE VALUE in $\mu\text{Ci/L}$ (SVal)	0.010398	0.010398
Sample #	INSTRUMENT EFFICIENCY FACTOR (EFF)	0.2322	0.2322
V77-8025	SAMPLE + SPIKE $\mu\text{Ci/L}$ (S+S)	1.04E+00	1.00E+00
Instrument Code	AVG. SAMPLE or DIGEST $\mu\text{Ci/L}$ from FORM #1	5.40E-02	
Analyst	R_s (Sample Count Rate) = $(TC / CT) - BKG$ $\text{SAMPLE} + \text{SPIKE } \mu\text{Ci/L} = R_s \cdot 1000 \text{ mL/L} \cdot DF / (EFF \cdot SS \cdot 2220000 \text{ dpm}/\mu\text{Ci})$ $\text{AVG. PERCENT SPIKE RECOVERY} = (((S+S \mu\text{Ci/L (Spike)} + S+S \mu\text{Ci/L (Replicate)})/2) - \text{Sample } \mu\text{Ci/L}) / ((SDF/SVol) / (DF/SS))$		
LEWIS			
Date	05/10/94		
Time	14:30		

RESULT **AVG. PERCENT SPIKE RECOVERY = 93.2%**

Data Entry by:	Date:	16-May-94
Approved by:	Date:	16-May-94

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TOTAL ALPHA ANALYSIS - ACID DIGESTION

13/2
1626
30

V 77-8025

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 05-10-1994 at 20:01:38
Det #13 2-inch mount Alpha eff. : .2322
Sample size : .1 mL Dilution : 1

1569
30

Sample # V-77-8025 Mount # 1

1626
----- 0.5 = 1.0417E+00 uCi/L alpha
30

Sample # V-77-8025 Mount # 2

1569
----- 0.5 = 1.0049E+00 uCi/L alpha
30

WHC-SD-WM-DP-065, REV. 0

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0A
24

WESTINGHOUSE HANFORD COMPANY

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222-S LABORATORY
ANALYTICAL BATCH

WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No. V75-77	Customer ID: COMP
Analysis: TB	Sample Prep: ACID DIGEST

Instrument: WA 57276	Procedure/ Rev: LA-508-101 D-0
Technologist: ALETA K LEWIS	Date: 05/10/94
Starting Time: 0800	Temperature 25 C
Ending Time: 1200	Chemist: S FITZGEARLD

Comments: BATCH # 3443

	Description	Lab ID
1	LMCS	V75-8580
2	BLANK	V76-8620
3	SAMPLE	V77-8720
4	SAMPLE DUP	V77-8820
5	SAMPLE SPIKE	V77-8920
6	SAMPLE SPIKE DUP	V77-8020
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	142B51	10ML		

1362

RERUN *Batch 3443*

Serial No V 75.-8520	Sample ID 108-AP	Date 3-18-94	Time Issued 12: 0	Priority 26
Determination TB	Method-Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 2
Sample Size ? <i>10ml</i>			Customer ID STD	
Remarks, Calculations, Results S515 EV-CRB STD# 142351 <i>SLF-94</i> RESULT <i>2.3911E-1</i> STD VAL <i>2.6794E-1</i> %REC <i>89.1%</i> <i>2.6794 E-1</i> <i>alta Lewis</i>				
Analyst - 1 <i>alta Lewis</i>	Analyst - 2 <i>D. H. Medina</i>	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	<i>5-12-94</i> <i>SKM</i>
Date <i>5/10/94</i>	Time Completed <i>12:00</i>	Lap Unit Mgr <i>SKM</i>	<i>5-12-94</i> <i>SKM</i>	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

TB: LA-508-101 (D-0) LIQUIDS

		STD	REPLICATE
Type	DETECTOR NUMBER	14	14
STD	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	49018	49492
3443	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	9	9
TB	SAMPLE SIZE in mL (SS)	10.000	10
Test Code	DILUTION FACTOR (DF)	1	1
	DIGEST DILUTION FACTOR (DDF)	1	1
Matrix	EFFICIENCY FACTOR (EFF)	0.3076	0.3076
LIQUID	LC, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE	1624.933	1640.733
Sample #	SAMPLE CONCENTRATION in $\mu\text{Ci/L}$	2.38E-01	2.40E-01
V75-8520	AVG. $\mu\text{Ci/L}$ in SAMPLE and REPLICATE =	2.3911E-01	
Instrument Code	R_s (Sample Count Rate) = $(TC / CT) - BKG$ TOTAL BETA $\mu\text{Ci/L}$ = $R_s * 1000\text{mL/L} * DF * DDF / (EFF * SS * 2220000\text{dpm}/\mu\text{Ci})$ TOTAL BETA $\mu\text{Ci/mL}$ = TOTAL BETA $\mu\text{Ci/L} / 1000\text{mL/L}$ Relative Counting Error = $(\text{The Square Root of } TC + BKG * CT) / (TC - BKG * CT) * 1.96 * 100$ Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Analyst	v RESULTS v		
LEWIS	TOTAL BETA in $\mu\text{Ci/L}$ (AVERAGE) =	2.39E-01	DETECTION LEVEL 5.69E-07 $\mu\text{Ci/mL}$
Date	TOTAL BETA in $\mu\text{Ci/mL}$ (AVERAGE) =	2.39E-04	
Time	RELATIVE COUNTING ERROR =	0.9%	

Data Entry by: <i>[Signature]</i>	Date: 12-May-94
Approved by: <i>[Signature]</i>	Date: 16-Mar-94

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TOTAL BETA ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

14/2 5-10-94 MB

1,2

V75-8520

49018
30

Beta Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 05-10-1994 at 18:01:01
Det #14 2 -inch mount Beta eff. : .3076
Sample size : 10 mL Dilution : 1

49492
30

Sample # V-75 Mount # 1

49018

----- 9.0 = 2.3796E-01 uCi/L beta
30

Sample # V-75 Mount # 2

49492

----- 9.0 = 2.4027E-01 uCi/L beta
30

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34

RERUN

Serial No V 76.-8620	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination TB	Method Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 2
Sample Size ? 100ml - 10ml - 100ml			Customer ID BLANK	
Remarks Calculations Results COUNT AS uCi/L USE 13,14,15 OR 16 WHC-SD-WM-DP-065, REV. 0 $< 1.34E-2 \text{ uCi/ml}$ <i>Alta Lewis</i>				
Analyst - 1	Analyst - 2 <i>Alta Lewis</i>	Analyst - 3 <i>Rakete</i>	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5/10/94	Time Completed 12:00	Lab Unit Mgr <i>Alta Lewis</i>	5-12-94 <i>Alta Lewis</i>	

54-6800-061 (R-10-83)

TB: LA-508-101 (D-0) LIQUIDS		BLK	REPLICATE
Type	DETECTOR NUMBER	14	14
BLK	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	264	249
3443	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	9	9
TB	SAMPLE SIZE in ml. (SS)	0.100	0.1
Test Code	DILUTION FACTOR (DF)	101	101
	DIGEST DILUTION FACTOR (DDF)	5	5
Matrix	EFFICIENCY FACTOR (EFF)	0.3076	0.3076
LIQUID	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE	1.807	1.807
Sample #	SAMPLE CONCENTRATION in uCi/L	1.34E+01	1.34E+01
V76-8620	AVG. uCi/L in DIGEST SOLUTION =	<	2.6734E+00
Instrument Code	$R_s \text{ (Sample Count Rate)} = (TC / CT) - BKG$ $\text{TOTAL BETA } \mu\text{Ci/L} = R_s * 1000\text{mL/L} * DF * DDF / (EFF * SS * 2220000\text{dpm}/\mu\text{Ci})$ $\text{TOTAL BETA } \mu\text{Ci/mL} = \text{TOTAL BETA } \mu\text{Ci/L} / 1000\text{mL/L}$ $\text{Relative Counting Error} = 1 * (\text{The Square Root of } TC + BKG * CT) / (TC - BKG * CT) * 1.96 * 100$ Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Analyst	v RESULTS v		
LEWIS	TOTAL BETA in uCi/L (AVERAGE) =	< 1.34E+01	DETECTION LEVEL 2.87E-02 uCi/mL
Date	TOTAL BETA in uCi/mL (AVERAGE) =	< 1.34E-02	
05/10/94	LESS Than Value was Determined from Lc.		
Time	RELATIVE COUNTING ERROR =	500.0%	
1200			

Data Entry by: <i>Alta Lewis</i>	Date: 12-May-94
Approved by: <i>Alta Lewis</i>	Date: 16-May-94

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1366

TOTAL BETA ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

14/2 5-10-94 mB

V 76-8620

3,4

Beta Calculation (CRPC_CAL 2.0)
 By: DH MLCIA, on 05-10-1994 at 18:01:48
 Det #14 2 -inch mount Beta eff. : .3076
 Sample size : .1 mL Dilution : 101

264
 30

Sample # V-76 Mount # 1

249
 30

264
 ----- 9.0 < 1.8876E+00 uCi/L beta
 30

Sample # V-76 Mount # 2

249
 ----- 9.0 < 1.8876E+00 uCi/L beta
 30

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RERUN

Serial No V 77.-8720	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination TB	Method Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 2
Sample Size ?. 100 ml - 10 ml - .100 ml			Customer ID COMP	
Remarks Calculations, Results COUNT AS uCi/L USE 13,14,15 OR 16 WHC-SD-WM-DP-065, REV. 0 6.18E+0 uCi/ml Alt. Lewis				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5/10/94	Time Completed 12:00	Lab Unit Mgr	5-12-94 Smyth	

54-6800-061 (R-10-83)

TB: LA-508-101 (D-0)

LIQUIDS

		SAM	REPLICATE
Type	DETECTOR NUMBER	14	14
SAM	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	25148	25555
3443	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	9	9
TB	SAMPLE SIZE in mL (SS)	0.100	0.1
Test Code	DILUTION FACTOR (DF)	101	101
	DIGEST DILUTION FACTOR (DDF)	5	5
Matrix	EFFICIENCY FACTOR (EFF)	0.3076	0.3076
LIQUID	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE	829.267	842.833
Sample #	SAMPLE CONCENTRATION in uCi/L	6.13E+03	6.23E+03
V77-8720	AVG. uCi/L in DIGEST SOLUTION =	1.2366E+03	
Instrument Code	Rs (Sample Count Rate) = (TC / CT) - BKG		
Analyst	TOTAL BETA uCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/uCi)		
LEWIS	TOTAL BETA uCi/mL = TOTAL BETA uCi/L / 1000mL/L		
Date	Relative Counting Error = 1 (The Square Root of TC + BKG * CT) / (TC - BKG * CT) * 1.96 * 100		
05/10/94	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Time			
1200			
v RESULTS v			
TOTAL BETA	in uCi/L (AVERAGE) =	6.18E+03	DETECTION LEVEL 2.87E-02 uCi/mL
TOTAL BETA	in uCi/mL (AVERAGE) =	6.18E+00	
RELATIVE COUNTING ERROR	=	1.3%	

Data Entry by:	Date:	12-May-94
Approved by:	Date:	16-May-94

Form L1 Rev. 2.1

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TOTAL BETA ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

14/2 5-10-94 mcs

V-77-8720 5,6

Beta Calculation (CRPC_CAL 2.0)
 By: DH MILICIA, on 05-10-1994 at 18:02:27
 Det #14 2-inch mount Beta eff. : .3076
 Sample size .1 mL Dilution : 101

25148

30

Sample # V-77-8720 Mount # 1

25555 25148

30

30

9.0 = 1.2265E+03 uCi/L beta

Sample # V-77-8720 Mount # 2

25555

30

9.0 = 1.2466E+03 uCi/L beta

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RERUN

Serial No V 77.-8820	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination TB	Method-Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Retuns 2
Sample Size ?.100ml - 10ml - .100ml			Customer ID COMP	
Remarks, Calculations, Results COUNT AS uCi/L USE 13,14,15 OR 16 WHC-SD-WM-DP-065, REV. 0 6.32 E+0 uci/ml Celita Lewis				
Analyst - 1	Analyst - 2 MB	Analyst - 3 D. Hamilton	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5/10/94	Time Completed 12:00	Lab Unit Mgr R. H. H.	5-12-94 AKM	

54-6800-061 (R-10-83)

TB: LA-508-101 (D-0)

LIQUIDS

		SAMPLE	REPLICATE
Type	DETECTOR NUMBER	14	14
DUP	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	26802	25003
3443	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	9	9
TB	SAMPLE SIZE in mL (SS)	0.100	0.1
Test Code	DILUTION FACTOR (DF)	101	101
Matrix	DIGEST DILUTION FACTOR (DDF)	5	5
LIQUID	EFFICIENCY FACTOR (EFF)	0.3076	0.3076
Sample #	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE	884.400	824.433
V77-8820	SAMPLE CONCENTRATION in uCi/L	6.54E+03	6.10E+03
Instrument Code	AVG. uCi/L in DIGEST SOLUTION =	1.2637E+03	
Analyst	Rs (Sample Count Rate) = (TC / CT) - BKG		
LEWIS	TOTAL BETA uCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/uCi)		
Date	TOTAL BETA uCi/mL = TOTAL BETA uCi/L / 1000mL/L		
05/10/94	Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100		
Time	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
1200	v RESULTS v		
TOTAL BETA	in uCi/L (AVERAGE) =	6.32E+03	DETECTION LEVEL 2.87E-02 uCi/mL
TOTAL BETA	in uCi/mL (AVERAGE) =	6.32E+00	
RELATIVE COUNTING ERROR	=	1.3%	

Data Entry by: MB	Date: 12-May-94
Approved by: R. H. H.	Date: 16-May-94

TOTAL BETA ANALYSIS - ACID DIGESTION

14/2 5-10-94 mrs

V.77-8820

7,8

Beta Calculation (CRPC_CAL 2.0)

By: DH MILICIA, on 05-10-1994 at 18:02:59

25003

Det #14 1/2 -inch mount Beta eff. : .3076

30

Sample size : .1 mL Dilution : 101

Sample # V-77-8820

Mount # 1

WHC-SD-WM-DP-065, REV. 0

26802

25003

30

30

9.0 = 1.2194E+03 uCi/L beta

Sample # V-77-8820

Mount # 2

26802

30

9.0 = 1.3031E+03 uCi/L beta

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9/10 RERUN

Serial No V 77.-8920	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination TB	Method Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 2
Sample Size ?. 100 ml - 10 ml - 100 ml			Customer ID COMP	
Remarks Calculations, Results SAMPLE SPIKED ID. WHC-SD-WM-DP-065, REV. 0 SPIKE ID SPIKE VOLUME 10 ml 14251 <i>85.27% recovery</i> <i>76.17%</i> 87.4% <i>Alita Lewis</i> Analyst - 1 Analyst - 2 Analyst - 3 Analyst - 4 Analyst - 5 Date 5/10/94 Time Completed 12:00 Lab Mgr 5-12-94 54-6800-061 (R-10-83)				

TB: LA-508-101 (D-0) SPIKED SAMPLE

		SPIKE	REPLICATE
Type	DETECTOR NUMBER	14	14
SPIKE	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	72873	73779
3443	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	9	9
TB	SAMPLE VOLUME in mL (Spiked Vial) (SS)	0.100	0.100
Test Code	SAMPLE DILUTION FACTOR (Spiked Vial) (DF)	101	101
	SPIKE VOLUME in mL (SVol)	10.000	10.000
Matrix	SPIKE DILUTION FACTOR (SDF)	1	1
LIQUID	SPIKE VALUE in pCi/L (SVal)	0.26794	0.26794
Sample #	INSTRUMENT EFFICIENCY FACTOR (EFF)	0.3076	0.3076
V77-8920	SAMPLE + SPIKE pCi/L (S+S)	3.58E+03	3.62E+03
Instrument Code	AVG. SAMPLE or DIGEST pCi/L from FORM #1	1.24E+03	
Analyst	$R_s \text{ (Sample Count Rate)} = (TC / CT) - BKG$ $\text{SAMPLE + SPIKE pCi/L} = R_s * 1000 \text{ mL/L} * DF / (EFF * SS * 2220000 \text{ dpm/pCi})$ $\text{AVG. PERCENT SPIKE RECOVERY} = (((S+S \text{ pCi/L (Spike)} + S+S \text{ pCi/L (Replicate)}) / 2) - \text{Sample pCi/L}) * ((SDF/SVol) / (DF/SS))$		
LEWIS			
Date			
05/10/94			
Time			
14:30			

RESULT **AVG. PERCENT SPIKE RECOVERY = 87.4%**

Data Entry by: <i>Alita Lewis</i>	Date: 16-May-94
Approved by: <i>Alita Lewis</i>	Date: 16-May-94

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TOTAL BETA ANALYSIS - ACID DIGESTION

14/2 5-10-94 ms

V77-8920

9,10

Beta Calculation

(CRPC_CAL 2.0)

72873

By: DH MILICIA,

on 05-10-1994 at 19:51:05

Det #14

9-inch mount

Beta eff. : .3076

Sample size: .1 mL

Dilution : 101

30

Sample # V-77-8920

Mount # 1

WHC-SD-WM-DP-065, REV. 0

73779 72873

9.0 = 3.5794E+03 uCi/L beta

30 30

Sample # V-77-8920

Mount # 2

73779

9.0 = 3.6241E+03 uCi/L beta

30

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1-2 **RERUN**

Serial No V 77.-8020	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination TB	Method/Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F	Repeats 2
Sample Size ? 100 ml - 10 ml - 100 ml			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKE DUPLICATE 87.1% SPIKE ID 84.6% recovery 5-16-94 SPIKE VOL 76.0% 3LF 5-16-94 10ml 142851 ALD Lewis				
Analyst - 1	Analyst - 2 D.H. Milicia	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 5/10/94	Time Completed 12:00	Lab Unit Mgr. P. J. H. H.	3-12-94 H.M. Salinas	

54 6800-061 (R 10-83)

WHC-SD-WM-DP-065, REV. 0

TB: LA-508-101 (D-0) SPIKED SAMPLE

		SPIKE	REPLICATE
Type	DETECTOR NUMBER	14	14
SPIKE	DESI SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	74191	73241
3443	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	9	9
TB	SAMPLE VOLUME in mL (Spiked Vial) (SS)	0.100	0.100
Test Code	SAMPLE DILUTION FACTOR (Spiked Vial) (DF)	101	101
	SPIKE VOLUME in mL (SVol)	10.000	10.000
Matrix	SPIKE DILUTION FACTOR (SDF)	1	1
LIQUID	SPIKE VALUE in $\mu\text{Ci/L}$ (SVol)	0.26794	0.26794
Sample #	INSTRUMENT EFFICIENCY FACTOR (EFF)	0.3076	0.3076
V77-8020	SAMPLE + SPIKE $\mu\text{Ci/L}$ (S+S)	3.64E+03	3.60E+03
Instrument Code	AVG. SAMPLE or DIGEST $\mu\text{Ci/L}$ from FORM #1	1.26E+03	
Analyst	R_s (Sample Count Rate) = $(TC / CT) - BKG$ $SAMPLE + SPIKE \mu\text{Ci/L} = R_s * 1000\text{mL/L} * DF / (EFF * SS * 2220000\text{dpm}/\mu\text{Ci})$ $AVG. PERCENT SPIKE RECOVERY = (((S+S \mu\text{Ci/L (Spike)} + S+S \mu\text{Ci/L (Replicate)})/2) - Sample \mu\text{Ci/L}) * ((SDF/SVol)/(DF/SS)))$		
LEWIS			
Date	05/10/94		
Time	14:30		

RESULT **AVG. PERCENT SPIKE RECOVERY = 87.1%**

Date Entry by:	Date:	16-May-94
Approved by:	Date:	16-May-94
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TOTAL BETA ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-065, REV. 0

14/2

74191
30

V77-8020

Beta Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 05-10-1994 at 19:51:38
Det #14 2 -inch mount Beta eff. : .3076
Sample size : .1 mL Dilution : 101

73241
30

Sample # V-77-8020 Mount # 1

74191

----- 9.0 = 3.6444E+03 uCi/L beta
30

Sample # V-77-8020 Mount # 2

73241

----- 9.0 = 3.5976E+03 uCi/L beta
30

BEST AVAILABLE COPY

WHC-SD-WM-DP-065, REV. 0

**THE FOLLOWING ANALYSES ARE INCLUDED IN THE
DATA PACKAGE BUT THE RESULTS HAVE NOT BEEN
REPORTED IN THE FINAL SUMMARY REPORTS.**

WHC-SD-WM-DP-065, REV. 0

2 **RERUN** Batch 3337

Serial No V 75.-8520	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 0	Priority 26
Determination TB	Method-Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size 10.mL	WHC-SD-WM-DP-065, REV. 0		Customer ID STD	
Remarks, Calculations, Results S515. EV-CRB STD# 142 B51 RESULT 2.46 E-01 STD VAL 2.683 E-01 %REC 91.7				
OUT FOR RERUN				
Analyst - 1	Analyst - 2 D. Hamilton	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab. Unit Mgr.	Signature: <i>[Signature]</i>	

54-6800-061 (R-10-83)

TB: LA-508-101 (D-0) LIQUIDS

		STANDARD	REPLICATE
Type	DETECTOR NUMBER	18	N/A
STANDARD	DISH SIZE 1, 2, or 5 (MS)	2	N/A
Work List	TOTAL COUNTS (TC)	51844	N/A
3337	COUNT TIME in MINUTES (CT)	30	N/A
AT or TB?	BACKGROUND in cpm (BKG)	10	N/A
TB	SAMPLE SIZE in mL (SS)	10.000	N/A
Test Code	DILUTION FACTOR (DF)	1	N/A
TB	DIGEST DILUTION FACTOR (DDF)	1	N/A
Matrix	EFFICIENCY FACTOR (EFF)	0.3151	N/A
LIQUID	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE	1718.133	N/A
Sample #	SAMPLE CONCENTRATION in $\mu\text{Ci/L}$	2.46E-01	N/A
V75-8520	$\mu\text{Ci/L}$ in SAMPLE =	2.4562E-01	
Instrument Code	R_s (Sample Count Rate) = $(TC / CT) - .BKG$ $\text{TOTAL BETA } \mu\text{Ci/L} = R_s * 1000 \text{ mL/L} * DF * DDF / (EFF * SS * 2220000 \text{ dpm}/\mu\text{Ci})$ $\text{TOTAL BETA } \mu\text{Ci/mL} = \text{TOTAL BETA } \mu\text{Ci/L} / 1000 \text{ mL/L}$ $\text{Relative Counting Error} = (\text{The Square Root of } TC + BKG * CT) / (TC - BKG * CT) * 1.96 * 100$ Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Analyst	v RESULTS v		
A LEWIS	TOTAL BETA in $\mu\text{Ci/L}$	=	2.46E-01
Date	TOTAL BETA in $\mu\text{Ci/mL}$	=	2.46E-04
05/05/94			DETECTION LEVEL 5.84E-07 $\mu\text{Ci/mL}$
Time	RELATIVE COUNTING ERROR = 0.9%		

Data Entry by: <i>[Signature]</i>	Date: 08-May-94
Approved by: <i>[Signature]</i>	Date: 9-May-94

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3

RERUN

Serial No V 76.-8620	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination TB	Method-Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 1
Sample Size <i>.100 ml - 10 ml - 500 ml</i>			Customer ID BLANK	
Remarks, Calculations Results COUNT AS uCi/L USE 13,14,15 OR 16 WHC-SD-WM-DP-065, REV. 0 <i>3.37 E-03 uCi/ml</i> <i>Alta Lewis</i> OUT FOR RERUN				
Analyst - 1	Analyst - 2 <i>D.H. Miller</i>	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr <i>[Signature]</i> 54-6800-061 (R-10-83)		

TB: LA-508-101 (D-0) LIQUIDS		BLANK	REPLICATE
Type	DETECTOR NUMBER	18	N/A
BLANK	DISH SIZE 1, 2, or 5 (MS)	2	N/A
Work List	TOTAL COUNTS (TC)	370	N/A
3337	COUNT TIME in MINUTES (CT)	30	N/A
AT or TB?	BACKGROUND in cpm (BKG)	10	N/A
TB	SAMPLE SIZE in mL (SS)	0.500	N/A
Test Code	DILUTION FACTOR (DF)	101	N/A
TB	DIGEST DILUTION FACTOR (DDF)	5	N/A
Matrix	EFFICIENCY FACTOR (EFF)	0.3151	N/A
LIQUID	L _c , R _{max} , or R _s (SAMPLE RATE) as APPROPRIATE	2.333	N/A
Sample #	SAMPLE CONCENTRATION in uCi/L	3.37E+00	N/A
V76-8620	uCi/L in DIGEST SOLUTION =	6.7379E-01	
Instrument Code	R _s (Sample Count Rate) = (TC / CT) - BKG		
Analyst	TOTAL BETA uCi/L = R _s * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/uCi)		
A LEWIS	TOTAL BETA uCi/mL = TOTAL BETA uCi/L / 1000mL/L		
Date	Relative Counting Error = [(The Square Root of TC + BKG * CT) / (TC - BKG * CT)] * 1.96 * 100		
05/05/94	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Time	v RESULTS v		
1200	TOTAL BETA in uCi/L	=	3.37E+00
	TOTAL BETA in uCi/mL	=	3.37E-03
	RELATIVE COUNTING ERROR	=	72.5%
			DETECTION LEVEL 5.89E-03 uCi/mL

Data Entry by: <i>[Signature]</i>	Date: 08-May-94
Approved by: <i>[Signature]</i>	Date: 9-May-94

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RERUN

Serial No V 77.-8720	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination TB	Method-Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 1
Sample Size 100 - 10 ml - .500			Customer ID COMP	
Remarks, Calculations, Results COUNT AS uCi/L USE 13, 14, 15 OR 16 <div style="text-align: right; font-weight: bold;">WHC-SD-WM-DP-065, REV. 0</div> <div style="text-align: center; font-size: 1.2em;">7.30^{E00} uCi/ml</div> <div style="display: flex; justify-content: space-between;"> <i>Alita Lewis</i> OUT FOR RERUN </div>				
Analyst - 1	Analyst - 2 <i>D. H. Lewis</i>	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr <i>[Signature]</i>	<i>[Signature]</i>	

54-6800-061 (R-10-83)

TB: LA-508-101 (D-0)

LIQUIDS

	SAMPLE	REPLICATE
Type	DETECTOR NUMBER	18
SAMPLE	DISH SIZE 1, 2, or 5 (MS)	2
Work List	TOTAL COUNTS (TC)	152074
3337	COUNT TIME in MINUTES (CT)	30
AT or TB?	BACKGROUND in cpm (BKG)	10
TB	SAMPLE SIZE in mL (SS)	0.500
Test Code	DILUTION FACTOR (DF)	101
TB	DIGEST DILUTION FACTOR (DDF)	5
Matrix	EFFICIENCY FACTOR (EFF)	0.3151
LIQUID	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE	5059.133
Sample #	SAMPLE CONCENTRATION in uCi/L	7.30E+03
V77-8720	uCi/L in DIGEST SOLUTION =	1.4609E+03
Instrument Code	$Rs \text{ (Sample Count Rate)} = (TC / CT) - BKG$	
Analyst	$\text{TOTAL BETA } \mu\text{Ci/L} = Rs * 1000\text{mL/L} * DF * DDF / (EFF * SS * 2220000\text{dpm}/\mu\text{Ci})$	
A LEWIS	$\text{TOTAL BETA } \mu\text{Ci/mL} = \text{TOTAL BETA } \mu\text{Ci/L} / 1000\text{mL/L}$	
Date	$\text{Relative Counting Error} = (\sqrt{\text{The Square Root of } TC + BKG * CT} / (TC - BKG * CT)) * 1.96 * 100$	
05/05/94	Detection Levels and Less Than Values are determined from Procedure LA-508-002.	
Time	v RESULTS v	
1200	TOTAL BETA in uCi/L	= 7.30E+03
	TOTAL BETA in uCi/mL	= 7.30E+00
	RELATIVE COUNTING ERROR	= 0.5%

DETECTION
LEVEL

5.89E-03
uCi/mL

Data Entry by: <i>[Signature]</i>	Date: 08-May-94
Approved by: <i>[Signature]</i>	Date: 7-May-94

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RERUN

Serial No V 77.-8820	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination TB	Method Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 1
Sample Size 100 - 500 ml			Customer ID COMP	
Remarks Calculations, Results COUNT AS uCi/L USE 13, 14, 15 OR 16 DUF <div style="text-align: right; font-weight: bold;">WHC-SD-WM-DP-065, REV. 0</div> <div style="text-align: center; font-size: 1.2em;">7.30^{COU} uCi/ml</div> <div style="text-align: left; font-style: italic;">Alita Lewis</div> <div style="text-align: right; font-weight: bold; font-size: 1.2em;">OUT FOR RERUN</div>				
Analyst - 1	Analyst - 2 <i>D. H. Miller</i>	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr	<i>[Signature]</i>	

54-6800-061 (R-10-83)

TB: LA-508-101 (D-0)

LIQUIDS

	SAMPLE	REPLICATE
Type	DETECTOR NUMBER	18
DUPLICATE	DISH SIZE 1, 2, or 5 (MS)	2
Work List	TOTAL COUNTS (TC)	152035
3337	COUNT TIME in MINUTES (CT)	30
AT or TB?	BACKGROUND in cpm (BKG)	10
TB	SAMPLE SIZE in mL (SS)	0.500
Test Code	DILUTION FACTOR (DF)	101
TB	DIGEST DILUTION FACTOR (DDF)	5
Matrix	EFFICIENCY FACTOR (EFF)	0.3151
LIQUID	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE	5057.833
Sample #	SAMPLE CONCENTRATION in uCi/L	7.30E+03
V77-8820	uCi/L in DIGEST SOLUTION =	1.4605E+03
Instrument Code	$Rs \text{ (Sample Count Rate)} = (TC / CT) - BKG$	
Analyst	$\text{TOTAL BETA } \mu\text{Ci/L} = Rs * 1000\text{mL/L} * DF * DDF / (EFF * SS * 2220000\text{dpm}/\mu\text{Ci})$	
A LEWIS	$\text{TOTAL BETA } \mu\text{Ci/mL} = \text{TOTAL BETA } \mu\text{Ci/L} / 1000\text{mL/L}$	
Date	$\text{Relative Counting Error} = \{ (\text{The Square Root of } TC + BKG * CT) / (TC - BKG * CT) \} * 1.96 * 100$	
05/05/94	Detection Levels and Less Than Values are determined from Procedure LA-508-002.	
Time		
1200	v RESULTS v	
TOTAL BETA	in uCi/L	= 7.30E+03
TOTAL BETA	in uCi/mL	= 7.30E+00
RELATIVE COUNTING ERROR	=	0.5%
		DETECTION LEVEL
		5.89E-03 uCi/mL

Data Entry by: <i>[Signature]</i>	Date: 08-May-94
Approved by: <i>[Signature]</i>	Date: 9-May-94

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Serial No V 77.-8920	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination TB	Method/Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size 100 - 10ml - 500			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKED ID SPIKE ID SPIKE VOLUME 10ml 142 B51 WHC-SD-WM-DP-065, REV. 0 43.9% Recovery OUT FOR RERUN Alita Lewis				
Analyst - 1	Analyst - 2 D.H. Miller	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Dir/In Mgr [Signature]	[Signature] 54-6800-061 (R-10-83)	

TB: LA-508-101 (D-0) SPIKED SAMPLE

		SPIKE	REPLICATE
Type	DETECTOR NUMBER	18	N/A
SPIKE	DISH SIZE 1, 2, or 5 (MS)	2	N/A
Work List	TOTAL COUNTS (TC)	176773	N/A
3337	COUNT TIME in MINUTES (CT)	30	N/A
AT or TB ?	BACKGROUND in cpm (BKG)	10	N/A
TB	SAMPLE VOLUME in mL (Spiked Vial) (SS)	0.500	N/A
Test Code	SAMPLE DILUTION FACTOR (Spiked Vial) (DF)	101	N/A
TB	SPIKE VOLUME in mL (SVol)	10.000	N/A
Matrix	SPIKE DILUTION FACTOR (SDF)	1	N/A
LIQUID	SPIKE VALUE in µCi/L (SVal)	0.2683	N/A
Sample #	INSTRUMENT EFFICIENCY FACTOR (EFF)	0.3151	N/A
V77-8920	SAMPLE + SPIKE µCi/L (S+S)	1.70E+03	N/A
Instrument Code	SAMPLE or DIGEST µCi/L from FORM #1	1.46E+03	
Analyst	$Rs \text{ (Sample Count Rate)} = (TC / CT) - BKG$ $SAMPLE + SPIKE \mu Ci/L = Rs * 1000 mL/L * DF / (EFF * SS * 2220000 dpm/\mu Ci)$ $PERCENT SPIKE RECOVERY = (((S+S \mu Ci/L - SAMPLE \mu Ci/L) * ((SDF/SVol)/(DF/SS)))/(SVal)) * 100$		
A LEWIS			
Date	05/05/94		
Time	1200		

RESULT **PERCENT SPIKE RECOVERY = 43.9%**

Data Entry by: [Signature]	Date: 08-May-94
Approved by: [Signature]	Date: 9-May-94

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1383

RERUN

Serial No V 77.-8020	Sample Point 108-AP	Time Issued 3-18-94	Priority 26
Determination TB	Method-Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F
Sample Size 100 - 10 mL - .500		Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKE DUPLICATE SPIKE ID SPIKE VOL 10ml 142 B51 34.8% Recovery OUT FOR RERUN Q. Lewis			
Analyst - 1	Analyst - 2 D. H. M. Lewis	Analyst - 3	Analyst - 4
Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr	

54-6800-061 (R-10-83)

TB: LA-508-101 (D-0) SPIKED SAMPLE

		SPIKE	REPLICATE
Type	DETECTOR NUMBER	18	N/A
SPIKE	DISH SIZE 1, 2, or 5 (MS)	2	N/A
Work List	TOTAL COUNTS (TC)	171679	N/A
3337	COUNT TIME in MINUTES (CT)	30	N/A
AT or TB	BACKGROUND in cpm (BKG)	10	N/A
TB	SAMPLE VOLUME in mL (Spiked Vial) (SS)	0.500	N/A
Test Code	SAMPLE DILUTION FACTOR (Spiked Vial) (DF)	101	N/A
TB	SPIKE VOLUME in mL (SVol)	10.000	N/A
Matrix	SPIKE DILUTION FACTOR (SDF)	1	N/A
LIQUID	SPIKE VALUE in $\mu\text{Ci/L}$ (SVal)	0.2683	N/A
Sample #	INSTRUMENT EFFICIENCY FACTOR (EFF)	0.3151	N/A
V77-8020	SAMPLE + SPIKE $\mu\text{Ci/L}$ (S+S)	1.65E+03	N/A
Instrument Code	SAMPLE or DIGEST $\mu\text{Ci/L}$ from FORM #1	1.46E+03	
Analyst	R_s (Sample Count Rate) = $(TC / CT) - BKG$ $SAMPLE + SPIKE \mu\text{Ci/L} = R_s \cdot 1000\text{mL/L} \cdot DF / (EFF \cdot SS \cdot 2220000\text{dpm}/\mu\text{Ci})$ $PERCENT SPIKE RECOVERY = (((S+S \mu\text{Ci/L} - SAMPLE \mu\text{Ci/L}) \cdot ((SDF/SVol)/(DF/SS)))/(SVal)) \cdot 100$		
A LEWIS			
Date	05/05/94		
Time	1200		

RESULT **PERCENT SPIKE RECOVERY = 34.8%**

Data Entry by:	Date: 08-May-94
Approved by:	Date: 9-May-94

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1384

18/2 DM
~~2784~~ -10
 30

V75-8520

51844 -10
 30

Beta Calculation (CRPC_CAL 2.0)
 By: DH MILICIA, on 05-05-1994 at 19:38:28
 Det #18 2 -inch mount Beta eff. : .3151
 Sample size : 10 mL Dilution : 1

Sample # V-75 Mount # 1

51844

30

10.0 = 2.4562E-01 uCi/L beta

WHC-SD-WM-DP-065, REV. 0

18/2 DM
~~19~~ -10
 30

V76-8620

370 -10
 30

Beta Calculation (CRPC_CAL 2.0)
 By: DH MILICIA, on 05-05-1994 at 19:39:28
 Det #18 2 -inch mount Beta eff. : .3151
 Sample size : .5 mL Dilution : 101

Sample # V-76 Mount # 1

370

30

10.0 = 6.7379E-01 uCi/L beta

18/2
171679 - 10
30

V 77-8020

Beta Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 05-05-1994 at 19:41:45
Det #18 2 -inch mount Beta eff. : .3151
Sample size : .5 mL Dilution : 101

Sample # V-77-8020 Mount # 1

171679
----- 10.0 = 1.6496E+03 uCi/L beta
30

18/2
176773 - 10
30

V 77-8920

Beta Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 05-05-1994 at 19:41:05
Det #18 2 -inch mount Beta eff. : .3151
Sample size : .5 mL Dilution : 101

Sample # V-77-8920 Mount # 1

176773
----- 10.0 = 1.6967E+03 uCi/L beta
30

18/2 Dm
~~2778~~
 30 -10

V 47-8720

Beta Calculation (CRPC_CAL 2.0)
 By: DH MILICIA, on 05-05-1994 at 19:39:56
 Det #18 2 -inch mount Beta eff. : .3151
 Sample size : .5 mL Dilution : 101

152074 -10
 30

Sample # V-77 Mount # 1

152074

----- 10.0 = 1.4609E+03 uCi/L beta

30

18/2 Dm
~~2725~~
 30 -10

V 47-8820

Beta Calculation (CRPC_CAL 2.0)
 By: DH MILICIA, on 05-05-1994 at 19:40:30
 Det #18 2 -inch mount Beta eff. : .3151
 Sample size : .5 mL Dilution : 101

152035 -10
 30

Sample # V-77-8820 Mount # 1

152035

----- 10.0 = 1.4605E+03 uCi/L beta

30

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-065, REV. 0

Lab Segment Serial No.
V75-77Customer ID:
COMPAnalysis:
ATSample Prep:
ACID DIGEST

Instrument: WA 57276

Procedure/ Rev: LA-508-101

Technologist: ALETA K LEWIS

Date: 05/05/94

Starting Time: 0800

Temperature 25 C

Ending Time: 1200

Chemist: S. FITZGERALD

Comments: BATCH# 3336

OUT FOR RERUN

	Description	Lab ID
1	LMCS	V75-8525
2	BLANK	V76-8625
3	SAMPLE	V77-8725
4	SAMPLE DUP	V77-8825
5	SAMPLE SPIKE	V77-8625 ⁵¹⁵ 8925
6	SAMPLE SPIKE DUP	V77-8025
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

DATA
NOT USED
IN PACKAGE

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
EV-CRB	142B51 10ML			
				1388

[illegible]

sted.

RERUN

Batu 3336

Serial No V 75.-8525	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 0	Priority 26
Determination AT	Method/Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample <i>SKM 4-28-94</i> <i>Time 10 ml</i>			Customer ID STD	
Remarks, Calculations, Results S510 EV-CRB STD# 142B51 RESULT 9.76 E-03 STD VAL 1.0398 E-02 %REC 93.9 OUT FOR RERUN <i>Alita Lewis</i>				
Analyst - 1	Analyst - 2 <i>D.H. Milicia</i>	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs <i>Gay Hammett</i>
Time Completed		Lab Unit Mgr <i>A. J. H.</i>	<i>Gay Hammett</i> 54-6800-061 (R-10-83)	

AT: LA-508-101 (D-0) LIQUIDS

		STANDARD	REPLICATE
Type	DETECTOR NUMBER	14	N/A
STANDARD	DISH SIZE 1, 2, or 5 (MS)	2	N/A
Work List	TOTAL COUNTS (TC)	1485	N/A
3336	COUNT TIME in MINUTES (CT)	30	N/A
AT or TB?	BACKGROUND in cpm (BKG)	0.2	N/A
AT	SAMPLE SIZE in mL (SS)	10.000	N/A
Test Code	DILUTION FACTOR (DF)	1	N/A
AT	DIGEST DILUTION FACTOR (DDF)	1	N/A
Matrix	EFFICIENCY FACTOR (EFF)	0.2274	N/A
LIQUID	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE	49.300	N/A
Sample #	SAMPLE CONCENTRATION in $\mu\text{Ci/L}$	9.77E-03	N/A
V75-8525	$\mu\text{Ci/L}$ in SAMPLE =	9.7657E-03	
Instrument Code	Rs (Sample Count Rate) = $(TC / CT) - BKG$		
Analyst	ALPHA TOTAL $\mu\text{Ci/L}$ = $Rs * 1000\text{mL/L} * DF * DDF / (EFF * SS * 2220000\text{dpm}/\mu\text{Ci})$		
A LEWIS	ALPHA TOTAL $\mu\text{Ci/mL}$ = ALPHA TOTAL $\mu\text{Ci/L}$ / 1000mL/L		
Date	Relative Counting Error = $1 (The \text{Square Root of } TC + BKG * CT) / (TC - BKG * CT) * 1.96 * 100$		
05/05/94	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Time	v RESULTS v		
1200	ALPHA TOTAL in $\mu\text{Ci/L}$ =	9.77E-03	DETECTION LEVEL 1.61E-07 $\mu\text{Ci/mL}$
	ALPHA TOTAL in $\mu\text{Ci/mL}$ =	9.77E-06	
	RELATIVE COUNTING ERROR =	5.1%	

Data Entry by: <i>Gay Hammett</i>	Date: 08-May-94
Approved by: <i>A. J. H.</i>	Date: 9-May-94

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RERUN

Serial No V 76.-8625	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination AT	Method/Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ml			Customer ID BLANK	
Remarks, Calculations, Results COUNT AS uCi/L USE 13,14,15 OR 16 WHC-SD-WM-DP-065, REV. 0 $< 3.05 \times 10^{-5}$ uCi/ml Alta Lewis OUT FOR RERUN				
Analyst - 1	Analyst - 2 D.H. Milicia	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr. <i>[Signature]</i>		

54-6800-061 (R-10-83)

AT: LA-508-101 (D-0) LIQUIDS			BLANK	REPLICATE
Type	DETECTOR NUMBER		14	N/A
BLANK	DISH SIZE 1, 2, or 5 (MS)		2	N/A
Work List	TOTAL COUNTS (TC)		7	N/A
3336	COUNT TIME in MINUTES (CT)		30	N/A
AT or TB?	BACKGROUND in cpm (BKG)		0.2	N/A
AT	SAMPLE SIZE in mL (SS)		0.100	N/A
Test Code	DILUTION FACTOR (DF)		1	N/A
AT	DIGEST DILUTION FACTOR (DDF)		5	N/A
Matrix	EFFICIENCY FACTOR (EFF)		0.2274	N/A
LIQUID	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE		0.308	N/A
Sample #	SAMPLE CONCENTRATION in uCi/L		3.05E-02	N/A
V76-8625	uCi/L in DIGEST SOLUTION =		<	6.1077E-03
Instrument Code	R_s (Sample Count Rate) = $(TC / CT) - BKG$ $\text{ALPHA TOTAL } \mu\text{Ci/L} = R_s \cdot 1000 \text{ mL/L} \cdot DF \cdot DDF / (EFF \cdot SS \cdot 2220000 \text{ dpm}/\mu\text{Ci})$ $\text{ALPHA TOTAL } \mu\text{Ci/mL} = \text{ALPHA TOTAL } \mu\text{Ci/L} / 1000 \text{ mL/L}$ $\text{Relative Counting Error} = (\sqrt{\text{The Square Root of } TC + BKG \cdot CT} / (TC - BKG \cdot CT)) \cdot 1.96 \cdot 100$ Detection Levels and Less Than Values are determined from Procedure LA-508-002.			
Analyst	A LEWIS			
Date	05/05/94			
Time	1200			
v RESULTS v				
ALPHA TOTAL	in uCi/L	=	< 3.05E-02	DETECTION LEVEL 8.03E-05 uCi/mL
ALPHA TOTAL	in uCi/mL	=	< 3.05E-05	
LESS THAN Value was Determined from Rmax.				
RELATIVE COUNTING ERROR	=	500.0%		

Date Entry by: <i>[Signature]</i>	Date: 08-May-94
Approved by: <i>[Signature]</i>	Date: 9-May-94

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3

RERUN

Serial No V 77.-8725	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination AT	Method/Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ml			Customer ID COMP	
Remarks Calculations, Results COUNT AS uCi/L USE 13,14,15 OR 16 WHC-SD-WM-DP-065, REV.0 3.83E-03 uCi/ml Alita Lewis OUT FOR RERUN				
Analyst - 1	Analyst - 2 D.H. Matris	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr [Signature]	[Signature]	

54-6800-061 (R-10-83)

AT: LA-508-101 (D-0) LIQUIDS

		SAMPLE	REPLICATE
Type	DETECTOR NUMBER	14	N/A
SAMPLE	DISH SIZE 1, 2, or 5 (MS)	2	N/A
Work List	TOTAL COUNTS (TC)	1166	N/A
3336	COUNT TIME in MINUTES (CT)	30	N/A
AT or TB?	BACKGROUND in cpm (BKG)	0.2	N/A
AT	SAMPLE SIZE in mL (SS)	0.100	N/A
Test Code	DILUTION FACTOR (DF)	1	N/A
AT	DIGEST DILUTION FACTOR (DDF)	5	N/A
Matrix	EFFICIENCY FACTOR (EFF)	0.2274	N/A
LIQUID	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE	38.667	N/A
Sample #	SAMPLE CONCENTRATION in uCi/L	3.83E+00	N/A
V77-8725	uCi/L in DIGEST SOLUTION =	7.6594E-01	
Instrument Code	$R_s \text{ (Sample Count Rate)} = (TC / CT) - BKG$		
Analyst	$\text{ALPHA TOTAL } \mu\text{Ci/L} = R_s * 1000\text{mL/L} * DF * DDF / (EFF * SS * 2220000\text{dpm}/\mu\text{Ci})$		
A LEWIS	$\text{ALPHA TOTAL } \mu\text{Ci/mL} = \text{ALPHA TOTAL } \mu\text{Ci/L} / 1000\text{mL/L}$		
Date	$\text{Relative Counting Error} = \{ (\text{The Square Root of } TC + BKG * CT) / (TC - BKG * CT) \} * 1.96 * 100$		
05/05/94	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Time			
1200	v RESULTS v		
ALPHA TOTAL in uCi/L =		3.83E+00	DETECTION LEVEL 8.03E-05 uCi/mL
ALPHA TOTAL in uCi/mL =		3.83E-03	
RELATIVE COUNTING ERROR =		5.8%	

Data Entry by:

Date: 08-May-94

Approved by:

Date: 9-May-94

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4 **RERUN**

Serial No V 77.-8825	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination AT	Method/Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 1
Sample Size 1 ml			Customer ID COMP	
Remarks, Calculations, Results COUNT AS uCi/L USE 13, 14, 15 OR 16 <div style="text-align: center;">WHC-SD-WM-DP-065, REV. 0</div> <div style="text-align: center;">$3.72E-03$ uCi/ml</div> <div style="text-align: right;">OUT FOR RERUN</div>				
Analyst - 1	Analyst - 2 D.H. Miller	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr	 54-5800-061 (R-10-83)	

AT: LA-508-101 (D-0) LIQUIDS

		SAMPLE	REPLICATE
Type	DETECTOR NUMBER	14	N/A
DUPLICATE	DISH SIZE 1, 2, or 5 (MS)	2	N/A
Work List	TOTAL COUNTS (TC)	1132	N/A
3336	COUNT TIME in MINUTES (CT)	30	N/A
AT or TB?	BACKGROUND in cpm (BKG)	0.2	N/A
AT	SAMPLE SIZE in mL (SS)	0.100	N/A
Test Code	DILUTION FACTOR (DF)	1	N/A
AT	DIGEST DILUTION FACTOR (DDF)	5	N/A
Matrix	EFFICIENCY FACTOR (EFF)	0.2274	N/A
LIQUID	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE	37.533	N/A
Sample #	SAMPLE CONCENTRATION in uCi/L	3.72E+00	N/A
V77-8825	uCi/L in DIGEST SOLUTION =	7.4349E-01	
Instrument Code	R_s (Sample Count Rate) = $(TC / CT) - BKG$		
Analyst	$\text{ALPHA TOTAL } \mu\text{Ci/L} = R_s \cdot 1000 \text{ mL/L} \cdot DF \cdot DDF / (EFF \cdot SS \cdot 2220000 \text{ dpm}/\mu\text{Ci})$		
A LEWIS	$\text{ALPHA TOTAL } \mu\text{Ci/mL} = \text{ALPHA TOTAL } \mu\text{Ci/L} / 1000 \text{ mL/L}$		
Date	$\text{Relative Counting Error} = [(\text{The Square Root of } TC + BKG \cdot CT) / (TC - BKG \cdot CT)] \cdot 1.96 \cdot 100$		
05/05/94	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Time	v RESULTS v		
1200	ALPHA TOTAL in uCi/L	=	3.72E+00
	ALPHA TOTAL in uCi/mL	=	3.72E-03
	RELATIVE COUNTING ERROR	=	5.9%
			DETECTION LEVEL 8.03E-05 uCi/mL

Data Entry by:	Date: 08-May-94
Approved by:	Date: 9-May-94
Form L1 Rev. 2.1	

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RERUN

Serial No V 77.-8925	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination AT	Method-Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size .1 ml			Customer ID COMP	
Remarks Calculations Results SAMPLE SPIKED ID SPIKE ID 142651 SPIKE VOLUME 10 ml WHC-SD-WM-DP-065, REV. 0 79.7 % Recovery OUT FOR RERUN Alita Lewis				
Analyst - 1	Analyst - 2 D.H. Miller	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr	[Signature] 54-6800-061 (R-10-83)	

AT: LA-508-101 (D-0) SPIKED SAMPLE

		SPIKE	REPLICATE
Type	DETECTOR NUMBER	14	N/A
SPIKE	DISH SIZE 1, 2, or 5 (MS)	2	N/A
Work List	TOTAL COUNTS (TC)	2421	N/A
3337	COUNT TIME in MINUTES (CT)	30	N/A
AT or TB?	BACKGROUND in cpm (BKG)	0.2	N/A
AT	SAMPLE VOLUME in mL (Spiked Vial) (SS)	0.100	N/A
Test Code	SAMPLE DILUTION FACTOR (Spiked Vial) (DF)	1	N/A
AT	SPIKE VOLUME in mL (SVol)	10.000	N/A
Matrix	SPIKE DILUTION FACTOR (SDF)	1	N/A
LIQUID	SPIKE VALUE in µCi/L (SVal)	0.010398	N/A
Sample #	INSTRUMENT EFFICIENCY FACTOR (EFF)	0.2274	N/A
V77-8925	SAMPLE + SPIKE µCi/L (S+S)	1.59E+00	N/A
Instrument Code	SAMPLE or DIGEST µCi/L from FORM #1	7.66E-01	
Analyst	$Rs \text{ (Sample Count Rate)} = (TC / CT) - BKG$		
A LEWIS	$SAMPLE + SPIKE \mu Ci/L = Rs * 1000 mL/L * DF / (EFF * SS * 2220000 dpm/\mu Ci)$		
Date	$PERCENT \text{ SPIKE RECOVERY} = (((S+S \mu Ci/L - SAMPLE \mu Ci/L) * ((SDF/SVol)/(DF/SS)))/(SVal)) * 100$		
05/05/94			
Time			
1200			

RESULT **PERCENT SPIKE RECOVERY = 79.7%**

Data Entry by: [Signature]	Date: 08-May-94
Approved by: [Signature]	Date: 9-May-94

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1394

6

RERUN

Serial No V 77.-8025	Sample Point 108-AP	3-18-94	Time Issued 12:18	Priority 26
Determination AT	Method/Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 1
Sample Size 1 ml			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKE DUPLICATE SPIKE ID 142B50 SPIKE VOL 10-ml WHC-SD-WM-DP-065, REV. 0 100.1 % Recovery OUT FOR RERUN Alita Lewis				
Analyst - 1	Analyst - 2 D. H. Milicia	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr [Signature]	[Signature]	

54-6800-061 (R-10-83)

AT: LA-508-101 (D-0) SPIKED SAMPLE

		SPIKE	REPLICATE
Type	DETECTOR NUMBER	14	N/A
SPIKE	DISH SIZE 1, 2, or 5 (MS)	2	N/A
Work List	TOTAL COUNTS (TC)	2708	N/A
3337	COUNT TIME in MINUTES (CT)	30	N/A
AT or TB 2	BACKGROUND in cpm (BKG)	0.2	N/A
AT	SAMPLE VOLUME in mL (Spiked Vial) (SS)	0.100	N/A
Test Code	SAMPLE DILUTION FACTOR (Spiked Vial) (DF)	1	N/A
AT	SPIKE VOLUME in mL (SVol)	10.000	N/A
Matrix	SPIKE DILUTION FACTOR (SDF)	1	N/A
LIQUID	SPIKE VALUE in $\mu\text{Ci/L}$ (SVal)	0.010398	N/A
Sample #	INSTRUMENT EFFICIENCY FACTOR (EFF)	0.2274	N/A
V77-8025	SAMPLE + SPIKE $\mu\text{Ci/L}$ (S+S)	1.78E+00	N/A
Instrument Code	SAMPLE or DIGEST $\mu\text{Ci/L}$ from FORM #1	7.43E-01	
Analyst	R_s (Sample Count Rate) = $(TC / CT) - BKG$ $SAMPLE + SPIKE \mu\text{Ci/L} = R_s \cdot 1000\text{mL/L} \cdot DF / (EFF \cdot SS \cdot 2220000\text{dpm}/\mu\text{Ci})$ $PERCENT SPIKE RECOVERY = (((S+S \mu\text{Ci/L} - SAMPLE \mu\text{Ci/L}) \cdot ((SDF/SVol)/(DF/SS)))/(SVal)) \cdot 100$		
A LEWIS			
Date	05/05/94		
Time	1200		

RESULT **PERCENT SPIKE RECOVERY = 100.1%**

Date Entry by: [Signature]	Date: 08-May-94
Approved by: [Signature]	Date: 9-May-94

Form L3 Rev. 2.1

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1395

14/2

$\frac{1485}{30} \dots 2$

V75-8525

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 05-06-1994 at 02:18:39
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : 10 mL Dilution : 1

Sample # V-75 Mount # 1

1485
----- 0.2 = 9.7657E-03 uCi/L alpha
30

14/2

$\frac{7}{30} \dots 2$

V76-8625

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 05-06-1994 at 02:19:35
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

Sample # V-76 Mount # 1

7
----- 0.2 < 4.5885E-03 uCi/L alpha
30

14/2

1132 - .2
30

V77-8825

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 05-06-1994 at 02:20:57
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

WHC-SD-WM-DP-065, REV. 0

Sample # V-77-8825 Mount # 1

1132
----- 0.2 = 7.4349E-01 uCi/L alpha
30

14/2

1166 - .2
30

V77-8725

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 05-06-1994 at 02:20:28
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

Sample # V-77-8725 Mount # 1

1166
----- 0.2 = 7.6594E-01 uCi/L alpha
30

14/2

2708 --.2
30

V77-8825

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, C on 05-06-1994 at 02:21:52
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

Sample # V-77-8825 Mount # 1

WHC-SD-WM-DP-065, REV. 0

2708

----- 0.2 = 1.7841E+00 uCi/L alpha

30

14/2

2421 --.2
30

V77-8925

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, C on 05-06-1994 at 02:21:27
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

Sample # V-77-8925 Mount # 1

2421

----- 0.2 = 1.5946E+00 uCi/L alpha

30

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-065, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.

$$\sqrt{75} - \sqrt{77}$$

Customer ID:

comp

Analysis:

AT / TB

Sample Prep:

ap: Acid Digest

Instrument:

Procedure/ Rev: LA-508-101 / 0-0

Technologist:

Kae Ann Green
R.A. Green

Date: 4-23-94

Starting Time:

01:00

Temperature

N.A.

Ending Time:

05:30

Chemist:

S. Catlow

Comments: Re-run Requested AT+TB standard sample + Replicate

months not within limits, TB spike Recoveries out of limits

~~OUT FOR RERUN~~

	Description	Lab ID
1	INITIAL LMCS CHECK STD	V75,-8520
2	REAGENT BLANK ²⁶⁴⁻²³⁻⁴ STD	V75,-8525
3	Blank	V76,-8620
4	Blank	V76,-8625
5	Sample	V77,-8720
6	sample	V77,-8725
7	duplicate sample	V77,-8820
8	duplicate sample	V77,-8825
9	Sample spiked	V77,-8920
10	sample, spiked	V77,-8925

	Description	Lab ID
11	Sample Dupl. Spiked	V 77-8 020
12	Sample Dupl. Spiked	V 77-8 025
13		
14		
15		
16		
17		
18		
19		
20		

[illegible]

~~1399~~

1-2 Balch 3034

Serial No V 75.-8520	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 0	Priority 26
Determination TB	Method/Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 10ml			Customer ID STD	
Remarks Calculations Results S515 EV-CRB STD# 142BS1 RESULT 2.65-1 STD VAL 2.73 ⁴⁻²⁴⁻⁹⁴ 2.6971-1 %REC 98.25 4-24-94 OUT FOR RERUN Rae Ann Green				
Analyst - 1	Analyst - 2 Em Balch	Analyst - 3 R. A. Green	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 4-23-94	Hrs	Hrs
Time Completed 05:30		Lab Unit Mgr [Signature]	[Signature]	

54.

WHC-SD-WM-DP-065, REV. 0

TB: LA-508-101 (D-0) LIQUIDS

		STANDARD	REPLICATE
Type	DETECTOR NUMBER	14	14
STANDARD	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	58743	50883
BATCH #3034	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	16	16
TB	SAMPLE SIZE in mL (SS)	10.000	10
Test Code	DILUTION FACTOR (DF)	1	1
	DIGEST DILUTION FACTOR (DDF)	1	1
Matrix	EFFICIENCY FACTOR (EFF)	0.3076	0.3076
LIQUID	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE	1942.100	1680.100
Sample #	SAMPLE CONCENTRATION in $\mu\text{Ci/L}$	2.84E-01	2.46E-01
V75.-8520	AVG. $\mu\text{Ci/L}$ in SAMPLE and REPLICATE =	2.6522E-01	
Instrument Code	R_s (Sample Count Rate) = $(TC / CT) - BKG$ $\text{TOTAL BETA } \mu\text{Ci/L} = R_s * 1000\text{mL/L} * DF * DDF / (EFF * SS * 2220000\text{dpm}/\mu\text{Ci})$ $\text{TOTAL BETA } \mu\text{Ci/mL} = \text{TOTAL BETA } \mu\text{Ci/L} / 1000\text{mL/L}$ $\text{Relative Counting Error} = 1 (\text{The Square Root of } TC + BKG * CT) / (TC - BKG * CT) * 1.96 * 100$ Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Analyst	v RESULTS v		
R.A.GREEN	TOTAL BETA in $\mu\text{Ci/L}$ (AVERAGE) =	2.65E-01	DETECTION LEVEL 7.46E-07 $\mu\text{Ci/mL}$
Date	TOTAL BETA in $\mu\text{Ci/mL}$ (AVERAGE) =	2.65E-04	
Time	RELATIVE COUNTING ERROR =	0.9%	

Data Entry by: [Signature]	Date: 24-Apr-94
Approved by: [Signature]	Date: 27-APR-94

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1400

Batch 3034

Serial No V 75.-8525	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 0	Priority 26
Determination AT	Method/Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size <i>10 ml</i> 10 ml			Customer ID STD	
Remarks Calculations, Results S510 EV-CRB STD# 142 B51 RESULT 1.07-2 STD VAL <i>1.04</i> %REC 102.90 4-24-94 1.0398-2 <i>DA</i> <div style="text-align: right; font-size: 1.2em;">OUT FOR RERUN</div>				
Analyst - 1 <i>Rae Ann Green</i>	Analyst - 2 <i>Jim Baraka</i>	Analyst - 3 <i>[Signature]</i>	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs <i>4-23-94</i>	Hrs	Hrs
Date 4-23-94	Time Completed 05:30	Lab Aqut Mgr <i>[Signature]</i>	<i>[Signature]</i>	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV.0

AT: LA-508-101 (D-0) LIQUIDS			STANDARD	REPLICATE
Type	DETECTOR NUMBER		14	14
STANDARD	DISH SIZE 1, 2, or 5 (MS)		2	2
Work List	TOTAL COUNTS (TC)		1769	1511
BATCH #3034	COUNT TIME in MINUTES (CT)		30	30
AT or TB?	BACKGROUND in cpm (BKG)		0.7	0.7
AT	SAMPLE SIZE in mL (SS)		10.000	10
Test Code	DILUTION FACTOR (DF)		1	1
	DIGEST DILUTION FACTOR (DDF)		1	1
Matrix	EFFICIENCY FACTOR (EFF)		0.2274	0.2274
LIQUID	LC, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE		58.267	49.667
Sample #	SAMPLE CONCENTRATION in µCi/L		1.15E-02	9.84E-03
V75.-8525	AVG. µCi/L in SAMPLE and REPLICATE =		1.0690E-02	
Instrument Code	Rs (Sample Count Rate) = (TC / CT) - BKG ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi) ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L Relative Counting Error = ((The Square Root of TC + BKG * CT) / (TC - BKG * CT)) * 1.96 * 100 Detection Levels and Less Than Values are determined from Procedure LA-508-002.			
WB27807	v RESULTS v			
Analyst	ALPHA TOTAL in µCi/L (AVERAGE) =		1.07E-02	DETECTION LEVEL 2.54E-07 µCi/mL
R.A.GREEN	ALPHA TOTAL in µCi/mL (AVERAGE) =		1.07E-05	
Date	RELATIVE COUNTING ERROR =		5.1%	
04/23/94				
Time				
05:30				

Data Entry by: <i>[Signature]</i>	Date: 24-Apr-94
Approved by: <i>[Signature]</i>	Date: 27-Apr-94

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3-4

Serial No V 76.-8620	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination TB	Method Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size Result 100ml			Customer ID BLANK	
Remarks Calculations Results COUNT AS uCi/L USE 13,14,15 OF 16 E-4 WHC-SD-WM-DP-065, REV. 0 5.26 1.05 E-4 uCi/ml 4-26-94 Rae Ann Green OUT FOR RERUN				
Analyst - 1	Analyst - 2 Em Baran	Analyst - 3 Appluse	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 4-23-94	Hrs	Hrs
Date 4-23-94	Time Completed 05:30	Lab Unit Mgr		

54-6800-061 (R-10-83)

TB: LA-508-101 (D-0)

LIQUIDS

		BLK	REPLICATE
Type	DETECTOR NUMBER	14	14
BLK	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	750	641
3034	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	16	16
TB	SAMPLE SIZE in mL (SS)	0.100	0.1
Test Code	DILUTION FACTOR (DF)	5	5
	DIGEST DILUTION FACTOR (DDF)	1	1
Matrix	EFFICIENCY FACTOR (EFF)	0.3076	0.3076
LIQUID	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE	9.000	5.367
Sample #	SAMPLE CONCENTRATION in uCi/L	6.59E-01	3.93E-01
V76-8620	AVG. uCi/L in SAMPLE and REPLICATE =	5.2596E-01	
Instrument Code			
WB27807	Rs (Sample Count Rate) = (TC / CT) - BKG		
Analyst	TOTAL BETA uCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/uCi)		
GREEN	TOTAL BETA uCi/mL = TOTAL BETA uCi/L / 1000mL/L		
Date	Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT) * 1.96 * 100		
05:30	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Time			
v RESULTS v			
TOTAL BETA	in uCi/L (AVERAGE)	=	5.26E-01
TOTAL BETA	in uCi/mL (AVERAGE)	=	5.26E-04
RELATIVE COUNTING ERROR	=	40.8%	
			DETECTION LEVEL
			3.73E-04 uCi/mL

Data Entry by:	Date:	26-Apr-94
Approved by:	Date:	27-Apr-94

Form L1 Rev. 2.1

Serial No V 76.-8625	Sample Point 108-AP	Date 3-18-94	Time Issued 12: 3	Priority 26
Determination AT	Method/Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size <i>Re 4/23/94</i> <i>1ml</i> .100 ml			Customer ID BLANK	
Remarks, Calculations, Results COUNT AS uCi/L USE 13,14,15 OR 16 <i>< 4.99 E-5</i> <i>PLS - 4.99 E-6 uCi/ml</i> <i>4-26-94</i> <div style="text-align: right;">OUT FOR RERUN</div>				
Analyst <i>Rae Ann Green</i>	Analyst - 2 <i>Embar</i>	Analyst - 3 <i>Embar</i>	Analyst - 4	Analyst - 5
Hrs	Hrs <i>4-23-94</i>	Hrs	Hrs	Hrs
Time Completed <i>05:30</i>		Lab Unit Mgr <i>[Signature]</i>		

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV.0

AT: LA-508-101 (D-0) LIQUIDS

		BLK	REPLICATE
Type	DETECTOR NUMBER	14	14
BLK	DISK SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	16	12
3034	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	0.7	0.7
AT	SAMPLE SIZE in mL (SS)	0.100	0.1
Test Code	DILUTION FACTOR (DF)	5	5
	DIGEST DILUTION FACTOR (DDF)	1	1
Matrix	EFFICIENCY FACTOR (EFF)	0.2274	0.2274
LIQUID	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE	0.504	0.504
Sample #	SAMPLE CONCENTRATION in uCi/L	4.99E-02	4.99E-02
V76-8625	AVG. uCi/L in SAMPLE and REPLICATE =	<	4.9926E-02
Instrument Code			
WB27807	Rs (Sample Count Rate) = (TC / CT) - BKG		
Analyst	ALPHA TOTAL uCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/uCi)		
GREEN	ALPHA TOTAL uCi/mL = ALPHA TOTAL uCi/L / 1000mL/L		
Date	Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT) * 1.96 * 100		
05:30	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Time			
v RESULTS v			
ALPHA TOTAL	in uCi/L (AVERAGE) =	< 4.99E-02	DETECTION LEVEL 1.27E-04 uCi/mL
ALPHA TOTAL	in uCi/mL (AVERAGE) =	< 4.99E-05	
LESS Than Value was Determined from Lc.			
RELATIVE COUNTING ERROR	=	238.4%	

Data Entry by: <i>[Signature]</i>	Date: 26-Apr-94
Approved by: <i>[Signature]</i>	Date: 27 Apr-94

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5-6

Serial No V 77.-8720	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination TB	Method/Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size <i>1 ml</i> 100 ml			Customer ID COMP	
Remarks Calculations Results COUNT AS uCi/L USE 13,14,15 OR 16 <i>2,20</i> <i>4.59E-7 uCi/ml</i> <i>4-26-94</i> OUT FOR RERUN <i>Pace Ann Green</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-23-94	Time Completed 05:30	Lab Unit Mgr		

WHC-SD-WM-DP-065, REV.0

TB: LA-508-101 (D-0) LIQUIDS		SAM	REPLICATE
Type	DETECTOR NUMBER	14	14
SAM	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	900138	900162
3034	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	16	16
TB	SAMPLE SIZE in mL (SS)	0.100	0.1
Test Code	DILUTION FACTOR (DF)	5	5
	DIGEST DILUTION FACTOR (DDF)	1	1
Matrix	EFFICIENCY FACTOR (EFF)	0.3076	0.3076
LIQUID	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE	29988.600	29989.400
Sample #	SAMPLE CONCENTRATION in uCi/L	2.20E+03	2.20E+03
V77-8720	AVG. uCi/L in SAMPLE and REPLICATE =	2.1958E+03	
Instrument Code	$R_s \text{ (Sample Count Rate)} = (TC / CT) - BKG$ $\text{TOTAL BETA } \mu\text{Ci/L} = R_s * 1000\text{mL/L} * DF * DDF / (EFF * SS * 2220000\text{dpm}/\mu\text{Ci})$ $\text{TOTAL BETA } \mu\text{Ci/mL} = \text{TOTAL BETA } \mu\text{Ci/L} / 1000\text{mL/L}$ $\text{Relative Counting Error} = 1 / (\text{The Square Root of } TC + BKG * CT) / (TC - BKG * CT) * 1.96 * 100$ Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
WB27807	v RESULTS v		
Analyst	TOTAL BETA in uCi/L (AVERAGE) =	2.20E+03	DETECTION LEVEL 3.73E-04 uCi/mL
GREEN	TOTAL BETA in uCi/mL (AVERAGE) =	2.20E+00	
Date	RELATIVE COUNTING ERROR =	0.2%	
05:30			
Time			
Data Entry by:		Date:	26-Apr-94
Approved by:		Date:	27-Apr-94

Serial No V 77.-8725	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination AT	Method/Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size Ind R6 412244 100ml			Customer ID COMP	
Remarks, Calculations, Results COUNT AS uCi/L USE 13,14,15 OR 16 $8.98E-3$ $1.80E-3$ uCi/ml 4-20-94 OUT FOR RERUN				
Analyst - 1	Analyst - 2 Emilia	Analyst - 3 Hrs 4-23-94	Analyst - 4	Analyst - 5
Date 4-23-94	Time Completed 05:30	Laboratory Unit Mgr [Signature]	[Signature]	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

AT: LA-508-101 (D-0) LIQUIDS

		SAM	REPLICATE
Type	DETECTOR NUMBER	14	14
SAM	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	2641	2842
3034	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	0.7	0.7
AT	SAMPLE SIZE in mL (SS)	0.100	0.1
Test Code	DILUTION FACTOR (DF)	5	5
Matrix	DIGEST DILUTION FACTOR (DDF)	1	1
LIQUID	EFFICIENCY FACTOR (EFF)	0.2274	0.2274
Sample #	L _s , R _{max} , or R _s (SAMPLE RATE) as APPROPRIATE	87.333	94.033
V77-8725	SAMPLE CONCENTRATION in uCi/L	8.65E+00	9.31E+00
Instrument Code	AVG. uCi/L in SAMPLE and REPLICATE =	8.9816E+00	
WB27807	Rs (Sample Count Rate) = (TC / CT) - BKG		
Analyst	ALPHA TOTAL uCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/uCi)		
GREEN	ALPHA TOTAL uCi/mL = ALPHA TOTAL uCi/L / 1000mL/L		
Date	Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT) * 1.96 * 100		
05:30	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Time			

ALPHA TOTAL	in uCi/L (AVERAGE) =	8.98E+00	DETECTION LEVEL 1.27E-04 uCi/mL
ALPHA TOTAL	in uCi/mL (AVERAGE) =	8.98E-03	
RELATIVE COUNTING ERROR	=	3.9%	

Data Entry by: [Signature]	Date: 26-Apr-94
Approved by: [Signature]	Date: 27-Apr-94

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1405

182

Serial No V 77.-8820	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination TB	Method/Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size <i>Large 264/22194 100 ml</i>			Customer ID COMP	
Remarks Calculations Results COUNT AS uCi/L USE 13,14,15 OR 16 <i>2.20 E+0</i> <i>4.59 E-1 uCi/ml</i> OUT FOR RE RUN				
Analyst - 1	Analyst - 2 <i>AD Hansen</i>	Analyst - 3 <i>Raymond</i>	Analyst - 4	Analyst - 5
Hrs	Hrs <i>4-23-94</i>	Hrs <i>4-24-94</i>	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr <i>A. Hill</i>	<i>Ph. B.</i>	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV.0

TB: LA-508-101 (D-0)

LIQUIDS

		SAMPLE	REPLICATE
Type	DETECTOR NUMBER	14	14
DUP	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	900071	900156
3034	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	16	16
TB	SAMPLE SIZE in mL (SS)	0.100	0.1
Test Code	DILUTION FACTOR (DF)	5	5
	DIGEST DILUTION FACTOR (DDF)	1	1
Matrix	EFFICIENCY FACTOR (EFF)	0.3076	0.3076
LIQUID	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE	29986.367	29989.200
Sample #	SAMPLE CONCENTRATION in uCi/L	2.20E+03	2.20E+03
V77-8820	AVG. uCi/L in SAMPLE and REPLICATE =	2.1957E+03	
Instrument Code			
WB27807	Rs (Sample Count Rate) = (TC / CT) - BKG		
Analyst	TOTAL BETA uCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/uCi)		
GREEN	TOTAL BETA uCi/mL = TOTAL BETA uCi/L / 1000mL/L		
Date	Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT) * 1.96 * 100		
05:30	Detection Levels and Less Than Values are determined from Procedure LA-508-002.		
Time			
v RESULTS v			
TOTAL BETA	in uCi/L (AVERAGE) =	2.20E+03	DETECTION LEVEL 3.73E-04 uCi/mL
TOTAL BETA	in uCi/mL (AVERAGE) =	2.20E+00	
RELATIVE COUNTING ERROR	=	0.2%	

Data Entry by:	<i>[Signature]</i>	Date:	26-Apr-94
Approved by:	<i>[Signature]</i>	Date:	27-Apr-94

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1406

Serial No V 77.-8825	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination AT	Method/Standard LA-508-101	Result Units uCi/ML	Charge Code N1A7F	Reruns 0
Sample Size tmt ^{R6} 4/22/94, 100ml			Customer ID COMP	
Remarks, Calculations, Results COUNT AS uCi/L USE 13,14,15 OR 16 $8.39E-3$ $1.68E-3$ uCi/ml 4-26-94 OUT FOR RERUN				
Analyst - 1	Analyst - 2 <i>Shane</i>	Analyst - 3 <i>Raymond</i>	Analyst - 4	Analyst - 5
Hrs	Hrs 4-23-94	Hrs 4-24-94	Hrs	Hrs
Date 4-23-94	Time Completed 05:30	Lab Unit Mod <i>SH</i>	<i>MS</i>	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV.0

AT: LA-508-101 (D-0) LIQUIDS

AT: LA-508-101 (D-0) LIQUIDS		SAMPLE	REPLICATE
Type	DETECTOR NUMBER	14	14
DUP	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	2397	2725
3034	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	0.7	0.7
AT	SAMPLE SIZE in mL (SS)	0.100	0.1
Test Code	DILUTION FACTOR (DF)	5	5
	DIGEST DILUTION FACTOR (DDF)	1	1
Matrix	EFFICIENCY FACTOR (EFF)	0.2274	0.2274
LIQUID	L, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE	79.200	90.133
Sample #	SAMPLE CONCENTRATION in µCi/L	7.84E+00	8.93E+00
V77-8825	AVG. µCi/L in SAMPLE and REPLICATE =	8.3857E+00	
Instrument Code	<div><div><div>$Rs \text{ (Sample Count Rate)} = (TC / CT) - BKG$$\text{ALPHA TOTAL } \mu\text{Ci/L} = Rs * 1000\text{mL/L} * DF * DDF / (EFF * SS * 2220000\text{dpm}/\mu\text{Ci})$$\text{ALPHA TOTAL } \mu\text{Ci/mL} = \text{ALPHA TOTAL } \mu\text{Ci/L} / 1000\text{mL/L}$$\text{Relative Counting Error} = 1 \text{ (The Square Root of } TC + BKG * CT) / (TC - BKG * CT)) * 1.96 * 100$</div><div>Detection Levels and Less Than Values are determined from Procedure LA-508-002.</div></div><div>∇ RESULTS ∇</div></div>		
WB27807			
Analyst			
GREEN			
Date			
05:30			
Time			
ALPHA TOTAL	in µCi/L (AVERAGE) =	8.39E+00	DETECTION

ALPHA TOTAL	in uCi/L (AVERAGE) =	8.39E+00	DETECTION LEVEL 1.27E-04 uCi/mL
ALPHA TOTAL	in uCi/mL (AVERAGE) =	8.39E-03	
RELATIVE COUNTING ERROR	=	4.1%	

Data Entry by: <i>SH</i>	Date: 26-Apr-94
Approved by: <i>SH</i>	Date: 27-APR-94

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1407

7-8

Serial No V 77.-8920	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination TB	Method-Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 1 ml ^{RG} 4122194, 100 ml			Customer ID COMP	
Remarks Calculations Results SAMPLE SPIKED ID SPIKE ID 112851 SPIKE VOLUME 10ml OUT FOR RERUN				
Analyst - 1	Analyst - 2 <i>Em. Guadalupe</i>	Analyst - 3 <i>Apollon</i>	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 4-23-94	Hrs	Hrs
Date 4-23-94	Time Completed 05:30	Lab Unit Mgr <i>[Signature]</i>	4-28-94 <i>AKM Farland</i>	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

TB: LA-508-101 (D-0) SPIKED SAMPLE

		SPIKE	REPLICATE
Type	DETECTOR NUMBER	14	14
SPIKE	DISH SIZE 1, 2, or 5 (MS)	2	2
Work List	TOTAL COUNTS (TC)	900179	900099
3034	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	16	16
TB	SAMPLE VOLUME in mL (Spiked Vial) (SS)	0.100	0.100
Test Code	SAMPLE DILUTION FACTOR (Spiked Vial) (DF)	5	5
	SPIKE VOLUME in mL (SVol)	10.000	10.000
Matrix	SPIKE DILUTION FACTOR (SDF)	1	1
LIQUID	SPIKE VALUE in µCi/L (SVal)	0.26971	0.26971
Sample #	INSTRUMENT EFFICIENCY FACTOR (EFF)	0.3076	0.3076
V77-8920	SAMPLE + SPIKE µCi/L (S+S)	2.20E+03	2.20E+03
Instrument Code	AVG. SAMPLE or DIGEST µCi/L from FORM #1	2.20E+03	
WB27807			
Analyst	Rs (Sample Count Rate) = (TC / CT) - BKG		
GREEN	SAMPLE + SPIKE µCi/L = Rs * 1000mL/L * DF / (EFF * SS * 2220000dpm/µCi)		
Date	AVG. PERCENT SPIKE RECOVERY = (((S+S µCi/L (Spike) + S+S µCi/L (Replicate))/2) - Sample µCi/L) * ((SDF/SVol)/(DF/SS))		
04/23/94			
Time			
0530			

RESULT AVG. PERCENT SPIKE RECOVERY = -3.1%

Data Entry by: <i>[Signature]</i>	Date: 26-Apr-94
Approved by: <i>[Signature]</i>	Date: 27-Apr-94

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1408

Serial No V 77.-8925	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination AT	Method/Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size 1 ml ⁶⁵ 4/23/94, 100ml			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKED ID SPIKE ID 142 B51 ^{26-4/23/94} SPIKE VOLUME 10ml 10ml OUT FOR REFIN!				
Analyst - 1 <i>Rae Ann Green</i>	Analyst - 2 <i>M. Baker</i>	Analyst - 3 <i>A. Blanton</i>	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 4-23-94	Hrs	Hrs
Date 4-23-94	Time Completed 05:30	Lab Unit Mgr <i>[Signature]</i>	4-28-94 <i>OKM</i>	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV. 0

AT: LA-508-101 (D-0) SPIKED SAMPLE			SPIKE	REPLICATE
Type	DETECTOR NUMBER		14	14
SPIKE	DISH SIZE 1, 2, or 5 (MS)		2	2
Work List	TOTAL COUNTS (TC)		3915	3996
3034	COUNT TIME in MINUTES (CT)		30	30
AT or TB?	BACKGROUND in cpm (BKG)		0.7	0.7
AT	SAMPLE VOLUME in mL (Spiked Vial) (SS)		0.100	0.100
Test Code	SAMPLE DILUTION FACTOR (Spiked Vial) (DF)		5	5
	SPIKE VOLUME in mL (SVol)		10.000	10.000
Matrix	SPIKE DILUTION FACTOR (SDF)		1	1
LIQUID	SPIKE VALUE in $\mu\text{Ci/L}$ (SVal)		0.010398	0.010398
Sample #	INSTRUMENT EFFICIENCY FACTOR (EFF)		0.2274	0.2274
V77-8925	SAMPLE + SPIKE $\mu\text{Ci/L}$ (S+S)		1.29E+01	1.31E+01
Instrument Code	AVG. SAMPLE or DIGEST $\mu\text{Ci/L}$ from FORM #1		8.39E+00	
WB27807				
Analyst	Rs (Sample Count Rate) = $(TC / CT) - BKG$			
GREEN	SAMPLE + SPIKE $\mu\text{Ci/L}$ = $Rs * 1000\text{mL/L} * DF / (EFF * SS * 2220000\text{dpm}/\mu\text{Ci})$			
Date	AVG. PERCENT SPIKE RECOVERY = $(((((S+S \mu\text{Ci/L (Spike)} + S+S \mu\text{Ci/L (Replicate)})/2) - \text{Sample } \mu\text{Ci/L}) * ((SDF/SVol)/(DF/SS))))$			
04/23/94				
Time				
0530				

RESULT **AVG. PERCENT SPIKE RECOVERY = 88.5%**

Data Entry by: <i>[Signature]</i>	Date: 26-Apr-94
Approved by: <i>[Signature]</i>	Date: 27-APR-94

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1403

9-10

Serial No V 77.-8020	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination TB	Method Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size +mc R6 4122194, 100ml			Customer ID COMP	
Remarks Calculations Results SAMPLE SPIKE DUPLICATE SPIKE ID 142851 SPIKE VOL 10ml OUT FOR RERUN Rae Ann Green				
Analyst - 1	Analyst - 2 Rae Ann Green	Analyst - 3 Hrs 4-23-94	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 4-23-94	Time Completed 05:30	Lab Dir Mgr H	4-28-94 Jkm Gaudin	

54-6800-061 (R-10-83)

WHC-SD-WM-DP-065, REV.0

TB: LA-508-101 (D-0) SPIKED SAMPLE

		SPIKE	REPLICATE
Type	DETECTOR NUMBER	14	N/A
SPIKE	DESI SIZE 1, 2, or 5 (MS)	2	N/A
Work List	TOTAL COUNTS (TC)	900090	900115
3034	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	16	16
TB	SAMPLE VOLUME in mL (Spiked Vial) (SS)	0.100	0.100
Test Code	SAMPLE DILUTION FACTOR (Spiked Vial) (DF)	5	5
	SPIKE VOLUME in mL (SVol)	10.000	10.000
Matrix	SPIKE DILUTION FACTOR (SDF)	1	1
LIQUID	SPIKE VALUE in $\mu\text{Ci/L}$ (SVal)	0.26971	0.26971
Sample #	INSTRUMENT EFFICIENCY FACTOR (EFF)	0.3076	N/A
V77-8020	SAMPLE + SPIKE $\mu\text{Ci/L}$ (S+S)	2.20E+03	N/A
Instrument Code	SAMPLE or DIGEST $\mu\text{Ci/L}$ from FORM #1	2.20E+03	
WB27807			
Analyst	Rs (Sample Count Rate) = $(TC / CT) - BKG$		
GREEN	SAMPLE + SPIKE $\mu\text{Ci/L}$ = $Rs * 1000\text{mL/L} * DF / (EFF * SS * 2220000\text{dpm}/\mu\text{Ci})$		
Date	PERCENT SPIKE RECOVERY = $((S+S \mu\text{Ci/L} - \text{SAMPLE } \mu\text{Ci/L}) * ((SDF/SVol)/(DF/SS)))/(SVal)*100$		
04/23/94			
Time			
0530			

RESULT PERCENT SPIKE RECOVERY = -3.2%

Data Entry by:	Date: 26-Apr-94
Approved by:	Date: 27-Apr-94

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1410

Serial No V 77.-8025	Sample Point 108-AP	Date 3-18-94	Time Issued 12:18	Priority 26
Determination AT	Method-Standard LA-508-101	Result Units % RECOVERY	Charge Code N1A7F	Reruns 0
Sample Size <i>1 ml</i> <i>4/22/94</i> <i>100ml</i>			Customer ID COMP	
Remarks, Calculations, Results SAMPLE SPIKE DUPLICATE SPIKE ID 142851 SPIKE VOL 10ml <i>Rae Ann Green</i> OUT FOR RERUN				
Analyst - 1	Analyst - 2 <i>Em Daele</i>	Analyst - 3 <i>R. D. Hume</i>	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs <i>4-23-94</i>	Hrs	Hrs
Date <i>4-23-94</i>	Time Completed <i>05:30</i>	Lab Unit Mgr <i>A. J. Hume</i>	<i>4-28-94</i> <i>A. M. J. Hume</i>	

WHC-SD-WM-DP-065, REV. 0

AT: LA-508-101 (D-0) SPIKED SAMPLE

		SPIKE	REPLICATE
Type	DETECTOR NUMBER	14	N/A
SPIKE	DISH SIZE 1, 2, or 5 (MS)	2	N/A
Work List	TOTAL COUNTS (TC)	4102	3957
3034	COUNT TIME in MINUTES (CT)	30	30
AT or TB?	BACKGROUND in cpm (BKG)	0.7	0.7
AT	SAMPLE VOLUME in mL (Spiked Vial) (SS)	0.100	0.100
Test Code	SAMPLE DILUTION FACTOR (Spiked Vial) (DF)	5	5
	SPIKE VOLUME in mL (SVol)	10.000	10.000
Matrix	SPIKE DILUTION FACTOR (SDF)	1	1
LIQUID	SPIKE VALUE in $\mu\text{Ci/L}$ (SVal)	0.010398	0.010398
Sample #	INSTRUMENT EFFICIENCY FACTOR (EFF)	0.2274	N/A
V77-8025	SAMPLE + SPIKE $\mu\text{Ci/L}$ (S+S)	1.35E+01	N/A
Instrument Code	SAMPLE or DIGEST $\mu\text{Ci/L}$ from FORM #1	8.98E+00	
WB27807			
Analyst	R_s (Sample Count Rate) = $(TC / CT) - BKG$		
GREEN	SAMPLE + SPIKE $\mu\text{Ci/L}$ = $R_s * 1000\text{mL/L} * DF / (EFF * SS * 2220000\text{dpm}/\mu\text{Ci})$		
Date	PERCENT SPIKE RECOVERY = $((S+S \mu\text{Ci/L} - \text{SAMPLE } \mu\text{Ci/L}) * ((SDF/SVol)/(DF/SS)))/(SVal)*100$		
04/23/94			
Time			
0530			

RESULT **PERCENT SPIKE RECOVERY = 86.4%**

Data Entry by:	<i>[Signature]</i>	Date:	26-Apr-94
Approved by:	<i>[Signature]</i>	Date:	27-APR-94

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14/2 4-23-94 Mark Program 100ml

900179
30

Beta Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, on 04-23-1994 at 22:06:52
Det #14 2-inch mount Beta eff. : .3076
Sample size : .1 mL Dilution : 1

Sample # V 77 Mount # 1

WHC-SD-WM-DP-065, REV. 0

900099
30

900179

30 16.0 = 4.3917E+02 uCi/L beta

Sample # V 77 Mount # 2

900099

30 16.0 = 4.3914E+02 uCi/L beta

14/2 4-23-94

3915
30

Alpha Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, on 04-23-1994 at 22:06:53
Det #14 2-inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

Sample # V 77 Mount # 1

3915

30 0.7 = 2.5712E+00 uCi/L alpha

Sample # V 77 Mount # 2

3996

30 0.7 = 2.6247E+00 uCi/L alpha

14/2

V 17 8025

4102
30

Alpha Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, on 04-23-1994 at 23:09:02
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

WHC-SD-WM-DP-065, REV. 0

3957
30

Sample # V 77 Mount # 1

4102

30 0.7 = 2.6946E+00 uCi/L alpha

Sample # V 77 Mount # 2

3957

30 0.7 = 2.5989E+00 uCi/L alpha

14/2

4-23-94

Mark program

100 ul

V 77-8020

900090
30

Beta Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, on 04-23-1994 at 23:09:02
Det #14 2 -inch mount Beta eff. : .3076
Sample size : .1 mL Dilution : 1

900115
30

Sample # V 77 Mount # 1

900090

30 16.0 = 4.3913E+02 uCi/L beta

Sample # V 77 Mount # 2

900115

30 16.0 = 4.3914E+02 uCi/L beta

14/2

2397

30

2725

30

V77-8825

Alpha Calculation (CRPC_CAL 2.0)
By: VA RAYMOND, on 04-24-1994 at 00:41:18
Det #14 2-inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

Sample # V77 Mount # 1

2397

0.7 = 1.5689E+00 uCi/L alpha

30

Sample # V77 Mount # 2

2725

0.7 = 1.7854E+00 uCi/L alpha

30

WHC-SD-WM-DP-065, REV. 0

14/2

4-23-94 AG

900071

30

900156

30

V77-8820

.100uP

Beta Calculation (CRPC_CAL 2.0)
By: VA RAYMOND, on 04-24-1994 at 00:41:18
Det #14 2-inch mount Beta eff. : .3076
Sample size : .1 mL Dilution : 1

Sample # V77 Mount # 1

900071

16.0 = 4.3912E+02 uCi/L beta

30

Sample # V77 Mount # 2

900156

16.0 = 4.3916E+02 uCi/L beta

30

1414

14/2

4-23-94

V87-8725

2641

30

Alpha Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, on 04-23-1994 at 22:04:22
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

2842

30

Sample # V 77 Mount # 1

2641

----- 0.7 = 1.7300E+00 uCi/L alpha

30

Sample # V 77 Mount # 2

2842

----- 0.7 = 1.8627E+00 uCi/L alpha

30

WHC-SD-WM-DP-065, REV. 0

14/2

4-23-94

Mark Program

V77-8720

.100 ml

900138

30

Beta Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, on 04-23-1994 at 22:04:22
Det #14 2 -inch mount Beta eff. : .3076
Sample size : .1 mL Dilution : 1

Sample # V 77 Mount # 1

900138

----- 16.0 = 4.3915E+02 uCi/L beta

30

Sample # V 77 Mount # 2

900162

----- 16.0 = 4.3917E+02 uCi/L beta

30

1415

14/2

$\frac{16}{30} - .7$

V76-8625

Alpha Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, on 04-23-1994 at 18:57:37
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

WHC-SD-WM-DP-065, REV. 0

$\frac{12}{30}$

Sample # V 76 Mount # 1

$\frac{16}{30} - 0.7 < 7.0502E-03 \text{ uCi/L alpha}$

Sample # V 76 Mount # 2

$\frac{12}{30} - 0.7 < 7.0502E-03 \text{ uCi/L alpha}$

14/2

4-23-94

"Mark Program"

.100 mL

$\frac{750}{30}$

Beta Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, on 04-23-1994 at 18:57:37
Det #14 2 -inch mount Beta eff. : .3076
Sample size : .1 mL Dilution : 1

V76-8620

$\frac{641}{30}$

Sample # V 76 Mount # 1

$\frac{750}{30} - 16.0 = 1.3180E-01 \text{ uCi/L beta}$

Sample # V 76 Mount # 2

$\frac{641}{30} - 16.0 = 7.8590E-02 \text{ uCi/L beta}$

14/2 4-23-94

Blank Program

10 ml

58743 -16
30

V75-8520

Beta Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, on 04-23-1994 at 18:38:39
Det #14 2-inch mount Beta eff. : .3076
Sample size : 10 mL Dilution : 1

WHC-SD-WM-DP-065, REV. 0

50883
30

Sample # V 75 Mount # 1

58743
----- 16.0 = 2.8440E-01 uCi/L beta
30

Sample # V 75 Mount # 2

50883
----- 16.0 = 2.4603E-01 uCi/L beta
30

14/2

1769 -0.7
30

V75-8525

Alpha Calculation (CRPC_CAL 2.0)
By: AL JOHANSEN, on 04-23-1994 at 18:38:39
Det #14 2-inch mount Alpha eff. : .2274
Sample size : 10 mL Dilution : 1

Sample # V 75 Mount # 1

1769
----- 0.7 = 1.1542E-02 uCi/L alpha
30

Sample # V 75 Mount # 2

1511
----- 0.7 = 9.8383E-03 uCi/L alpha
30

1417