LETTER REPORT
TANK WASTE SOURCE TERM
INVENTORY VALIDATION

Prepared for
Westinghouse Hanford Company

April 1995

For the U.S. Department of Energy
Contract DE-AC06-93RL12359

Prepared by
ICF Kaiser Hanford Company
Richland, Washington

E01595LR

VOLUME I

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7. Abstract

The sample data for a selection of 11 radionuclides and 24 chemical analytes were extracted from six separate sample data sets, were arranged in a tabular format and were plotted on scatter plots for all of the 149 single-shell tanks, the 24 double-shell tanks and the four aging waste tanks. The solid and liquid sample data was placed in separate tables and plots. The sample data and plots were compiled from the following data sets: * Characterization raw sample data, * Recent core samples, * D. Braun data base, * Wastren (Van Vleet) data base, * TRAC and * HTCE Inventories

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May 1, 1995

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TANK WASTE SOURCE TERM
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ICF Kaiser Hanford Company

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**TANK WASTE
SOURCE TERM INVENTORY
VALIDATION
E01595**

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Send Comments to: Mr. W. L. Cowley
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GLOSSARY/ACRONYM LIST

μCi	microcurie
μg	microgram
^{241}Am	Americium-241
Analyte	A particular chemical ion/compound from a chemical analysis (such as: Ba, Cr^{+3} , CN^- , or NaOH) that could be an ionic portion of a reported analyzed chemical (e.g., Na is an analyte from Na_2SO_4); however, an exception is NaOH which could be extrapolated from OH^-
As	Arsenic
ASA	Accelerated Safety Analysis
ASA line	A line on the plots that represents the highest concentration for a specific chemical analyte or radionuclide determination by the process described in this document
Ba	Barium
Be	Beryllium
Bq	Becquerel
Braun	Dave J. Braun - reference to tank sample analysis data file (TSAD) received by ICF KH from Dave J. Braun (11/10/94), that contains information from the Characterization library selecting only the samples with the highest fissile material and lowest neutron poison
Ca	Calcium
Cd	Cadmium
Characterization library	WHC catalogued compilation of hard copy sample information found in reports, memos, and letters
Ci	Curie
^{244}Cm	Curium-244
CN^-	Cyanide
Co	Cobalt
^{60}Co	Cobalt-60

GLOSSARY/ACRONYM LIST (Continued)

Constituent	Any chemical or radionuclide reported on a sample report, memo, letter, or table
$\text{Cr}^{+3}/\text{Cr}^{+6}$	Chromium
^{137}Cs	Cesium-137
DJ Braun	(See Braun)
DST	Double-Shell Tank
Dy	Dysprosium
^{154}Eu	Europium-154
g	gram
Hg	Mercury
HTCE	Historical Tank Content Estimate (Brevick, 1994)
HTCE	In reference to solid process flow analyte tank estimates from the Historical Tank Inventory Content Estimate (Brevick, 1994)
ICF KH	ICF Kaiser Hanford Company
KOH	Potassium Hydroxide
L	liter
La	Lanthanum
LATA	Los Alamos Technical Associates
Li	Lithium
Na	Sodium
NaOH	Sodium Hydroxide
Nd	Neodymium
NH_3	Ammonia
^{237}Np	Neptunium-237
^{238}Pu	Plutonium-238
$^{239/240}\text{Pu}$	Plutonium-239 and Plutonium-240

GLOSSARY/ACRONYM LIST (Continued)

^{241}Pu	Plutonium-241
Sb	Antimony
Se	Selenium
Source Term	The quantity of radioactive and/or toxic materials released in an accident scenario. Radioactive source terms are given in terms of the activity (in Ci or Bq) of each isotope released. Toxic chemical source terms are given in terms of the amount of material (in grams) of each toxic chemical released
Sr	Strontium
$^{89/90}\text{Sr}$	Strontium-89 and Strontium-90
SST	Single-Shell Tank
TCD	Tank Characterization Database - database of core sample information managed by Battelle - Pacific Northwest Laboratory
TCR	Tank Characterization Report - reports generated by WHC and LATA to characterize tank waste, predominantly using core sample data taken after 1989
Te	Tellurium
Tl	Thallium
TRAC	Track Radioactive Components
U	Uranium
V	Vanadium
WASTREN	A compilation of sample information that attempted to select the highest, most recent sample information from the Characterization library, prepared by WASTREN, Inc. This document does not contain information taken after 1990.
WHC	Westinghouse Hanford Company
^{90}Y	Yttrium-90

LETTER REPORT

TANK WASTE SOURCE TERM INVENTORY VALIDATION

INTRODUCTION

The 177 Hanford waste storage tanks in the 200-East and 200-West Areas have received a wide variety and concentration of hazardous chemicals and radionuclides over the last 50 years (1944 to the present). Throughout this time period, the tanks have been sampled numerous times, several tank content estimates have been developed, and several tank sample information data sets have been compiled, all in an effort to establish a tank content characterization.

During fiscal years (FY) 1994 and 1995, the Safety Analysis and Nuclear Engineering (SANE) organization prepared revised accident analyses for the Hanford tank farms. The results of the accident analyses are documented in a Hazard and Accident Analysis Report (WHC-SD-WM-SAR-065, Draft). The accident analyses required calculation of unit doses, dose consequences, and source terms for radionuclides and toxic chemicals.

The development of source terms required that concentrations of selected radionuclides and toxic chemicals in the different waste forms be selected. One of the most important steps in determining the concentrations is in the process of selecting which sample data to use and then interpreting the data. This report describes the process used to select and interpret data.

This effort includes: waste estimations, waste sample analyses, and data sets for a specified 11 radionuclides and 24 chemical analytes. Sources of the sample analyses information were the WHC characterization library (represented by the electronic data sets of ICF KH, Braun and WASTREN), tank characterization database (TCD), and the 241-B-110 and 241-U-110 core data. Waste estimate sources were the track radioactive components (TRAC) and the Historical Tank Content Estimate (HTCE) report (ref 1 and 2).

This report documents the results of a joint ICF KH and WHC venture that assembled, organized, and interpreted sample data for use in developing radionuclide and toxic chemical source terms for a revised Hazard and Accident Analysis. Plots and tables of the various reported sample and estimate values are presented and the methodology used to select the concentrations for developing the source terms is explained.

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Sample analysis and waste estimation information are provided in the form of scatter plots and tables. These plots and tables provide a visual reference to the range in numbers of sample analyses and varied concentrations of selected chemical analytes or radionuclides. The range in the numbers of sample analyses for each analyte and each tank is attributed partly to there not being a set listing of chemical constituents or radionuclides analyzed for each sample taken. The chemical constituents or radionuclides analyzed were often based on individual requests for specific sample analysis information. A large number of process samples are of limited value for safety analysis because current materials and inventories in the tanks are not reflected. Other reasons could include the tank usage (i.e., evaporator feed or receiver tanks, etc.), the selected chemical list for a waste estimate report (i.e., HTCE), or the number of tanks addressed in an estimate report.

The work performed resulted in the selection of concentrations for nine different groupings of tanks for radionuclide source terms and five different groupings of tanks for toxic chemical source terms. The groupings and associated concentrations are summarized in the two tables shown in Appendix E.

It is not possible to gather "all" the sample data that has been generated by sampling programs for the Hanford waste tanks. Much of the early data was not filed in readily retrievable forms. Other data requires recovery from the LCCS and LIMS computer files and interpretation by technical experts before it is usable for safety analysis. There is additional data available every month, therefore, any compilation of sample data for safety analysis work is a living document that needs to be updated periodically.

There are two recommendations resulting from this work.

1. The electronic data set compiled by ICF KH during the writing of this report represented the largest collection of useable sample data available on the Hanford Site. Additional sample information is available every month. The information may be current sampling results or historical results that have been added to the WHC Characterization library. The electronic data set created for this report needs to be updated, expanded, and maintained on a regular basis.
2. For this report, the highest believable concentrations of the selected radionuclides and chemicals were used to establish upper bound values for the total unit doses. In some cases, examination of the scatter plots revealed that some of the upper bound values could be lowered or raised. Additional review of this data may determine that more upper bound values could be changed.

APPROACH/EVALUATION

Selection of Data

The development of source terms required that concentrations of selected radionuclides and toxic chemicals in different waste forms be selected. The concentrations are selected by reviewing the large amount of tank sample data. One of the most important steps in determining the concentrations is selecting and interpreting the sample data. Collecting all of the sample data that has been generated from the Hanford waste tanks would be impossible because much of the early data were not filed in readily retrievable form. Other information require recovery from incompatible computer files and interpretation by technical experts before it is useful for safety analysis.

Initially, two documents prepared by WASTREN (WHC-SD-WM-TI-543, "Radiological and Chemical Inventories for Double Shell Tanks [DSTs]" and WHC-SD-WM-TI-565, "Radionuclide and Chemical Inventories for Single Shell Tanks [SSTs]"), were used to develop the radionuclide and toxic chemical unit doses for the Accelerated Safety Analysis (ASA). The documents list the highest concentrations of radionuclides and chemicals found

in a survey of the most current sample data, prior to 1990, maintained by TWRS engineers and the WHC Tank Characterization Program. The documents do not represent all the sample data available at Hanford.

As the ASA proceeded, more sample data became available due to continued sampling and the release of additional existing data located and documented by the WHC Tank Characterization Program. It was decided that the recently available sample data should be reviewed to see if it would affect the upper bounds selected for the radiological and toxicological data.

Scatter plots of the various reported concentrations of the selected chemical analytes or radionuclides versus tanks were concluded to be the best form in which to present this data.

WHC identified 11 radionuclides and 24 chemical analytes, out of the much larger group of analyses, as those constituents that contributed over 95% activity or toxicity to the potential source term. The chemical analytes and radionuclides are:

Radionuclides		Chemical Analytes	
Am-241	Americium-241	As - Arsenic	Na - Sodium
Co-60	Cobalt-60	Ba - Barium	NaOH - Sodium Hydroxide
Cs-137	Cesium-137	Be - Beryllium	Nd - Neodymium
Cm-244	Curium-244	Ca - Calcium	NH ₃ - Ammonia
Eu-154	Europium-154	Cd - Cadmium	Sb - Antimony
Np-237	Neptunium-237	Ce - Cerium	Se - Selenium
Pu-238	Plutonium-238	CN - Cyanide	Sr - Strontium
Pu-239/240	Plutonium-239/240	Co - Cobalt	Te - Tellurium
Pu-241	Plutonium-241	Cr ⁺³ - Chromium	Tl - Thallium
Sr-89/90	Strontium-89/90	Cr ⁺⁶ - Chromium	U - Uranium
Y-90	Yttrium-90	Dy - Dysprosium	V - Vanadium
		Hg - Mercury	
		La - Lanthanum	

The original chemical analyte list was revised during this report preparation process to include Ca, La, Na, Ce, Dy, Nd, Sr, CN⁻, and V and to remove Cu, Mn, Mo, Ni, Rh, and Sn.

To select a dataset that best would represent the waste within the 177 tanks, an effort was made to identify all the sources of samples or estimated data that was usable at this time. The following data sources were selected and believed to be the best representation of the waste within the tanks: WHC characterization library (developed into electronic data sets by ICF KH, Braun, and WASTREN); TCD; 241-B-110 and 241-U-110 core data; TRAC; and the HTCE inventory data.

Standardization and Presentation of Data

Sample information from the selected data sources were entered into EXCEL spreadsheets that were used to produce the scatter plots and tables. Due to the large number of lines of data and EXCEL's limitation in number of rows, the data was separated into five files. The scatter plots were generated by scripting the data into AutoCAD templates. The tables were produced using EXCEL templates.

The sample points on the scatter plots were differentiated by source. The WHC characterization library source was separated into three identifiable points: the Braun database was identified by a "B;" the WASTREN data set by a "W;" and the remaining data including ICF KH data, TCD, B-110 and U-110 core data were identified by an "X" with the most recent data for each tank represented by an "O." The TRAC and HTCE estimates are identified by a Δ and a $\square$, respectfully.

Various manipulations were necessary to standardize all the data into consistent units of Becquerel/liter (Bq/L) or microgram/liter ($\mu\text{g/L}$). A set of criteria was established for preparation of this database. The data was not used if: the units were not specified; a date could not be connected to the data; the reported value was less than the detection limit; the reported value was presented in percent with no reference to weight or volume. Corrections were made to some memos or sample reports. These corrected memos or sample reports were used instead of the originals.

Additional criteria was established for certain radionuclides and chemical analytes. Originally, it was desired to separate Ni, Tl, and U based on their water solubility, but test reports did not distinguish (in)solubility, therefore, all reported values have been used. In addition, related constituents of two radionuclides and three chemical analytes were grouped together for this project. Plutonium-239/240 includes all the data for ^{239}Pu and nonspeciated Pu. The activity for $^{239/240}\text{Pu}$ was calculated using 6 weight % ^{240}Pu and 94 weight % ^{239}Pu . Strontium-90 includes all the data for $^{89/90}\text{Sr}$. NH_3 includes both NH_3 and NH_4^+ analyses. To simplify the conversion to $\mu\text{g/L}$, the molecular weight of NH_3 was used for both NH_3 and NH_4^+ , since it is not known how much NH_3 is in this or the NH_4^+ form for any sample. NaOH includes all OH^- analysis as long as no NaOH analysis was reported for the same sample on the same day. For Na, if more than one sodium salt is listed for a unique sample and there is no total Na value given, all salts are summed to find the total sodium for that sample.

Preparing the information for easy interpretation required the data to be organized into a consistent format. All sample data was given a code to delineate sample state or phase. The codes and sample descriptions associated with them are as follows:

CODE	DESCRIPTION
A	Salts
D	Suspended Solids
F	Filtrate
G	Sludge
I	Composite, sludge/composite
K	Saltcake
L	Liquid/Liquor, centrifuged decant, centrate
O	Other (must be accompanied with % solids)
P	Supernatant
R	Slurry
S	Solid (including: KOH fusion, acid wash, filtered or centrifuged solids, washed or fusion solids, slurry/solids, supernatant/solids)
T	Crust
U	Unknown
Y	Slurry/Sludge

The data codes are divided into solid and liquid phases as follows:

Phase	Code
Solid	S, R, A, K, I, G, Y, D, and T O (50% solids and above)
Liquid	P, F, L, and U O (under 50% solids)

The sample data were coded according to the following criteria:

- If the memo/letter/report had a designation of the sample state, then that sample state was used and a code letter was applied.
- If the sample was divided into solid and liquid fractions in the laboratory, then the solid fraction is a solid, and the liquid fraction was considered a liquid.
- If the sample did not have a sample state specification in the table or in the accompanying report/letter/memo, but a % solids amount was given, the sample received an O (Other) and was considered a solid if it was 50% solids and over, and a liquid if under 50% solids.
- Finally, if no sample state designation was given, and no % solids amount were given, the sample received the sample code U (Unknown).

Some assumptions were made when no information was given with the sample. Chromium, if not specified, would be Cr^{+6} if it was a liquid sample and Cr^{+3} if it was a solid sample. In cases where a density was not specified with the rest of the data, and the reported value needed to be converted from a per weight basis to a per volume basis, a constant density of 1.6 gram/milliliter (g/ml) was assumed for solid and a constant density of 1.1 g/ml for liquid.

WHC requested that 8 of the 11 selected radionuclides be decayed to 12/31/94. The decayed, with their associated half-lives, and undecayed radionuclides are as follows:

Radionuclides	Half-life (yrs)
^{241}Am	432.2
^{244}Cm	18.11
^{60}Co	5.271
^{137}Cs	30.17
^{154}Eu	8.8
^{238}Pu	87.75
^{241}Pu	14.4
^{90}Sr	28.6
^{237}Np	Undecayed
$^{239/240}\text{Pu}$	Undecayed
^{90}Y	Undecayed

These half-lives were used to decay the sample data, TCD data, TRAC data, 241-B-110 core data, 241-U-110 core data, Braun data, and WASTREN data to 12/31/94. The HTCE inventory data was already decayed to 1994.

Minor inconsistencies or problems found in some of the electronic data received and their remedies were as follows.

- **TCD Data**
 - Incorrect Tank 241-SY-101 TCD data for Window E was remedied by applying the already entered dilution factors (which are actually multiplication factors in this case) to the recorded values to get the correct values and units.
 - Selenium values in Tank 241-AW-102 were recorded in microcurie/liter ($\mu\text{Ci/L}$), these values were actually for Selenium-79 and not used.

- Radionuclides for Tank 241-BX-107 had units of microgram/gram ($\mu\text{g/g}$) when the actual report specified the units as microcurie/gram ($\mu\text{Ci/g}$) which was remedied by changing the $\mu\text{g/g}$ manually by ICF KH to $\mu\text{Ci/g}$.
- **Tank 241-B-110 Core Data**

The files contained information for cores 1, 2, 3, 4, 9, 10, and 16; whereas, the tank characterization report contained adjoining densities for cores 1, 2, 3, 4, 9, 10, and 18. It was found that core 16 information is synonymous with core 18 information.
- **Tank 241-U-110 Core Data**

Units left out of one of the electronic files for segment information are the same as for the core composite information.

Scatter plots of the 11 radionuclides and 24 chemical analytes were broken down into the following tank groupings:

- **Radionuclides**
 - Single-shell tank liquid/radionuclides
 - Single-shell tank solid/radionuclides
 - Double-shell tank liquid (excluding aging waste tanks)/radionuclides
 - Double-shell tank solid (excluding aging waste tanks)/radionuclides
 - Aging waste tanks liquid/radionuclides
 - Aging waste tanks solid/radionuclides
- **Chemical**
 - Single-shell tank liquid/analyte
 - Single-shell tank solid/analyte
 - Double-shell tank liquid/analyte
 - Double-shell tank solid/analyte

Formatting the plots consisted of keeping a consistent horizontal and vertical axis, a consistent scale, unique tank markings, and unique data symbols. The scatter plots are specified with the tanks on the horizontal axes with darker markings delineating the beginning of each tank farm for SST plots only, and the concentration assigned to the vertical axes. A logarithmic scale was used on the vertical (concentration) axes. For radionuclides, the concentration used was Bq/L on the left vertical axis and microcuries/liter ($\mu\text{Ci/L}$) on the right vertical axis (straight conversion from Bq/L, not an independent $\mu\text{Ci/L}$ logarithmic scale). For chemicals, the concentration used was $\mu\text{g/L}$. The flammable gas watch list tanks are distinguished from the rest of the tanks on all the plots with an extended mark above the tank index. In addition, each data source, or group of data sources, received a unique plot symbol. A list of the plot symbols and flammable gas watch list tanks is shown in Appendices A and B.

The drawing number in the title block of the plots is also included in the title of the tables to provide better coordination when using the plots and tables together. The radionuclide scatter plots include the conversion from Bq/L to $\mu\text{Ci/L}$ in the footnote/legend section of the plots.

Plots have been included for all specified radionuclides and chemical analytes for all ten groupings previously listed. In three incidents, no data were available but basic plots have been included for consistency. The plots with no data available include ^{90}Y for aging waste tank (AWT) solid(radionuclide) and Dy for SST liquid and Te for SST liquid (chemical analyte).

Tables were generated containing the information on the scatter plots in addition to information that appears outside the scatter plot ranges. Information included in the tables fits into two categories: tank waste characterization sample information and analyte/radionuclides information. The tank waste characterization sample information consists of tank, reported chemical/radionuclides, date, sample number, density, reported value and unit, code, sample state, and source. The analyte/radionuclides information consists of analyte/radionuclides and $\mu\text{g/L}$ (for chemical analyte tables) or Bq/L and Bq/L decayed (for radionuclides tables). A row indicator is included for ASA source term activity concentration (ASA line), preliminary ASA line, when applicable, and to separate the data

above or on the plots from the data below the plots. A summary page, including the field and code interpretation information, is in front of the tables in Appendices C and D.

Data Evaluation by WHC

An evaluation process using preliminary scatter plots (complete with a line representing the preliminary ASA line) and accompanying tables was performed by a WHC panel. These plots and tables were reviewed to verify data and to validate the chosen ASA source term activity concentrations.

The review panel consisted of experienced personnel from the analytical laboratory, process chemistry, TWRS engineering, waste tank operations, and safety analysis. Data support was provided by engineers from ICF KH. The review panel used their cumulative knowledge of the Hanford chemical separations processes, references on the history of the Hanford tank farms, and files of laboratory sample reports to evaluate the sample points.

Most plots contain a preliminary ASA line that corresponds to the concentration originally obtained from the WASTREN reports. The purpose of the review was to ensure that the unit doses were an upper bound. Sample concentrations were evaluated from the highest to lowest value with the ASA line established at the first valid sample. No statistical tests or techniques have been used in this process. The process uses the available data and eliminates some data points if there are obvious errors in the data or if the sampled material is no longer present in the tank.

The following basic criteria were used to evaluate sample points:

- Was the data reported correctly (e.g., analyses of solids reported incorrectly as liquids, transcription errors, and unit conversion errors)?
- Was an analytical result actually a "less than" value (below detection limits)?
- Is the sampled material still present in the tank? Generally, the most recent sample analysis is used unless the analysis is suspect for some reason.

- The analysis may be valid, but the sampled material is now overlaid with several feet of saltcake and, therefore, is considered not available for release.

The panel documented their rationale for rejecting or accepting sample points on the scatter plots and on separate Concentration Data Evaluation forms that were filed with the scatter plots. A complete set of notes from the review panel meetings is contained in WHC-SD-WM-CN-014, "Notes from WHC Review of Sample Records for TWRS Accelerated Safety Analysis."

The review panel provided guidelines for total organic carbon (TOC) and oxalate concentrations rather than using data plots. The highest credible liquid sample datum for TOC is 40 g/l taken from Tank AN-107. The material is an accumulation of supernate from saltwell pumping of SSTs representing a bounding concentration for SSTs, DSTs, and AWF tanks. For a solids concentration, information about Tanks AN-107 and SY-101 solids were used. Samples from Tank SY-101 show that the concentration of organics in solids are about 50% higher in the solid phase than in the liquid phase. Since Tank SY-101 contains proportionally more complex concentrate than other Hanford tanks, it is assumed that the 50% higher concentration is a bounding case. Therefore, a solids concentration bounding case would be 1.5 times 40 g/l or 60 g/l TOC in the solids phase.

Oxalate is essentially insoluble in the waste liquid. It is also about 50% of the TOC in the solids. The oxalate concentration can be calculated by taking half the TOC reported for the solid and adjusting for the molecular weight of oxalate.

As the reviews and guidelines were completed, the recommended concentrations for each radionuclide and chemical were provided to the WHC Criticality and Radiological Analyses group for calculation of unit doses. The radionuclide and toxic chemical concentrations developed by the panel are shown in Tables 1 and 2 in Appendix E.

During the review of the sample results, additional requests for different groupings of radionuclides and toxic chemicals were made. These requests were for subsets of the original ten groups. The subsets were developed from accident scenarios that applied only to certain tanks. Therefore, it is reasonable to create subsets of sample concentrations

from data taken for the selected tanks rather than data for all the tanks. The following additional subsets (groupings) are included in Tables 1 and 2 of Appendix E.

Radionuclides

- SST combined liquid and solid from the Flammable Gas Watch List tanks.
- DST combined liquid and solid from the Flammable Gas Watch List tanks.
- SST liquids, excluding Tanks 241-C-106, -C-107, -T-104, -U-105, -U-107, -U-109, and -AX-102.

Toxic Chemicals

- DST solids from Flammable Gas Watch List tanks.

Additional scatter plots were not prepared for the four new subsets. The review panel used copies of the existing scatter plots to evaluate the data. A combined value was requested for the first two radionuclide subsets; therefore, the higher of the liquid or solid concentrations for each radionuclide is reported in Table 1 of Appendix E.

Only the calculated concentrations from TRAC above the ASA lines were plotted on the scatter plots, but all data are included in the tables. However, TRAC concentrations were not used to establish the source terms. The TRAC data were not considered useful for the following reasons:

1. Data input to the TRAC program ended in 1980.
2. At the time TRAC was written, the production figures for plutonium were still secret and the TRAC equations for plutonium and related isotopes were deliberate guesses.
3. The TRAC program was originally designed to track only specific radioisotopes and not chemicals.

The calculated concentrations taken from WHC-SD-WM-ER-349 and WHC-SD-WM-ER-352, collectively referred to as the HTCE inventory data, were plotted on the scatter plots. The HTCE inventory concentrations were not used to establish the source terms. The HTCE inventory data were not used to define concentrations because many tanks, including the DSTs, need to be completed and unpublished tank data have not been peer reviewed by WHC.

The WHC panel review resulted in changes to some of the ASA source term activity or concentration for some radionuclides and chemical analytes. In addition, some of the chemical analytes and radionuclides were deemed as not having a significant effect on the total dose consequence, therefore, no change in the ASA source term activity concentrations was necessary. These changes, including preliminary and final ASA source term activity concentrations, are reflected and presented on the plots and tables in Appendices A through D.

In the process of completing this task, a tank waste chemical constituent list compiling all the information available from the WHC characterization library and TCD was completed (see Appendix F). In addition, a sample analysis table for lithium is included in Appendix G (this is not one of the 24 plotted chemicals). Appendix H contains all the sample references, separated by tank, that were used to create the electronic data set.

A request was received from Tank Farm Safety Engineering to perform a similar data screening for Tank 241-C-106 to support development of a source term for the safety analysis being performed for project W-320. ICF KH provided a plot of the requested data and the accompanying tables. This information was reviewed by the WHC panel, and concentrations for the radionuclides and toxic chemicals were developed specifically for Tank 241-C-106. The concentrations, as well as the plot and tables, are included in Appendix I.

UNCERTAINTIES AND RECOMMENDATIONS FOR FURTHER STUDY

Most chemical and radionuclide sample analyses from the WHC Characterization library were input into a consistent spreadsheet format. However, since the scope of this work

was limited to the 11 radionuclides and 24 chemical analytes requested, only the information for these have been checked for accuracy. The data was found to be easily structured for a database. It is our recommendation that the database should be completed from all the information on spreadsheets with proper checking of the data over and above that in the initial 11 radionuclides and 24 chemical analytes.

REFERENCES

1. Brevick, C. H., L. A. Gaddis, and W. W. Pickett, June 1994, Historical Tank Content Estimate Report for the Northeast Quadrant of the Hanford 200-East Area, WHC-SD-WM-ER-349, Rev. 0, ICF Kaiser Hanford Company, Richland, Washington.
2. Brevick, C. H., L. A. Gaddis, and W. W. Pickett, June 1994, Historical Tank Content Estimate Report for the Southwest Quadrant of the Hanford 200-East Area, WHC-SD-WM-ER-352, Rev. 0, ICF Kaiser Hanford Company, Richland, Washington.
3. Cowley W. L., Letter Of Instruction (external letter 9457188 to R. B. Johnson, October 18), Westinghouse Hanford Company, Richland, Washington.
4. Davis, J. S., June 1994, Toxic Chemical Considerations for Tank Farm Releases, WHC-SD-WM-SARR-011 Rev. 0, Westinghouse Hanford Company, Richland, Washington.
5. Hanlon, B. M., November 1994, Waste Tank Summary for Month Ending September 30, 1994, WHC-EP-0182-78, Westinghouse Hanford Company, Richland, Washington.
6. Savino, A. V., June 1994, Tank Farm HLW Compositions and Atmospheric Dispersion Coefficients for use in ASA Consequence Assessments, WHC-SD-WM-SARR-016, Westinghouse Hanford Company, Richland, Washington.

APPENDICES

Appendix A. Radionuclides Plots

Appendix B. Chemical Analyte Plots

Appendix C. Radionuclides Tables (Volume II)

Appendix D. Chemical Analyte Tables (Volume II)

Appendix E. Source Term Concentrations

Appendix F. Complete Tank Waste Chemical Concentration List

Appendix G. Tank Waste Characterization Sample Analysis Lithium (Li) Information Table

Appendix H. Sample References

Appendix I. Tank 241-C-106 Sample Information

APPENDIX A

Radionuclide Plots

SCATTER PLOT SYMBOLS AND CONCENTRATION INFORMATION

The symbols used on the scatter plots for the respective sample data sources are defined below:

- o - most recent (highest value if many on that date) raw data per tank for that constituent
- x - all other raw data; all other data from the WHC Characterization library, TCD, 241-B-110 and 241-U-110 core information
- - HTCE Inventory data, only available for a select number of Single-Shell Tank solid radionuclides and chemical analytes
- Δ - TRAC data, only those points that are above the ASA Source Term Activity Concentration
- B - Tank Sample Analysis Datafile (TSAD) (Braun Data)
- W - WASTREN data
- - ASA Source Term Activity Concentration, or revised ASA Source Term Activity Concentration if the value has changed due to panel review
- - - - - - - Preliminary ASA, Preliminary ASA Source Term Activity Concentration (based on WASTREN data)

The unit of concentration for the chemical plots is microgram/liter ($\mu\text{g/L}$). Two different units of concentration are shown on the radionuclide plots, Becquerel/liter (Bq/L) and microcurie/liter ($\mu\text{Ci/L}$). Note that the two axes do not show independent logarithmic scales, but a straight conversion from Bq/L to $\mu\text{Ci/L}$. The conversion from Bq/L to $\mu\text{Ci/L}$ is given below, and is also given in the legend section of the plot.

$$\mu\text{Ci/L} = \frac{\text{Bq/L}}{3.7\text{E} +4}$$

DELINEATED FLAMMABLE GAS WATCH LIST TANKS

The Flammable Gas Watch List tanks taken from WHC Waste Tank Summary for Month Ending September 30, 1994 (Hanlon, 1994) are indicated on the scatter plots with extended tank index marks. A list of these is given below.

Flammable Gas Watch List Tanks			
Single-Shell Tanks			Double-Shell Tanks
241-A-101	241-SX-102	241-U-103	241-AN-103
241-AX-101	241-SX-103	241-U-105	241-AN-104
241-AX-103	241-SX-104	241-U-107	241-AN-105
241-S-102	241-SX-105	241-U-108	241-AW-101
241-S-111	241-SX-106	241-U-109	241-SY-101
241-S-112	241-SX-109		241-SY-103
241-SX-101	241-T-110		

A list of the 11 Radionuclide and 24 Chemical Analyte Scatter Plots (in order of appearance) is given below.

Radionuclide and Chemical Analyte Scatter Plots			
Radionuclides		Chemical Analytes	
Am-241	Americium-241	As - Arsenic	Na - Sodium
Co-60	Cobalt-60	Ba - Barium	NaOH - Sodium Hydroxide
Cs-137	Cesium-137	Be - Beryllium	Nd - Neodymium
Cm-244	Curium-244	Ca - Calcium	NH ₃ - Ammonia
Eu-154	Europium-154	Cd - Cadmium	Sb - Antimony
Np-237	Neptunium-237	Ce - Cerium	Se - Selenium
Pu-238	Plutonium-238	CN - Cyanide	Sr - Strontium
Pu-239/240	Plutonium-239/240	Co - Cobalt	Te - Tellurium
Pu-241	Plutonium-241	Cr ⁺³ - Chromium ⁺³	Tl - Thallium
Sr-89/90	Strontium-89/90	Cr ⁺⁶ - Chromium ⁺⁶	U - Uranium
Y-90	Yttrium-90	Dy - Dysprosium	V - Vanadium
		Hg - Mercury	
		La - Lanthanum

Inventory

Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY
RICHLAND OPERATIONS OFFICE
ICF KAISER HANFORD COMPANY

SINGLE-SHELL WASTE TANKS
Am241 Liquid

PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION
Drawing No. ES-VAL-CR01 JOB NO. E01595 Date 4/95

Inventory

Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
SINGLE-SHELL WASTE TANKS		
Am241 Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CR02	E01595	4/95

Concentration
Bq/L

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□ HTCI

○ Most Recent Sample

B Braun

Δ TRA

Inventory

Conversion from Becquerel/
Liter to μ Curie/Liter
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extented tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
SINGLE-SHELL WASTE TANKS		
Cm244 Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CR03	E01595	4/95

Concentration
Bq/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

□ HTCE

o Most Recent Sample

B Braun

△ TRAC

Inventory

Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
SINGLE-SHELL WASTE TANKS			
Cm244 Solid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CR04	JOB NO.	E01595
Date	4/95		

Concentration
Bq/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

□ HTCE

o Most Recent Sample

B Braun

△ TRAC

Inventory

Conversion from Becquerel/
Liter to μ Curie/Liter
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
SINGLE-SHELL WASTE TANKS			
Co60 Liquid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CR05	JOB NO.	E01595
Date	4/95

Concentration
Bq/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

□ HTCE

o Most Recent Sample

B Braun

Δ TRAC

Inventory

Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY
RICHLAND OPERATIONS OFFICE
ICF KAISER HANFORD COMPANY

SINGLE-SHELL WASTE TANKS
Cs137 Liquid

PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION
Drawing No. ES-VAL-CR07 JOB NO. E01595 Date 4/95

Concentration
Bq/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

□ HTCE

○ Most Recent Sample

B Braun

△ TRAC

Inventory

Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY
RICHLAND OPERATIONS OFFICE
ICF KAISER HANFORD COMPANY

SINGLE-SHELL WASTE TANKS
Cs137 Solid

PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION
Drawing No. ES-VAL-CR08 JOB NO. E01595 Date 4/95

Concentration
Bq/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

□ HTCE

○ Most Recent Sample

B Braun

△ TRAC

Inventory

Conversion from Becquerel/
Liter to $\mu\text{Ci}/\text{Liter}$
 $(\mu\text{Ci}/\text{L}) = (\text{Bq}/\text{L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
SINGLE-SHELL WASTE TANKS			
Eu154 Liquid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing	ES-VAL-CR09	JOB NO	E01595
		Date	4/95

Concentration
Bq/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

Δ HTCE

o Most Recent Sample

B Braun

Δ TRAC

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
SINGLE-SHELL WASTE TANKS			
Eu154 Solid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing	ES-VAL-CR10	JOB NO.	E01595
Date	4/95		

Concentration
Bq/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

□ HTCE

o Most Recent Sample

b Braun

△ TRAC

Inventory

Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
SINGLE-SHELL WASTE TANKS			
Np237 Liquid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CR11	JOB NO.	E01595
Date	4/95		

Concentration
Bq/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

Δ HTCE

o Most Recent Sample

B Braun

Δ TRAC

Inventory

Conversion from Becquerel/
Liter to μ Curie/Liter
(μ Ci/L)=(Bq/L)/(3.7E+04)

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
SINGLE-SHELL WASTE TANKS		
Np237 Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CR12	E01595	4/95

Concentration
Bq/L

— ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□ HTCE

○ Most Recent Sample

B Braun

△ TRAC

Inventory

Conversion from Becquerel/
Liter to μ Curie/Liter
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
SINGLE-SHELL WASTE TANKS			
Pu238 Liquid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CR13	JOB NO.	E01595
Date	4/95		

Concentration
Bq/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

□ HTCE

o Most Recent Sample

b Braun

△ TRAC

Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
($\mu\text{Ci/L} = (\text{Bq/L}) / (3.7\text{E}+04)$)

Extended tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
SINGLE-SHELL WASTE TANKS		
Pu238 Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CR14	E01595	4/95

Concentration
Bq/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

Δ HTCE

O Most Recent Sample

B Braun

Δ TRAC

Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
($\mu\text{Ci/L} = (\text{Bq/L}) / (3.7\text{E}+04)$)

Extented tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY
RICHLAND OPERATIONS OFFICE
ICF KAISER HANFORD COMPANY

SINGLE-SHELL WASTE TANKS
Pu239/240 Solid

PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION
Drawing No. ES-VAL-CR16 JOB NO. E01595 Date 4/95

Inventory

Conversion from Becquerel/
Liter to μ Curie/Liter
($\mu\text{Ci/L} = (\text{Bq/L}) / (3.7\text{E}+04)$)

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
SINGLE-SHELL WASTE TANKS		
Pu241 Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CR17	E01595	4/95

Concentration
Bq/L

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□ HTCE

○ Most Recent Sample

B Braun

Δ TRAC

Inventory

Conversion from Becquerel/
Liter to μ Curie/Liter
(μ Ci/L)=(Bq/L)/(3.7E+04)

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
SINGLE-SHELL WASTE TANKS			
Pu241 Solid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CR18	JOB NO.	E01595
Date	4/95		

Concentration
Bq/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

□ HTCE

o Most Recent Sample

B Braun

Δ TRAC

Inventory

Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extented tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY
RICHLAND OPERATIONS OFFICE
ICF KAISER HANFORD COMPANY

SINGLE-SHELL WASTE TANKS
Sr90 Liquid

PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION
Drawing No. ES-VAL-CR19 JOB NO. E01595 Date 4/95

Concentration
Bq/L

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□ HTCE

○ Most Recent Sample

B Braun

△ TRAC

Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY
RICHLAND OPERATIONS OFFICE
ICF KAISER HANFORD COMPANY

SINGLE-SHELL WASTE TANKS
Sr90 Solid

PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION
Drawing No. ES-VAL-CR20 JOB NO. E01595 Date 4/95

Concentration
Bq/L

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□ HTCE

○ Most Recent Sample

B Braun

△ TRA

Concentration
Bq/L

1.00E+14

1.00E+13

1.70E+12

1.00E+12

1.00E+11

1.00E+10

A-101

AX-101

B-101

BX-101

BY-101

C-101

S-101

Δ

A-101

AX-101

B-101

BX-101

BY-101

C-101

S-101

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

□ HTCE

○ Most Recent Sample

B Braun

Δ TRAC

Inventory

Conversion from Becquerel/
Liter to μ Curie/Liter
(μ Ci/L)=(Bq/L)/(3.7E+04)

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
SINGLE-SHELL WASTE TANKS			
Y90 Solid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CR22	JOB NO.	E01595
Date	4/95		

Concentration
Bq/L

Inventory

Conversion from Becquerel/
Liter to μ Curie/Liter
(μ Ci/L)=(Bq/L)/(3.7E+04)

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY RICHLAND OPERATIONS OFFICE ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS Am241 Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No. ES-VAL-CR23	JOB NO. E01595	Date 4/95

Concentration
Bq/L

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□ HTCE

○ Most Recent Sample

B Braun

△ TRAC

Inventory

Conversion from Becquerel/
Liter to μ Curie/Liter
(μ Ci/L)=(Bq/L)/(3.7E+04)

Extented tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
Cm244 Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CR25	E01595	4/95

Concentration
Bq/L

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□ HTCE

○ Most Recent Sample

B Braun

△ TRAC

Concentration
Bq/L

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□ HTCE

○ Most Recent Sample

B Braun

Δ TRAC

Concentration
Bq/L

1.00E+12

1.00E+11

6.10E+10

1.00E+10

1.00E+09

1.00E+08

AN-101

AN-102

AN-103

AN-104

AN-105

AN-106

AN-107

AP-101

AP-102

AP-103

AP-104

AP-105

AN-101

AN-102

AN-103

AN-104

AN-105

AN-106

AN-107

AP-101

AP-102

AP-103

AP-104

AP-105

ASA Source Term
Activity Concentration

x Sampling Data

O Most Recent Sample

W WASTREN

B Braun

□ HTCE I

△ TRAC

W

x x x x x

O

O

W

x x

x x x x

O

x

B

x

B

O

W

x

x

x

O

x

x

Concentration
Bq/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

□ HTCE

O Most Recent Sample

B Braun

Δ TRAC

Concentration
Bq/L

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□ HTCE

O Most Recent Sample

B Braun

△ TRAC

Concentration
Bq/L

1.00E+10

1.00E+09

2.50E+08

1.00E+08

1.00E+07

1.00E+06

AN-101

AN-102

AN-103

AN-104

AN-105

AN-106

AN-107

AP-101

AP-102

AP-103

AP-104

AP-105

AN-101

AN-102

AN-103

AN-104

AN-105

AN-106

AN-107

AP-101

AP-102

AP-103

AP-104

AP-105

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□ HTCE

○ Most Recent Sample

B Braun

△ TRAC

Inventory

Conversion from Becquerel/
Liter to μ Curie/Liter
(μ Ci/L)=(Bq/L)/(3.7E+04)

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
Eu154 Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CR32	E01595	4/95

Concentration
Bq/L

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□ HTCE

○ Most Recent Sample

B Braun

△ TRAC

Concentration
Bq/L

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□ HTCE

○ Most Recent Sample

B Braun

△ TRAC

Inventory Conversion from Becquerel/
Liter to μ Curie/Liter
(μ Ci/L)=(Bq/L)/(3.7E+04)

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
Pu239/240 Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CR38	E01595	4/95

Concentration
Bq/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

□ HTCE

o Most Recent Sample

B Braun

Δ TRAC

Concentration
Bq/L

1.00E+10

4.14E+09

1.00E+09

1.00E+08

1.00E+07

1.00E+06

AN-101

AN-102

AN-103

AN-104

AN-105

AN-106

AN-107

AP-101

AP-102

AP-103

AP-104

AP-105

AN-101

AN-102

AN-103

AN-104

AN-105

AN-106

AN-107

AP-101

AP-102

AP-103

AP-104

AP-105

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□ HTCE

○ Most Recent Sample

B Braun

△ TRAC

nventory

Conversion from Becquerel/
Liter to μ Curie/Liter
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
DOUBLE-SHELL WASTE TANKS			
Pu241 Solid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing	ES-VAL-CR40	JOB NO.	E01595
		Date	4/95

Concentration
Bq/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

Δ HTCE

o Most Recent Sample

B Braun

Δ TRAC

Concentration
Bq/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

□ HTCE

o Most Recent Sample

B Braun

△ TRAC

Concentration
Bq/L

ASA Source Term
Activity Concentration

x Sampling Data

o Most Recent Sample

W WASTREN

B Braun

□ HTCE I

△ TRAC

Inventory Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
AGING WASTE TANKS			
Am241 Liquid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CR45	JOB NO.	E01595
Date	4/95		

Concentration
Bq/L

1.00E+12

1.00E+11

1.10E+10

1.00E+10

1.00E+09

1.00E+08

AY-101

AY-102

AY-101

AY-102

B
WASTREN
x

ASA Source Term
Activity Concentration

x Sampling Data

o Most Recent Sample

W WASTREN

B Braun

□ HTCE I

△ TRAC

Inventory Conversion from Becquerel/
Liter to μ Curie/Liter
($\mu\text{Ci/L} = (\text{Bq/L}) / (3.7\text{E}+04)$)

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
AGING WASTE TANKS			
Am241 Solid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CR46	JOB NO.	E01595
Date	4/95		

Concentration
Bq/L

1.00E+06

1.00E+05

1.00E+04

1.00E+03

1.00E+02

AY-101

AY-102

Δ

Δ

AY-101

AY-102

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□ HTCE In

○ Most Recent Sample

B Braun

Δ TRAC

A-49

Inventory

Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
AGING WASTE TANKS		
Cm244 Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CR48	E01595	4/95

Inventory Conversion from Becquerel/
Liter to μ Curie/Liter
($\mu\text{Ci/L} = (\text{Bq/L}) / (3.7\text{E}+04)$)

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
AGING WASTE TANKS		
Co60 Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CR49	E01595	4/95

Concentration
Bq/L

AY-101

AY-102

1.00E+11

1.00E+10

1.00E+09

6.1E+08

2.77E+08
(Preliminary)

1.00E+08

1.00E+07

AY-101

AY-102

x

O

B

W

x

ASA Source Term
Activity Concentration

x Sampling Data

O Most Recent Sample

W WASTREN

B Braun

□ HTCE Invent

△ TRAC

Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
AGING WASTE TANKS		
Co60 Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CR50	E01595	4/95

A-53

Inventory Conversion from Becquerel/
Liter to μ Curie/Liter
($\mu\text{Ci/L} = (\text{Bq/L}) / (3.7\text{E}+04)$)

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
AGING WASTE TANKS			
Cs137 Solid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CR52	JOB NO.	E01595
Date	4/95

Inventory

Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extented tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
AGING WASTE TANKS			
Eu154 Liquid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CR53	JOB NO.	E01595
Date	4/95

Inventory	Conversion from Becquerel/ Liter to μ Curie/Liter ($\mu\text{Ci/L} = (\text{Bq/L}) / (3.7\text{E}+04)$)	Extended tank lines represent Flammable Gas Watch List Tanks.
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U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
AGING WASTE TANKS			
Eu154 Solid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing	ES-VAL-CR54	JOB NO.	E01595
Date	4/95

Inventory	Conversion from Becquerel/ Liter to μ Curie/Liter (μ Ci/L)=(Bq/L)/(3.7E+04)	Extended tank lines represent Flammable Gas Watch List Tanks.
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U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
AGING WASTE TANKS			
Np237 Liquid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing	ES-VAL-CR55	JOB NO.	E01595
Date			4/95

Inventory Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
($\mu\text{Ci/L} = (\text{Bq/L}) / (3.7\text{E}+04)$)

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
AGING WASTE TANKS			
Np237 Solid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CR56	JOB NO.	E01595
Date	4/95

Inventory Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
AGING WASTE TANKS			
Pu238 Liquid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CR57	JOB NO.	E01595
Date	4/95

Inventory

Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY RICHLAND OPERATIONS OFFICE ICF KAISER HANFORD COMPANY		
AGING WASTE TANKS Pu238 Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No. ES-VAL-CR58	JOB NO. E01595	Date 4/95

Inventory

Conversion from Becquerel/
Liter to μ Curie/Liter
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
AGING WASTE TANKS			
Pu239/240 Liquid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing	ES-VAL-CR59	JOB NO.	Date
		E01595	4/95

Concentration
Bq/L

1.00E+10

1.00E+09

4.40E+08

1.00E+08

1.00E+07

1.00E+06

AY-101

AY-102

AY-101

AY-102

W
B
B

B

—	ASA Source Term Activity Concentration	×	Sampling Data	W	WASTREN	□	HTCE In
- - -	Preliminary ASA Source Term Activity Concentration	○	Most Recent Sample	B	Braun	△	TRAC

entory

Conversion from Becquerel/
Liter to μ Curie/Liter
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
AGING WASTE TANKS			
Pu239/240 Solid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing	ES-VAL-CR60	JOB NO.	E01595
Date	4/95

Inventory

Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
AGING WASTE TANKS		
Pu241 Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	ES-VAL-CR61	JOB NO. E01595 Date 4/95

Inventory Conversion from Becquerel/
Liter to μ Curie/Liter
($\mu\text{Ci/L} = (\text{Bq/L}) / (3.7\text{E}+04)$)

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY RICHLAND OPERATIONS OFFICE ICF KAISER HANFORD COMPANY		
AGING WASTE TANKS Pu241 Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No. ES-VAL-CR62	JOB NO. E01595	Date 4/95

Concentration
Bq/L

ASA Source Term
Activity Concentration

x Sampling Data

o Most Recent Sample

w WASTREN

B Braun

□ HTCE Ir

△ TRAC

Inventory Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
 $(\mu\text{Ci/L}) = (\text{Bq/L}) / (3.7\text{E}+04)$

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
AGING WASTE TANKS			
Sr90 Liquid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CR63	JOB NO.	E01595
Date	4/95

A-66

Inventory Conversion from Becquerel/
Liter to $\mu\text{Curie/Liter}$
($\mu\text{Ci/L} = (\text{Bq/L}) / (3.7\text{E}+04)$)

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
AGING WASTE TANKS		
Y90 Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CR65	E01595	4/95

Inventory Conversion from Becquerel/
Liter to μ Curie/Liter
($\mu\text{Ci/L} = \text{Bq/L} / (3.7\text{E}+04)$)

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
AGING WASTE TANKS			
Y90 Solid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CR66	JOB NO.	E01595
Date	4/95		

APPENDIX B

Chemical Analyte Plots

SCATTER PLOT SYMBOLS AND CONCENTRATION INFORMATION

The symbols used on the scatter plots for the respective sample data sources are defined below:

- o - most recent (highest value if many on that date) raw data per tank for that constituent
- x - all other raw data; all other data from the WHC Characterization library, TCD, 241-B-110 and 241-U-110 core information
- - HTCE Inventory data, only available for a select number of Single-Shell Tank solid radionuclides and chemical analytes
- Δ - TRAC data, only those points that are above the ASA Source Term Activity Concentration
- B - Tank Sample Analysis Datafile (TSAD) (Braun Data)
- W - WASTREN data
- - ASA Source Term Activity Concentration, or revised ASA Source Term Activity Concentration if the value has changed due to panel review
- - - - - - Preliminary ASA, Preliminary ASA Source Term Activity Concentration (based on WASTREN data)

The unit of concentration for the chemical plots is microgram/liter ($\mu\text{g/L}$). Two different units of concentration are shown on the radionuclide plots, Becquerel/liter (Bq/L) and microcurie/liter ($\mu\text{Ci/L}$). Note that the two axes do not show independent logarithmic scales, but a straight conversion from Bq/L to $\mu\text{Ci/L}$. The conversion from Bq/L to $\mu\text{Ci/L}$ is given below, and is also given in the legend section of the plot.

$$\mu\text{Ci/L} = \frac{\text{Bq/L}}{3.7\text{E} +4}$$

DELINEATED FLAMMABLE GAS WATCH LIST TANKS

The Flammable Gas Watch List tanks taken from WHC Waste Tank Summary for Month Ending September 30, 1994 (Hanlon, 1994) are indicated on the scatter plots with extended tank index marks. A list of these is given below.

Flammable Gas Watch List Tanks			
Single-Shell Tanks			Double-Shell Tanks
241-A-101	241-SX-102	241-U-103	241-AN-103
241-AX-101	241-SX-103	241-U-105	241-AN-104
241-AX-103	241-SX-104	241-U-107	241-AN-105
241-S-102	241-SX-105	241-U-108	241-AW-101
241-S-111	241-SX-106	241-U-109	241-SY-101
241-S-112	241-SX-109		241-SY-103
241-SX-101	241-T-110		

A list of the 11 Radionuclide and 24 Chemical Analyte Scatter Plots (in order of appearance) is given below.

Radionuclide and Chemical Analyte Scatter Plots			
Radionuclides		Chemical Analytes	
Am-241	Americium-241	As - Arsenic	Na - Sodium
Co-60	Cobalt-60	Ba - Barium	NaOH - Sodium Hydroxide
Cs-137	Cesium-137	Be - Beryllium	Nd - Neodymium
Cm-244	Curium-244	Ca - Calcium	NH ₃ - Ammonia
Eu-154	Europium-154	Cd - Cadmium	Sb - Antimony
Np-237	Neptunium-237	Ce - Cerium	Se - Selenium
Pu-238	Plutonium-238	CN - Cyanide	Sr - Strontium
Pu-239/240	Plutonium-239/240	Co - Cobalt	Te - Tellurium
Pu-241	Plutonium-241	Cr+3 - Chromium ⁺³	Tl - Thallium
Sr-89/90	Strontium-89/90	Cr+6 - Chromium ⁺⁶	U - Uranium
Y-90	Yttrium-90	Dy - Dysprosium	V - Vanadium
		Hg - Mercury	
		La - Lanthanum

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

o Most Recent Sample

B Braun

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

O Most Recent Sample

B Braun

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

O Most Recent Sample

B Braun

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

x Sampling Data

o Most Recent Sample

w WASTREN

B Braun

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

O Most Recent Sample

B Braun

Δ

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

o Most Recent Sample

B Braun

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

o Most Recent Sample

w WASTREN

B Braun

Δ

HTCE Inventory

Extented tank lines
represent Flammable
Gas Watch List Tanks.

TRAC

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
SINGLE-SHELL WASTE TANKS		
Cd - Cadmium Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC09	E01595	4/95

Concentration
μg/L

A-101 AX-101 B-101 BX-101 BY-101 C-101 S-101

1.00E+08

1.00E+07

1.70E+06

1.00E+06

1.00E+05

1.00E+04

A-101

AX-101

B-101

BX-101

BY-101

C-101

S-101

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

○ Most Recent Sample

B Braun

Concentration
μg/L

HTCE Inventory

TRAC

Extented tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
SINGLE-SHELL WASTE TANKS		
Ce - Cerium Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC12	E01595	4/95

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

o Most Recent Sample

B Braun

HTCE Inventory

TRAC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY
RICHLAND OPERATIONS OFFICE
ICF KAISER HANFORD COMPANY

SINGLE-SHELL WASTE TANKS
Cr+3 - Chromium+3 Liquid

PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No. ES-VAL-CC17	JOB NO. E01595	Date 4/95

Concentration
μg/L

1.00E+09

1.00E+08

6.91E+07

1.00E+07

1.00E+06

1.00E+05

A-101

AX-101

B-101

BX-101

BY-101

C-101

S-101

A-101

AX-101

B-101

BX-101

BY-101

C-101

S-101

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

○ Most Recent Sample

B Braun

HTCE Inventory

TRAC

Extended tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
SINGLE-SHELL WASTE TANKS		
Cr+6 - Chromium+6 Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC19	E01595	4/95

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

O Most Recent Sample

B Braun

HTCE Inventory

TRAC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
SINGLE-SHELL WASTE TANKS		
Cr+6 - Chromium+6 Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC20	E01595	4/95

HTCE Inventory

TRAC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
SINGLE-SHELL WASTE TANKS			
Dy - Dysprosium Solid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CC22	JOB NO.	E01595
Date	4/95

Concentration
 $\mu\text{g/L}$

2.01E+06
(Preliminary)

ASA Source Term
Activity Concentration

x Sampling Data

o Most Recent Sample

w WASTREN

B Braun

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

o Most Recent Sample

B Braun

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

o Most Recent Sample

w WASTREN

B Braun

Concentration
 $\mu\text{g/L}$

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

o Most Recent Sample

B Braun

HTCE Inventory
TRAC

Extented tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
SINGLE-SHELL WASTE TANKS		
Na - Sodium Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No	ES-VAL-CC28	JOB NO. E01595
Date	4/95	

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

O Most Recent Sample

B Braun

Concentration
μg/L

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

○ Most Recent Sample

B Braun

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

O Most Recent Sample

B Braun

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

o Most Recent Sample

W WASTREN

B Braun

□

Δ

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

○ Most Recent Sample

B Braun

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
SINGLE-SHELL WASTE TANKS		
NH ₃ - Ammonia Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC33	E01595	4/95

Concentration
 $\mu\text{g/L}$

A-101

AX-101

B-101

BX-101

BY-101

C-101

S-101

1.00E+08

1.00E+07

W

1.5E+06
(Preliminary)

1.00E+06

3.3E+05

1.00E+05

1.00E+04

A-101

AX-101

B-101

BX-101

BY-101

C-101

S-101

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

○ Most Recent Sample

B Braun

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

x Sampling Data

O Most Recent Sample

W WASTREN

B Braun

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

o Most Recent Sample

B Braun

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

o Most Recent Sample

B Braun

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

○ Most Recent Sample

B Braun

HTCE Inventory

TRAC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
SINGLE-SHELL WASTE TANKS		
Sr - Strontium Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC40	E01595	4/95

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

○ Most Recent Sample

B Braun

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

o Most Recent Sample

B Braun

Concentration
 $\mu\text{g/L}$

HTCE Inventory

TRAC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
SINGLE-SHELL WASTE TANKS		
TI - Thallium Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No	ES-VAL-CC43	JOB NO. E01595
Date	4/95	

Concentration
μg/L

Concentration
μg/L

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

○ Most Recent Sample

B Braun

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

o Most Recent Sample

B Braun

Concentration
 $\mu\text{g/L}$

HTCE Inventory

TRAC

Extented tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
SINGLE-SHELL WASTE TANKS		
V - Vanadium Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC47	E01595	4/95

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

o Most Recent Sample

B Braun

HTCE Inventory

TRAC

Extented tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
SINGLE-SHELL WASTE TANKS			
V - Vanadium Solid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CC48	JOB NO.	E01595
Date	4/95		

Concentration
 $\mu\text{g/L}$

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□

Most Recent Sample

B Braun

△

CE Inventory
RAC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
As - Arsenic Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC50	E01595	4/95

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

× Sampling Data

w WASTREN

□

Most Recent Sample

B Braun

△

TCE Inventory

RAC

Extented tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
DOUBLE-SHELL WASTE TANKS			
Ba - Barium Solid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CC52	Job No.	E01595
Date	4/95		

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

Most Recent Sample

B Braun

Δ

CE Inventory

AC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
Be - Beryllium Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC53	E01595	4/95

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

x Sampling Data

Most Recent Sample

w WASTREN

B Braun

□

△

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

Most Recent Sample

B Braun

Δ

Concentration
 $\mu\text{g/L}$

ITCE Inventory
RAC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

Most Recent Sample

B Braun

Δ

B-59

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

□

Most Recent Sample

B Braun

△

TCE Inventory

RAC

Extended tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
Cd - Cadmium Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing ES-VAL-CC58	JOB NO. E01595	Date 4/95

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

□

Most Recent Sample

B Braun

△

TCE Inventory
RAC

Extended tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
Ce - Cerium Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	ES-VAL-CC59	JOB NO. E01595
Date	4/95

HTCE Inventory

TRAC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY RICHLAND OPERATIONS OFFICE ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS CN - Cyanide Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No. ES-VAL-CC61	JOB NO. E01595	Date 4/95

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

Most Recent Sample

B Braun

Δ

Concentration
μg/L

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□

Most Recent Sample

B Braun

△

CE Inventory

AC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
Co - Cobalt Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC63	E01595	4/95

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□

Most Recent Sample

B Braun

△

TCE Inventory
RAC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
Co - Cobalt Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing ES-VAL-CC64	JOB NO. E01595	Date 4/95

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

□

Most Recent Sample

B Braun

Δ

ICE Inventory
RAC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

TCE Inventory
RAC

Extended tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
Cr+3 - Chromium+3 Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC66	E01595	4/95

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

Δ

Most Recent Sample

B Braun

Δ

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

□

Most Recent Sample

B Braun

△

HTCE Inventory
TRAC

Extended tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
Cr+6 - Chromium+6 Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC68	E01595	4/95

HTCE Inventory

TRAC

Extented tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
Dy - Dysprosium Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC69	E01595	4/95

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

□

Most Recent Sample

B Braun

△

TCE Inventory
RAC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

Concentration
 $\mu\text{g/L}$

1.00E+06

1.00E+05

1.00E+04

1.00E+03

2.44E+02

1.5E+02
(Preliminary)

1.00E+02

AN-101

AN-102

AN-103

AN-104

AN-105

AN-106

AN-107

AP-101

AP-102

AP-103

AP-104

AP-105

AP-106

AP-107

AN-101

AN-102

AN-103

AN-104

AN-105

AN-106

AN-107

AP-101

AP-102

AP-103

AP-104

AP-105

AP-106

AP-107

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□

Most Recent Sample

B Braun

△

Concentration
 $\mu\text{g/L}$

ITCE Inventory

RAC

Extented tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
DOUBLE-SHELL WASTE TANKS			
Hg - Mercury Solid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CC72	JOB NO.	E01595
Date	4/95

ITCE Inventory

TRAC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
La - Lanthanum Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC73	E01595	4/95

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□

Most Recent Sample

B Braun

△

TCE Inventory

RAC

Extended tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
La - Lanthanum Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC74	E01595	4/95

ITCE Inventory

RAC

Extended tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY RICHLAND OPERATIONS OFFICE ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS Na - Sodium Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No. ES-VAL-CC75	JOB NO. E01595	Date 4/95

Extented tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
Na - Sodium Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	ES-VAL-CC76	JOB NO. E01595
Date	4/95	

Concentration
μg/L

2.3E+08
(Preliminary)
2.11E+08

1.00E+10

1.00E+09

1.00E+08

1.00E+07

1.00E+06

AN-101

AN-102

AN-103

AN-104

AN-105

AN-106

AN-107

AP-101

AP-102

AP-103

AP-104

AP-105

AP-106

AP-107

AN-101

AN-102

AN-103

AN-104

AN-105

AN-106

AN-107

AP-101

AP-102

AP-103

AP-104

AP-105

AP-106

AP-107

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

Most Recent Sample

B Braun

Δ

Concentration
μg/L

1.00E+10

1.00E+09

2.30E+08

1.00E+08

1.00E+07

1.00E+06

AN-101

AN-102

AN-103

AN-104

AN-105

AN-106

AN-107

AP-101

AP-102

AP-103

AP-104

AP-105

AP-106

AP-107

AN-101

AN-102

AN-103

AN-104

AN-105

AN-106

AN-107

AP-101

AP-102

AP-103

AP-104

AP-105

AP-106

AP-107

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

□

Most Recent Sample

B Braun

△

⊗

B

B

O

⊗

B

O

⊗

B

O

⊗

B

O

⊗

B

O

⊗

B

O

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

Most Recent Sample

B Braun

Δ

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

Most Recent Sample

B Braun

Δ

TCE Inventory

RAC

Extended tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
NH ₃ - Ammonia Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC81	E01595	4/95

Concentration
 $\mu\text{g/L}$

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
DOUBLE-SHELL WASTE TANKS			
NH3 - Ammonia Solid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CC82	JOB NO.	E01595
Date	4/95		

Concentration
μg/L

ASA Source Term
Activity Concentration

x Sampling Data

W WASTREN

□

Most Recent Sample

B Braun

△

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

□

Most Recent Sample

B Braun

△

TCE Inventory

RAC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY RICHLAND OPERATIONS OFFICE ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS Se - Selenium Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No. ES-VAL-CC86	JOB NO. E01595	Date 4/95

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

□

Most Recent Sample

B Braun

△

B-89

Concentration
 $\mu\text{g/L}$

1.00E+07

1.41E+06

1.00E+06

1.00E+05

1.00E+04

1.00E+03

AN-101

AN-102

AN-103

AN-104

AN-105

AN-106

AN-107

AP-101

AP-102

AP-103

AP-104

AP-105

AP-106

AP-107

AN-101

AN-102

AN-103

AN-104

AN-105

AN-106

AN-107

AP-101

AP-102

AP-103

AP-104

AP-105

AP-106

AP-107

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

Most Recent Sample

B Braun

Δ

TCE Inventory

RAC

Extended tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
DOUBLE-SHELL WASTE TANKS			
Sr - Strontium Solid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CC88	JOB NO.	E01595
Date	4/95		

Concentration
 $\mu\text{g/L}$

TCE Inventory

RAC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
DOUBLE-SHELL WASTE TANKS			
Te - Tellurium Liquid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CC89	JOB NO.	E01595
Date	4/95		

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

□

Most Recent Sample

B Braun

△

TCE Inventory
RAC

Extended tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
DOUBLE-SHELL WASTE TANKS			
Te - Tellurium Solid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CC90	JOB NO.	E01595
Date	4/95		

Concentration
 $\mu\text{g/L}$

1.00E+06

1.00E+05

3.9E+04
(Preliminary)
3.66E+04

1.00E+04

1.00E+03

1.00E+02

AN-101

AN-102

AN-103

AN-104

AN-105

AN-106

AN-107

AP-101

AP-102

AP-103

AP-104

AP-105

AP-106

AP-107

AN-101

AN-102

AN-103

AN-104

AN-105

AN-106

AN-107

AP-101

AP-102

AP-103

AP-104

AP-105

AP-106

AP-107

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

□

Most Recent Sample

B Braun

△

TCE Inventory
RAC

Extented tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
TI - Thallium Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC91	E01595	4/95

Concentration
 $\mu\text{g/L}$

W WASTREN

B Braun

Most Recent Sample

Δ

Source Inventory

RAC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
TI - Thallium Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC92	E01595	4/95

Concentration
μg/L

1.05E+07
1.00E+07

1.00E+06

8.3E+05
(Preliminary)

1.00E+05

1.00E+04

1.00E+03

AN-101

AN-102

AN-103

AN-104

AN-105

AN-106

AN-107

AP-101

AP-102

AP-103

AP-104

AP-105

AP-106

AP-107

AN-101

AN-102

AN-103

AN-104

AN-105

AN-106

AN-107

AP-101

AP-102

AP-103

AP-104

AP-105

AP-106

AP-107

ASA Source Term
Activity Concentration

x Sampling Data

w WASTREN

Most Recent Sample

B Braun

Δ

TCE Inventory

RAC

Extended tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
DOUBLE-SHELL WASTE TANKS			
U - Uranium Liquid			
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION			
Drawing No.	ES-VAL-CC93	JOB NO.	E01595
Date	4/95		

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

× Sampling Data

V WASTREN

□

Most Recent Sample

B Braun

△

TCE Inventory
RAC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
U - Uranium Solid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC94	E01595	4/95

TCE Inventory

RAC

Extended tank lines
represent Flamable
Gas Watch List Tanks.

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
DOUBLE-SHELL WASTE TANKS		
V - Vanadium Liquid		
PROJECT TANK WASTE SOURCE TERM INVENTORY VALIDATION		
Drawing No.	JOB NO.	Date
ES-VAL-CC95	E01595	4/95

Concentration
 $\mu\text{g/L}$

ASA Source Term
Activity Concentration

× Sampling Data

W WASTREN

Most Recent Sample

B Braun

△

TCE Inventory
RAC

Extended tank lines
represent Flammable
Gas Watch List Tanks.

Appendices C and D are in Volume II

APPENDIX E

Source Term Concentrations

Table 1: Accident Source Term Activity Concentrations for Accidents Involving Release of Solid or Liquid Tank Waste (Based on the Maximum Sample Activity Concentrations)

Nuclide	Activity Concentration, Bq/L								
	SST Liq	SST Sol	DST Liq ^a	DST Sol ^a	AWF Liq ^b	AWF Sol ^b	SST Flam. ^c	DST Flam. ^d	SST Liq A ^e
¹⁴ C	1.0E+05	1.2E+05	2.3E+05	1.6E+05	5.8E+04	1.0E+05	0.0E+00	7.4E+04	1.0E+05
⁶⁰ Co	1.2E+07	5.3E+08	9.6E+06	1.6E+07	4.6E+07	2.8E+08	3.5E+04	1.3E+06	9.0E+05
⁷⁹ Se	0.0E+00	1.7E+04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
⁹⁰ Sr	1.1E+10	1.7E+12	5.1E+09	2.5E+10	4.5E+09	3.0E+12	1.4E+10	5.3E+09	2.3E+09
⁹⁰ Y	1.1E+10	1.7E+12	5.1E+09	2.5E+10	4.5E+09	3.0E+12	1.4E+10	5.3E+09	2.3E+09
⁹⁹ Tc	1.7E+07	1.2E+10	1.1E+07	6.2E+07	1.2E+07	2.8E+08	5.4E+05	6.3E+06	1.7E+07
¹⁰⁶ Ru	3.3E+03	2.4E+05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.2E+03	0.0E+00	3.3E+03
¹²⁵ Sb	5.3E+04	2.8E+08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.3E+05	0.0E+00	5.3E+04
¹²⁹ I	1.0E+04	6.4E+06	2.0E+04	2.0E+04	4.4E+01	4.1E+06	0.0E+00	2.0E+04	1.0E+04
¹³⁴ Cs	2.1E+05	2.6E+06	1.1E+07	1.7E+07	2.4E+04	0.0E+00	4.9E+05	1.7E+07	1.3E+05
¹³⁷ Cs	2.3E+10	7.5E+10	6.1E+10	6.1E+10	1.3E+11	9.3E+10	2.0E+10	6.1E+10	2.3E+10
¹⁴⁴ Ce	4.3E+01	1.6E+03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.3E+01
¹⁴⁷ Pm	0.0E+00	0.0E+00	5.7E+07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
¹⁵⁴ Eu	2.7E+09	6.6E+09	4.8E+07	2.5E+08	1.6E+08	1.5E+10	3.3E+08	0.0E+00	5.1E+07
¹⁵⁵ Eu	7.5E+07	6.4E+06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
²³⁷ Np	0.0E+00	3.2E+07	2.3E+05	5.7E+05	7.3E+04	7.6E+06	0.0E+00	1.7E+03	0.0E+00
²³⁹ Pu	9.3E+04	1.9E+08	1.8E+06	7.2E+07	2.8E+03	4.3E+07	2.2E+06	7.1E+05	9.3E+04
²³⁹ Pu ^f	3.6E+07	4.4E+08	4.3E+06	1.6E+09	1.2E+06	4.4E+08	5.1E+06	1.7E+06	5.7E+06
²⁴¹ Pu	2.8E+08	3.5E+09	2.0E+07	4.1E+09	1.3E+05	1.6E+09	4.0E+07	1.3E+07	4.5E+07
²⁴¹ Am	3.7E+07	3.6E+08	3.4E+07	2.7E+09	5.9E+05	1.1E+10	3.3E+07	1.3E+07	8.0E+04
²⁴² Cm	0.0E+00	0.0E+00	1.70E+02	0.0E+00	0.0E+00	3.0E+03	0.0E+00	0.0E+00	0.0E+00
²⁴⁴ Cm	0.0E+00	0.0E+00	1.3E+05	1.1E+07	0.0E+00	6.5E+07	0.0E+00	1.3E+04	0.0E+00

Bold indicates radionuclides that ICF KH provided data for.

^a Double shell tank excluding the Aging Waste Facility (AWF Tanks).

^b Aging Waste Facility (AWF) Tanks (Tank Farms 241-AY and 241-AZ).

^c SST Flammable Gas Watchlist Combined Liquid and Solid.

^d DST Flammable Gas Watch list Combined Liquid and Solid.

^e SST Liquids excluding 6 non-interim stabilized tanks (C-106, C-107, T-104, U-105, U-107, U-109) and 1 interim stabilized tank (AX-102).

^f The ²³⁹Pu activity concentration also includes ²⁴⁰Pu.

Table 2: Tank Waste Material Toxic Chemical Concentrations

Composites Concentrations (g/L)					
Analyte	SST SOLID S	SST LIQUIDS	DST SOLIDS	DST LIQUIDS	204-AR LIQUIDS
Ammonia (NH ₃)	1.5	1.1	6.5	7.1	
Antimony (Sb)	1.5	.037	0.005	0.16	
Arsenic (As)	1.2	0.003	5.7	0.0087	0.0002
Barium (Ba)	40	0.053	2.9	0.017	0.01
Beryllium (Be)	.026	0.0003	0.14	0.0017	0.00004
Cadmium (Cd)	1.7	0.05	26	0.07	0.0065
Calcium (Ca)	95	1.1	26	1.3	
Cerium (Ce)	0.86	1.75	2.6	0.0122	
Chromium (Cr ⁺³)	69	16	68	0.0	0.067
Cobalt (Co)	0.54	0.00132	0.65	0.0088	
Cyanide (Cn)	16	5.3	0.47	0.12	
Dysprosium (Dy)	0.067	0.0	0.083	0.00089	
Lanthanum (La)	33	0.19	30	1.0	
Mercury (Hg)	20.1	0.084	0.11	0.00015	0.00006
Neodymium (Nd)	0.11	0.14	7.0	0.0056	
Oxalate (C ₂ O ₄)	275	0.0	275	0.0	
Selenium (Se)	3.5	0.080	0.24	0.011	
Sodium Hydroxide (NaOH)	230	180	230	202	
Sodium (Na)	470	250	280	210	
Tellurium (Te)	0.2	0.0	0.93	0.0033	
Thallium (Tl)	5.0	0.25	13	0.039	
Total Organic Compounds (TOC)	75	40	75	40	1.2
Uranium (U)	284	1.4	44	0.83	
Vanadium (V)	0.13	0.0041	0.015	0.0021	

Bold indicates analytes that ICF KH provided data for.

APPENDIX F

Complete Tank Waste Chemical Constituent List

Complete Tank Waste Chemical Constituent List

Released: November 17, 1994

Summary and assumptions -

- 1) Chemical constituents on this list may be found reported as an ion or (where applicable) the element.
- 2) Compounds found in the reports are also given.
- 3) This is a complete list of all available quantitative characterization data from Hanford Tank waste sample analyses found in the WHC Characterization library and TCD.
- 4) No radiological constituents or vapor sample results are included on this list.

All Found Tank Waste Chemical Constituents

1,1,1-Trichloroethane
 1,1,2,2-Tetrachloroethane
 1,1,2-Trichloro-1,2,2-trifluoroethane
 1,1,2-Trichloroethane
 1,1-Dichloroethane
 1,1-Dichloroethene
 1,2,3-Trimethylbenzene
 1,2,4-Trichlorobenzene
 1,2,4-Trimethylbenzene
 1,2-Dichlorobenzene
 1,2-Dichloroethane
 1,2-Dichloroethene
 1,2-Dichloroethylene
 1,2-Dichloropropane
 1,3,5-Trimethylbenzene
 1,3-Dichlorobenzene
 1,4-Dichlorobenzene
 1-Butanol
 1-Nitrocyclohexene
 2,2'-Oxybis (1 - chloropropane)
 2,2,6-Trimethyloctane
 2,2,8-Trimethyldecane
 2,2-Dimethyldecane
 2,2-Dimethylheptane
 2,3,7-Trimethyloctane
 2,4,5-Trichlorophenol
 2,4,6-Trichlorophenol
 2,4,6-Trimethyloctane
 2,4-Dichlorophenol
 2,4-Dimethylphenol
 2,4-Dinitrophenol
 2,4-Dinitrotoluene
 2,5,6-Trimethyldecane
 2,6,6-Trimethyloctane
 2,6-bis(1,1-Dimethyl)phenol
 2,6-bis(1,1-dimethylethyl)-4-methylphenol
 2,6-Dibromo-4-nitrophenol
 2,6-Dibromophenol

All Found Tank Waste Chemical Constituents

2,6-Dinitrotoluene
 2-Butanone
 2-Butoxyethanol
 2-Chloronaphthalene
 2-Chloronitrophenol-d3
 2-Chlorophenol
 2-Fluoro-4-nitrophenol
 2-Fluoronitrophenol
 2-Hexanone
 2-Methylnaphthalene
 2-Methylphenol
 2-Nitroaniline
 2-Nitrophenol
 2-Nitrophenol-d4
 3,3'-Dichlorobenzidine
 3,3-Dimethylhexane
 3-Ethyl-5-methylheptane
 3-Methylphenol
 3-Nitroaniline
 4,6-Dinitro-o-cresol
 4-Bromophenylphenyl ether
 4-Chloro-3-methylphenol
 4-Chloroaniline
 4-Chlorophenyl-phenylether
 4-Methyl-2-pentanone
 4-Methylphenol
 4-Nitroaniline
 4-Nitrophenol
 4-Nitrophenol-d4
 6-Ethyl-2-methyl-octane
 Acenaphthene
 Acenaphthylene
 Acetate
 Acetic Acid
 Acetone
 Al(OH)₃
 Al₂O₃
 AlO₂⁻
 AlOH⁺
 Aluminum (Al ⁺⁺⁺)
 Ammonia
 Ammonium (NH₄ ⁺)
 Anorthite
 Anthracene
 Antimony (Sb)
 Arsenic (As)
 Barium (Ba ⁺⁺)
 Benzene
 Benzo(a)anthracene

All Found Tank Waste Chemical Constituents

Benzo(a)pyrene
 Benzo(b)fluoranthene
 Benzo(ghi)perylene
 Benzo(k)fluoranthene
 Benzoic acid
 Benzyl alcohol
 Beryllium (Be^{++})
 bis(2-chloroethoxy) methane
 bis(2-chloroethyl) ether
 bis(2-chloroisopropyl) ether
 bis(2-ethylhexyl) phthalate
 bis(3-tertbutyl-4-hydroxy-6-methyl-phenyl) sulfide
 Bismuth (Bi^{+++})
 Boron (B^{+++})
 Bromide (Br^-)
 Bromodichloromethane
 Bromoform
 Bromomethane
 Butanedioic Acid
 Butylbenzylphthalate
 $\text{C}_6\text{H}_5\text{O}_7^-$
 $\text{Ca}(\text{OH})_2$
 Cadmium (Cd^{++})
 Calcium (Ca^{++})
 Carazole
 Carbon (C)
 Carbon disulfide
 Carbon tetrachloride
 Carbonate (CO_3^-)
 CaSO_4
 $\text{Ce}(\text{NO}_3)_2$
 Cerium (Ce^{+++})
 Cesium (Cs)
 Chloride (Cl^-)
 Chlorobenzene
 Chlorocyclohexene
 Chloroethane
 Chloroform
 Chloromethane
 Chromium (Cr^{+++})
 Chrysene
 cis-1,2-Dichloroethene
 cis-1,3-Dichloropropene
 cis-2-Bromocyclohexanol
 Citric Acid
 Cobalt (Co)
 Copper (Cu)
 Cr_2O_3

All Found Tank Waste Chemical Constituents

Cr_2O_7
 CrCl_2
 CrO
 CrO_2
 CrO_4^-
 CrPO_4
 $\text{Cs}(\text{NO}_3)_2$
 CuO
 Cyanide (CN^-)
 Cyclohexene
 Cyclopentasiloxane
 Cyclotetrasiloxane
 Cyclotrisiloxane
 Decahydro-naphthalene
 Decamethylcyclopentasiloxane
 Decane
 Di-n-butylphosphate (DBP)
 Di-n-butylphthalate
 Di-n-octylphthalate
 Dibenzo[a,h]anthracene
 Dibenzofuran
 Dibromochloromethane
 Dichlorocyclohexane
 Dichlorohexane
 Diethylphthalate
 Dimethyl phthalate
 Dioctyl adipate
 Diphenylamine
 Dodecamethylcyclohexasiloxane
 Dodecane
 Dodecane,4,6-dimethyl
 Dysprosium (Dy)
 Ethylbenzene
 Ethylenediaminetetraacetic Acid (EDTA)
 Ethylenediaminetriacetic Acid (ED3A)
 Europium
 $\text{Fe}(\text{CN})_6^{--}$
 Fe_2O_3
 $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$
 FeOH
 FeOOH
 Fluoranthene
 Fluorene
 Fluoride (F^-)
 Gadolinium (Gd)
 Glutaric Acid
 Glycolate
 Heptadecane
 Heptanedioic Acid

All Found Tank Waste Chemical Constituents

Hexachlorobenzene
 Hexachlorobutadiene
 Hexachlorocyclopentadiene
 Hexachloroethane
 Hexadecane
 Hexadecanoic acid (9CI)
 Hexadecanoic acid ester
 Hexamethyldisiloxane
 Hexanedioic Acid
 Hexanoic Acid
 Hexavalent Chromium (Cr ⁺⁺⁺⁺⁺)
 Hexone
 Hydrogen (H)
 Hydroxide (OH ⁻)
 Iminodiacetic Acid (IDA)
 Indeno(1,2,3-cd)pyrene
 Iodine (I)
 Iron (Fe)
 Isophorone
 Isopropylbenzene
 K₂CO₃
 K₃UF₇
 KHCO₃
 KNO₃
 KOH
 Lanthanum (La ⁺⁺⁺)
 Lead (Pb ⁺⁺)
 Lithium (Li ⁺)
 Magnesium (Mg ⁺⁺)
 Manganese (Mn ⁺⁺⁺⁺)
 Mercury (Hg)
 Methoxytrimethylsilane
 Methylenechloride
 MgCl₂
 MgO
 MnO₂
 Molybdenum (Mo)
 N,N-bis(2-hydroxyethyl)dodecanamide
 N-(2-hydroxyethyl) ethylenediaminetriacetic Acid (HEDTA)
 N-(2-hydroxyethyl) iminodiacetic Acid (HEIDA)
 N-(methyl) ethylenediamine-N,N'-diacetic Acid (MeEDD'A)
 N-(methylamine) iminodiacetic Acid (MAIDA)
 N-(methyliminocarboxy) ethylene diamine-N-acetic Acid (Miceda)
 n-(trifluoroacetyl)-n,0,0',0
 N-[2-(methylidene)ethyl] iminocarboxyacetic Acid (MEICA)
 N-nitroso-di-n-dipropylamine
 N-nitrosodiphenylamine
 n-paraffin hydrocarbons (NPH)

All Found Tank Waste Chemical Constituents

$\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$
 $\text{Na}_2\text{C}_2\text{O}_4$
 $\text{Na}_2\text{CO}_3(\text{H}_2\text{O})$
 Na_2CrO_3
 Na_2SiO_3
 Na_2SO_4
 $\text{Na}_3\text{PO}_4(12\text{H}_2\text{O})$
 $\text{Na}_4\text{Fe}(\text{CN})_6$
 NaAlO_2
 NaCl
 NaF
 NaNO_2
 NaNO_3
 NaNO_4
 NaOH
 NaOOCCH_3
Naphthalene
Neodymium (Nd)
Neptunium (Np)
Nickel (Ni^{++})
 NiSO_4
Nitrate (NO_3^-)
Nitrilotriacetic Acid (NTA)
Nitrite (NO_2^-)
Nitrobenzene
Nitrosoiminodiacetic Acid
NO CO
Nonane
Nonanedioic Acid
Octanedioic Acid
Oxalate
Oxalic Acid
Palladium (Pd)
Pentachlorophenol
Pentacosane
Pentadecane
Phenanthrene
Phenol
Phosphate (PO_4^-)
Phosphine Oxide
Phosphite (PO_3^-)
Phosphonic acid, dioctadecyl ester (8Cl,9Cl)
Phosphorus (P)
Platinum (Pt)
Plutonium (Pu)
Potassium (K^+)
Pyrene
Pyridine

All Found Tank Waste Chemical Constituents

Rare Earths

Rhenium (Re)

Rhodium (Rh)

Ruthenium (Ru)

Samarium (Sm)

Selenium (Se)

 SeO_4

Silicon (Si)

Silver (Ag^+) SiO_2^- SiO^3 SiO_4 SO_2^- Sodium (Na^+) $\text{Sr}(\text{NO}_3)_2$ SrF_2 Strontium (Sr^{++})

Styrene

Sulfate (SO_4^-)

Sulfur

TAD (Total Acid Demand)

Tantalum (Ta)

Tellurium (Te)

Tetrachloroethene

Tetradecane

Tetrahydrofuran

Thallium (Tl)

Thorium (Th)

TIC (Total Inorganic Carbon)

Tin (Sn)

Titanium (Ti)

TOC (Total Organic Carbon)

Toluene

TC (Total Carbon)

trans-1,3-Dichloropropene

Tri-n-butylphosphate (TBP)

Trichloroethene

Tridecane

Trimethylsilanol

Tungsten (W)

Undecane

Undecanedioic Acid

 UP_2O_7

Uranium (U)

Urea, 1,3-diethyl-

Vanadium (V)

Vinyl acetate

Vinyl chloride

Water (H_2O)

All Found Tank Waste Chemical Constituents

WO₄

Xylenes (total)

Yttrium (Y)

Zinc (Zn)

Zirconium (Zr)

Zr(OH)₄

ZrO

APPENDIX G

Tank Waste Characterization Sample Analysis Lithium (Li) Information Table

Tank Waste Source Term Inventory Validation Chemical Analyte
Lithium Single and Double Shell Tank Liquid and Solid
Tank Waste Characterization Sample Analysis Information Table
Released: December 9, 1994

WHC-SD-WM-ER-400, Rev. 0

Tank	Reported Chemical	Date	Sample #	Density	Reported		Code	Sample State	Source	µg/L
					Value	Unit				
Single-Shell Tank Lithium Solid and Liquid										
U110	Li	12/15/89	89-070/1/2		180	ugm/gm	I	Sludge/Composite	Braun	2.88E+05
U110	Li	11/30/89	89-075		112	ugm/gm	G	Sludge	Braun	1.79E+05
U110	Li	12/4/89	89-082/3/4		93	ugm/gm	I	Sludge/Composite	Braun	1.49E+05
U110	Li	11/29/89	89-070		85	ugm/gm	G	Sludge	Braun	1.36E+05
U110	Li	11/29/89	89-072		39	ugm/gm	G	Sludge	Braun	6.24E+04
U110	Li	11/15/89	89-046		38	ugm/gm	G	Sludge	Braun	6.08E+04
BY102	Li	6/3/91	R-8091	1.41	4.00E+01	ppm	P	supernatant	Raw	5.64E+04
BY109	Li	6/3/91	R-8094	1.4	40	ppm	P	Supernate	Braun	5.60E+04
BY109	Li	6/3/91	R-8094	1.4	4.00E+01	ppm	P	supernatant	Raw	5.60E+04
BY105	Li	6/3/91	R-8092	1.4	3.90E+01	ppm	P	supernatant	Raw	5.46E+04
BY106	Li	6/3/91	R-8093	1.47	36	ppm	P	Supernate	Braun	5.29E+04
BY106	Li	6/3/91	R-8093	1.47	3.60E+01	ppm	P	supernatant	Raw	5.29E+04
BY109	Li	11/20/90	R8084	1.3	4.00E+01	ppm	P	supernatant	Raw	5.20E+04
BY106	Li	11/20/90			4.00E+01	ppm	P	supernatant	Raw	4.40E+04
BY105	Li	11/20/90			3.90E+01	PPM	P	supernatant	Raw	4.29E+04
C109	Li	9/1/92	B08T69		2.20E+01	ug/g	S	DUPLICATE RESULT	TCD	3.52E+04
C109	Li	9/1/92	B08T63		1.80E+01	ug/g	S	PRIMARY RESULT	TCD	2.88E+04
C112	Li	3/1/92	B08DN8	1.6	1.80E+01	ug/g	S	DUPLICATE RESULT	TCD	2.88E+04
BY109	Li	6/3/91			2.86E-02	g/L	P	Supernate	Wastren	2.86E+04
T107	Li	3/1/93	B08VD8	1.42	1.97E+01	ug/g	S	PRIMARY RESULT	TCD	2.80E+04
T107	Li	3/1/93	B08VD8	1.42	1.96E+01	ug/g	S	DUPLICATE RESULT	TCD	2.78E+04
T107	Li	3/1/93	B08VB9	1.19	1.98E+01	ug/g	S	DUPLICATE RESULT	TCD	2.36E+04
T107	Li	3/1/93	B08VB9	1.19	1.97E+01	ug/g	S	PRIMARY RESULT	TCD	2.34E+04
T107	Li	3/1/93	B08VB9	1.19	1.97E+01	ug/g	S	PRIMARY RESULT	TCD	2.34E+04
C112	Li	3/1/92	B08DY1	2	1.09E+01	ug/g	S	PRIMARY RESULT	TCD	2.18E+04
C112	Li	3/1/92	B08DY1	2	1.07E+01	ug/g	S	DUPLICATE RESULT	TCD	2.14E+04
U110	Li	11/10/89	89-043		13	ugm/gm	G	Sludge	Braun	2.08E+04
U110	Li	12/4/89	89-084		13	ugm/gm	G	Sludge	Braun	2.08E+04
C112	Li	3/1/92	B08DY1	2	9.60E+00	ug/g	S	DUPLICATE RESULT	TCD	1.92E+04
C112	Li	3/1/92	B08DY1	2	9.60E+00	ug/g	S	PRIMARY RESULT	TCD	1.92E+04
C112	Li	3/1/92	B08DY1	2	8.90E+00	ug/g	S	PRIMARY RESULT	TCD	1.78E+04
C112	Li	3/1/92	B08DY1	2	8.50E+00	ug/g	S	PRIMARY RESULT	TCD	1.70E+04
C112	Li	3/1/92	B08DY1	2	8.40E+00	ug/g	S	PRIMARY RESULT	TCD	1.68E+04
C112	Li	3/1/92	B08DY1	2	8.20E+00	ug/g	S	DUPLICATE RESULT	TCD	1.64E+04
C112	Li	3/1/92	B08DY1	2	8.20E+00	ug/g	S	DUPLICATE RESULT	TCD	1.64E+04
C112	Li	3/1/92	B08DY1	2	8.20E+00	ug/g	S	DUPLICATE RESULT	TCD	1.64E+04
C112	Li	3/1/92	B08DY1	2	7.50E+00	ug/g	S	PRIMARY RESULT	TCD	1.50E+04
T107	Li	3/1/93	B08V43	1.15	1.30E+01	ug/g	S	PRIMARY RESULT	TCD	1.50E+04
C109	Li	9/1/92	B08T69		9.00E+00	ug/g	S	DUPLICATE RESULT	TCD	1.44E+04
C109	Li	9/1/92	B08T69		9.00E+00	ug/g	S	PRIMARY RESULT	TCD	1.44E+04
C109	Li	9/1/92	B08T16	1.3	1.10E+01	ug/g	S	DUPLICATE RESULT	TCD	1.43E+04
AX102	Li	11/14/88			1.39E-02	g/L	P	Supernate	Wastren	1.39E+04
AX102	Li	11/14/88	RAT-AX102-3		0.002	moles/l	P	Supernate	Braun	1.39E+04
T107	Li	3/1/93	B08V39	1.57	8.79E+00	ug/g	S	PRIMARY RESULT	TCD	1.38E+04
C112	Li	3/1/92	B08DY1	2	6.90E+00	ug/g	S	DUPLICATE RESULT	TCD	1.38E+04
T107	Li	3/1/93	B08V39	1.57	8.75E+00	ug/g	S	DUPLICATE RESULT	TCD	1.37E+04
C112	Li	3/1/92	B08DW5		7.80E+00	ug/g	S	PRIMARY RESULT	TCD	1.25E+04
C112	Li	3/1/92	B08DW5		7.60E+00	ug/g	S	DUPLICATE RESULT	TCD	1.22E+04
T107	Li	3/1/93	B08VD2		7.59E+00	ug/g	S	PRIMARY RESULT	TCD	1.21E+04
C109	Li	9/1/92	B08T17	1.2	1.00E+01	ug/g	S	PRIMARY RESULT	TCD	1.20E+04
C112	Li	3/1/92	B08DW5		7.50E+00	ug/g	S	DUPLICATE RESULT	TCD	1.20E+04
T107	Li	3/1/93	B08VF0	1.38	8.64E+00	ug/g	S	DUPLICATE RESULT	TCD	1.19E+04
T107	Li	3/1/93	B08V43	1.15	9.79E+00	ug/g	S	PRIMARY RESULT	TCD	1.13E+04
T107	Li	3/1/93	B08VF0	1.38	7.88E+00	ug/g	S	PRIMARY RESULT	TCD	1.09E+04
C109	Li	9/1/92	B08T17	1.2	9.00E+00	ug/g	S	DUPLICATE RESULT	TCD	1.08E+04

Tank Waste Source Term Inventory Validation Chemical Analyte
Lithium Single and Double Shell Tank Liquid and Solid
Tank Waste Characterization Sample Analysis Information Table
Released: December 9, 1994

WHC-SD-WM-ER-400, Rev. 0

Tank	Reported Chemical	Date	Sample #	Density	Reported Value	Unit	Code	Sample State	Source	µg/L
C109	Li	9/1/92	B08T17	1.2	9.00E+00	ug/g	S	PRIMARY RESULT	TCD	1.08E+04
T105	Li	5/28/93	B08WT4	2.01	5.32E+00	ug/g	S	DUPLICATE RESULT	TCD	1.07E+04
T107	Li	3/1/93	B08V43	1.15	9.10E+00	ug/g	S	DUPLICATE RESULT	TCD	1.05E+04
C109	Li	9/1/92	B08T16	1.3	8.00E+00	ug/g	S	PRIMARY RESULT	TCD	1.04E+04
T107	Li	3/1/93	B08VD2		6.32E+00	ug/g	S	DUPLICATE RESULT	TCD	1.01E+04
T107	Li	3/1/93	B08V43	1.15	8.64E+00	ug/g	S	PRIMARY RESULT	TCD	9.94E+03
T107	Li	3/1/93	B08V44	1.1	8.95E+00	ug/g	S	PRIMARY RESULT	TCD	9.85E+03
C112	Li	3/1/92	B08DN8	1.6	6.10E+00	ug/g	S	DUPLICATE RESULT	TCD	9.76E+03
C109	Li	9/1/92	B08T17	1.2	8.00E+00	ug/g	S	DUPLICATE RESULT	TCD	9.60E+03
C112	Li	3/1/92	B08DN8	1.6	5.90E+00	ug/g	S	PRIMARY RESULT	TCD	9.44E+03
T107	Li	3/1/93	B08V43	1.15	8.19E+00	ug/g	S	PRIMARY RESULT	TCD	9.42E+03
T107	Li	3/1/93	B08V44	1.1	8.50E+00	ug/g	S	DUPLICATE RESULT	TCD	9.35E+03
T107	Li	3/1/93	B08T22	1.25	7.47E+00	ug/g	S	PRIMARY RESULT	TCD	9.34E+03
C112	Li	3/1/92	B08DN8	1.6	5.80E+00	ug/g	S	DUPLICATE RESULT	TCD	9.28E+03
C112	Li	3/1/92	B08DN8	1.6	5.80E+00	ug/g	S	PRIMARY RESULT	TCD	9.28E+03
C109	Li	9/1/92	B08T16	1.3	7.00E+00	ug/g	S	PRIMARY RESULT	TCD	9.10E+03
T107	Li	3/1/93	B08V43	1.15	7.90E+00	ug/g	S	DUPLICATE RESULT	TCD	9.09E+03
T107	Li	3/1/93	B08V43	1.15	7.74E+00	ug/g	S	PRIMARY RESULT	TCD	8.90E+03
T107	Li	3/1/93	B08T22	1.25	7.09E+00	ug/g	S	PRIMARY RESULT	TCD	8.86E+03
T107	Li	3/1/93	B08V43	1.15	7.39E+00	ug/g	S	DUPLICATE RESULT	TCD	8.50E+03
C112	Li	3/1/92	B08DT4		5.30E+00	ug/g	S	DUPLICATE RESULT	TCD	8.48E+03
T105	Li	5/28/93	B08WT4	2.01	4.18E+00	ug/g	S	DUPLICATE RESULT	TCD	8.40E+03
T107	Li	3/1/93	B08V43	1.15	7.28E+00	ug/g	S	PRIMARY RESULT	TCD	8.37E+03
T105	Li	5/28/93	B08WT4	2.01	4.11E+00	ug/g	S	DUPLICATE RESULT	TCD	8.26E+03
T105	Li	5/28/93	B08WT4	2.01	4.10E+00	ug/g	S	PRIMARY RESULT	TCD	8.24E+03
T107	Li	3/1/93	B08VD2		5.07E+00	ug/g	S	DUPLICATE RESULT	TCD	8.11E+03
T107	Li	3/1/93	B08V43	1.15	7.03E+00	ug/g	S	DUPLICATE RESULT	TCD	8.08E+03
T107	Li	3/1/93	B08T22	1.25	6.46E+00	ug/g	S	DUPLICATE RESULT	TCD	8.08E+03
T107	Li	3/1/93	B08VD9	1.3	6.21E+00	ug/g	S	PRIMARY RESULT	TCD	8.07E+03
T105	Li	5/28/93	B08WT4	2.01	3.99E+00	ug/g	S	DUPLICATE RESULT	TCD	8.02E+03
T105	Li	5/28/93	B08WT4	2.01	3.99E+00	ug/g	S	PRIMARY RESULT	TCD	8.02E+03
T105	Li	5/28/93	B08WT4	2.01	3.96E+00	ug/g	S	PRIMARY RESULT	TCD	7.96E+03
T105	Li	5/28/93	B08WT4	2.01	3.94E+00	ug/g	S	PRIMARY RESULT	TCD	7.92E+03
T107	Li	3/1/93	B08V43	1.15	6.86E+00	ug/g	S	DUPLICATE RESULT	TCD	7.89E+03
C112	Li	3/1/92	B08DM7	1.6	4.90E+00	ug/g	S	PRIMARY RESULT	TCD	7.84E+03
C109	Li	9/1/92	B08T16	1.3	6.00E+00	ug/g	S	DUPLICATE RESULT	TCD	7.80E+03
T107	Li	3/1/93	B08VD2		4.87E+00	ug/g	S	PRIMARY RESULT	TCD	7.79E+03
T107	Li	3/1/93	B08VF0	1.38	5.55E+00	ug/g	S	PRIMARY RESULT	TCD	7.66E+03
T107	Li	3/1/93	B08VD9	1.3	5.80E+00	ug/g	S	DUPLICATE RESULT	TCD	7.54E+03
T107	Li	3/1/93	B08T22	1.25	5.65E+00	ug/g	S	PRIMARY RESULT	TCD	7.06E+03
T105	Li	5/28/93	B08WT4	2.01	3.51E+00	ug/g	S	DUPLICATE RESULT	TCD	7.06E+03
C112	Li	3/1/92	B08DM7	1.6	4.40E+00	ug/g	S	DUPLICATE RESULT	TCD	7.04E+03
T107	Li	3/1/93	B08T22	1.25	5.59E+00	ug/g	S	PRIMARY RESULT	TCD	6.99E+03
T107	Li	3/1/93	B08T22	1.25	5.53E+00	ug/g	S	DUPLICATE RESULT	TCD	6.91E+03
C112	Li	3/1/92	B08DM7	1.6	4.30E+00	ug/g	S	PRIMARY RESULT	TCD	6.88E+03
C112	Li	3/1/92	B08DT4		4.30E+00	ug/g	S	PRIMARY RESULT	TCD	6.88E+03
C112	Li	3/1/92	B08DM7	1.6	4.10E+00	ug/g	S	DUPLICATE RESULT	TCD	6.56E+03
C109	Li	9/1/92	B08T16	1.3	5.00E+00	ug/g	S	DUPLICATE RESULT	TCD	6.50E+03
C109	Li	9/1/92	B08T16	1.3	5.00E+00	ug/g	S	PRIMARY RESULT	TCD	6.50E+03
C109	Li	9/1/92	B08T63		4.00E+00	ug/g	S	DUPLICATE RESULT	TCD	6.40E+03
C109	Li	9/1/92	B08T63		4.00E+00	ug/g	S	PRIMARY RESULT	TCD	6.40E+03
T107	Li	3/1/93	B08T22	1.25	5.09E+00	ug/g	S	DUPLICATE RESULT	TCD	6.36E+03
T107	Li	3/1/93	B08VF0	1.38	4.57E+00	ug/g	S	DUPLICATE RESULT	TCD	6.31E+03
C112	Li	3/1/92	B08DM7	1.6	3.90E+00	ug/g	S	DUPLICATE RESULT	TCD	6.24E+03
C109	Li	9/1/92	B08T17	1.2	5.00E+00	ug/g	S	DUPLICATE RESULT	TCD	6.00E+03
T107	Li	3/1/93	B08VB9	1.19	4.98E+00	ug/g	S	DUPLICATE RESULT	TCD	5.93E+03
C112	Li	3/1/92	B08DM7	1.6	3.70E+00	ug/g	S	DUPLICATE RESULT	TCD	5.92E+03

Tank Waste Source Term Inventory Validation Chemical Analyte
Lithium Single and Double Shell Tank Liquid and Solid
Tank Waste Characterization Sample Analysis Information Table
Released: December 9, 1994

WHC-SD-WM-ER-400, Rev. 0

Tank	Reported Chemical	Date	Sample #	Density	Reported Value Unit		Code	Sample State	Source	µg/L
C112	Li	3/1/92	B08DM7	1.6	3.70E+00	ug/g	S	PRIMARY RESULT	TCD	5.92E+03
T105	Li	10/26/93	RAT-T105-2B	2.01	2.94	ugm/gm	I	Sludge/Composite	Braun	5.91E+03
C112	Li	3/1/92	B08DN6	1.3	4.30E+00	ug/g	S	PRIMARY RESULT	TCD	5.59E+03
T107	Li	3/1/93	B08T22	1.25	4.45E+00	ug/g	S	DUPLICATE RESULT	TCD	5.56E+03
T107	Li	3/1/93	B08T22	1.25	4.40E+00	ug/g	S	PRIMARY RESULT	TCD	5.50E+03
C112	Li	3/1/92	B08DM7	1.6	3.40E+00	ug/g	S	PRIMARY RESULT	TCD	5.44E+03
T107	Li	3/1/93	B08T22	1.25	4.34E+00	ug/g	S	DUPLICATE RESULT	TCD	5.43E+03
T105	Li	5/28/93	B08WT2		4.87E+00	ug/g	L	PRIMARY RESULT	TCD	5.36E+03
T107	Li	3/1/93	B08VR2	1.73	2.97E+00	ug/g	S	PRIMARY RESULT	TCD	5.14E+03
T107	Li	3/1/93	B08VR2	1.73	2.96E+00	ug/g	S	DUPLICATE RESULT	TCD	5.12E+03
C112	Li	3/1/92	B08DN6	1.3	3.80E+00	ug/g	S	DUPLICATE RESULT	TCD	4.94E+03
C112	Li	3/1/92	B08DN6	1.3	3.80E+00	ug/g	S	DUPLICATE RESULT	TCD	4.94E+03
T107	Li	3/1/93	B08VB9	1.19	4.05E+00	ug/g	S	DUPLICATE RESULT	TCD	4.82E+03
C109	Li	9/1/92	B08T17	1.2	4.00E+00	ug/g	S	DUPLICATE RESULT	TCD	4.80E+03
C109	Li	9/1/92	B08T17	1.2	4.00E+00	ug/g	S	PRIMARY RESULT	TCD	4.80E+03
T105	Li	5/28/93	B08WT4	2.01	2.37E+00	ug/g	S	PRIMARY RESULT	TCD	4.76E+03
T107	Li	3/1/93	B08VB9	1.19	3.97E+00	ug/g	S	PRIMARY RESULT	TCD	4.72E+03
C112	Li	3/1/92	B08DN6	1.3	3.60E+00	ug/g	S	PRIMARY RESULT	TCD	4.68E+03
T107	Li	3/1/93	B08T23	0.95	4.69E+00	ug/g	S	DUPLICATE RESULT	TCD	4.46E+03
T105	Li	5/28/93	B08WT2		3.87E+00	ug/g	L	DUPLICATE RESULT	TCD	4.26E+03
T105	Li	5/28/93	B08WT2	0.89	4.32E+00	mg/kg	S	DUPLICATE RESULT	TCD	3.84E+03
T107	Li	3/1/93	B08VB9	1.19	3.14E+00	ug/g	S	PRIMARY RESULT	TCD	3.74E+03
T105	Li	5/28/93	B08WT2	0.89	4.16E+00	mg/kg	S	PRIMARY RESULT	TCD	3.70E+03
C109	Li	9/1/92	B08T17	1.2	3.00E+00	ug/g	S	PRIMARY RESULT	TCD	3.60E+03
T107	Li	3/1/93	B08V44	1.1	2.90E+00	ug/g	S	PRIMARY RESULT	TCD	3.19E+03
T107	Li	3/1/93	B08V44	1.1	2.89E+00	ug/g	S	DUPLICATE RESULT	TCD	3.18E+03
T107	Li	3/1/93	B08T23	0.95	3.31E+00	ug/g	S	PRIMARY RESULT	TCD	3.14E+03
T107	Li	3/1/93	B08VF0	1.38	1.58E+00	ug/g	S	PRIMARY RESULT	TCD	2.18E+03
T107	Li	3/1/93	B08VF0	1.38	1.57E+00	ug/g	S	DUPLICATE RESULT	TCD	2.17E+03
T107	Li	3/1/93	B08VF0	1.38	1.50E+00	ug/g	S	DUPLICATE RESULT	TCD	2.07E+03
T107	Li	3/1/93	B08VF0	1.38	1.48E+00	ug/g	S	DUPLICATE RESULT	TCD	2.04E+03
T107	Li	3/1/93	B08VF0	1.38	1.39E+00	ug/g	S	PRIMARY RESULT	TCD	1.92E+03
T107	Li	3/1/93	B08VF0	1.38	1.34E+00	ug/g	S	PRIMARY RESULT	TCD	1.85E+03
T107	Li	3/1/93	B08VF0	1.38	1.33E+00	ug/g	S	DUPLICATE RESULT	TCD	1.84E+03
T107	Li	3/1/93	B08VF0	1.38	1.22E+00	ug/g	S	PRIMARY RESULT	TCD	1.68E+03
T107	Li	3/1/93	B08VD2		9.04E-01	ug/g	S	PRIMARY RESULT	TCD	1.45E+03
T107	Li	3/1/93	B08VD2		7.93E-01	ug/g	S	DUPLICATE RESULT	TCD	1.27E+03
T105	Li	5/28/93	B08WT2	0.89	4.11E-01	ug/g	S	PRIMARY RESULT	TCD	3.66E+02
T105	Li	5/28/93	B08WT2	0.89	4.10E-01	ug/g	S	DUPLICATE RESULT	TCD	3.65E+02
Double-Shell Tank Lithium Solid and Liquid										
AW103	Li	1/23/90			0.165	g/L	G	Sludge	Wastren	1.65E+05
AW103	Li	1/23/90	RAT-AW103-1	1.75	0.000094	gm/gm	S	Solids	Braun	1.65E+05
AZ101	Li	9/1/89	RAT-AZ101-4A	1.2	0.0001	mmol/gm	P	Supernate	Braun	8.33E+02
AZ102	Li	Aug 89			9.01E-05	g/L	P	Supernatant	Wastren	9.01E+01
AZ102	Li	9/1/89			1.10E-02	umol/g	P	Supernate	Raw	8.40E+01
AY102	Li	9/30/80		1	8.00E-06	M	P	Supernate	Raw	5.55E+01
SY102	Li	6/30/89		1.52	1.00E-06	mmol/g	L	yellow liquid	Raw	1.06E+01
SY102	Li	10/1/88			9.02E-06	g/L	P	Supernatant	Wastren	9.02E+00
SY102	Li	10/1/88	102-SY-1-2		0.000001	mmol/gm	P	Supernate	Braun	7.64E+00

Note: 1) Assumed density of 1.6 g/ml used for solid, and 1.1 g/ml for liquid to complete µg/L conversion if none given.
2) Information regarding column contents and codes is contained on the summary page included in Appendices C and D.

APPENDIX H

Samples References

Tank Waste Source Term Inventory Validation
Sample Information References by Waste Tank

Tank 241-A-101

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Tank Waste Source Term Inventory Validation
Sample Information References by Waste Tank

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A Waste Sample Characteristics," Document No. 65453-80-337, November 17,
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"Radiation Peak in Dry Well 10-01-04 Exceeding the Increase Criterion," March
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Tank Waste Source Term Inventory Validation
Sample Information References by Waste Tank

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Tank Waste Source Term Inventory Validation
Sample Information References by Waste Tank

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Tank Waste Source Term Inventory Validation
Sample Information References by Waste Tank

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Tank 241-TY-104

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Tank Waste Source Term Inventory Validation
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Tank 241-TY-105

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Tank 241-U-101

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Tank Waste Source Term Inventory Validation
Sample Information References by Waste Tank

Tank 241-U-102

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Sample Information References by Waste Tank

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Tank 241-U-106

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Tank Waste Source Term Inventory Validation
Sample Information References by Waste Tank

Tank 241-U-107

Internal Memorandum, Atlantic Richfield Hanford Company, R.E. Wheeler to R.L. Walser, "Analysis of Tank Farm Samples, Sample: T-8938 107-U," December 20, 1974.

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Tank 241-U-108

Internal Memorandum, Atlantic Richfield Hanford Company, D. A. Puryear To J. O. Skolrud, "Characterization of S, U, and SX Waste Tanks," September 21, 1971.

Internal Memorandum, Atlantic Richfield Hanford company, W. H. Sant to R.L. Walser, "242-S Feed Samples Number T-151 Sample Point 108-U," January 21, 1974.

Internal Memorandum, Atlantic Richfield Hanford Company, J.E. Horton to W.R. Christensen, "Analysis of Sludge Sample from Tank 108-U," September 29, 1975.

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Tank 241-U-110

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Tank 242-U-202

Internal Memorandum, Atlantic Richfield Hanford Company, R.E. Wheeler to R.L. Walser, "Analysis of tank farm samples Sample: T-8245, tank 202-U, September 25, 1975.

Tank 242-U-203

Internal Memorandum, Atlantic Richfield Hanford Company, R.E. Wheeler to R.L. Walser, "Analysis Of Tank Farm samples Sample: T-8246 Tank: 203-U Received: September 25, 1975.

Tank Waste Source Term Inventory Validation
Sample Information References by Waste Tank

Tank 242-U-204

Internal Memorandum, Atlantic Richfield Hanford company, R.E. Wheeler to R.L. Walser, "Analysis of Tank Farm Samples Sample: T-8247 Tank 204-U", September 25, 1975.

APPENDIX I

Tank 241-C-106 Sample Information

SUMMARY/DESCRIPTION OF TABLE FIELDS AND CODES

The sample data tables that follow contain all the information used to make the plots, either radionuclide or chemical analyte as indicated in the title. This information is specifically useful in that it includes, in addition to the information on the plots found in the previous appendices, all the data points that are above or below the plot limits. Information included in the tables is as follows:

Tank Waste Characterization Sample Information

- **Tank** - the tank the sample was taken from
- **Reported Chemical/Radionuclide** - the chemical/radionuclide as it was reported
- **Date** - date sampled (if available), otherwise analyzed date or memo/letter/report date
- **Sample #** - any sample number available to identify the sample from others
- **Density** - any bulk density or specific gravity associated with the particular reported chemical or radionuclide
- **Reported Value** - value associated with the constituent analyzed
- **Reported Unit** - unit associated with the constituent analyzed and the value obtained
- **Code** - A letter code indicating the general sample state/phase, defined below
- **Sample.State** - a reiteration of the code, or additional sample characteristics
- **Source** - indication of the source of the data (ie. Braun, WASTREN, Raw, etc.)

Analyte/Radionuclide Information

- **Analyte/Radionuclide** - the analyte/radionuclide desired by the WHC ASA Source Term Inventory Validation. This information may be different than the reported chemical/radionuclide since analytes were pulled out of chemical compounds, or extrapolated as in the case with OH used for NaOH.

- $\mu\text{g/L}$ (chemical table) - the reported value converted to micrograms/liter
- Bq/L (radionuclide table) - the reported value converted to Becquerel/liter
- Bq/L Decayed (radionuclide table) - the Bq/L value decayed from the date (described above) to 12/31/94.

Other row indicators and codes are defined here. Row indicators for the ASA Source Term Activity concentration and preliminary ASA Source Term Activity Concentration will divide the data into those data points above, and those below the chosen maximum concentrations. There is also a row indicator for the minimum plot limit. In addition, all the data was given a code to delineate sample type. These codes are as follows:

A	Salts	P	Supernatant
D	Suspended Solids	R	Slurry
F	Filtrate	S	Solid (including: KOH fusion, acid wash, filtered or centrifuged solids, washed or fusion solids, slurry/solids, supernatant/solids)
G	Sludge	T	Crust
I	Composite, sludge/composite	U	Unknown
K	Saltcake	Y	Slurry/Sludge
L	Liquid/Liquor, centrifuged decant, centrate		
O	Other (must be accompanied with % solids)		

SCATTER PLOT SYMBOLS AND CONCENTRATION INFORMATION

The symbols used on the scatter plots for the respective sample data sources are defined below:

- - most recent (highest value if many on that date) raw data per tank for that constituent
- x - all other raw data; all other data from the WHC Characterization library, TCD, 241-B-110 and 241-U-110 core information
- - HTCE Inventory data, only available for a select number of Single-Shell Tank solid radionuclides and chemical analytes
- Δ - TRAC data, only those points that are above the ASA Source Term Activity Concentration
- B - Tank Sample Analysis Datafile (TSAD) (Braun Data)
- W - WASTREN data

The unit of concentration for the chemical plots is microgram/liter ($\mu\text{g/L}$). Two different units of concentration are shown on the radionuclide plots, Becquerel/liter (Bq/L) and microcurie/liter ($\mu\text{Ci/L}$). Note that the two axes do not show independent logarithmic scales, but a straight conversion from Bq/L to $\mu\text{Ci/L}$. The conversion from Bq/L to $\mu\text{Ci/L}$ is given below, and is also given in the legend section of the plot.

$$\mu\text{Ci/L} = \frac{\text{Bq/L}}{3.7\text{E} +4}$$

A list of the 11 Radionuclide and 24 Chemical Analyte Scatter Plots (in order of appearance) is given below.

Radionuclide and Chemical Analyte Scatter Plots			
Radionuclides		Chemical Analytes	
Am-241	Americium-241	As - Arsenic	Na - Sodium
Co-60	Cobalt-60	Ba - Barium	NaOH - Sodium Hydroxide
Cs-137	Cesium-137	Be - Beryllium	Nd - Neodymium
Cm-244	Curium-244	Ca - Calcium	NH ₃ - Ammonia
Eu-154	Europium-154	Cd - Cadmium	Sb - Antimony
Np-237	Neptunium-237	Ce - Cerium	Se - Selenium
Pu-238	Plutonium-238	CN - Cyanide	Sr - Strontium
Pu-239/240	Plutonium-239/240	Co - Cobalt	Te - Tellurium
Pu-241	Plutonium-241	Cr ⁺³ - Chromium ⁺³	Tl - Thallium
Sr-89/90	Strontium-89/90	Cr ⁺⁶ - Chromium ⁺⁶	U - Uranium
Y-90	Yttrium-90	Dy - Dysprosium	V - Vanadium
		Hg - Mercury	
		La - Lanthanum	

Table 3: Tank 241-C-106 Radionuclide Solid Sample Data
(Sketch ES-SIX-R1)

Tank Waste Characterization Sample Information										Radionuclide Information		
Tank	Reported Radionuclide	Date	Sample #	Density	Reported Value	Unit	Code	Sample State	Source	Radionuclide	Bq/L	Bq/L Decayed
C106	Cs-137	5/19/86	G1XCOOXX	1.43	330	ugm/gm	G	Sludge/Composite	Braun	Cs137	1.52E+12	1.25E+12
Maximum Plot Limit: 1.00E+12 Bq/L												
C106	Sr-89/90	10/10/74	RAT-C106-1		18800000	uCi/l	G	Sludge	Braun	Sr90	6.96E+11	4.28E+11
C106	Sr90	10/10/74			18800000	uCi/L	G	sludge	RAW	Sr90	6.96E+11	4.28E+11
C106	Sr-90	1/6/75	RAT-C106-5		18300000	uCi/l	G	Sludge	Braun	Sr90	6.77E+11	4.19E+11
C106	Sr90	7/1/77	5	2.44	4959016	uCi/kg	O		RAW	Sr90	4.48E+11	2.94E+11
C106	Sr-89/90	1/24/77	RAT-C106-3	2.44	12100000	uCi/l	G	Sludge	Braun	Sr90	4.48E+11	2.91E+11
C106	Sr90	1/24/77		2.44	12100000	uCi/L	G	sludge	RAW	Sr90	4.48E+11	2.91E+11
C-106	Sr90				6.883933219	Ci/L	S		Agnew	Sr90		2.55E+11
C106	Sr90	9/18/80		1.365	6470	uCi/g	I	H2O insoluble Wt. %	RAW	Sr90	3.27E+11	2.32E+11
C106	Y90						S		TRAC	Y90	1.33E+11	
C106	Sr90	5/1/87	3		1980000	uCi/kg	S		RAW	Sr90	1.17E+11	9.75E+10
C106	Sr90	5/19/86			1980	uCi/g	S	Core, solid	RAW	Sr90	1.17E+11	9.53E+10
C106	Sr90						S		TRAC	Sr90		9.41E+10
C106	Sr90	4/14/87		1.43	1980	uCi/g	S	solid	RAW	Sr90	1.05E+11	8.70E+10
C106	Sr89/90	5/19/86					G	sludge	Wastren	Sr90	1.05E+11	8.54E+10
C106	Sr-90	5/19/86	G1XCOOXX	1.43	1980	uCi/gm	G	Sludge/Composite	Braun	Sr90	1.05E+11	8.52E+10
C106	Cs137	4/1/90	1		504000	uCi/kg	S		RAW	Cs137	2.98E+10	2.67E+10
C106	Cs-137	1/6/75	RAT-C106-5		862000	uCi/l	G	Sludge	Braun	Cs137	3.19E+10	2.01E+10
C106	Cs-137	10/10/74	RAT-C106-1		862000	uCi/l	G	Sludge	Braun	Cs137	3.19E+10	2.00E+10
C106	Cs137	10/10/74			862000	uCi/L	G	sludge	RAW	Cs137	3.19E+10	2.00E+10
C106	Cs137	10/1/74			0.86	Ci/L	G	sludge	RAW	Cs137	3.18E+10	2.00E+10
C106	Co-60	5/19/86	G1XCOOXX	1.43	0.888	ugm/gm	G	Sludge/Composite	Braun	Co60	5.32E+10	1.72E+10
C106	Cs137	5/1/87	3		330000	uCi/kg	S		RAW	Cs137	1.95E+10	1.64E+10
C106	Cs137	5/19/86			330	uCi/g	S	Core, solid	RAW	Cs137	1.95E+10	1.60E+10
C106	Cs137	4/14/87		1.43	330	uCi/g	S	solid	RAW	Cs137	1.75E+10	1.46E+10
C106	Cs137	5/19/86					G	sludge	Wastren	Cs137	1.75E+10	1.44E+10
C106	Cs137	7/1/77	5	2.44	223361	uCi/kg	O		RAW	Cs137	2.02E+10	1.35E+10
C106	Cs-137	1/24/77	RAT-C106-3	2.44	545000	uCi/l	G	Sludge	Braun	Cs137	2.02E+10	1.33E+10
C106	Cs137	1/24/77		2.44	545000	uCi/L	G	sludge	RAW	Cs137	2.02E+10	1.33E+10
C106	Co-60	5/19/86	G1XCOOXX	1.43	0.555	ugm/gm	G	Sludge/Composite	Braun	Co60	3.33E+10	1.07E+10
C106	Cs137	9/1/80	4		213000	uCi/kg	O		RAW	Cs137	1.26E+10	9.07E+09
C106	Cs137	9/18/80		1.365	213	uCi/g	I	H2O insoluble	RAW	Cs137	1.08E+10	7.74E+09

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Table 3: Tank 241-C-106 Radionuclide Solid Sample Data
(Sketch ES-SIX-R1)

Tank Waste Characterization Sample Information										Radionuclide Information		
Tank	Reported Radionuclide	Date	Sample #	Density	Reported Value	Unit	Code	Sample State	Source	Radionuclide	Bq/L	Bq/L Decayed
C106	Sr90	9/18/80		1.365	133	uCi/g	I	H2O soluble Wt. %	RAW	Sr90	6.72E+09	4.77E+09
C-106	Cs137				0.127818678	Ci/L	S		Agnew	Cs137		4.73E+09
C106	Cs137	9/18/80		1.365	97.9	uCi/g	I	H2O soluble	RAW	Cs137	4.94E+09	3.56E+09
C106	Eu154	7/1/77	5	2.44	50410	uCi/kg	O		RAW	Eu154	4.55E+09	1.14E+09
C106	Pu239/240	9/1/80	4		5520	uCi/kg	O		RAW	Pu239/240	3.27E+08	
C106	Sr90	8/1/88	2		4030	uCi/kg	O		RAW	Sr90	2.39E+08	2.05E+08
C106	Sr90	7/22/88			4030	uCi/Kg	O		RAW	Sr90	2.39E+08	2.04E+08
C106	Pu239/240	5/19/86			3.05	uCi/g	S	Core, solid	RAW	Pu239/240	1.81E+08	
C106	Pu239/240	5/1/87	3		3050	uCi/kg	S		RAW	Pu239/240	1.81E+08	
C106	Pu-239/240	5/19/86	G1XCOOXX	1.43	3.05	uCi/gm	G	Sludge/Composite	Braun	Pu239/240	1.61E+08	
C106	Pu239/240	4/14/87		1.43	3.05	uCi/g	S	solid	RAW	Pu239/240	1.61E+08	
C106	Pu	10/10/74	RAT-C106-1		0.06	gm/l	G	Sludge	Braun	Pu239/240	1.58E+08	
C106	Pu	1/6/75	RAT-C106-5		0.06	gm/l	G	Sludge	Braun	Pu239/240	1.58E+08	
C106	Pu	1/24/77	RAT-C106-3	2.44	0.06	gm/l	G	Sludge	Braun	Pu239/240	1.58E+08	
C106	Pu	1/24/77		2.44	0.06	g/l	G	Sludge	RAW	Pu239/240	1.58E+08	
C106	Pu	1/6/75			0.06	g/l	G	Sludge	RAW	Pu239/240	1.58E+08	
C106	Pu-239/240	5/19/86	G1XCOOXX	1.43	2.69	uCi/gm	G	Sludge/Composite	Braun	Pu239/240	1.42E+08	
C106	Pu239/240	7/1/77	5	2.44	1530	uCi/kg	O		RAW	Pu239/240	1.38E+08	
C106	Pu241						S		TRAC	Pu241		1.08E+08
C106	Am241						S		TRAC	Am241		6.91E+07
C106	Am241	5/19/86			1.05	uCi/g	S	Solids	RAW	Am241	6.22E+07	6.13E+07
C106	Pu239						S		TRAC	Pu239/240	5.97E+07	
C106	Am241	4/17/87		1.43	1.05	uCi/g	S	solid	RAW	Am241	5.56E+07	5.49E+07
C106	Am241	4/14/87		1.43	1.05	uCi/g	I	Composite	RAW	Am241	5.56E+07	5.49E+07
C106	Am241	5/19/86					G	sludge	Wastren	Am241	5.56E+07	5.48E+07
C106	Am-241	5/19/86	G1XCOOXX	1.43	1.05	uCi/gm	G	Sludge/Composite	Braun	Am241	5.56E+07	5.48E+07
C106	Eu154	9/15/75	T-8059	1.8	13800	uCi/gal	G	sludge	RAW	Eu154	1.35E+08	2.93E+07
C106	Cs137	8/1/88	2		536	uCi/kg	O		RAW	Cs137	3.17E+07	2.74E+07
C106	Cs137	7/22/88			536	uCi/Kg	O		RAW	Cs137	3.17E+07	2.74E+07
C106	Co60	4/1/90	1		788	uCi/kg	S		RAW	Co60	4.66E+07	2.50E+07
C106	Co60	4/14/87		1.43	0.88	uCi/g	I	Composite	RAW	Co60	4.66E+07	1.69E+07
C106	Co60	5/19/86			0.88	uCi/g	S	Solids	RAW	Co60	5.21E+07	1.68E+07
C106	Co60	5/19/86					G	sludge	Wastren	Co60	4.50E+07	1.45E+07

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Table 3: Tank 241-C-106 Radionuclide Solid Sample Data
(Sketch ES-SIX-R1)

Tank Waste Characterization Sample Information										Radionuclide Information		
Tank	Reported Radionuclide	Date	Sample #	Density	Reported Value	Unit	Code	Sample State	Source	Radionuclide	Bq/L	Bq/L Decayed
C106	Co60	5/1/87	3		560	uCi/kg	S		RAW	Co60	3.32E+07	1.21E+07
Minimum Plot Limit: 1.00E+07 Bq/L												
C106	Pu238						S		TRAC	Pu238		1.38E+06
C106	Pu	9/15/75	T-8059	1.8	0.00174	gm/gal	S	Cruddy	RAW	Pu239/240	1.21E+06	
C106	Sr90	4/23/80			28.9	Ci/L	G	sludge	RAW	Sr90	1.07E+06	7.51E+05
C106	Eu154	8/1/88	2		14.4	uCi/kg	O		RAW	Eu154	8.52E+05	5.13E+05
C106	Eu154	7/22/88			14.4	uCi/Kg	O		RAW	Eu154	8.52E+05	5.12E+05
C106	Sr90	9/1/80	4		6.47	uCi/kg	O		RAW	Sr90	3.83E+05	2.71E+05
C106	Co60	8/1/88	2		1.15	uCi/kg	O		RAW	Co60	6.81E+04	2.94E+04
C106	Co60	7/22/88			1.15	uCi/Kg	O		RAW	Co60	6.81E+04	2.93E+04
C106	Cs137	4/23/80			1.08	Ci/L	G	sludge	RAW	Cs137	4.00E+04	2.85E+04
C106	Np237						S		TRAC	Np237	2.11E+02	
C106	Am-241	5/19/86	G1XCOOXX	1.43	0	uCi/gm	G	Sludge/Composite	Braun	Am241	0.00E+00	0.00E+00

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Table 4: Tank 241-C-106 Toxic Chemical Solid Sample Data Table
(Sketch ES-SIX-C1)

Tank Waste Characterization Sample Information										Analyte Information	
Tank	Reported Chemical	Date	Sample #	Density	Reported Value	Unit	Code	Sample State	Source	Analyte	ug/L
Maximum Plot Limit: 1.00E+09 ug/L											
C106	OH				2629936.2	g-moles	S		TRAC	NaOH	5.55E+08
C106	Na				3089936.2	g-moles	S		TRAC	Na	3.75E+08
C106	OH-				7.318287437	moles/L	S		Agnew	NaOH	2.93E+08
C106	Na	4/1/90			273	g/L	G	Sludge	Wastren	Na	2.73E+08
C106	Na	2/1/91			156000	mg/kg	S	KOH Fusion	RAW	Na	2.50E+08
C106	Na	4/1/90	1		156000	mg/kg	S		RAW	Na	2.50E+08
C106	Na	5/19/86			117000	ug/g	I	Composite	RAW	Na	1.87E+08
C106	Na	4/1/87	3		117000	mg/kg	S		RAW	Na	1.87E+08
C106	Na	5/19/86		1.43	117000	ugm/gm	I	Sludge/Composite	Braun	Na	1.67E+08
C106	Na	4/17/87	G1xcxxxxR-1	1.43	117000	ug/g	I	Composite	RAW	Na	1.67E+08
C106	Na	4/14/87		1.43	117000	uG/G	S		RAW	Na	1.67E+08
C106	Na+				5.501586236	moles/L	S		Agnew	Na	1.27E+08
C106	Na	1/24/77		2.44	4.9	moles/l	G	Sludge	Braun	Na	1.13E+08
C106	Na	1/24/77		2.44	4.9	M/L	G	Sludge	RAW	Na	1.13E+08
C106	Na	5/19/86		1.22	94900	mg/L	I	Composite	RAW	Na	9.49E+07
C106	Na	7/1/77	5		46189	mg/kg	S		RAW	Na	7.39E+07
C106	Na	9/1/80	4		35800	mg/kg	S		RAW	Na	5.73E+07
C106	Na	7/22/88			16.1	g/kg	G	Sludge	RAW	Na	2.58E+07
C106	Na	8/1/88	2		16100	mg/kg	S		RAW	Na	2.58E+07
C106	Ca	5/19/86			11900	ug/g	I	Composite	RAW	Ca	1.90E+07
C106	Ca	4/1/87	3		11900	mg/kg	S		RAW	Ca	1.90E+07
C106	Ca	5/19/86		1.43	11900	ugm/gm	I	Sludge/Composite	Braun	Ca	1.70E+07
C106	Ca	4/17/87	G1xcxxxxR-1	1.43	11900	ug/g	I	Composite	RAW	Ca	1.70E+07
C106	Ca	4/14/87		1.43	11900	uG/G	S		RAW	Ca	1.70E+07
C106	Cr	1/24/77		2.44	0.2	moles/l	G	Sludge	Braun	Cr	1.04E+07
C106	Cr	1/24/77		2.44	0.2	M/L	G	Sludge	RAW	Cr	1.04E+07
C106	Ca	10/10/74			0.2	moles/l	G	Sludge	Braun	Ca	8.02E+06
C106	Ca	1/6/75			0.2	moles/l	G	Sludge	Braun	Ca	8.02E+06
C106	Ca	1/6/75			0.2	M	G	Sludge	RAW	Ca	8.02E+06
C106	Ba	5/19/86			4890	ug/g	I	Composite	RAW	Ba	7.82E+06
C106	Ba	4/1/87	3		4890	mg/kg	S		RAW	Ba	7.82E+06
C106	Ba	5/19/86		1.43	4890	ugm/gm	I	Sludge/Composite	Braun	Ba	6.99E+06

Table 4: Tank 241-C-106 Toxic Chemical Solid Sample Data Table
(Sketch ES-SIX-C1)

Tank Waste Characterization Sample Information										Analyte Information	
Tank	Reported Chemical	Date	Sample #	Density	Reported Value	Unit	Code	Sample State	Source	Analyte	ug/L
C106	Ba	4/17/87	G1xcxxxR-1	1.43	4890	ug/g	I	Composite	RAW	Ba	6.99E+06
C106	Ba	4/14/87		1.43	4890	ug/g	S		RAW	Ba	6.99E+06
C106	Cr	7/1/77	5		4262	mg/kg	S		RAW	Cr	6.82E+06
C106	Sb	4/1/90			5.08	g/L	G	Sludge	Wastren	Sb	5.08E+06
C106	Sb	2/1/91			2900	mg/kg	S	KOH Fusion	RAW	Sb	4.64E+06
C106	Ba	7/1/77	5		2246	mg/kg	S		RAW	Ba	3.59E+06
C106	Ca	4/1/90			3.33	g/L	G	Sludge	Wastren	Ca	3.33E+06
C106	Cr	4/1/90			3.06	g/L	G	Sludge	Wastren	Cr	3.06E+06
C106	Ca	2/1/91			1900	mg/kg	S	KOH Fusion	RAW	Ca	3.04E+06
C106	Ca	4/1/90	1		1900	mg/kg	S		RAW	Ca	3.04E+06
C106	Cr	2/1/91			1750	mg/kg	S	KOH Fusion	RAW	Cr	2.80E+06
C106	Cr	4/1/90	1		1750	mg/kg	S		RAW	Cr	2.80E+06
C106	U				0.010846239	moles/L	S		Agnew	U	2.58E+06
C106	Cr	7/22/88			1560	mg/kg	G	Sludge	RAW	Cr	2.50E+06
C106	Cr	8/1/88	2		1560	mg/kg	S		RAW	Cr	2.50E+06
C106	Se	4/1/90			2.45	g/L	G	Sludge	Wastren	Se	2.45E+06
C106	Ca	7/22/88			1480	mg/kg	G	Sludge	RAW	Ca	2.37E+06
C106	Ca	8/1/88	2		1480	mg/kg	S		RAW	Ca	2.37E+06
C106	Se	2/1/91			1400	mg/kg	S	KOH Fusion	RAW	Se	2.24E+06
C106	Cr	9/1/80	4		1350	mg/kg	S		RAW	Cr	2.16E+06
C106	Tl	4/1/90			2.1	g/L	G	Sludge	Wastren	Tl	2.10E+06
C106	Tl	2/1/91			1200	mg/kg	S	KOH Fusion	RAW	Tl	1.92E+06
C106	Cr	5/19/86			984	ug/g	I	Composite	RAW	Cr	1.57E+06
C106	Cr	4/1/87	3		984	mg/kg	S		RAW	Cr	1.57E+06
C106	U	4/1/90	1		944	mg/kg	S		RAW	U	1.51E+06
C106	Cr	5/19/86		1.43	984	ugm/gm	I	Sludge/Composite	Braun	Cr	1.41E+06
C106	Cr	4/17/87	G1xcxxxR-1	1.43	984	ug/g	I	Composite	RAW	Cr	1.41E+06
C106	Cr	4/14/87		1.43	984	ug/g	S		RAW	Cr	1.41E+06
C106	Nd	4/1/90			0.98	g/L	G	Sludge	Wastren	Nd	9.80E+05
C106	U	5/19/86		1.22	958	mg/L	I	Composite	RAW	U	9.58E+05
C106	Nd	2/1/91			560	mg/kg	S	KOH Fusion	RAW	Nd	8.96E+05
C106	Ce	4/1/90			0.858	g/L	G	Sludge	Wastren	Ce	8.58E+05
C106	Ce	2/1/91			490	mg/kg	S	KOH Fusion	RAW	Ce	7.84E+05

Table 4: Tank 241-C-106 Toxic Chemical Solid Sample Data Table
(Sketch ES-SIX-C1)

Tank Waste Characterization Sample Information										Analyte Information	
Tank	Reported Chemical	Date	Sample #	Density	Reported Value	Unit	Code	Sample State	Source	Analyte	ug/L
C106	Cd	7/1/77	5		461	mg/kg	S		RAW	Cd	7.38E+05
C106	As	4/1/90			0.683	g/L	G	Sludge	Wastren	As	6.83E+05
C106	As	2/1/91			390	mg/kg	S	KOH Fusion	RAW	As	6.24E+05
C106	Ba	4/1/90			0.613	g/L	G	Sludge	Wastren	Ba	6.13E+05
C106	Cd	5/19/86			370	ug/g	I	Composite	RAW	Cd	5.92E+05
C106	U	5/19/86		1.43	409	ugm/gm	I	Sludge/Composite	Braun	U	5.85E+05
C106	U	4/17/87	G1xcxxxxR-1	1.43	409	ug/g	I	Composite	RAW	U	5.85E+05
C106	Ba	2/1/91			350	mg/kg	S	KOH Fusion	RAW	Ba	5.60E+05
C106	Ba	4/1/90	1		350	mg/kg	S		RAW	Ba	5.60E+05
C106	Ba	7/22/88			345	mg/kg	G	Sludge	RAW	Ba	5.52E+05
C106	Ba	8/1/88	2		345	mg/kg	S		RAW	Ba	5.52E+05
C106	Cd	5/19/86		1.43	370	ugm/gm	I	Sludge/Composite	Braun	Cd	5.29E+05
C106	Cd	4/17/87	G1xcxxxxR-1	1.43	370	ug/g	I	Composite	RAW	Cd	5.29E+05
C106	Cd	4/14/87		1.43	370	ug/g	S		RAW	Cd	5.29E+05
C106	Sr	10/10/74			0.006	moles/l	G	Sludge	Braun	Sr	5.26E+05
C106	Sr	1/6/75			0.006	moles/l	G	Sludge	Braun	Sr	5.26E+05
C106	Hg	7/22/88			327	mg/kg	G	Sludge	RAW	Hg	5.23E+05
C106	Cd	9/1/80	4		210	mg/kg	S		RAW	Cd	3.36E+05
C106	Sr	4/1/90			0.193	g/L	G	Sludge	Wastren	Sr	1.93E+05
C106	Sr	2/1/91			110	mg/kg	S	KOH Fusion	RAW	Sr	1.76E+05
C106	Sr	4/1/90	1		110	mg/kg	S		RAW	Sr	1.76E+05
C106	Sr	5/19/86			103	ug/g	I	Composite	RAW	Sr	1.65E+05
C106	Sr	5/19/86		1.43	103	ugm/gm	I	Sludge/Composite	Braun	Sr	1.47E+05
C106	Sr	4/17/87	G1xcxxxxR-1	1.43	103	ug/g	I	Composite	RAW	Sr	1.47E+05
C106	Sr	4/14/87		1.43	103	ug/G	S		RAW	Sr	1.47E+05
C106	CN-	7/22/88			60	mg/kg	G	Sludge	RAW	CN	9.60E+04
C106	Ba				118	g-moles	S		TRAC	Ba	8.55E+04
C106	Cd	7/22/88			48	mg/kg	G	Sludge	RAW	Cd	7.68E+04
C106	Cd	8/1/88	2		48	mg/kg	S		RAW	Cd	7.68E+04
C106	Hg	7/22/88			42	mg/kg	G	Sludge	RAW	Hg	6.72E+04
C106	As	7/22/88			37	mg/kg	G	Sludge	RAW	As	5.92E+04
C106	As	8/1/88	2		37	mg/kg	S		RAW	As	5.92E+04
C106	Cd	5/19/86		1.22	25.2	mg/L	I	Composite	RAW	Cd	2.52E+04

Table 4: Tank 241-C-106 Toxic Chemical Solid Sample Data Table
(Sketch ES-SIX-C1)

Tank Waste Characterization Sample Information										Analyte Information	
Tank	Reported Chemical	Date	Sample #	Density	Reported Value	Unit	Code	Sample State	Source	Analyte	ug/L
C106	Cd	4/1/87	3		12	mg/kg	S		RAW	Cd	1.92E+04
C106	V	7/22/88			12	mg/kg	G	Sludge	RAW	V	1.92E+04
C106	V	7/22/88			12	mg/kg	G	Sludge	RAW	V	1.92E+04
C106	Cd	5/19/86		1.43	12	ugm/gm	I	Sludge/Composite	Braun	Cd	1.72E+04
C106	Co	7/22/88			9.7	mg/kg	G	Sludge	RAW	Co	1.55E+04
C106	Ca	5/19/86		1.22	11.4	mg/L	I	Composite	RAW	Ca	1.14E+04
Minimum Plot Limit: 1.00E+04 ug/L											
C106	Co	5/19/86			4.81	ug/g	I	Composite	RAW	Co	7.70E+03
C106	Co	5/19/86		1.43	4.81	ugm/gm	I	Sludge/Composite	Braun	Co	6.88E+03
C106	Co	4/17/87	G1xcxxxxR-1	1.43	4.81	ug/g	I	Composite	RAW	Co	6.88E+03
C106	Co	4/14/87		1.43	4.81	ug/G	S		RAW	Co	6.88E+03
C106	Cr	5/19/86		1.22	6.2	mg/L	I	Composite	RAW	Cr	6.20E+03
C106	Ba	5/19/86		1.22	5	mg/L	I	Composite	RAW	Ba	5.00E+03
C106	U	1/24/77		2.44	0.004	gm/l	G	Sludge	Braun	U	4.00E+03
C106	U	7/1/77	5		1.64	mg/kg	S		RAW	U	2.62E+03
C106	Be	7/22/88			0.72	mg/kg	G	Sludge	RAW	Be	1.15E+03
C106	Be	8/1/88	2		0.72	mg/kg	S		RAW	Be	1.15E+03
C106	Cr+++				3.44743E-08	moles/L	S		Agnew	Cr+3	1.79E+00
C106	Sr				7.41E-09	g-moles	S		TRAC	Sr	3.43E-06

rel/Liter to micro Curie/Liter
/L)/(3.7E+4)

U.S. DEPARTMENT OF ENERGY			
RICHLAND OPERATIONS OFFICE			
ICF KAISER HANFORD COMPANY			
Tank 241-C-106			
Radionuclide Solids			
PROJECT C-106 Sample Data and Plots			
Drawing No.	ES-SIX-R1	JOB NO.	E34274
Date	2/10/95		

Concentration
μg/L

x Sampling Data

o Most Recent Sample

w WASTRE

B Braun (1)

□ HTCE Inventory

△ TRAC Data

U.S. DEPARTMENT OF ENERGY		
RICHLAND OPERATIONS OFFICE		
ICF KAISER HANFORD COMPANY		
Tank 241-C-106		
Chemical Solids		
PROJECT C-106 Sample Data and Plots		
Drawing No.	ES-SIX-C1	JOB NO. E34274
Date	2/9/95	