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CHARACTERIZATION ENGINEERING STATUS REPORT APRIL 1997 - SEPTEMBER-1997

Alois J. Kostelnik

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Abstract: The attached report identifies the activities of the Characterization Engineering organization for the time period of April, through September 1997.

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CHARACTERIZATION ENGINEERING STATUS REPORT APRIL 1997 - SEPTEMBER 1997

EXECUTIVE SUMMARY

Characterization Engineering (CE) continues to make progress in support of the project goal of characterizing the Hanford high level waste tanks. Two core sampling systems were operational during this reporting period, rotary mode core sample truck system #2 and push mode core sample truck system #1. The deployment of the third rotary mode core sample truck system #4 continued to be delayed during the reporting period due to exhauster design issues. The schedule to close the exhauster design issues had not yet been finalized at the end of the reporting period.

The availability average for all core sampling systems for this period is 49%. This is an increase compared to 37% during the last reporting period. Sixteen tanks were core sampled during the reporting period and 140 samples were retrieved. This is the most tanks, cores, and segments ever sampled in a six month period. Average sampler recoveries exceeded the performance goals of 80 % for system #1 and 60% for systems #2, #3, and #4. For the Fiscal Year, 43 cores were taken, 5 more than the 38 proposed.

This reporting period included revision of the authorization basis for Rotary Mode Core Sampling with significant input from CE personnel. The changes simplified the interpretation of the flammable gas controls applicable to core sampling. Although some of the remaining controls are still complex, most of the interferences that existed between the BIO/TSR/97-01/JCO controls and the SAD-035/IOSR flammable gas controls have been eliminated.

During this reporting period there was significant progress made in other areas as well. The Light Duty Utility Arm was fitted with a new Extended Reach End Effector to increase its capability. The Magnetometer was used along with Photogrammetry to determine the residual waste volume in tank 241-AX-104. Grab Sampling retrieved samples of waste from 8 tanks. Vapor Sampling was completed on 42 tanks and was also deployed on 8 additional tanks to determine passive tank ventilation rates.

1.0 INTRODUCTION

The purpose of this report is to status the activities and plans for Characterization Engineering (CE) activities. The reports are meant to be the status report for deliverables to the Characterization Project.

2.0 HIGHLIGHTS for REPORTING PERIOD

This report statuses the activities and plans accomplished by CE for the period from April 1, 1997 through September 1, 1997.

2.1 CORE SAMPLING

2.1.1 Tanks Sampled

During this reporting period, one rotary mode truck systems, and one push mode truck system actively sampled waste in the Hanford waste tanks. All samples were taken in push mode.

Truck Number	Obtained Samples from...	Riser Number
1	Tank 241-U-103	2, 7, and 13
1	Tank 241-BY-101	10b and 10d
1	Tank 241-BY-109	10b, and 12c
1	Tank 241-T-105	2, 3, 5, 7, and 8
1	Tank 241-SY-102	23a
2	Tank 241-T-204	3 and 7
2	Tank 241-T-203	3 and 7
2	Tank 241-T-202	3, 7, and 8
2	Tank 241-T-201	3 and 7
2	Tank 241-AW-103	10a, 12a, 15a, and 16b
2	Tank 241-AW-105	10a, 12a, 13a, 15a, and 16b
2	Tank 241-BX-110	3 and 6

Truck Number	Obtained Samples from...	Riser Number
2	Tank 241-BX-111	3 and 6
2	241-AW-104	13a and 15a
2	241-AP-105	24 and 28
2	241-AX-103	9a and 9f

During this reporting period 16 tanks were sampled and 140 samples were obtained. Truck #2 obtained 99 samples and Truck #1 obtained 41 samples.

2.1.2 Sample Data

Color profiles of the extruded samples continue to be collected and are on file in CE, as well as in the 222-S laboratory.

2.1.3 Sample Recovery

All core sampling during this period was done in push mode, no drill string rotation was used. Core profiles for each tank sampled are shown in figures 1 thru 16. Significant delays occurred during the period covered by this report due to new flammable gas controls, DOE reviews and revision of the authorization basis for push mode core sampling. One tank which was sampled during the last reporting period, but was not included in the previous report, is included in the discussion.

2.1.3.1 Push Mode Core Sample Truck #1

Figure 17 documents the current performance of Truck #1. Overall recovery for Truck #1 continues to exceed the FY-97 goal of 83%, based upon the average of the last 100 samples. However, the recovery decreased over the period due to push sampling of harder material in the tanks, several of which were originally proposed for rotary mode sampling. The tanks may be sampled in push mode because of the riser liner which is used to reinforce the drill string and prevent buckling at higher down force.

Truck #1 sampled tanks U-103, BY-101, BY-109, T-105 and SY-102 during the period. Most of the sampling activity on U-103 was discussed in the prior report, but is included here for completeness. Two cores were attempted on U-103 during early October 1996 and January 1997. The first core was not successful in that only 2 feet of the 14 feet of waste could be penetrated in push mode with 4000 lbs of force. However, sampling was attempted in a second riser and was completed to within 18 inches of the tank bottom using less than 1000 lbs of force.

A third core was captured in April 1997, reaching to within 3 inches of the tank bottom with minimal force. Sample recovery was very good on U-103, averaging 88%. Six of the 24 U-103 samples taken were Retained Gas Sampler (RGS) samples. More liquid was recovered from the top half of the waste than expected.

Two cores were attempted in BY-101 during May 1997. Due to lack of available risers on this tank, the cores are within a few feet of each other. Historical in-tank photos showed discarded tapes below the sampled risers. These tapes are suspected to have blocked the bit, resulting in very poor recovery, high forces, and lack of penetration. The few grams of waste which was captured in the 7 samples was dry saltcake as expected.

BY-109 was sampled in June 1997. Fourteen samples were taken on this tank including 5 successful RGS samples. Average recovery for this tank was a respectable 80%. The first core failed to reach the tank bottom, stopping some 39 inches short, while the 2nd core reached within 1.5 inches of the tank bottom.

Tank T-105 was sampled during late June 1997. Two cores were taken, each containing just 2 segments as the waste in this tank is very shallow. Recovery averaged 81% and the waste resembled wet sludge and liquid, similar to that recovered in the 1993 sampling events.

SY-102 was sampled during July and August 1997. Although the waste in SY-102 was 13 segments deep, only the bottom 2 segments were taken as required to support the characterization of this tank. The average recovery for the 2 segments was 97%.

2.1.3.2 Rotary Mode Core Sample Trucks #2, #3, and #4

Figure 18 indicates the performance of the rotary systems from January 1996 through September 1997. Average recovery for Trucks #2, #3 and #4 on September 30, 1997 was 77%, based upon the average of the last 200 samples, exceeding the FY-97 goal of 60% established for these systems. The tanks which follow were all sampled with Truck #2 as Trucks #3 and #4 were out of service during the entire period for upgrades required to allow rotary mode sampling in flammable gas tanks.

Ten samples were captured from a single core on T-204 in April 1997. Average recovery was a very good at 87%. The sludge in this tank appeared drier than anticipated, but was easily penetrated with 400 lbs.

A single core was taken from T-203 in April 1997. Average recovery for the 10 segments in wet sludge was exceptional at 98%. As expected the waste was easily penetrated in push mode.

T-202 was also sampled in April 1997. Recovery averaged 93% for the single 5 segment core in the easily penetrated wet sludge.

T-201 was the final location for April 1997 sampling with Truck #2. A single 8 segment core was captured, yielding considerably more liquid in the upper 5 segments than had been anticipated. The bottom 3 segments contained mostly wet sludge as anticipated. Average recovery on T-201 was very good at 90%.

Fourteen samples were captured from 2 cores on AW-103 in early May 1997. The top 3 liquid samples were not taken. Average recovery was 92% and as expected the waste appearance resembled wet sludge, consistent with core sample results from 21 samples taken in 1986 and 1989. The tank bottom was contacted earlier than anticipated in both risers sampled in May 1997 as well as in the 2 risers sampled previously.

In May 1997, 12 samples were captured from 2 cores on AW-105. The top 3 liquid samples were not taken. Average recovery was 93% and as expected the waste appearance resembled mostly dry sludge, consistent with core sample results from the 23 samples taken in 1986 and 1990.

An attempt was made to sample BX-110 in mid May 1997. On the first core penetration closer than 46 inches from the published tank bottom elevation could not be achieved with 2000 lbs. On the opposite side of the tank however, the drill bit reached within 9 inches of the tank bottom using only 800 lbs of force. Average sample recovery was good at 83% for the 7 samples taken. More liquid was encountered with the wet salts than expected on BX-110.

During June 1997 BX-111 was sampled. Neither of the 2 cores reached closer than 20 inches from the tank bottom with 2200 lbs of force. The Average recovery for the 7 samples captured was only 51%, but considering that most samples contained dry saltcake, this recovery is considered good.

In late June 1997, 17 samples were captured from 2 cores on AW-104. The top 14 liquid samples were not taken. Average recovery was 83%. The waste recovered contained much more liquid than anticipated and required essentially no force to penetrate.

AP-105 was sampled in early July 1997. Average recovery for the 7 samples taken was 85%. The core samples contained the expected combination of wet saltcake and liquid which was easily penetrated with 650 lbs of force.

Four samples were obtained from 2 cores in AX-103 in early August 1997. Penetration forces for the saltcake in this tank were less than 250 lbs. Although mostly dry waste was expected, some samples contained mostly slurries. Average recovery for the 4 samples taken was 58%

2.1.4 Core Sampling Equipment Availability

As reported previously, the working definitions for availability and reliability of sampling equipment have been established in (WHC 1995 [ETP-171]). As defined, the availability of core sampling systems is tracked daily. Concurrence in equipment status is established between CE and Characterization Project Operations (CPO). The average equipment availability, based on a 52 week moving average) for the reporting period was 70% for System #1, 63% for system #2, 20% for system #3, and 5% for system #4. The data is shown graphically in figures 19 through 22.

During the current reporting period the schedule of tanks to be sampled was again revised to accommodate push-mode sampling since rotary-mode gas flammability issues were still being resolved. Meanwhile, modifications addressing flammable gas issues were completed on Truck

#1. Truck #3 upgrades are still in progress. All four systems combined for 43% availability for the reporting period compared to 63.8% availability for FY-96.

2.1.5 Core Sample Truck Modifications

The design for the Truck #1 upgrades to flammable gas requirements was completed during the previous reporting period. The truck was modified to the new configuration and testing was completed. Design upgrades include the replacement of the remote latch unit and purging the weather cover of the shielded receiver to eliminate potential flammable gas concerns. The modifications were necessary to comply with the functional design criteria (WHC 1996a [FDC-048]) and Standing Order 97-01 (LMHC 1997a).

Truck #2 did not receive any modifications during the reporting period.

Truck #3 is nearing completion for the required flammable gas modifications per (WHC 1996b [SAD-035]). At the time of the last report the only remaining field modification to be performed was the removal of the components which support the electric remote latch unit (RLU) and the installation of the mechanical RLU. Truck #1 was given a higher priority for its upgrade and interrupted the modifications to Truck #3.

Truck #4 was completely modified to comply with SAD-035 during FY-96 and no new modifications were performed in FY-97.

2.1.6 Rotary Mode Core Sampling Exhauster

In order to keep bit temperatures below the lowest possible ignition temperature of waste, Nitrogen gas has been used since 1993 while conducting rotary mode core sampling. To avoid pressurizing a tank and causing potential unfiltered air emissions, an exhauster has been used with the rotary mode core system.

2.1.6.1 Flammable Gas

During the last reporting period the design of the exhauster flammable gas detection system was found to be inadequate. The hydrogen gas detector was not capable of meeting the design requirements during extreme temperature conditions. In addition to the performance problem, the second flammable gas detector did not comply with the requirements for location in a flammable hydrogen gas environment, (Class 1, Division 1, Group B) in spite of claims by the manufacturer that the device was Factory Mutual tested and approved for the environment. The resolution to this issue was the removal of the flammable gas detection system from the exhauster and a revision to the authorization basis.

2.1.6.2 Notice of Construction (NOC)

A Notice of Construction or "NOC" is the regulatory "contract" or permission document between DOE and the Washington State Department of Health for the operation of an exhaustor system. We can not legally operate an exhaustor without an approved NOC.

During the redesign of the exhaustor to correct flammable gas issues the NOC was also discovered to incorrectly describe the exhaustor and required revision. A revision to the NOC was then required to allow the exhaustor to operate and was prepared and submitted. The comments on the revision from the regulators require the exhaustor stack classification to be upgraded to a Major Stack because of new meteorological data and computer code differences pertaining to dose rate calculation. Major stack is a classification based upon a year long accident with the potential to emit (PTE) radiation at levels such that the maximum exposed individual would receive more than .1 mrem in a year.

Continued efforts to refine the source term values, for the PTE analysis, with more accurate data is continuing to support further revision of the NOC and the reduction of the classification to Minor Stack. The upgrade to Major Stack requires the replacement of the HEPA train and additional equipment to be added to monitor the emissions of the exhaustor.

2.1.6.3 Design of Modifications and Reviews

During the last reporting period the review and remediation of the exhaustor design shortcomings was still in process. One activity was a second formal design review of the exhaustor and the flammable gas detection system and the design modifications required by the review. Emphasis is placed on elements of the systems important to safe RMCS operation in/on flammable gas watch list tanks. This activity was well underway during February/March 1997. The authorization basis for rotary mode core sampling at this time was solely SAD-035.

Another activity initiated was to develop a Design Compliance Matrix (DCM) which would document all design and functional requirements applicable to core sampling equipment which could then be used as a checklist for both design modifications and for design verification. During the current reporting period use of a DCM was formally implemented by issuance of an internal CE Desk Instruction. A DCM checklist, abbreviated to that required for exhaustor design verification, has been used for all design review activities conducted during this period on this system. Formal design review of the RMCS exhaustor is still an ongoing activity due to changes in both the authorization basis and NOC. As a consequence of the Safety/Authorization Basis change the RMCS exhaustor interlock system is no longer an element of the system and a subject of design verification. Also, the NOC changes impose additional controls and modifications to the RMCS exhaustor which are still in the process of being implemented. To date, the changes that have been prepared and reviewed include the installation design for the replacement HEPA train, and the redesign of the installation for the glycol pump and heater on the exhaustor.

2.2 GRAB SAMPLING

Grab Sampling has met the FY-97 Baseline Sampling Schedule (rev.5.2) goal of sampling 15 tanks. Baseline Sampling Schedule, revision 5.1, called for 20 tanks to be grab sampled. However, due to budget cut-backs from the Saltwell Pumping Program which also affected the Evaporator Campaign 98-1 there was a reduction in the number of possible tanks to be sampled for FY-97. Baseline Sampling Schedule revision 5.2 reflected this change. Three additional tanks were sampled using funding from the Tank Farm Privatization and Tank Farms Safety Issue Resolution.

The continued use of PVC was a major issue of concern related to the Authorization Basis. Performing work through a PVC riser adaptor in Facility Group 1 Ex Tank, Facility Group 1 and 2 Dome Intrusive, and Facility Group 3 Dome Intrusive (local waste disturbing) regions expired on June 1, 1997. To resolve the issue, the Flammable Gas Equipment Advisory Board (FGEAB) determined that the ignition source controls are satisfied when the inside of the PVC riser adaptor has been taped with conductive tape and the conductive tape is then bonded to either the riser or bonding bus.

2.3 VAPOR SAMPLING

The baseline sampling schedule was satisfied during this period with the sampling of the 42 required tanks by the end of FY-1997. Eight additional tanks were injected with tracer gasses and sampled periodically to determine the breathing rates of the tanks.

A procedure was written for operation of the vapor sampling cart. This completes the transition of the vapor sampling system to CPO. The procedure, in conjunction with a work package, enables CPO to capture a vapor sample with CPO personnel only. The new procedure will help to minimize delays due to operator availability. The vapor sampling procedures and upcoming work packages were also updated to comply with the new authorization basis (BIO).

2.4 OTHER EQUIPMENT MODIFICATION and DEPLOYMENT

2.4.1 Electrical Support Equipment

Correction of National Electrical Code (NEC) discrepancies is in progress. All the ECNs have been written to modify the core sampling equipment and work packages are being prepared. The electrical work remaining consists of NEC corrections on the three distribution trailers, two air compressors, and four generators. Compatibility and improvement work remaining consists of construction of a distribution trailer, upgrade of Truck #1 air compressor, and to finish modifications on service trailer #2. Upgrades to the services trailers for truck systems #3 & #4 have been completed and the distribution trailers are currently being modified.

A new spare portable generator was procured as a spare for core sampling equipment. The Acceptance for Beneficial Use (ABU) is being reviewed for approval to use this generator.

One of the portable generators has been sent back to the vendor for repairs. The engine and the load bank on the unit had overheating problems.

2.4.2 Equipment Qualification

To support compliance with Standing Order 97-01 and the BIO many components were qualified as equivalent to the BIO flammable gas requirements by the FGEAB. They included several items exposed to tank vapors inside the exhauster and also components and systems on Truck #2 which were required to meet the controls for push mode core sampling. The components are identified in (FGEAB 1997).

The FGEAB requested that additional qualitative testing be done here on site to ensure that proper grounding and bonding procedures are used with plastics and polymers. CE was present while the testing was conducted. The early indications are that the existing grounding and bonding requirements for polymers may be excessive.

2.4.3 Breathing Air Compressor

To support the upgrade of Truck #1, to comply with flammable gas requirements of the authorization basis, a purge supply was required for many components. One of the breathing air compressors which is not normally used was converted for use as a purge supply to be used with Truck #1. The necessary design changes were made and the equipment was modified during the second half of FY-97.

2.4.4 Configuration Control

Selected drawings for all core sample trucks are being as-built to improve the configuration control of the systems. At the start of FY-97, of the 874 drawing sheets for the core sampling system, there were 442 sheets with over 500 total outstanding ECNs. This fiscal year, approximately 180 of the sheets have had ECNs incorporated and are under review for release. The engineering task plan for this effort is HNF-SD-WM-ETP-216.

As of September 1, 1997, there were 67 drawings sheets for sampling systems that had more than 5 ECN outstanding against each of them. The breakdown of drawings is as follows: 20 sheets for Truck #1, 4 sheets for Truck #2, 29 sheets for Trucks #3 & #4, 14 sheets for ancillary equipment including 5 sheets for the exhauster. As part of the BIO implementation, 8 of the 20 sheets of Truck #1 drawings are being updated.

Currently, all 29 sheets of Truck #3 & #4 drawings which are affected by more than 5 ECNs are being updated. The drawings will be released when pending modification work on Truck #3 is completed (Truck #4 is complete).

None of the drawings are currently classified as essential. A review of core sampling system drawings for classification as essential, support, or general is scheduled for FY-98. This

review will determine which drawings should be reclassified to meet new procedure HNF-PRO-242, "Engineering Drawing Requirements".

A walk down of Truck #3 was completed to verify work complete status of ECNs. As a result, 40 ECNs were signed off and an open item checklist has been initiated to resolve the status of non work complete ECNs.

The configuration of the exhauster primarily consisted of vendor drawings contained in the CVI file. Maintenance of configuration in the vendor files is cumbersome and has not been performed well. As a first step to establish configuration control for an exhauster, 19 new drawing sheets have been created and are being reviewed for release. The exhauster configuration will be completed during FY-98 to support rotary mode sampling.

During the ECN incorporation process a total of 147 ECNs were found to be work complete, however the ECN was not signed work complete. Several were identified as work complete in packages that were not closed due to post modification activities such as calibration. Other ECNs were either completed per J3's and were "outside of the system" or were actually ECNs that provided fabrication details and should not have been classified as modification work ECNs. CE is now tracking closure of the ECNs and is currently 30 percent complete. None of the ECNs were found in closed packages.

Work package preparation and post review is a significant activity for the cognizant engineers within CE. The table below represents the work package quantities which require cognizant engineer attention. Many packages are cycled through the CE cognizant engineers several times due to preparation reviews, work scope changes, and post review.

Month	Work Packages Incoming	Work Packages Outgoing	Remaining at Month End
March	No Data	No Data	37
April	41	51	27
May	43	29	41
June	122	125	38
July	69	53	54
August	58	53	59
Total for Period	333	311	59

2.5 RISER PREPARATION ACTIVITIES

Continued support was provided for evaluation of risers to be used for sampling activities. The files that document the riser preparation activity are maintained on the Hanford Local Area Network (HLAN), and can be accessed by anyone on HLAN. The files are maintained on file server AP012 in shared area ACTLOG. To access the information make a network connection to \\AP012\ACTLOG. The files are located in the RISERS directory.

The isolation of risers 11 and 11B on BY-107 was a major activity. Originally, the elevation of riser 11B was going to be lowered to allow core sampling of this riser without the use of a platform. The elevation would be lowered by replacing the existing 60" spool piece with a 29" spool piece. Excavation of the lower end of the installed spool piece found two of the four studs for attaching the spool piece missing from the riser 11 cover plate. In addition, high radiation fields around this riser complicated the installation of the shorter spool piece. After considering other attachment options, isolation of risers 11 and 11B became the best option because this riser is no longer required for core sampling, and there are two other available 12" risers on BY-107. The field work to accomplish the isolation was completed on June 24, 1997.

The investigation of riser 9B on 241-BY-101 as an option for obtaining a second core from the tank showed that welds on the top of the pit cover that hold the air sweep (old ventilation duct) in place would need to be removed before removing the air sweep. Removal of the air sweep and the installation of a new riser at this location is cost prohibitive and this option has been abandoned..

Several ECNs, USQs, and work packages were prepared to support sampling activities during this reporting period. The most significant work includes the following: Support of the Hanford Tanks Initiative effort to improve the waste estimate for tank 241-AX-104. Preparation of documentation to support the rotary mode core sampling of 241-SX-101 involving the temporary removal of the ENRAF and a pressure transmitter and also the permanent removal of the PVC riser liner from riser 4.

2.6 HANFORD TANKS INITIATIVE (HTI)

Characterization Engineering also contributed to the Hanford Tanks Initiative by supporting deployment of the Light Duty Utility Arm and assisting with the tank waste volume estimate for tank AX-104.

2.6.1 In-Tank Waste Volume Estimate

An in-tank campaign was completed with AX-104 on August 15, 1997. Video, magnetometer, thermocouple, and gamma probes/sensors were deployed. The campaign used risers 3-A and 9-A which had been used for past in-tank video taping work. In addition, two new risers were opened; riser 9-G and riser 9-E. A thermocouple and an ion chamber were used to measure temperature and gamma dose levels. Data for these probes was taken at 5 ft increments

from the top of the riser flange and with the probes either 1 foot above the surface or resting on the waste surface.

This campaign was unique in several ways. First, a magnetometer probe was used to sense waste thickness by setting the probe on the waste surface and sensing the proximity of the tank's steel bottom. Second, two new risers were opened which had never been used previously for in-tank work. Third, video taping the activity used two risers. An ancillary light source in one riser and the video camera in another to provide cross lighting and shadows that clearly showed the topography of the waste surface and tank bottom. And fourth, a video camera was used to record, from another riser, the launching of the magnetometer, gamma, and thermocouple probes, showing deployment and contact with the waste surface. The results of the volume estimate are contained in (LMHC 1997b).

2.6.2 Light Duty Utility Arm (LDUA)

The LDUA deployment continues to be delayed until the hold that (DOE-RL 1997a) placed on the LDUA field activities is resolved. The hold was placed on field activities because of DOE reservations as to the authorization basis for the LDUA deployment.

2.7 FLAMMABLE GAS AUTHORIZATION BASIS ISSUES

The authorization basis for Rotary Mode Core Sampling in Single Shell Flammable Gas Watch List tanks was revised. The Safety Evaluation Report (DOE-RL 1997b) provided DOE approval to use the flammable gas related controls in Standing Order 97-01, and the similar controls in (LMHC 1997c [BIO]), for all RMCS activities. These controls replaced specified flammable gas controls in SAD-035 and the equivalent Limiting Conditions for Operations (LCO) and Administrative Controls in (LMHC 1997d [OSR-005]). The changes to the authorization basis documents were formalized with ECN 173679 on August 8, 1997. Some of the flammable gas controls in SAD-035 and OSR-005 were maintained until the logic path can be clarified to replace them with the TSR flammable gas controls.

These changes simplify much of the controls applicability for RMCS. Although the remaining controls are still complex, most of the interferences that existed between the BIO/TSR/97-01/JCO controls and the SAD-035/IOSR flammable gas controls have been eliminated.

2.8 OTHER SIGNIFICANT EVENTS

2.8.1 Rotary Mode Core Sampling Delays

In 1990 rotary mode core sampling was suspended due to flammable gas, ferrocyanide and organic safety concerns with tank waste. Extensive testing was performed to establish a safe operating envelope. Resulting from the testing, purge gas was required to cool the rotary core bit

and remove cuttings. Because of the introduction of purge gas an exhauster is also required to mitigate fugitive emissions from the waste tank being sampled.

In 1993 a NOC (DOE-RL-1993) was approved by the Washington State Department of Health (DOH) for use of the exhauster with Truck #2. In November of 1994, Truck #2 was placed in service (with an exhauster) qualified to sample non-flammable gas tanks until August of 1995. In 1995 another NOC (DOE-RL 1995) was approved for use of exhausters with Trucks 3 and 4 (DOH 1995). In July of 1995, Truck #4 was placed in service (with an exhauster) qualified to sample non-flammable gas tanks and it operated for three months until flammable gas was detected in the drill string in October. Flammable gas upgrades to the Truck and exhauster; and development of a safety assessment, SAD-035, to sample flammable gas tanks began in November of 1995.

In May of 1996, a revised assessment of the core sampling activities was prepared and submitted to DOH to relax the requirements for emissions monitoring on the exhauster (DOE-RL 1996). In response to the revised assessment, the DOH approved the exhauster operations as Minor Stacks, (DOH 1996) however flammable gas issues still prevented deployment. In July upgrades to the exhauster to meet flammable gas requirements contained in SAD-035 began.

In December of 1996, following acceptance testing, the first indication of design problems with the exhauster were discovered during a calibration activity. The hydrogen detector failed to pass calibration due to cold ambient temperatures. While the exhauster was being redesigned to comply with SAD-035 it was also being scrutinized for inclusion in SAD-035 and a design description was prepared (LANL 1997). Later, in March of 1997, the design problem with NFPA qualification of components was identified and in April the HEPA filter housing was discovered to not comply with ANSI N509/510 as described in the NOC. In July, the NOC was revised to include a cost benefit analysis for noncompliance with ANSI and also included the SX exhauster (DOE-RL 1997d).

In July an agreement with DOE for use of Standing Orders for rotary mode core sampling was made to relax the flammable gas requirements (DOE-RL 1997b). A significant result of the agreement was the elimination of the need for flammable gas detection and allowing equivalency to be used instead of strict NFPA code compliance. A more thorough comparison is contained in the Safety Evaluation Report (DOE-RL 1997b). Later, in August, relief from the 4 tank limit previously imposed by (DOE-RL 1996), was authorized via (DOE-RL 1997c).

Also in July, the DOH response to the revised NOC maintained the requirement for ANSI compliance with two-stage HEPAs and the need for changes to the NOC to accurately describe the exhauster and HEPA train before the exhauster can be used to support rotary mode. The NOC was resubmitted in September, and the DOH approved the NOC for portable exhausters, but as major stack due to mainframe vs PC version of offsite dose conversion factor program (DOH 1997). The SX farm exhauster was not approved and DOH requested a separate NOC for the SX facility. The NOC for SX is still in draft form.

2.8.2 Occurrences

During this reporting period there was one occurrence related to engineering performance. Violation of the authorization basis controls for flammable gas watch list tanks occurred in SY tank farm. Truck #2 was deployed to sample tank SY-103 and was positioned within the exclusion zone of the tank breather filter. The investigation determined that the breather filter diameter was incorrectly specified in the package and supplemental work instructions were not consistent with the Standing Order controls. The report issued for the event is "RL-PHMC-TANKFARM-1997-0068". As a corrective action, an additional review of similar packages to verify compliance with controls and a step has been added in the work package for the cognizant engineer to sign off after a walk down of the job site has been implemented. In addition to the above, after the work package has been routed through the entire review and signature process, the work package will be returned to the CFE Manager for a final review of the work package for compliance with the Authorization Basis documents.

A contributor to the event was that CE efforts have been primarily focused on Facility Group 2 and 3 tanks, because there are only five Facility Group 1 tanks. There are added controls that are not written in the characterization operating procedures for Facility Group 1 tanks that must be accounted for in the work package.

3.0 PLANNED ACTIVITIES FOR NEXT REPORTING PERIOD

3.1 CORE SAMPLING

Several activities are planned for the next fiscal year. The modifications required for Truck #3 to comply with the authorization basis will be completed and tested. The exhausters will be modified to comply with the new operating requirements pending the approval of the NOC. The obsolete Hoffer flow meters on the truck purge gas systems will be replaced. Testing is also proposed to expand the operating envelope for core sampling by adjusting the drilling parameters and changing the sampler design for improved rotary mode recovery. The development of a specification for a large volume sampler is also proposed.

3.2 GRAB and VAPOR SAMPLING

Continued effort will be focused towards modifying the basic grab sampler assembly design to reduce dose exposure limits by 20%. Continued development of a procedure to obtain vapor grab samples from SHMS cabinets. A draft procedure was developed and the procedure was reviewed during continuing training held at the 300 Area.

3.3 RISER PREPARATION

Continued support will be provided throughout the next reporting period for riser identification and preparation for sampling activities. A significant activity includes the selection of risers for core sampling of 241-AZ-102. This tank will require more planning than normal because the waste in this tank is highly radioactive.

3.4 EQUIPMENT

Continued closure of all NEC compliance activities is expected during the next reporting period.

4.0 BUDGET SUMMARY

Current projections are that CE will finish the fiscal year slightly under budget. Uncertainty and changes in rates for enterprise company labor, changes in overhead and other rates applied by FDH, and uncertainty regarding the amount of expended but unbilled enterprise company cost have plagued accurate projection of actual cost throughout the year.

As identified in the mid-year budget review, increases in scope and cost associated with deploying the Rotary Mode Core Sampling System under SAD-035 and Standing Order on Flammable Gas, 97-01, resulted in offsetting reductions in other planned scope. These reductions included rescoping the writing of a Systems Design Description for RMCS Systems to producing a Design Compliance Matrix only, reducing the scope of analyzing PMCS and RMCS systems availability, reducing the budget available for updating core sampling equipment drawings, deferring the updating of the Safety Equipment List for Truck #1, reducing the support available for general troubleshooting and minor modifications, deferring structural/safety upgrades to the truck jacks, deferring correction of seal failure and contamination problem on the X Ray carts, and eliminating effort to convert a RMCS truck for Retained Gas Sampling. The replanning of scope and budget was recorded and approved in Change Request TWRS 97-050.

5.0 ENGINEERING

The overall schedule of Characterization Engineering activities at the end of the reporting period is included as Figure 23.

6.0 REFERENCES

DOE-RL 1993

"RADIOACTIVE AIR EMISSIONS PROGRAM NOTICE OF CONSTRUCTION, ROTARY MODE CORE SAMPLING TRUCK AND EXHAUSTER", DOE/RL-93-40 Rev. 0

- DOE-RL 1995 *"RADIOACTIVE AIR EMISSIONS PROGRAM NOTICE OF CONSTRUCTION FOR THE ROTARY MODE CORE SAMPLING SYSTEMS THREE AND FOUR"*, DOE/RL-94-118 Rev. 0
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- DOH 1995 Letter, A.W. Conklin, DOH, to J. E. Rasmussen, DOE-RL, *"NOTICE OF CONSTRUCTION FOR ROTARY MODE CORE SAMPLING SYSTEMS THREE AND FOUR"*, AIR 95-603, June 30, 1995
- DOH 1996 Letter, A.W. Conklin, DOH, to J. E. Rasmussen, DOE-RL, *"REVISED ASSESSMENT FOR THE ROTARY MODE CORE SAMPLING EXHAUSTERS"*, AIR 96-707, July 17, 1996, Letter of approval of

operation of the exhauster with periodic and confirmatory sampling (Minor Stack).

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- FGEAB 1997 "*Flammable Gas Equipment Advisory Board Interpretation / Recommendation Report*", FGEAB-97-029, Rev.3, September 12, 1997
- LANL 1997 "*Design Description of the Existing Exhauster to be Used with the Rotary Mode Core Sampler*" Los Alamos National Laboratory, June 1997.
- LMHC 1997a East and West Tank Farms Standing Order 97-01, Revision 3, *COMPENSATORY ACTIONS TO OPEN DISCOVERY UNREVIEWED SAFETY QUESTIONS (USQS)*, Lockheed Martin Hanford Company, September 2, 1997.
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- LMHC 1997c "*Tank Waste Remediation System Basis for Interim Operation*", HNF-SD-WM-BIO-001, Rev. 0, Lockheed Martin Hanford Company
- LMHC 1997d WHC-SD-WM-OSR-005 REV 0G, *SINGLE SHELL TANK INTERIM OPERATIONAL SAFETY REQUIREMENTS*.
- WHC 1995 "*Sampling Equipment Availability/Reliability Improvement, Engineering Task Plan*", WHC-SD-WM-ETP-171, REV. 0, Janicek, G.P., Westinghouse Hanford Company
- WHC 1996a "*Functional Design Criteria for Core Sampling in Flammable Gas Watch List Tanks*", WHC-SD-WM-FDC-048, Rev.0, Westinghouse Hanford Company
- WHC 1996b "*Safety Assessment for Rotary Mode Core Sampling in Single Shell Flammable Gas Watch List Tanks at Hanford, Washington*" WHC-SD-WM-SAD-035, Rev.0a, Westinghouse Hanford Company

APPENDIX

FIGURE 1: U-103 PMCS CORE PROFILE

FIGURE 2: BY-101 PMCS CORE PROFILE

FIGURE 3: BY-109 PMCS CORE PROFILE

FIGURE 4: T-105 PMCS CORE PROFILE

FIGURE 5: SY-102 PMCS CORE PROFILE

FIGURE 6: T-204 RMCS CORE PROFILE

FIGURE 7: T-203 RMCS CORE PROFILE

FIGURE 8: T-202 PMCS CORE PROFILE

FIGURE 9: T-201 RMCS CORE PROFILE

FIGURE 10: AW-103 RMCS CORE PROFILE

FIGURE 11: AW-105 RMCS CORE PROFILE

FIGURE 12: BX-110 RMCS CORE PROFILE

FIGURE 13: BX-111 RMCS CORE PROFILE

FIGURE 14: AW-104 RMCS CORE PROFILE

FIGURE 15: AP-105 RMCS CORE PROFILE

FIGURE 16: AX-103 RMCS CORE PROFILE

FIGURE 17: TRUCK 1 SAMPLE RECOVERY (10/1/96-9/1/97)

FIGURE 18: TRUCK 2, 3, 4 SAMPLE RECOVERY (10/1/96-9/1/97)

FIGURE 19: TRUCK 1 SAMPLING SYSTEM AVAILABILITY (FY-97)

FIGURE 20: TRUCK 2 SAMPLING SYSTEM AVAILABILITY (FY-97)

FIGURE 21: TRUCK 3 SAMPLING SYSTEM AVAILABILITY (FY-97)

FIGURE 22: TRUCK 4 SAMPLING SYSTEM AVAILABILITY (FY-97)

FIGURE 23: MASTER SCHEDULE FOR CHARACTERIZATION PROJECT
ENGINEERING

FIGURE 1

U-103 PMCS CORE PROFILE

FILE: U103.CRD
DATE: 4/22/97

Profile reflects primary parameters for each sample. Data may be adjusted given information such as previous water additions.

RISER #104 ELEV. 651.05'

RISER #104 ELEV. 651.05'

FIGURE 2

BY-101 PMCS CORE PROFILE

 FILE: BY101.CRD
 DATE: 7/19/97

Profile reflects primary parameters for each sample. Data may be adjusted given information such as previous water additions.

Operator noted that huck platform shook as force changed during segments. Empty samples are suspected to be due to blockage of bit. Numerous discarded hucks are visible on wicket surface below these levels.

Color Key

CORE Locations

Standard Labeling Convention

FIGURE 3
BY-109 PMCS CORE PROFILE

FILE: BY109.CRD
DATE: 7/11/97

Profile reflects primary parameters for each sample. Data may be adjusted given information such as previous water additions.

Standard Labeling Convention

CORE Locations

Color Key

FIGURE 4

T-105 PMCS CORE PROFILE

FILE: T105.CRD
DATE: 7/11/97

Profile reflects primary parameters for each sample. Data may be adjusted given information such as previous water additions.

FIGURE 5

SY-102 PMCS CORE PROFILE

Profile reflects primary parameters for each sample. Data may be adjusted given information such as previous water additions.

FIGURE 6

T-204 RMCS CORE PROFILE

FILE: T204.CRD
DATE: 4/22/97

Profile reflects primary parameters for each sample. Data may be adjusted given information such as previous water additions.

FIGURE 7

T-203 RMCS CORE PROFILE

FILE: T203.CRD
DATE: 5/6/97

Profile reflects primary parameters for each sample. Data may be adjusted given information such as previous water additions.

FIGURE 8

T-202 RMCS CORE PROFILE

FILE: T202.CRD
DATE: 5/20/97

Profile reflects primary parameters for each sample. Data may be adjusted given information such as previous water additions.

FIGURE 9

T-201 RMCS CORE PROFILE

FILE: T201.CRD
DATE: 5/20/97

Profile reflects primary parameters for each sample. Data may be adjusted given information such as previous water additions.

FIGURE 10

AW-103 RMCS CORE PROFILE

RISER #15A
ELEV. 687.75RISER #16B
ELEV. 687.75RISER #10A
ELEV. 687.75RISER #12A
ELEV. 687.75FILE: AW103.CRD
DATE: 5/21/97

Tank bottom contacted 5' each in both lines 15A and 16B.
 Gobbles not attached to profile during strike on segments 4 & 5 in 1989, therefore,
 only the solids will be sampled in this tank.
 3' bottom limit self-imposed on core 19A at bottom elevation opposite to 16A in error.

Profile reflects primary parameters for each sample. Data may be adjusted given information such as previous water additions.

FIGURE 11

AW-105 RMCS CORE PROFILE

Standard Labeling Convention

CORE Locations

Color Key

FIGURE 12

BX-110 RMCS CORE PROFILE

RISER #3 ELEV: 657.60'

RISER #6 ELEV: 657.07'

FILE: BX110.CRD
DATE: 08/18/97

Profile reflects primary parameters for each sample. Data may be adjusted given information such as previous water additions.

In-tank photos show debris on waste surface.

10/95 - Tank was Auger Sampled - dry crystalline waste in Riser #6
wet sludge / crystal mix in Riser #3

CORE 197 - Could not penetrate waste with 2900# in riser #3.

197-4 - HBD activated 13" into stroke on final sample.

CORE 197
5/19/97-5/19/97 EXPECTED PROFILE
RISERS #3 AND #6CORE 198
5/21/97-5/22/97

Standard Labeling Convention

CORE Locations

Color Key

TANK
BOTTOM
CENTER
ELEVATION
616.00'

FIGURE 13

BX-111 RMCS CORE PROFILE

 FILE: BX111.CRD
 DATE: 06/18/97

Profile reflects primary parameters for each sample. Data may be adjusted given information such as previous water additions.

FIGURE 14

AW-104 RMCS CORE PROFILE

FILE: AW104.CRD
DATE: 7/11/97

Profile reflects primary parameters for each sample. Data may be adjusted given information such as previous water additions.

TANK BOTTOM CENTER
ELEVATION 632.24"

FIGURE 15

AP-105 RMCS CORE PROFILE

RISER #24 ELEV: 678.12'

RISER #28 ELEV: 628.77'

FILE: AP105.CRD
DATE: 07/16/97

Profile reflects primary parameters for each sample. Data may be adjusted given information such as previous water additions.

CORE 208 - Undocumented 24" high spool piece on riser leads to failure to reach near tank bottom.
CORE 210 - Returned to riser 24 to sample deeper into waste.

FIGURE 16

AX-103 RMCS CORE PROFILE

FILE: AX103.CRD
DATE: 08/13/97

Profile reflects primary parameters for each sample. Data may be adjusted given information such as previous water additions.

FIGURE 17

Truck 1 Sample Recovery

FIGURE 18

Truck 2, 3, 4 Sample Recovery

FIGURE 19

Truck 1 Sampling System Availability (52 Week Period)

FIGURE 20

Truck 2 Sampling System Availability (52 Week Period)

FIGURE 21

Truck 3 Sampling System Availability (52 Week Period)

Weekly Average

Long Term Running Average

FIGURE 22

Truck 4 Sampling System Availability (52 Week Period)

Activity ID	Early Start	Early Finish	Total float	Resp Eng	Due date	1997												1998					
						JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG			
20A2404	06OCT97	17OCT97	-106	CRIDDLE																			
20A2405	20OCT97	24OCT97	-106	BOGER	23MAY97																		
PROV FLD SPRT FOR MODS/TROUBLE SHOOTING (N4H2B)																							
TRUCK JACK BRACKETS (KOSTELNIK)																							
20B2320	06SEP97A	12SEP97A		KOSTELNIK																			
20B2320A	12SEP97A	16SEP97A		KOSTELNIK																			
20B2320B	22SEP97A	02OCT97	-21	MOORE																			
20B2320C	03OCT97	08OCT97	-11	MOORE																			
20B2320D	03OCT97	08OCT97	-21	MOORE																			
20B2320E	09OCT97	22OCT97	-21	MOORE																			
20B2320F		22OCT97	-21	MOORE																			
20B2320G	23OCT97	29OCT97	-21	SHOEMAKE																			
PUMP SUPPORT STAND FOR SERVICE TRK(WILSON)																							
20B2321	24FEB97A	10OCT97	-13	COVERDELL																			
20B2322C	22AUG97A	26AUG97A		MOORE																			
20B2322D	27AUG97A	03OCT97	-13	MOORE																			
20B2322E	06OCT97	10OCT97	-13	FAB SHOP																			
20B2322F	13OCT97	17OCT97	-13	SHOEMAKE	30SEP97																		
MODIFY PUMP FOR SERVICE TRUCK (WILSON)																							
20B2323	29SEP97*	17OCT97	-31	AKERS																			
20B2323A	20OCT97	24OCT97	-23	AKERS																			
20B2323B	25AUG97A	24OCT97	-27	MOORE																			
20B2323C	27OCT97	30OCT97	-27	MOORE																			
20B2323D	20OCT97	22OCT97	-31	MOORE																			
20B2323E	23OCT97	05NOV97	-31	MOORE																			
20B2323F		05NOV97	-31	MOORE																			
20B2323G	06NOV97	12NOV97	-31	SHOEMAKE	30SEP97																		
INSTRUMENT MAINTENANCE PLATFORM (G. WILSON)																							
DOCUMENTATION (LOI'S & ETP'S)																							
20B2306	10MAR97A	08OCT97	-139	COVERDELL																			
SAF UPGRADE TO TRUCK JACKS (N4H2B) (KOSTELNIK)																							
DOCUMENTATION (LOI'S & ETP'S)																							
20B2402A	16SEP97A	29SEP97	-147	COVERDELL																			
20B2402B	30SEP97	13OCT97	-147	COVERDELL																			
20B2403	14OCT97	20OCT97	-147	HANS/BOGER																			

▲ PREP THE PROPOSAL (ON HOLD-NOT FUNDED IN FY 98)
 ▲ EVAL AND ISS TASK ORD (ON HLD-NOT FUNDED IN FY 98)
 ▲ DRAFT ECN NO. 631347 TO ADD WASHERS/SHIMS TO TRK JACK BRACKETS
 ▲ REVIEW, APPROVE & RELEASE ECN NO. 631347
 ▲ DRAFT WP NO. ES-97-492 TO INSTALL WASHERS/SHIMS
 ▲ REVIEW, APPROVE & ISSUE WP NO. ES-97-492
 ▲ BOM ISSUED
 ▲ BOM FILLED
 ◇ WP NO. ES-97-492 RTW
 ▲ INSTALL WASHERS/SHIMS TO TRK JACK BRACKETS
 ▲ REV & RLS ECN NO. 639119 TO FAB PUMP SPRT STAND
 ▲ BOM ISSUED
 ▲ BOM FILLED
 ▲ FAB PUMP STAND
 ▲ INSTALL PUMP & PUMP STAND
 ▲ DFT ECN NO. 626757 TO MOD PUMP FOR SERVICE TRK
 ▲ REVIEW & RELEASE ECN NO. 626757
 ▲ DRAFT WP NO. ES-96-929
 ▲ REVIEW, APPROVE & RELEASE WP NO. ES-96-929
 ▲ BOM ISSUED
 ▲ BOM FILLED
 ◇ WP NO. ES-96-929 RTW
 ▲ MODIFY PUMP FOR SERVICE TRUCK
 ▲ DFT & APPV ETP NO. 224 (ON HLD-DEFERRED FY 98)
 ▲ REVISE ETP NO. 213, REV 1
 ▲ APPROVE & ISSUE ETP NO. 213, REV 1
 ▲ ISSUE RFP (ON HOLD)

Project Start	01OCT94	▲	Early Bar
Project Finish	09MAR98	■	Target Bar
Data Date	29SEP97	■	Progress Bar
Run Date	30SEP97	■	Critical Activity

IEAC

NHC

IMPROVE EQUIPMENT AVAILABILITY

Current Schedule Layout

Sheet 2 of 5

Activity ID	Early Start	Early Finish	Total float	Resp Eng	Due date	1997						1998																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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Project Start	01OCT94	Early Bar
Project Finish	09MAR98	Target Bar
Data Date	23SEP97	Progress Bar
Run Date	30SEP97	Critical Activity

REAC

NHC

IMPROVE EQUIPMENT AVAILABILITY

Current Schedule Layout

Sheet 3 of 5

Activity ID	Early Start	Early Finish	Total float	Resp Eng	Due date	1997												1998																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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						MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
30A2217		15OCT97	-274	HANSON																		
30A2218	16OCT97	22OCT97	-274	HANSON																		
30A2219		20OCT97	-274	HANSON																		
30A2220		21OCT97	-274	HANSON																		
30A2221	21OCT97	27OCT97	-274	HERNANDEZ																		
30A2222		22OCT97	-274																			
30A2223	27OCT97	31OCT97	-274																			
30A2224		31OCT97	-274																			
UPGRADE SARR 31 (N4H1E) (SMALLEY)																						
ANNUAL REV TO SARR 31																						
DOCUMENTATION (LOI'S & ETP'S)																						
30A2203		22SEP97	-40	BOGER																		
30A2203A	23SEP97*	06OCT97	-57	SMALLEY																		
30A2203B	07OCT97	13OCT97	-57	HANS/BOGER																		
30A2203C	14OCT97	27OCT97	-57	SMALLEY																		
30A2203D	28OCT97	03NOV97	-57	BOGER																		
ANNUAL REV TO SARR-031 (BOGER)																						
30A2210	03MAY96A	23SEP97	-122	BOGER																		
30A2214	24SEP97	07OCT97	-122	NHC																		
RSLV SHLDED RCVR LDG OF X-RAY CART (WEBER)																						
SUMMARY SCHEDULE																						
30B2100	27FEB97A	31OCT97	-52																			
DOCUMENTATION (LOI'S & ETP'S)																						
30B2102	27FEB97A	23SEP97	-127	WEBER																		
30B2103	24SEP97	30SEP97	-127	BOGER																		
30B2104	01OCT97	14OCT97	-127	KOS/WEBER																		
30B2105	15OCT97	21OCT97	-127	BOGER																		
MOD ONE TRUCK FOR RGS SMP LG (N4H3B) (SMALLEY)																						
SUMMARY SCHEDULE																						
30B2200	23SEP97*	06JAN98	-200																			
DOCUMENTATION (LOI'S & ETP'S)																						
30B2202	23SEP97	06OCT97	-147	SMALLEY																		
30B2203	07OCT97	13OCT97	-147	BOGER/HANS																		
30B2204	14OCT97	27OCT97	-147	SMALLEY																		
30B2205	28OCT97	03NOV97	-147	BOGER																		
TRUCK 3 FLAMMABLE GAS MDS (N4H3B) (HANSON)																						
RMCST #3 OUTAGE (HANSON)																						
MAINTENANCE SCHEDULE																						
30B2410B	24JUN97A	10DEC97	274	SMALLEY																		

◇SUBMIT REV 1 TO 3rd TIER REVIEW (ON HOLD)
 ▲◇WRITE AND APPROVE ETP FOR SARR 31 (ON HOLD)
 ◇DFT RESOLUTION OF INEL REV 1 TO DOE-RL (ON HOLD)
 ◇RESOLUTION OF INEL REV 1 TO INEL (ON HOLD)
 ▲◇GENERATE SER REV 1 (ON HOLD)
 ◇INEL COMMENTS TO NHC/DOE (ON HOLD)
 ▲◇DOE-RL APPROVE SA REV 1 (ON HOLD)
 ◇REV 1 APPROVAL (ON HOLD)

◇LETTER TO RE-PLAN MILESTONE FOR FY-98
 ▲◇WRITE AND APPROVE ETP FOR SARR 31 (ON HOLD)
 ▲◇ISSUE RFP (ON HOLD)
 ▲◇PREPARE THE PROPOSAL (ON HOLD)
 ▲◇EVALUATE AND ISSUE TASK ORDER (ON HOLD)

◇REV TO WHC-SD-WM-SARR-031 (T-24-96-197) (ON HOLD)
 ▲◇APPROVE REV TO WHC-SD-WM-SARR-031 (ON HOLD)

▲◇ADD BELLOWS TO SHLD RECEIVER ON, X-RAY (ON HOLD)
 ◇WRITE AND APPROVE ETP NO. 223
 ▲◇ISSUE RFP (ON HOLD)
 ▲◇PREPARE THE PROPOSAL (ON HOLD)
 ▲◇EVALUATE AND ISSUE TASK ORDER (ON HOLD)

▲◇MODIFY ANOTHER TRUCK FOR RGS SAMPLING (ON HOLD)
 ▲◇WRITE AND APPROVE ETP (ON HOLD)
 ▲◇ISSUE RFP (ON HOLD)
 ▲◇PREPARE THE PROPOSAL (ON HOLD)
 ▲◇EVALUATE AND ISSUE TASK ORDER (ON HOLD)

◇COMPL FLAM GAS MDS FOR TRK 3
 (SEE TRK 3 SCHEDULE FOR DETAILS)

Project Start	31OCT94		Early Bar	IEEC	NHC IMPROVE EQUIPMENT EFFECTIVENESS Current Schedule Layout	Sheet 2 of 3
Project Finish	05MAR98		TARGET BAR			
Date Date	23SEP97		Progress Bar			
Run Date	30SEP97		Critical Activity			
© Primavera Systems, Inc.						

Activity ID	Early Start	Early Finish	Total float	Resp Eng	Due date	1997												1998																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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△ V REVISÉ & REVIEW ETP NO. XXX (ON HOLD)

△ V RESPONSE FROM MERRICK TO COST ESTIMATE

△ V CLOSE OUT DIRECTION TO MERRICK,

△ V PREPARE & ISSUE EDT TO SEND VENDOR INFO, TO FILE

◇ ISSUE ETP REVISION ON CLOSE OUT OF 2ND DET SYS

Project Start 31OCT94
Project Finish 05MAR98
Data Date 23SEP97
Run Date 30SEP97

Early Bar
TARGET BAR
Progress Bar
Critical Activity

IEEG

NHC

IMPROVE EQUIPMENT EFFECTIVENESS

Current Schedule Layout

Activity ID	Early Start	Early Finish	Total float	Resp Eng	Due Date	1997												1998													
						MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV							
CHARACTERIZATION EQUIP ENGINEERING (RAYMOND)																															
MANAGE SAMPLING EQUIPMENT (BOGER) (N4H1A)																															
SAMPLING MANAGEMENT FY 97																															
4J2005B	02JUN97A	14OCT97	241	JANICEK																											
4J2006	18JUN97A	16OCT97	239	SCOTT																											
4J2007	11FEB97A	23SEP97	256	SMALLEY																											
4J2013		22SEP97*	-121	BOGER/FRAT	31MAR97																										
4J2014		01OCT97*	-106	BOGER/FRAT	30APR97																										
4J2016		01OCT97*	-74	BOGER/FRAT	16JUN97																										
4J2017		01OCT97*	-64	BOGER/FRAT	30JUN97																										
4J2018		30SEP97*	0	SCHOFIELD	30SEP97																										
4J2019		30SEP97*	0	SCHOFIELD	30SEP97																										
4J2020		22SEP97*	257	BOGER/JENK																											
COG ENGINEER SUPPORT FY 98 (BOGER)																															
4J2021	12AUG97A	15SEP97A		BOGER																											
4J2022	16SEP97A	30SEP97	-1	BOGER	30SEP97																										
COMMITMENTS WITH NHC ACTION																															
MYPP MILESTONES																															
AD1.31		10OCT97*	-40	HANSON	14AUG96																										
OTHER MILESTONES																															
ADL1.12		30SEP97*	0	BOGER/FRAT	30SEP97																										
ADL1.10		09OCT97*	-35	HANSON	20AUG97																										

EXHAUSTER FLAM GAS DSGN/RE-VERIFICATION PHASE 2
 DEVELOP DCM FOR RMCS SYSTEM 41
 (FOR DETS;SEE SHIT 1 OF 4-SYS DESIGN DESCR RMCS)
 DVL DCM FOR FLMB GAS DET(PRE DEPLOY)(ON HOLD)
 REV DESK INSTR DI-75200-002-00 FOR ETP's.(HATS)
 (PHMC-TF-96-0025)
 ISS DESK INSTR MNL (ON HOLD-DEFERRED TO FY 98)
 SUBMIT COMMENTS FROM ALL DESK INSTR REVIEW
 (ON HOLD-DEFERRED TO FY 98)
 RELEASE REVISED DIs
 (ON HOLD-DEFERRED TO FY 98)
 ENGINEERING EVALUATION OF PM RQMTS FOR OTCs
 DEV ADMIN CONTS FOR HIGH DOSE SHLDED CARRIER SYS
 COST EST & DFT TASK PLAN FOR AZ-102 SMPLG SLUDGE

DETERMINE SCOPE OF SESC SUPPORT FOR ELECT COG
 ARRANGE FUNDING/TASK ORDER

QUAL FOR RMCS IN ACT VENT TKS (T24-96-158)

ORT-95-0099 (HATS) REDESIGN/UPGRADE TRUCK DESIGN
 TO MEET AGREED UPON NFFA/NBC CRITERIA
 QUAL FOR RTRY MODE SAMPLING (DNFSB 93-5)

Project Start	01OCT94		Early Bar	R/MC NHC CHARACTERIZATION EQUIP ENGINEERING Current Schedule Layout	Sheet 1 of 1
Project Finish	16OCT97		TARGET BAR		
Data Date	23SEP97		Progress Bar		
Run Date	30SEP97		Criticality Activity		

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	Characterization Engineering	Date 09/30/97
Project Title/Work Order		EDT No. 619129
CHARACTERIZATION EQUIPMENT ENGINEERING STATUS REPORT		ECN No. N/A

Name	MSIN	Text With All Attach.	Text Only	Attach./Appendix Only	EDT/ECN Only
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DESH

WM FUNDERBURKE	R2-38	X			
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FDNW

BL COVERDELL	S7-12	X			
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LMHC

JR BIGGS	S7-03	X			
CB BRYAN	S7-01	X			
GJ BURTON	T4-07	X			
GP JANICEK	S7-12	X			
TJ KELLEY	S7-21	X			
JG KRISTOFZSKI	R2-12	X			
MA PAYNE	S7-84	X			
RS POPIELARCZYK	R2-38	X			
RE RAYMOND	S7-12	X			
WE ROSS	S5-07	X			
JS SCHOFIELD	S7-12	X			

NHC

RM BOGER	S7-12	2X			
M CREMONINI	H5-61	X			
PR DEICHELBOHRER	S7-12	X			
PA HAINE	R3-47	X			
DF HICKS	H6-11				
CG LINSCHOOTEN	S7-12	X			
RW MATTICHAK	R3-25	X			
TE RAINEY	H6-12	X			

RL

JF THOMPSON, JR	S7-54	X			
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SESC

JC AKERS	S7-12	X			
JD CRIDDLE JR	S7-12	X			
CE HANSON	S7-12	X			
BR JOHNS	S7-12	X			
AJ KOSTELNIK	S7-12	X			
KV SCOTT	S7-12	X			
JL SMALLEY	S7-12	X			
GW WILSON	S7-12	X			
CENTRAL FILES	A3-88	X			