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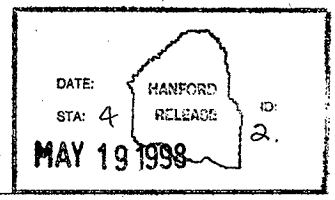
Abstract: The attached report identifies the activities of the Characterization Engineering organization for the time period of January through March 1998.



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CHARACTERIZATION ENGINEERING STATUS REPORT

JANUARY 1998 - MARCH 1998

HNF-2694
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Prepared By:

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COGEMA Engineering Corporation

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TABLES

FIGURES

EXECUTIVE SUMMARY

Characterization Engineering (CE) continues to make progress in support of the project goal of characterizing the Hanford high-level waste tanks. Four core sampling systems were operational during this reporting period--push mode core sample system #1 and rotary mode core sample systems #2, #3, and #4.

The availability average for all core sampling systems increased to 46 percent from the last quarter average of 43 percent. Six tanks were core sampled during the reporting period and 72 samples were retrieved. Average sampler recovery for system #1 was 76 percent, below the performance goal of 80 percent. The systems #2, #3, and #4 goal of 60 percent was satisfied by overall recovery of 77 percent.

This reporting period included the completion of modifications to Exhauster C for rotary mode core sampling (RMCS) and successful Acceptance and Operational testing. The portable exhauster was upgraded to "Major Stack." All of the permit issues were resolved and the exhauster will be deployed when the Readiness Review is complete.

During this reporting period significant progress was made in other areas as well. Grab Sampling retrieved samples of waste from fifteen tanks. Vapor Sampling was utilized in determining the passive tank ventilation rates for six tanks. The issues with the Authorization Basis for the Light Duty Utility Arm (LDUA) were resolved, and preparations for a Readiness Review have begun.

New work identified during the quarter involves CE personnel supporting the Tank Farms Privatization Initiative (Hanford Tanks Initiative [HTI]), with the design of the sampling system, the nested fixed depth sampler, for the verification of waste qualities prior to shipment to the vitrification contractors.

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 and other programs and projects supported by Characterization Project.

2.0 HIGHLIGHTS FOR REPORTING PERIOD

This report statuses the activities and plans accomplished by CE for the period from January 1, 1998, through March 31, 1998.

2.1 CORE SAMPLING

2.1.1 Tanks Sampled

During this reporting period, two rotary trucks and one push mode truck system were used to obtain core samples from six Hanford waste tanks. Table 1 shows that 30 core samples were obtained from two risers in 241-AX-101 with the push mode of operation. Four core samples were obtained with Truck #2 in two TX-104 risers. Both recovery modes were used with Truck #3 in tank SX-101 to obtain the equivalent of 15 core samples from two risers. The mode of recovery was based on several parameters, including the hardness of the waste, waste moisture, etc. The samples from riser 19 of tank SX-101 were obtained during the closing of the last quarter, but were not processed in time to be included in the last quarter's report. In addition, data for core samples obtained from tanks SX-105, TX-118, and S-102 were not received in time to be included in this report.

Table 1. Tank Core Summary

Truck Number	Tank Sampled	Tank Riser	Core Segments	
			Push Mode	Rotary Mode
1	241-AX-101	9D	15	
		9G	15	
2	241-TX-104	9A	2	
		13A	2	
3	241-SX-101	4	4.5	2.5
		19(1)	4	4

(1) Core samples obtained at the close of last quarter, but not processed.

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. The graphic files of the tank profiles are located on server \\AP012\ACTLOG\ in directory COREPROF.

2.1.3 Sample Recovery

The core profiles for each tank in Table 1 are shown in Figures 1 through 3. The core samples for tanks AX-101 and TX-104 were all obtained using the push mode of recovery. Core samples from both riser 19 and riser 4 of tank 241-SX-101 were obtained using both push and rotary modes of operation. A number of parameters, including suspected waste hardness, moisture content, and past core history, were used to control the coring mode. In general, push mode was used with the softer, moister materials, and rotary mode with harder, dryer materials.

Figure 1 shows the core profiles for the samples recovered from AX-101 using Truck #1. The two cores, each having 15 segments, were obtained from risers 9D and 9G of AX-101. Excellent sample recovery was made in the moist salt cake and slurry materials (moist salt cake, liquid and salt slurry materials). With the exception of segment 7 in riser 9G and segment 1 in both 9D and 9G, all recoveries were above 80 percent. The average recovery from riser 9D is 95 percent, while the average recovery from riser 9G is 87 percent.

The low waste level in TX-104 allowed only two segments to obtained from risers 9A and 13A in TX-104, as shown in Figure 2. The average recovery for riser 9A was 92 percent, while the average recovery in riser 13A was 83 percent. The material recovery for the bottom segment in both risers was strongly affected by material hardness. High down-force limits were experienced in both bottom segments. Water, added to riser 19 in an attempt to soften the waste, did not improve recovery.

Figure 3 shows that both push and rotary modes were used in tank SX-101 core sampling. Sampling was started in riser 19 using the rotary mode. However, after x-rays showed segments 1 and 2 to be empty, recovery was switched to push mode until a high down-force limit was experienced. Push mode was used to recover a core sample when the sampler ball valve stuck for segment 5. Rotary mode was used to complete the core sampling. For riser 4, push mode was initially used until a high down-force was experienced. Rotary mode was used to finish sampling. However, coring was terminated when the penetration rate alarm was experienced at core segment 7. Sampling was abandoned due to low penetration rate problems.

2.1.3.1 Push Mode Core Sample Truck #1

The current recovery performance of Truck #1 is shown in Figure 4. This figure shows the individual segment recovery for the last 100 core samples, the 80 percent recovery goal, and the running average of the last 100 core segments. Although the average segment recovery is below the 80 percent goal, the recovery level is nearly constant. The last 100-sample average, as of February 13, 1998, is 76 percent, which is a 1 percent drop from the last quarter final recovery value of 77 percent.

2.1.3.2 Push Mode Core (Sample Truck #1) Recovery Analysis

Figure 5 shows the same recovery data, but with additional data added to indicate the number of segments per core, retained gas samples, and the first and last core segments. An analysis of Figure 5 shows:

- Overall, 67 percent of the samples have recoveries greater than 80 percent and 33 percent less than 80 percent.
- For samples with less than 80 percent recovery, 6 percent were first segment samples, compared with 5 percent for samples above the 80 percent goal.
- For samples with less than 80 percent recovery, 6 percent are last segment samples, compared with 5 percent for samples above the 80 percent goal.
- For samples with less than 80 percent recovery, 10 percent are retained gas samples (RGSs), compared with 7 percent above the 80 percent goal.

The first and last core segments have not been a major factor in the material recovery for Truck #1. However, the type of waste material in the cores has had an impact on recovery. The high sample recoveries from the 30 segments in tank AX-101 have a strong influence on the overall recovery performance of Truck #1. Twenty of the 30 segments had recovery greater than 95 percent. An examination of the waste materials that the 222-S Laboratory identified in the cores from tank AX-101 (risers 9D and 9G) shows that 11 of the 30 segments contained liquid with salt slurry as a secondary material. More than nine of the 11 liquid samples had recoveries above 95 percent. Half of the 30 core segments were moist salt cake, and 11 of them had recoveries over 95 percent.

Figure 6 shows the average recovery for the last 100 samples grouped according to the major material category that was identified during segment extrusion in the 222-S Laboratory. The number of segments for each material category is also shown. The segment materials are not identified in the 222-S Laboratory for the RGS samples. An analysis of Figure 6 shows:

- Sample recoveries for liquid, sludge slurry, salt slurry, moist salt and dry sludge materials are all above 80 percent.
- Sample recoveries for wet sludge, wet salt cake, and RGS are between 60 percent and 70 percent.
- Sample recovery for dry salt cake is the poorest with a 33 percent recovery rate.

Although individual values have changed slightly, the relative levels for the material recoveries is basically the same as reported last quarter.

The decline in the core materials recovery for Truck #1 is due to the harder materials being encountered in the last 100 tanks that were cored. A summary of the materials for the last 200 core samples from Truck #1 is shown in Figure 10. This graph compares the materials identified by the 222-S Laboratory in the last 100 PMCS cores with materials identified in the previous 100 PMCS cores. The major difference is the number of liquid samples which, as previously indicated in Figure 6, have the highest average recovery of all materials (except for the single dry sludge sample). Figure 10 shows that for the previous 100 cores, 45 of the samples were liquid (accounting for nearly ½ of the cores) while for the last 100 cores, the number of Liquid samples dropped to 22 (accounting for less than 25 percent of the samples).

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

The current recovery performance of Truck #2, #3, and #4 is shown in Figure 4. No tanks were sampled using Truck #4 during the last quarter, as this truck was in maintenance during the whole reporting period. The average recovery of the last 200 segments is 77 percent, which is 1 percent higher than the average reported last quarter. A comparison of Figures 6 and 9 (Sample Recovery Summary for Truck #1 and for Trucks #2, 3, and 4) shows that both core modes are having similar recovery problems, with the exception for moist salt cake materials where PMCS appears to have a significant edge. The RMCS has lower recoveries for all waste materials except for wet sludge and wet salt cake materials.

2.1.3.4 Rotary Mode Core Sample Trucks #2, #3, and #4 Recovery Analysis

Figure 8 shows the same recovery data as for Figure 7, except that first and last segments are marked, and the number of segments per core is shown. An analysis of Figure 8 shows

- Overall, 76 percent of the samples have recoveries greater than 60 percent (actually greater than 70 percent) and 24 percent are less than 60 percent.
- For samples with less than 60 percent recovery, 5.5 percent are first segment samples, compared with 8.5 percent for samples that are above the 60 percent goal.
- For samples with less than 60 percent recovery, 3.5 percent are last segment samples, compared with 13.5 percent for samples above the 60 percent goal.

Figure 9 shows the average recovery for the last 100 samples grouped according to the major material category that was identified during segment extrusion in the 222-S Laboratory. The number of segments for each material category is also shown. An analysis of Figure 9 shows

- Moist salt cake and dry salt cake materials continue to have average recoveries that are below 60 percent.
- Similar to Truck #1, dry salt cake recovery has the lowest recovery.

To date, the total cores obtained with Trucks #2, 3, and 4 is 292. Figure 11 shows a material comparison (core material identified by the 222-S laboratory during extrusion) of the last 146 cores with the previous 146 cores for Trucks #2, 3, and 4 (similar to Figure 10 for Truck #1). The major differences between these groups of cores is the number of liquid and dry salt cake cores taken. Over 30 percent of the previous 146 cores were dry salt cake compared with less than 15 percent for the most recent 146 cores. Figure 9 shows that the average recovery for dry salt cake is less than 50 percent. Nearly 45 percent of the most recent 146 cores were liquid while the previous 146 had less than 25 percent liquid materials. Figure 9 shows an average recovery of about 85 percent for liquid materials. The differences between the first 146 and last 146 cores appear to offset each other as there is no significant changes in core materials recovery for Trucks #2, 3, and 4. Figure 8 shows that the average recovery is between 70 and 80 percent.

2.1.4 Core Sampling Equipment Availability

As reported previously, the working definitions for availability and reliability of sampling equipment have been established (Janicek 1995). 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 66 percent for System #1, 63 percent for system #2, 23 percent for system #3, and 19 percent for system #4. All four systems combined for 46 percent availability for the reporting period, up 3 percent from the previous quarter. The data is shown graphically in Figures 12 through 15.

Truck #1 was in service for the entire period. The truck was frequently down for repairing tangled cables and with purge system problems.

Deployment of Truck #2 was delayed for six weeks during this period for dome loading analysis required prior to deployment. When finally placed into service, the truck was down for short periods when purge gas was unavailable due to Nitrogen Trailer repairs.

Truck #4 was removed from service for calibration and preventive maintenance in January and remained out for 10 weeks.

Truck #3 started the period "out of service" for upgrades to comply with the Authorization Basis (AB). The upgrades were completed in January which allowed the truck to replace Truck #4 when it was removed from service for calibrations.

A new procedure, "Response to Off-Normal Conditions During Core Sampling Activities," (TO-02004) has been developed to be used when the trucks break down. The procedure will reduce down time and J-7 writing by allowing trouble shoot and repair via written instructions for commonly occurring problems.

2.1.5 Core Sample Truck Modifications

Truck #1 did not receive any modifications during the reporting period, and there are no modifications pending for AB compliance. Design improvements to be performed include 1) addition of kick plates and improved gates on the railing, 2) improved grapple slack cable detection and shielded receiver hole cover installation, 3) air compressor upgrade, 4) crane pendant control upgrade, 5) traverse hydraulic check valve installation, and 6) other minor modifications.

Truck #2 did not receive any modifications during the reporting period, and there are no modifications pending for AB compliance. Design improvements to be performed include 1) shielded receiver hole cover installation, 2) digital valve replacement on hydraulics, 3) alarm by-pass switch replacement, 4) crane pendant control, 5) purge gas control valve installation, 6) corrections of NEC violations, 7) oxygen monitor removal, 8) hydraulic filter installation, 9) outrigger shim installation, and 10) other minor modifications.

Acceptance testing of Truck #3 was completed for previous modifications to comply with flammable gas requirements per Leach 1997. Design improvements remaining to be performed include 1) crane pendant modification and shielded receiver hole cover installation, and 2) other minor modifications.

Truck #4 did not receive any modifications during the reporting period, and there are no modifications pending for AB compliance. Design improvements to be performed include 1) crane pendant modification and shielded receiver hole cover installation, and 2) other minor modifications.

2.2 GRAB SAMPLING

Grab Sampling has currently sampled fifteen of the eighteen tanks on the Baseline Sampling Schedule, Rev 5.3. The work packages for the three delayed tanks are either approved or waiting approval from the Work Authorization Review Team..

Privatization has reassessed their sampling needs and have reduced the sample volume size for several upcoming tanks. The reduced sample size for these tanks results in a reduction of the calculated number of tanks to be sampled. So far, the reduction in sample volume has resulted in a loss of three tanks from the required thirty tanks in the performance agreement for FY-98, T01-98-116. Other tanks may have to be added to the schedule to account for this reduction. The other tanks on the schedule are on hold. They can not be sampled until East Tank Farms has either completed transfers to them or added caustic. The sampling of AZ-101 has been placed on hold due to budget overruns on the mixer pump study and delays in the mixer pump Readiness Review. This hold results in an additional seven tanks not available to count towards the performance agreement.

The grab sampling procedures have been updated to comply with the latest revisions of LMHC 1997a (BIO), LMHC 1997b (TSRs), and LMHC 1998 (Writer's Guide).

The grab sampling equipment has been expanded to include a 60 ml sampler assembly. It was successful in obtaining samples in S-302C catch tank. The Finger Trap Sampler has been successful in obtaining samples from C-202, AX-102, and SX-115.

Testing for qualification of acceptable conductive spray or paints to be applied to non-conductive surfaces that would not wash off over a period of time has been completed. The Flammable Gas Equipment Advisory Board (FGEAB) is reviewing the test results. Preliminary comments from the FGEAB indicate that the coatings are acceptable. A formal report is forthcoming. The use of the new coatings will allow considerable savings in fabrication of components from PVC and plastics instead of steel.

2.3 STANDARD HYDROGEN MONITORING SYSTEM SAMPLING

Procedures have been updated to the latest revision of the Writers Guide. TWRS Characterization has continued to set the sample schedule requirements on a month-to-month basis on which Standard Hydrogen Monitoring System (SHMS) are to be sampled. All SHMS cabinets called out to date have been sampled for the month assigned. This program started in October 1997.

2.4 VAPOR SAMPLING

Six tanks have been injected with tracer gases and sampled periodically to determine the natural breathing rate and/or whether the cascade pipelines are opened or plugged. Equipment was designed and installed on four of these tanks to perform tracer gas injection and sampling through the breather filter. This new method allows other activities to take place in a riser that would otherwise have tracer gas equipment installed on it.

An automated data collection system has been installed on a Double-Contained Receiver Tank (DCRT). This continuous monitoring system was installed on an uncontaminated isolated underground storage tank to determine a baseline for single-shell tank breathing rates.

Four additional DCRTs will be injected with tracer gases to characterize the tank headspace gas composition and ventilation rate. This information will be used to support the safety analysis and closure of the Flammable Gas Unreviewed Safety Question for the DCRTs. Engineering Change Notices (ECN) are being prepared to install the equipment needed to perform two of these upcoming tracer gas samples.

2.5 OTHER EQUIPMENT MODIFICATION AND DEPLOYMENT

2.5.1 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. NEC corrections are nearly completed on the purge air compressor. Three generators and a portable air compressor remain to have NEC corrections made. Work progress in the field has been slow due to lack of craft resources.

The new spare portable generator sent back to the vendor for repair of an overheating problem has been repaired. A test report and an Acceptance for Beneficial Use (ABU) will be issued prior to field deployment.

ECNs have been issued to close out two projects that will not be accomplished. These two items are the construction of a fourth distribution trailer and the modification of service trailer #2. Lack of planning and craft resources are delaying the final closure of these two projects.

2.5.2 Exhauster

The RMCS Exhauster C was modified, and the ATP was completed during the period. The modifications included replacement of the HEPA filter housing and upgrade of the emissions monitoring equipment to comply with "Major Stack" requirements. New monitoring equipment includes a continuous air monitor for detecting beta and gamma particulates and a new isokinetic sampling probe for the Record Sampler. The modifications to Exhauster C will be completed during the next reporting period. Modifications to Exhauster B began during the period.

2.5.3 Support Equipment

Several new pieces of equipment for operational improvements were designed during the period. A new sixteen-inch riser adapter was designed specifically for core sampling from four different locations in a single sixteen-inch riser. The Grapple Hoist Test Stand was redesigned, and a drawing was created to document the configuration. The redesign eliminated excess forces from the thrust bearing which caused bearing deformation and inaccurate force readings. Modifications to the Supernatant and Sludge Sample Table were analyzed to ensure that the structural capability was not reduced. The modifications were documented.

A limited amount of testing was completed to identify improvements that could be made to the design of the current RMCS drill bit to improve penetration in hard wastes. The testing was requested after the RMCS system was shutdown for low penetration rate in the waste near the bottom of tank SX-101. Several prototypes were tested, and two designs show significant improvements over the current bit in side-by-side testing. The new designs will require further testing to ensure they can be operated within the established safety limits for RMCS.

CPO has expressed some interest in improving the performance of the Remote Latch Unit (RLU) especially on Truck #1. Some instances have been reported that release of the sampler (especially in the Onsite Transfer Cask) has taken too long to complete (i.e., 15 min).

The leading factor in the slow actuation of the RLU is the seals taking a "set." Set is the phenomenon in which the seal-metal friction is greater after the RLU remains inactive for extended periods. Seal set becomes less of a factor when the RLU responds more quickly. Consequently, orifices of different speeds are being evaluated. Three experimental orifices were tested in a remote latch unit to assess the utility of different RLU response times. The RLU with the new orifices are two to four times faster than the existing RLU. Two, intermediate-speed, orifices have been fabricated to see if the response time could be optimized. Testing will begin as soon as CPO has man power available.

Other factors in RLU performance include the Truck #1 RLU control system. The concept of reducing the slack detector dead band by replacing the micro switch with a shaft encoder is being pursued. Insufficient fluid in the RLU could also be a problem. Operations would like to be able to add fluid easily, e.g., with a hypodermic needle. Modifications so that fluid could be added in the field by means of a hypodermic syringe are being developed. It is planned to install a rubber septum in the Release Cone which can be penetrated by a long-needle syringe. Prototypes have been assembled and testing is pending.

The emergency lighting upgrade, other lighting safety concerns, and receptacle FEB concerns in the 2101HV warehouse have been completed. Testing of the emergency lights still remains to be completed. Field work has been started to replace the crane pendants on the core sample trucks with weatherproof pendants to resolve a safety concern.

2.5.4 Samplers

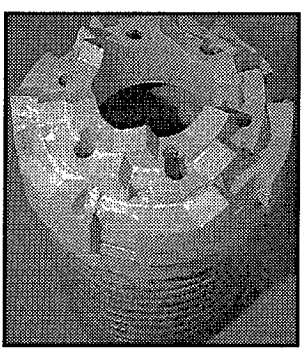
The firm GSC has experienced difficulty in meeting the cast finger design requirements and tolerances. GSC suggested a machining operation on the casting to achieve the tolerance and the cost of the quadralatch fingers when machined increased 50 percent. The fabrication shop requested that quadralatch fingers not be purchased from GSC based on their performance to date and their price. The order for quadralatch fingers from GSC was reduced from 1700 to 700 pieces, and the lead time has been reduced from 18 to 14 weeks. Additionally, a new order for 1000 fingers has been placed with SeaCast. Delays did not impact sampling schedule.

An ECN to machine a series of grooves in the barrel of the retained gas sampler is being processed. The grooves will facilitate measuring the actual volume of the sampler by providing a reference for scale on the radiographs. The ECN also changes the means of connecting the cable to the cable pistons. An improved swaging process will be employed instead of laser welding.

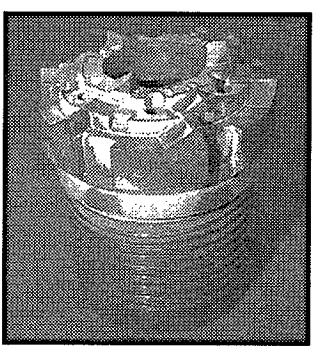
2.5.5 Rotary Bit Development

Sampling in tank SX-101 was halted when the penetration rate requirement of .75 inch/min was not satisfied. In anticipation of other tanks with hard waste, limited testing was performed to find a bit design that would produce higher penetration rates under the same operating conditions. Approximately 20 different configurations were tested, and two new bit designs showed nearly double the penetration capability in the simulant that was available.

Further side-by-side testing for comparison to the standard bit is in progress. The testing includes 1) bit temperature increases at low penetration rate for the AB operating envelope, 2) bit penetration less than $^{1}/_{16}$ into steel plate, 3) and a performance test to compare capabilities at higher down-forces. Program decisions on whether to qualify the new bit design are dependent upon the results of the comparison test. Photos of the bits are included below.



Standard RMCS Bit



Prototype RMCS Bit

2.5.6 Onsite Transfer Cask

The Onsite Transfer Cask (OTC) Safety Analysis Report for Packaging (SARP) (McCoy 1998) review and update was completed during February 1998, and ECN 640858 was released by Waste Management Northwest on February 26, 1998, as direct revision 1-C to the SARP document.

During the SARP review process, many unincorporated ECNs to the OTC fabrication drawings were discovered. When the ECNs were evaluated as a requirement set, a potential for configuration discrepancies was determined to exist, and a field walkdown of all OTCs was performed. There are 126 OTCs currently in the CPO inventory database, and the walkdown was able to examine 119 units. Of the seven OTCs not examined, three are listed in the data base as "location unknown," and the remaining four are locked in the T-Plant canyon for decontamination at a later time. Of those OTCs that were examined, all appear to agree with the design documents, although a documentation problem was found to exist because several ECNs incorrectly indicated applicability where it was not appropriate. ECNs 639160 and 639161 are

being prepared to correct the applicability problem. The configuration of two of the OTCs was found to be noncompliant with the SARP, and they were tagged "Out of Service" in the CPO inventory database. The 2 casks have not been used for waste shipments since the configuration was established in 1995.

2.6 CONFIGURATION CONTROL

Selected drawings for Trucks #3 and 4 and the exhausters are being as-built to improve configuration control. Funding is not authorized for upgrade of the other drawings.

Progress this period includes the following:

- 58 new sheets have been released, for a total of 959.
- approximately 28 drawing sheets have been revised with ECNs incorporated, and an additional 10 drawings are currently being reviewed for release.
- 51 new drawing sheets have been released for Exhauster B.
- 33 sheets of new drawings are being prepared for Exhausters B and C.
- 51 sheets of exhauster drawings for the Interlock Carts and Sampler Spool Piece have been voided.
- 24 ECNs were released (16 requiring modification, 8 to correct specifications and as-built).
- 13 ECNs were signed "Work Complete."

The breakdown of drawings is shown in Table 2 below with the current status of all core sampling drawings.

Currently, all sheets of Truck #3 and #4 drawings that are affected by more than five ECNs are being updated. The drawings will be released when the ECNs for Truck #3 flammable gas modifications are signed work complete. As part of the Basis for Interim Operation (BIO) implementation, 20 sheets of Truck #1 drawings are in final review.

An Engineering Study is being prepared that will result in classifying the remaining core sampling system drawings as essential, support, or general. Currently two of the support equipment electrical panel board drawings are classified as essential.

Table 2. Core Sampling Configuration Status

Equipment	Sheets with > 10 ECNs	Sheets with >5 ECNs	Sheets with < 5 ECNs	Total Sheets with ECNS	Sheets with 0 ECNs	Total Drawing Sheets
Trucks 3 & 4	0	2	53	55	243	293
Truck 2	3	31	112	148	86	212
Truck 1	1	7	45	72	23	112
Truck 1 & 2	3	8	26	37	14	54
Support/Ancillary	0	21	103	124	55	229
Exhausters	0	5	10	29	7	37
Exhauster C only	0	0	2	17	5	22
TOTALS	7	74	351	482	433	959

All ECNs that are work complete have been signed as work complete. Table 3 below represents the status of drawings and ECNs with modification work pending, in process, or with ECNs not signed "Work Complete."

Table 3. ECNs with Work Pending or in Process

Equipment	Sheets	ECNs
Trucks 3 & 4	43	22
Truck 2	73	27
Truck 1	34	24
Truck 1 & 2	17	15
Support/Ancillary	72	73
Exhausters	23	30
Exhauster C only	17	8
TOTALS	279	199

2.7 WORK PACKAGE REVIEW

Work package preparation and post review is a significant activity for the cognizant engineers within CE. Table 4 below represents the work package quantities that required cognizant engineer attention. Many packages are cycled through the CE cognizant engineers several times due to preparation reviews, work scope changes, and post review.

Table 4. Work Package Reviews

Month	Work Packages Incoming	Work Packages Outgoing	Remaining at Month End
January	30	19	46
February	17	15	48
March	33	19	62
Total for Period	80	53	62

2.8 RISER PREPARATION ACTIVITIES

Evaluation continued of the risers that can be used to support 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.

Because of a shortage of available risers on tanks SX-101 and SX-106, ECNs were prepared during the first quarter to temporarily remove the ENRAF and pressure transmitter, and to permanently remove the PVC riser liner for these tanks. The ENRAFs were removed during the first quarter, the tanks were core sampled, and the ENRAFs were reinstalled and returned to service during the second quarter.

ECNs to allow similar modifications to tank U-109 were prepared during the second quarter. Tank U-109 was previously sampled, but a retained gas core sample is needed to complete the analysis of the waste in this tank. Since a retained gas core sample should be obtained from a previously unsampled riser, the ENRAF will be temporarily removed from riser eight to allow core sampling of tank U-109.

Several other ECNs were prepared during the reporting period. These ECNs were required to resolve open items. Temporary ECNs were written to support core sampling of tanks TX-109 and BX-110. A supplemental ECN to support core sampling of tank BY-111 were canceled because the modifications are no longer required. A supersedure ECN was prepared for tank BY-110 to document the existing configuration of level instruments on this tank. Supplemental ECNs for the removal of a spool piece from tank SX-105, and the installation of reducers on tank T-105 were prepared to document the existing configuration on these tanks.

Preparation for the core sampling of tank AZ-102 continued. Risers 15I and 22A were identified as the sampling risers on this tank. Sampling of riser 15I will require temporary removal of the shield plug from this riser. Sampling of riser 22A will require the temporary removal of the level instrument and a shield plug from this riser. Currently, there is an FIC level gauge installed in riser 22A, which will be replaced with an ENRAF level gauge. Coordinating the gauge replacement with the core sampling activities will minimize equipment moves and radiation exposure on tank AZ-102. The current plan allows the core sampling of riser 22A to occur after the FIC is removed, but before the ENRAF is installed.

2.9 CHARACTERIZATION OF TANK AZ-102.

The scheduled start date for sampling AZ-102 is now "mid-June." This new schedule depends on the release of the DQO and the Tank Sampling Advisory Panel decisions.

Several tools were designed specifically for core sampling tank AZ-102. The tools are 1) Remote Kamlock Attachment Tool, 2) Onsite Transfer Cask (OTC) Cap Tool, 3) OTC Handling Tool, 4) Change-out Valve Operation Tool, and 6) a Lead Blanket Hanger.

For training, CPO created a full-scale field mockup of the AZ-102 sampling arrangement at the Rock Slinger Pit. The mockup was used to test the available sampling tools, and to confirm the location and thickness of any temporary shielding that may be needed. After a full walk through of the sampling process, CPO identified several additional tools that would be needed, but concluded that no further mockup training would be necessary. Some of the tools mentioned above resulted from this training.

The sample date for AZ-102 continues to slip. Four Data Quality Objective (DQO) documents are required to establish the sampling requirements for the following:

- High Level Waste (HLW) for Waste Feed Delivery,
- Low Level Waste (LLW) for Waste Feed Delivery,
- High Level Waste (HLW) for the Waste Integration Team (WIT), and
- Low Level Waste (LLW) for the Waste Integration Team (WIT).

None of these DQOs have yet been approved, and their approval schedules continue to slip. AZ-102 sampling is now tentatively scheduled for mid-June 1998, but if the required DQOs are not available to support the schedule, AZ-102 sampling may be pushed into FY-99.

2.10 NESTED, FIXED DEPTH SAMPLING SYSTEM

The final treatment of the Hanford High Level Waste (HLW) and Low Activity Waste (LAW) tank wastes will be completed through a privatization contract. The privatization contractor(s) will be responsible for waste separation/treatment and glassification, but the Hanford Site has the responsibility of supplying waste feed materials in a suitable condition and within a scheduled time interval.

The transfer of HLW and LAW waste materials will be accomplished with a transfer line between the Project Hanford Management Contract (PHMC) team staging tanks and the Privatization Contractors feed tanks. Prior to transfer to the privatization contractor, the waste feed in the PHMC team staging tank must conform to the TWRS Privatization Contracts with BNFL, Inc. and Lockheed Martin Advanced Environmental Systems feed envelope A, B, and C specifications. The Privatization Phase I supernate solutions are targeted to be dilute slurry/supernate solutions with a maximum of 5 percent by volume solids which is expected to change to 2 percent solids by weight.

To assure that these waste conditions are met, the contents of the PHMC team staging tank will be sampled prior to the transfer to the Privatization Contractors' tanks. The current approved method for sampling tank liquids is "grab" sampling. Grab sampling utilizes a "bottle on a string" technique which may be biased with materials from the upper tank elevations. In addition, grab sampling requires significant operator exposure and time for laboratory analysis. The concern associated with this method of sampling is that the long time to assure that a tank is well mixed and a representative sample has been obtained may conflict with the schedule needs

for staging batches of waste feed. In order to address these concerns, the development and demonstration of a representative, rapid sampling and analysis system has been proposed. This rapid sampling and analysis system will be developed to ensure that feeds to the transfer line, and to the Privatization Contractors, can be staged successfully within tank space and schedule constraints. This system will be developed as two major tasks. The first task will be to develop and deploy a nested, fixed depth fluidic sample retrieval system that provides waste samples that are representative of a tank's waste content. The second task will be to develop an at-tank analysis system (in-tank or at-tank deployments are options at this time) that provides on-line, real-time sample analysis data and that can be interfaced with the nested, fixed depth fluidic sample retrieval system.

A waste sampling system is needed that can be operated in conjunction with an active tank waste mixing system and can provide samples for analysis at the PHMC Team's 222-S Analytical Laboratory. When an at-tank sample analysis capability is available, this system would be coupled with the sample retrieval system. AEA Technology Engineering Services, Inc. (AEA) is a private firm that is currently under contract with the U.S. Department of Energy to develop fluid transfer and fluidic sampling systems for use with the radioactive waste stored in large underground storage tanks. AEA has previously developed concepts for transfer pumps and fixed elevation samplers for implementation in Savannah River site waste tanks. Currently AEA has a contract with the DOE to design and demonstrate proof-of-principle of a nested, fixed depth fluidic sample retrieval system for on-line use with Hanford's large underground radioactive waste storage tanks. This system is basically a group of fixed depth samplers, each set up to sample waste at a specific elevation in a waste tank. The results of testing this sampling concept with Hanford waste simulants will be used to develop a nested, fixed depth fluidic sample retrieval system for deployment in one or more Hanford DSTs.

Characterization Engineering is providing engineering support and project integration and management for the development of the nested, fixed depth sampling system. Program planning for this activity has been completed through the use of an Engineering Task Plan. Activities for this fiscal year include development of functions and requirements and a demonstration of a prototype sample retrieval mechanism. This activity is expected to produce a system that will be deployed in a tank in fiscal year 2002.

2.11 LIGHT DUTY UTILITY ARM (LDUA)

The LDUA deployment is continuing after answering all questions asked by the DOE related to the AB for the LDUA deployment.

Preparations for an Operational Readiness Review (ORR) have begun to ensure that the LDUA is acceptable for use in Tank Farm activities. Inconsistencies between the actual equipment construction and the vendor drawings are being resolved. An Essential Drawing walk-down has been initiated and will be concluded prior to ORR completion. A schedule is not available for completion of the ORR.

2.12 AUTHORIZATION BASIS AND PERMIT ISSUES

The Notice of Construction (NOC) (DOE-RL 1997a) for the portable exhausters with upgrades to Major Stack was approved (Conklin 1997a); however, several actions were required to allow operation. Conklin 1997b included modifying the exhausters to operate as "Major Stacks" as well as supplying the Washington State Department of Health (WDOH) with supplemental information. A response to the requirements was prepared and transmitted through Fluor Daniel Hanford, Inc. and DOE-RL to the WDOH. The response from the WDOH (Conklin 1998) was that the RMCS Portable Exhausters as described were acceptable.

The BIO was previously implemented as the AB for Tank Farm operations. The BIO is not in direct agreement with the previous AB and is not as specific regarding Characterization activities. To facilitate incorporation of SAD-035 into the BIO, CE personnel provided listings of issues with SAD-035 and USQ Determinations which resulted from using the BIO. Incorporation of SAD-035 into the BIO is being performed by TWRS Nuclear Safety and Licensing and is part of Performance Agreement TWR 1.2.2.

Issues related to the maximum tank temperatures in the AB prevented sampling in nine tanks. Extensive research into the temperatures and their basis resulted in Rotary Mode Core Sampling being allowed in the nine tanks. Currently only 13 tanks remain outside the AB for Core Sampling because of Organics and other concerns.

Characterization Engineering prepared forty-seven USQ Screenings and one USQ Determination during the period, without any issues raised concerning the quality of the content.

3.0 PLANNED ACTIVITIES

3.1 CORE SAMPLING

Several activities are planned for the next period. The completion of work and acceptance testing of Exhauster B flammable gas modifications will be completed. Testing will be performed to expand the operating envelope for core sampling by adjusting the drilling parameters of down-force, RPM, and purge gas flow.

3.2 GRAB AND VAPOR SAMPLING

Work continues on up-scaling the sample size of the grab sampler from 125 ml to 500 ml. The 500 ml sampler would be used to support Privatization sampling needs. The use of the 500 ml grab sampler would have to be evaluated on a tank per tank basis to see if it complies with the AB.

3.3 RISER PREPARATION

Continued support will be provided throughout the next reporting period for riser identification and preparation for sampling activities.

3.4 EQUIPMENT

The required upgrades for RMCS Exhauster B, including acceptance and operational testing, will be completed during the next period.

Closure of all NEC compliance modifications is expected during the next reporting period.

3.5 PLUTONIUM FINISHING PLANT (PFP)

Tank 241-Z-361 is a 20,000 gallon miscellaneous underground storage tank managed by the Babcock and Wilcox Hanford Company. The tank is estimated to contain 26 kilograms of plutonium and may also contain pressurized flammable gases. CE is supporting the approach and design for installing a breather filter, taking a gas sample, and viewing the tank internal features. CE is also supporting the planning and equipment needs for push-mode sampling the waste in 1999.

4.0 BUDGET SUMMARY

Budget results for the second quarter show CE under projections. Significant savings are being realized from preparing Truck #4 and associated support equipment for deployment in Flammable Gas Watch List Tanks.

A mid-year Change Request is being prepared to rebaseline this work and to add engineering scope for replacement of nitrogen vaporizers, AZ-102 sampling equipment design, drill bit development, RLU improvements and testing, and knife edged insert testing and deployment.

5.0 ENGINEERING SCHEDULE

The overall schedule of CE activities at the end of the reporting period is included as Figure 16.

6.0 REFERENCES

Conklin, A. W., 1997a, *Notice of Construction for Rotary Mode Core Sampling Systems Three and Four,* (internal letter, AIR 97-901 to J. E. Rasmussen, September 3) Washington State Department of Health, Olympia, Washington. (Approval of DOE/RL-94-118 Rev. 1.)

Conklin, A. W., 1998, *Notice of Construction for Rotary Mode Core Sampling Systems Three and Four,* (internal letter, AIR 98-301 to J. E. Rasmussen, March 6), Washington State Department of Health, Olympia, Washington. (Approval of DOE/RL-94-118 Rev. 1.)

DOE-RL, 1997a, *Radioactive Air Emissions Program Notice of Construction for the Rotary Mode Core Sampling Systems Three And Four,* DOE/RL-94-118, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Janicek G. P., 1995, *Sampling Equipment Availability/Reliability Improvement, Engineering Task Plan,* WHC-SD-WM-ETP-171, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Leach, C. E., 1997, *A Safety Assessment of Rotary Mode Core Sampling in Flammable Gas Single Shell Tanks: Hanford Site, Richland Washington,* HNF-SD-WM-SAD-035, Rev. 0b, Lockheed Martin Hanford Corporation, Richland, Washington.

LMHC, 1997a, *Tank Waste Remediation System Basis for Interim Operation,* HNF-SD-WM-BIO-001, Rev. 0, Lockheed Martin Hanford Corporation, Richland, Washington.

LMHC, 1997b, *Tank Waste Remediation System Technical Safety Requirements,* HNF-SD-WM-TSR-006, Rev. 0, Lockheed Martin Hanford Corporation, Richland, Washington.

LMHC, 1998, *Tank Waste Remediation Systems Technical Procedure Format and Preparation Guide,* HNF-IP-0731 Rev. 5, Lockheed Martin Hanford Corporation, Richland, Washington.

McClusky, J. K., 1997, *Contract Number DE-AC06-96RL13200; Directed Hold on Tank Intrusive Activities with the Light Duty Utility Arm (LDUA),* (external letter 97-WSD-069 to H. J. Hatch, February 27), U.S. Department of Energy, Richland Operations Office, Richland, Washington.

McCoy, J. C., 1998, *Safety Analysis Report for Packaging (Onsite), Onsite Transfer Cask,* HNF-SD-TP-SARP-002, Rev.1-C, Waste Management Northwest, Richland, Washington.

APPENDIX

Figure 1: AX-101 PMCS Core Profile

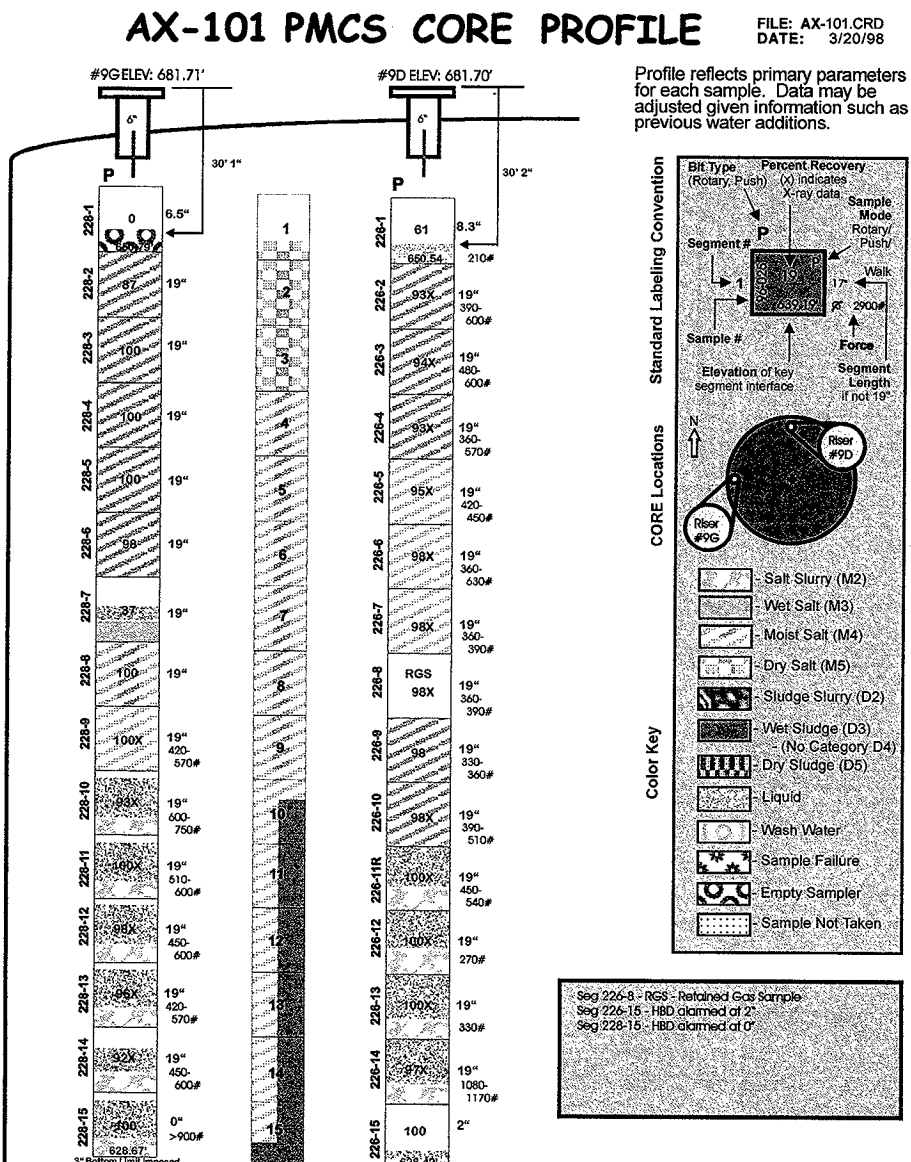


Figure 2: TX-104 PMCS Core Profile

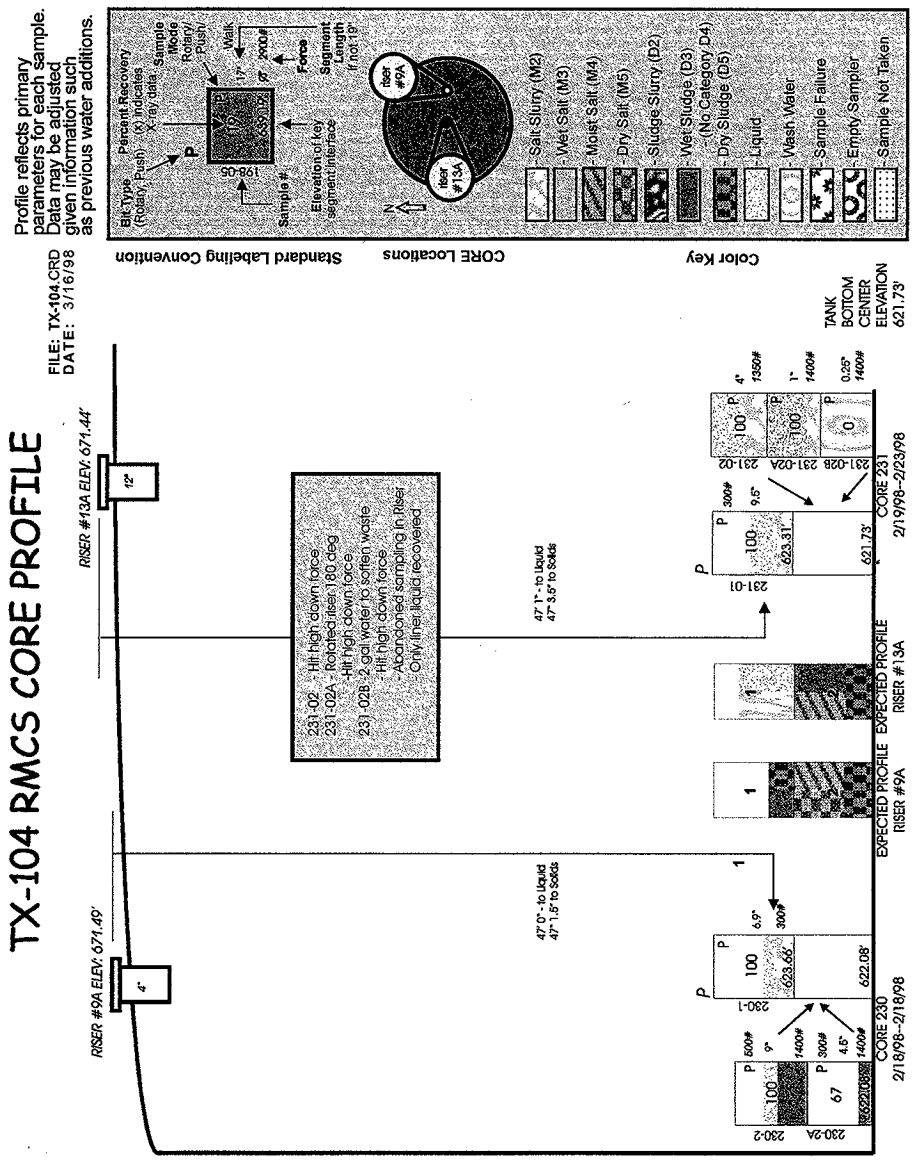


Figure 3: SX-101 RMCS Core Profile

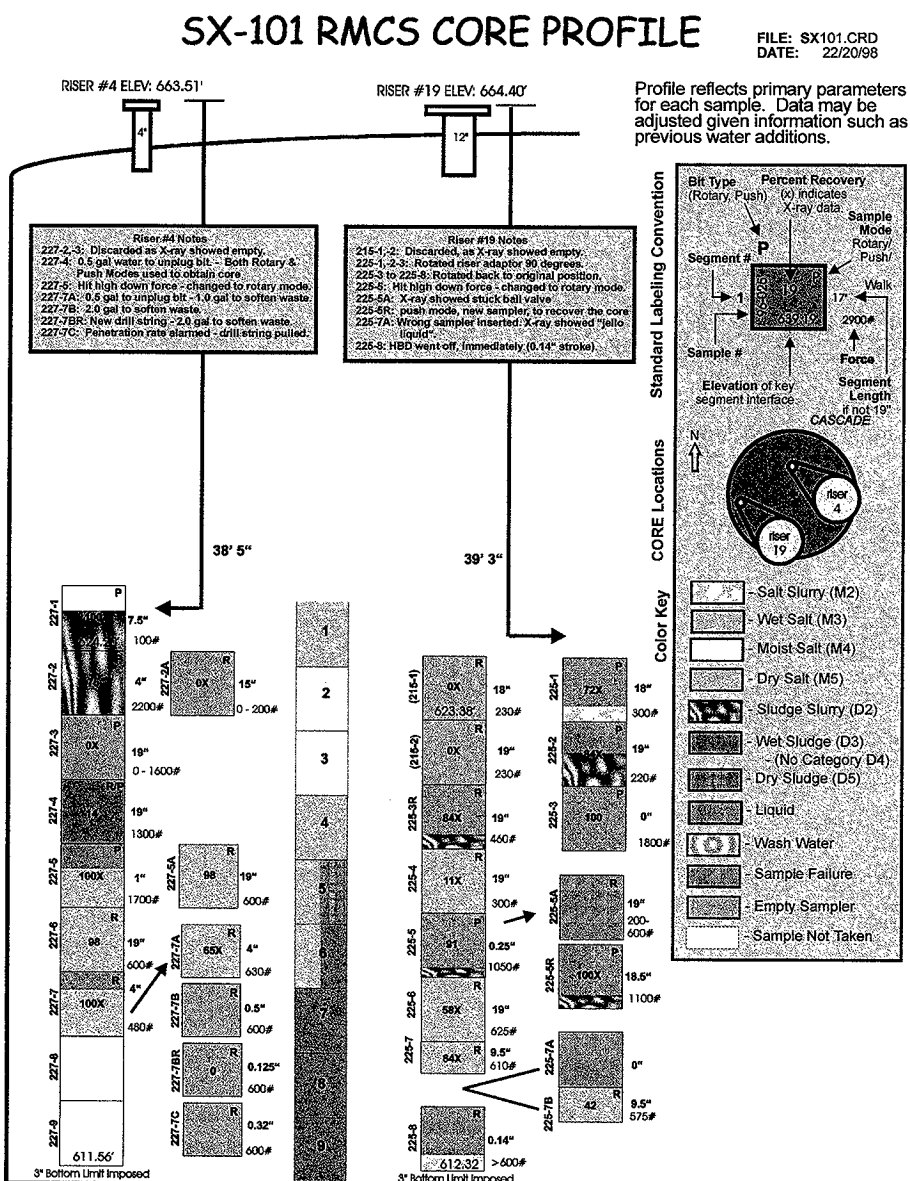
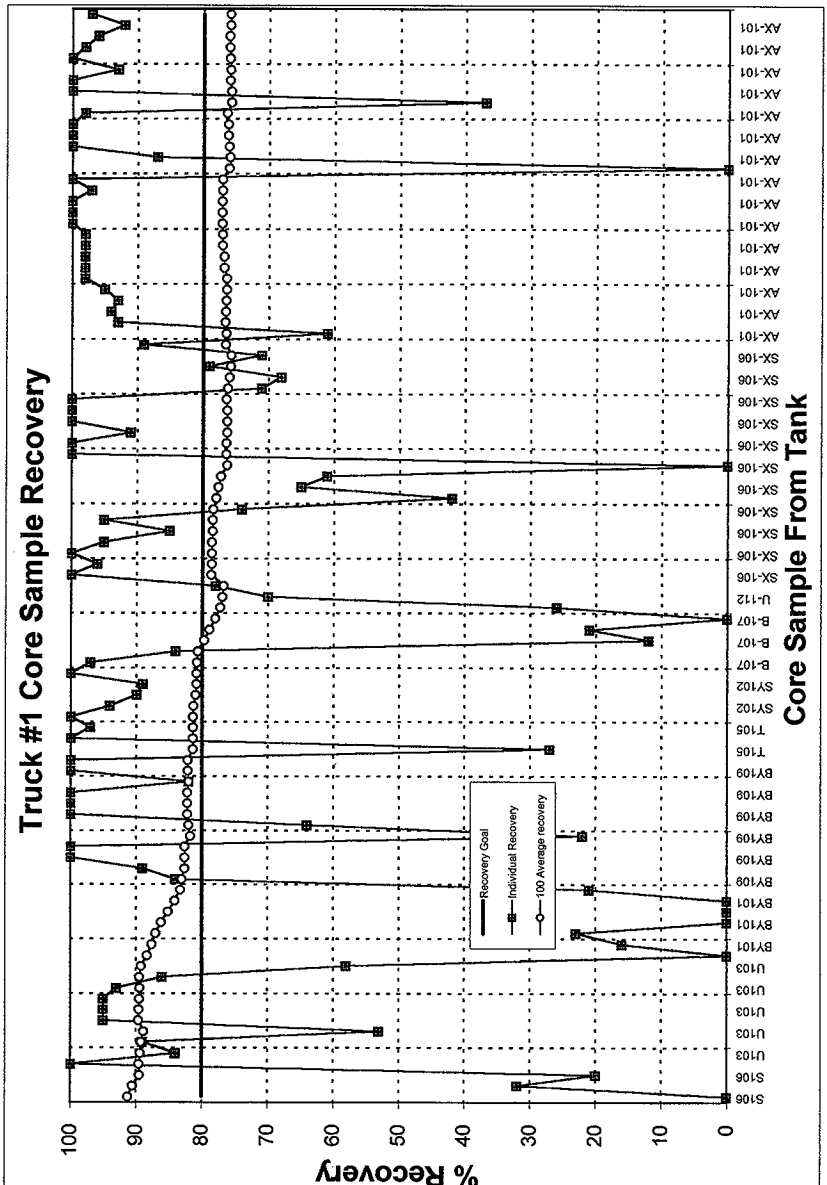


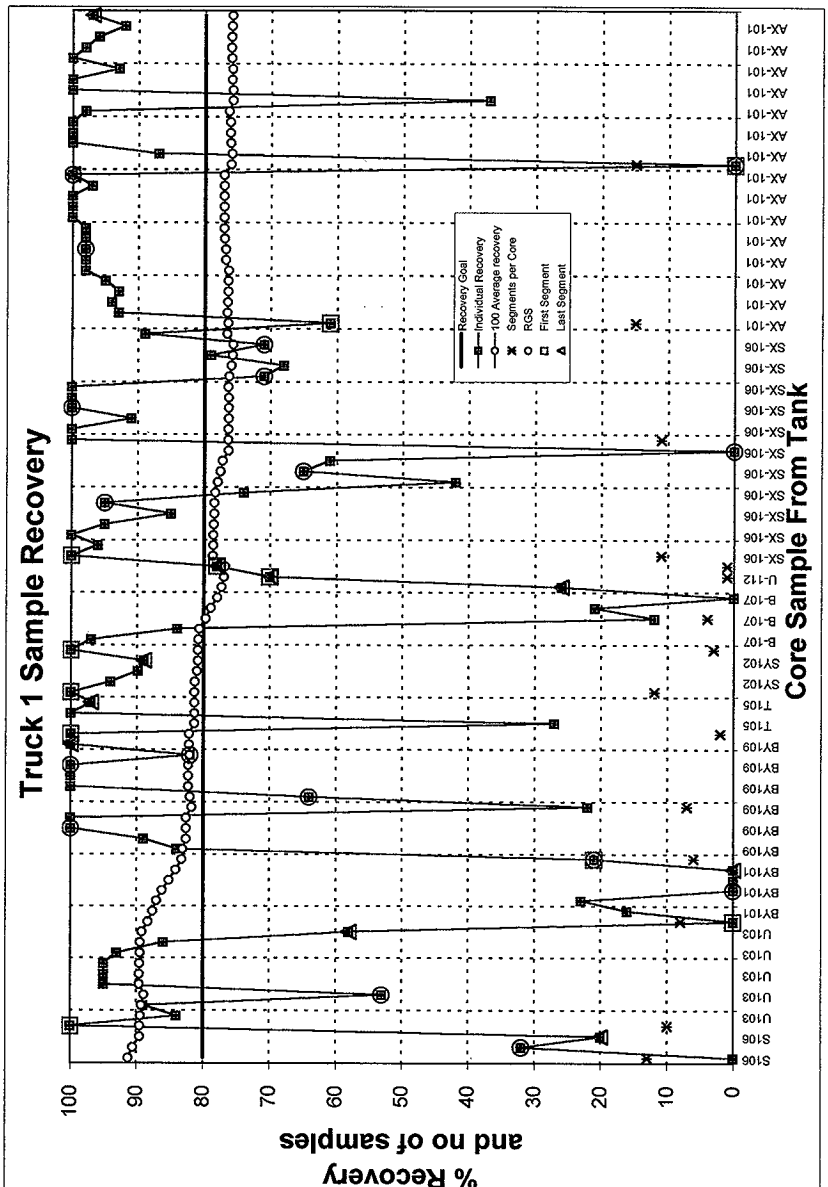
Figure 4: Truck #1 Sample Recovery



TK1Data

3/30/98

Figure 5: Truck #1 Sample Recovery (Additional Data Added)



TK1DATA

3/30/98

Figure 6: Truck #1 Sample Recovery (Grouped by Waste Type)

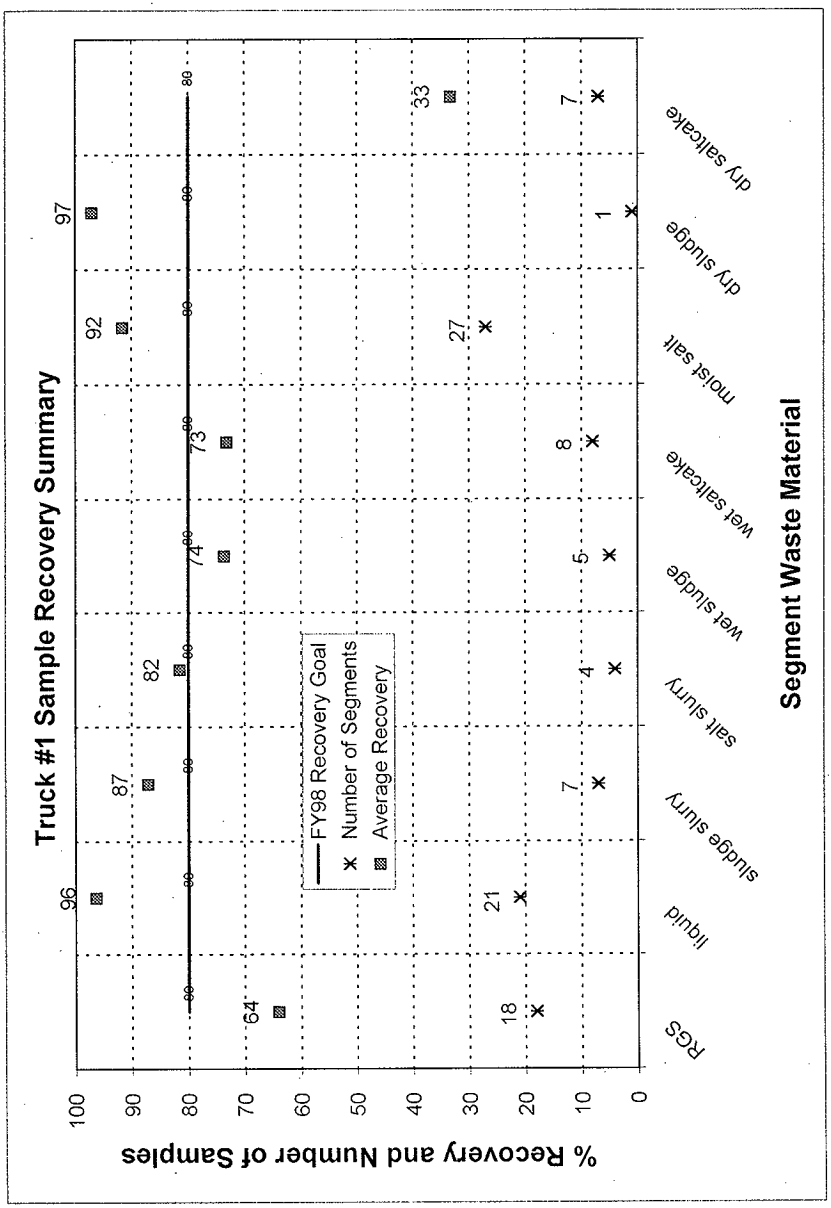
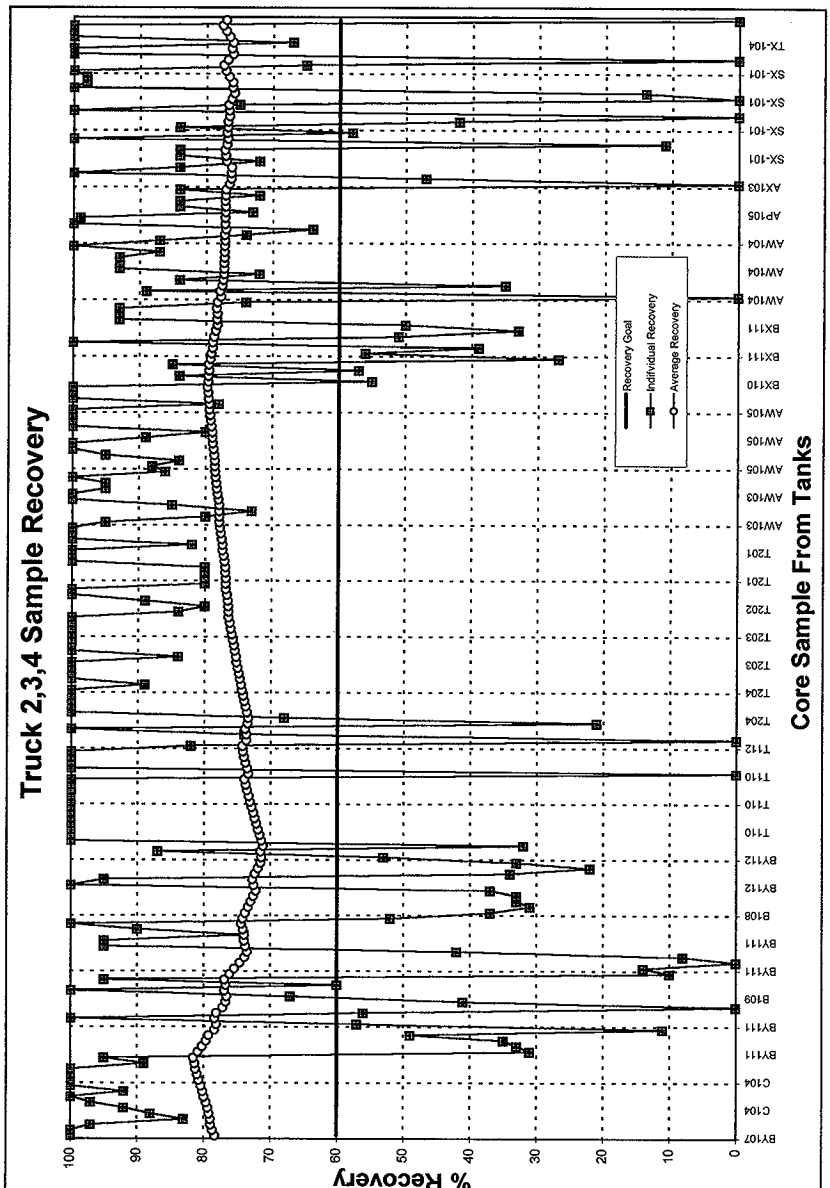


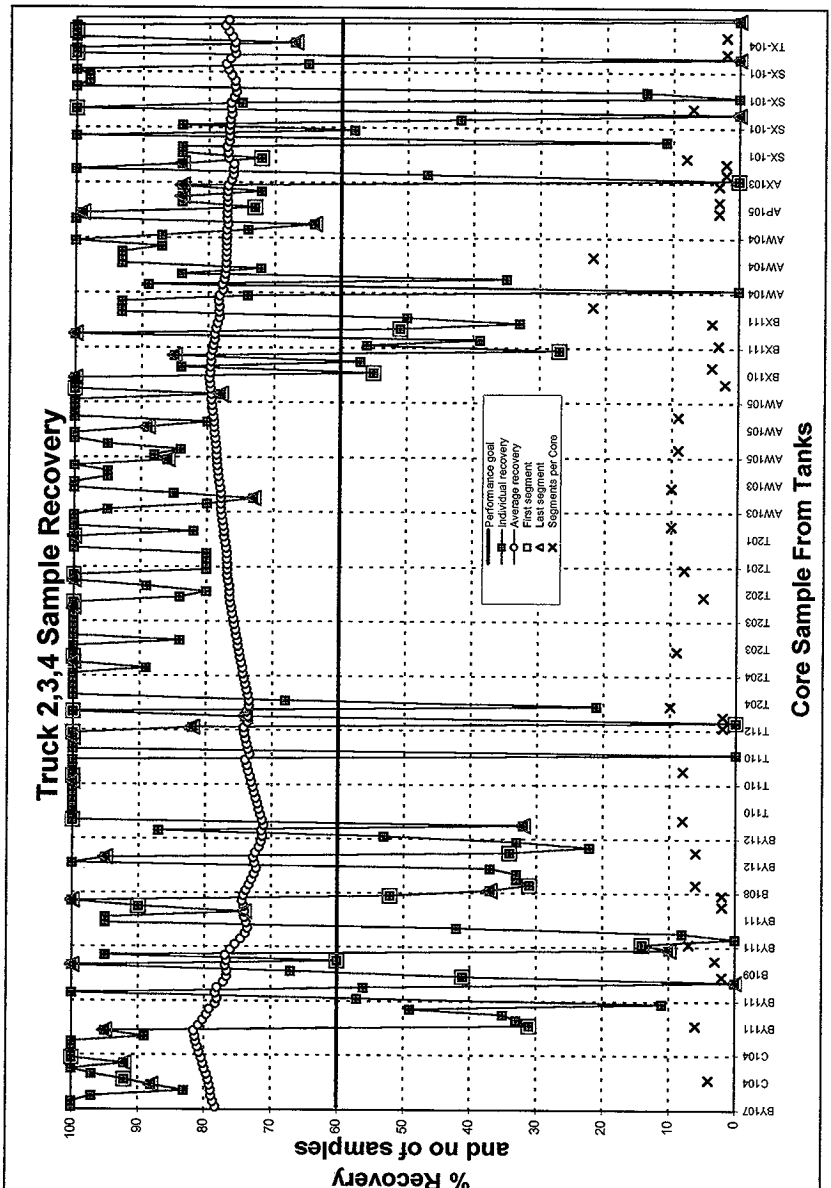
Figure 7: Truck #2, #3, & #4 Sample Recovery



TK234DAT

3/30/98

Figure 8: Truck #2, #3, & #4 Sample Recovery (Additional Data Added)



TK234DAT

3/30/98

Figure 9: Truck #2, #3, & #4 Sample Recovery (Grouped by Waste Type)

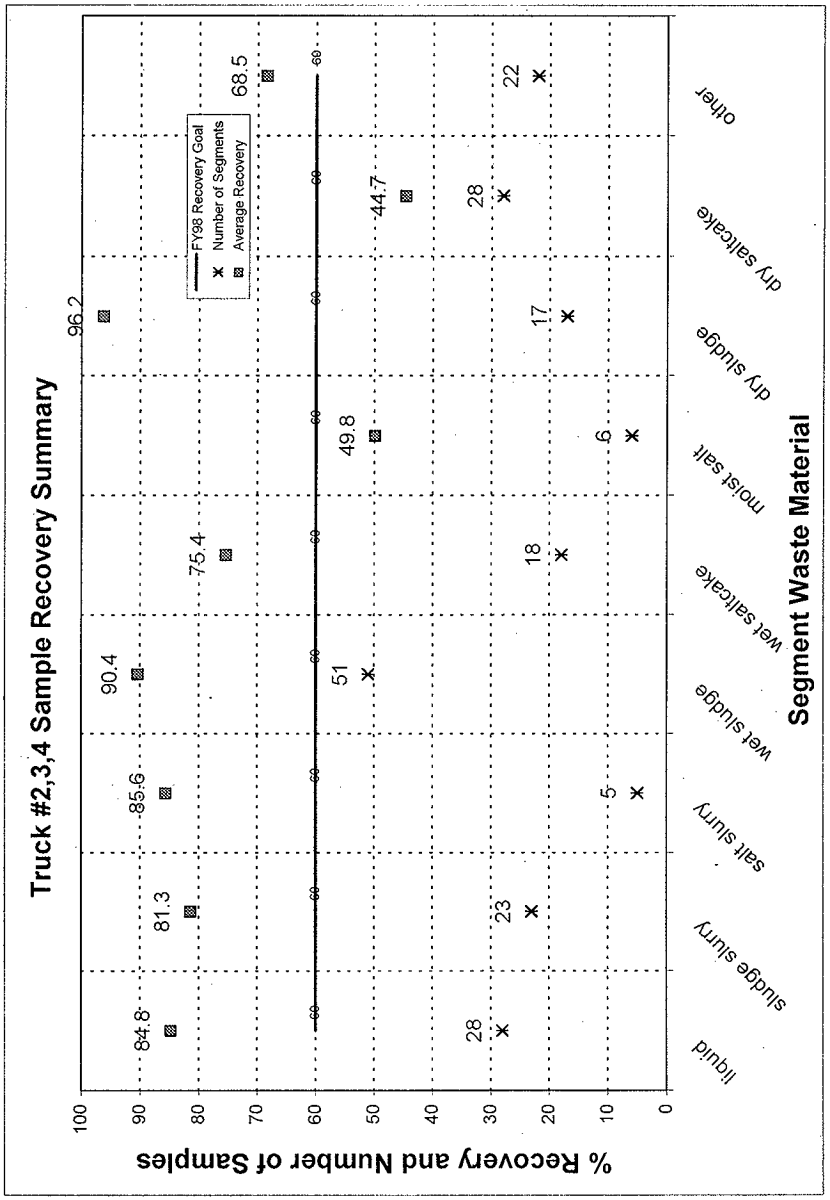


Figure 10: Truck #1 Sample Material Comparison (Last 100 samples w/ prior 100)

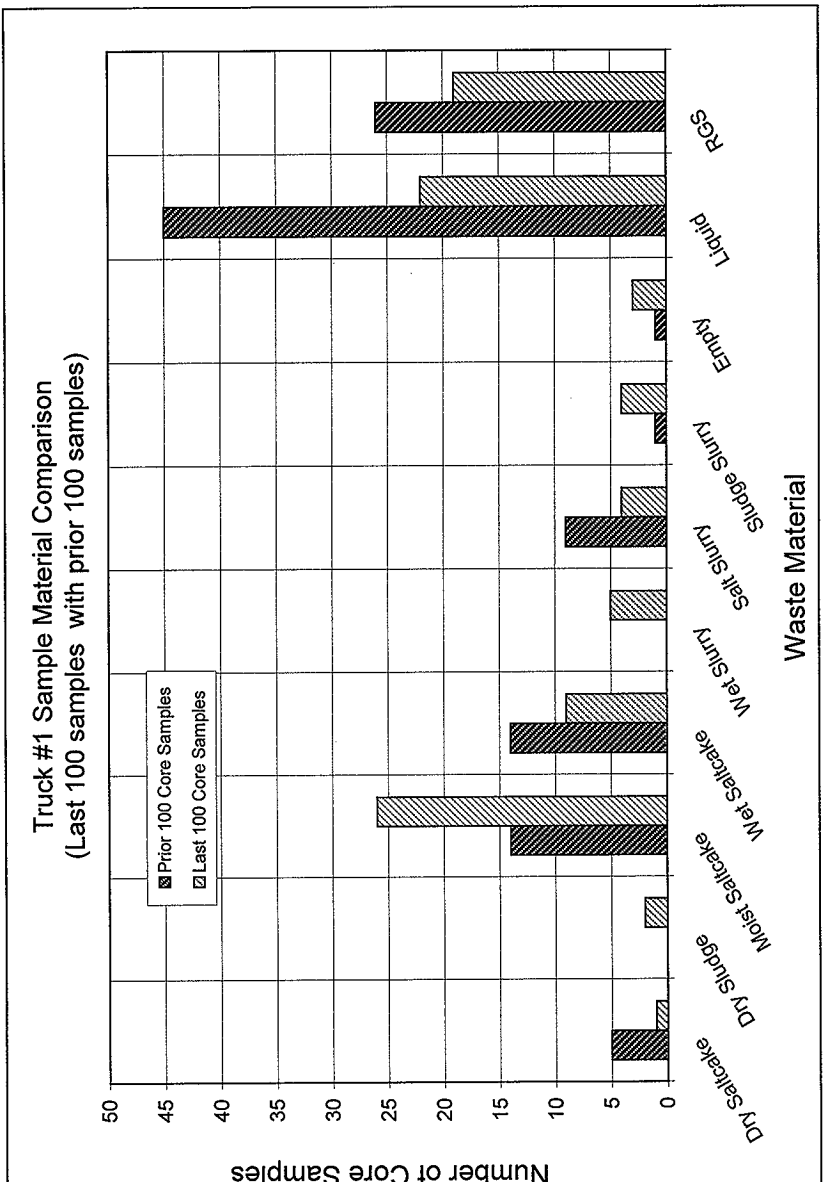


Figure 11: Truck #2, #3, #4 Sample Material Comparison (Last 146 samples w/ prior 146)

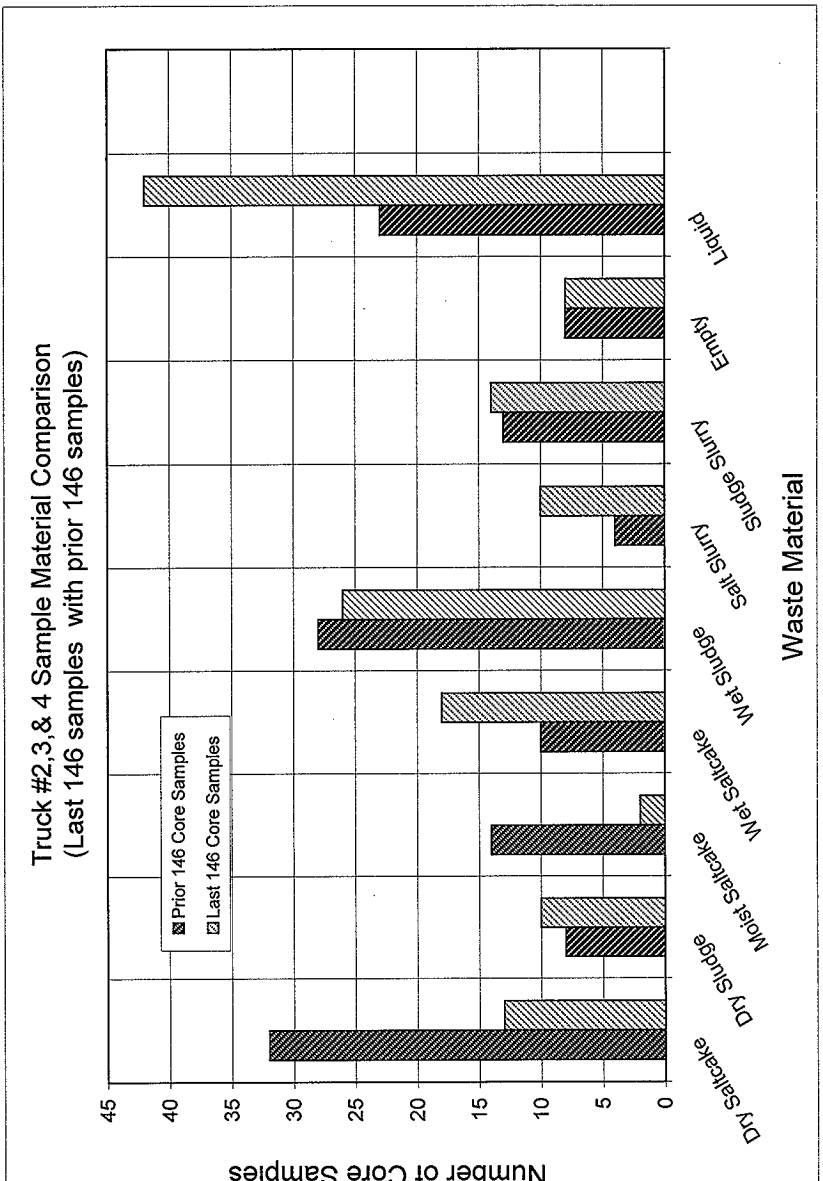


Figure 12: Truck #1 Sampling System Availability

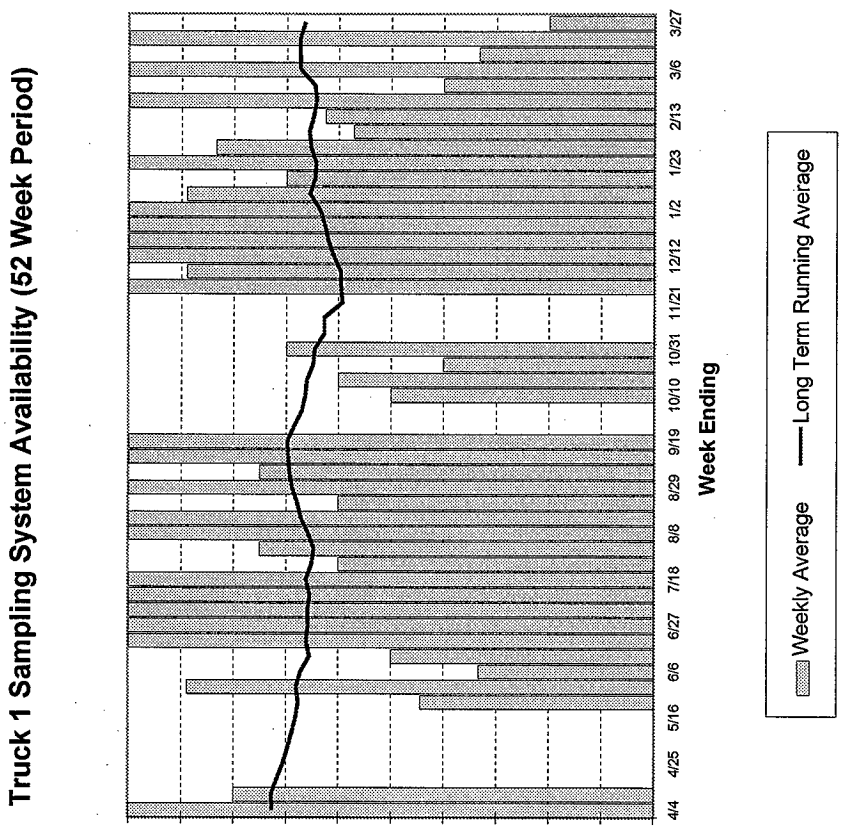


Figure 13: Truck #2 Sampling System Availability

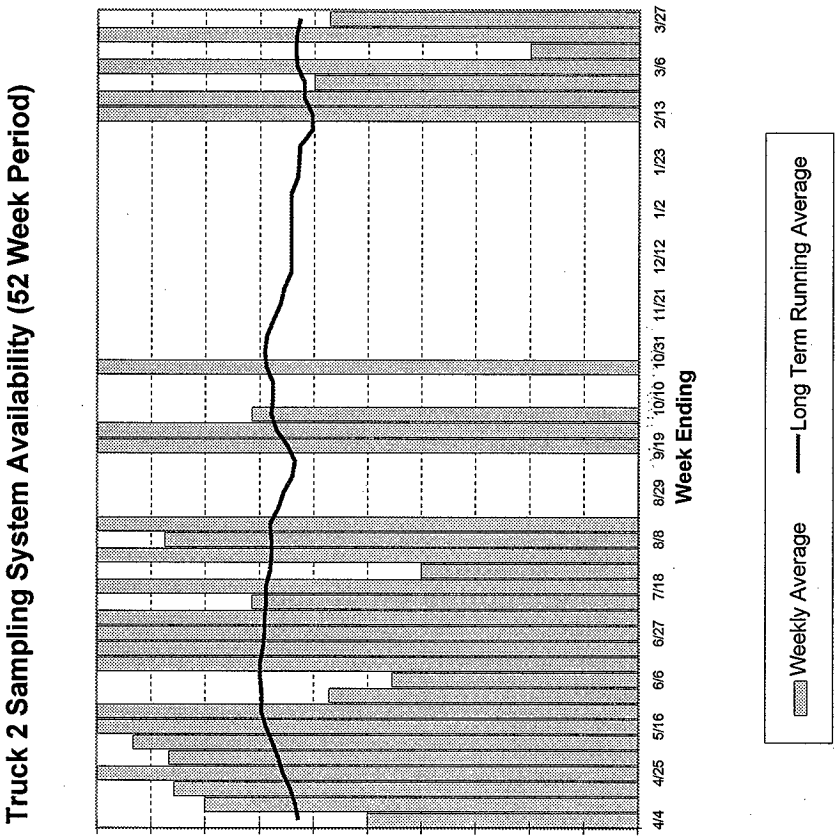


Figure 14: Truck #3 Sampling System Availability

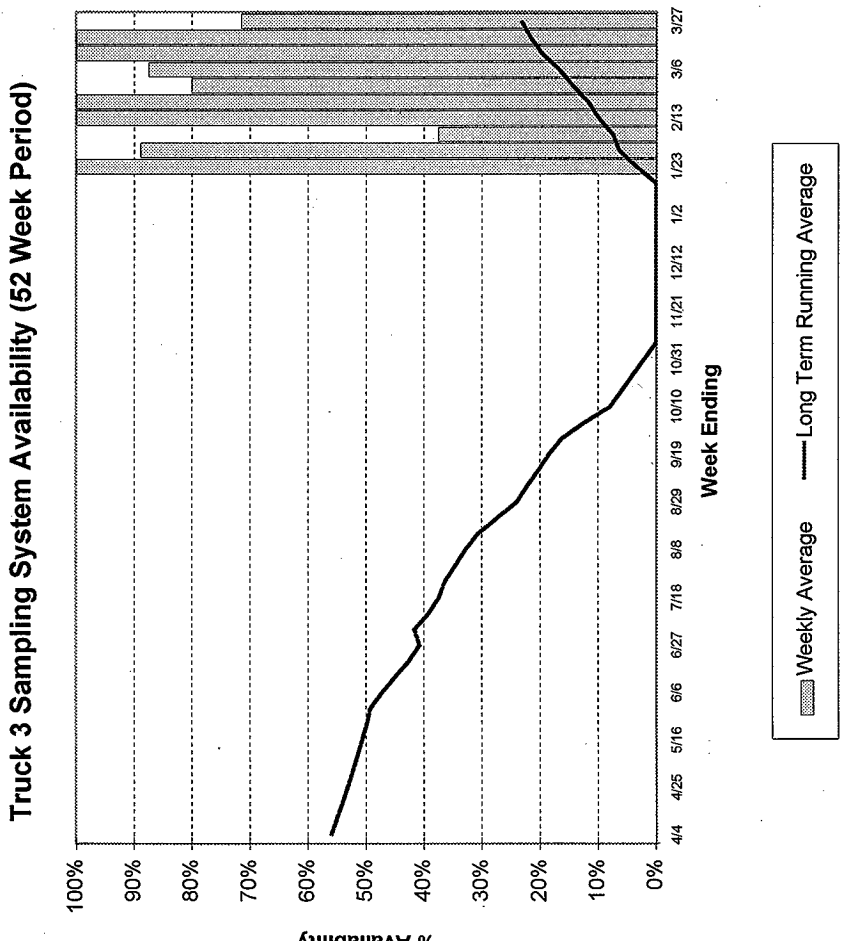


Figure 15: Truck #4 Sampling System Availability

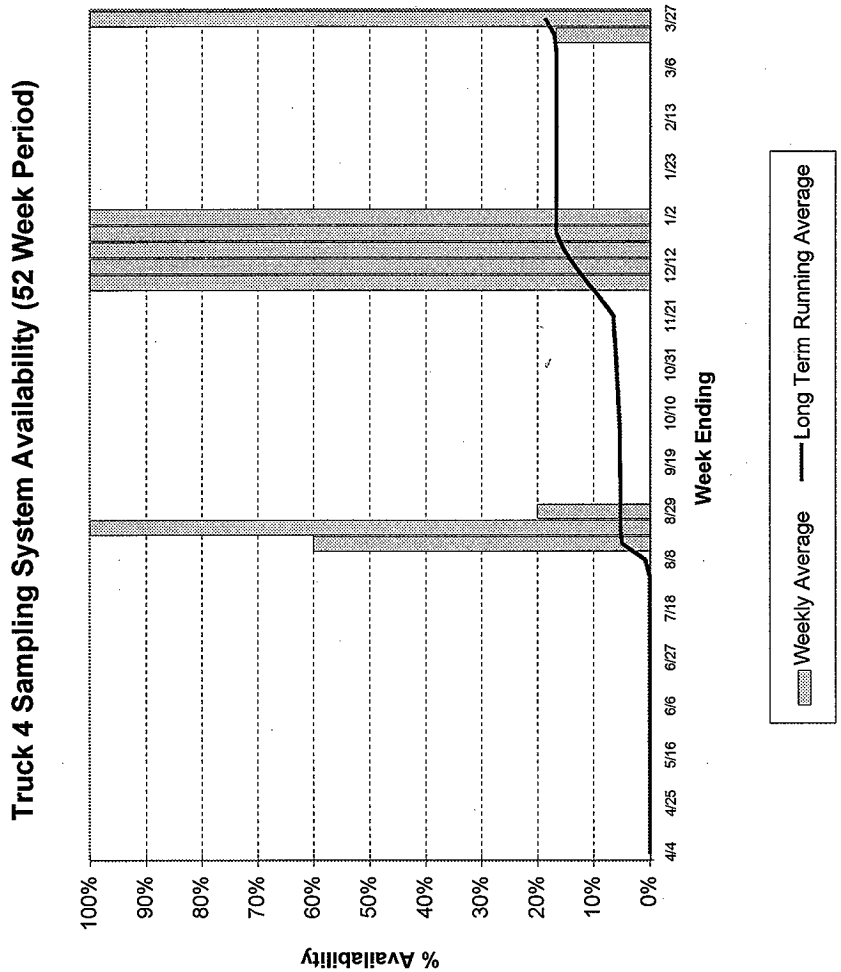
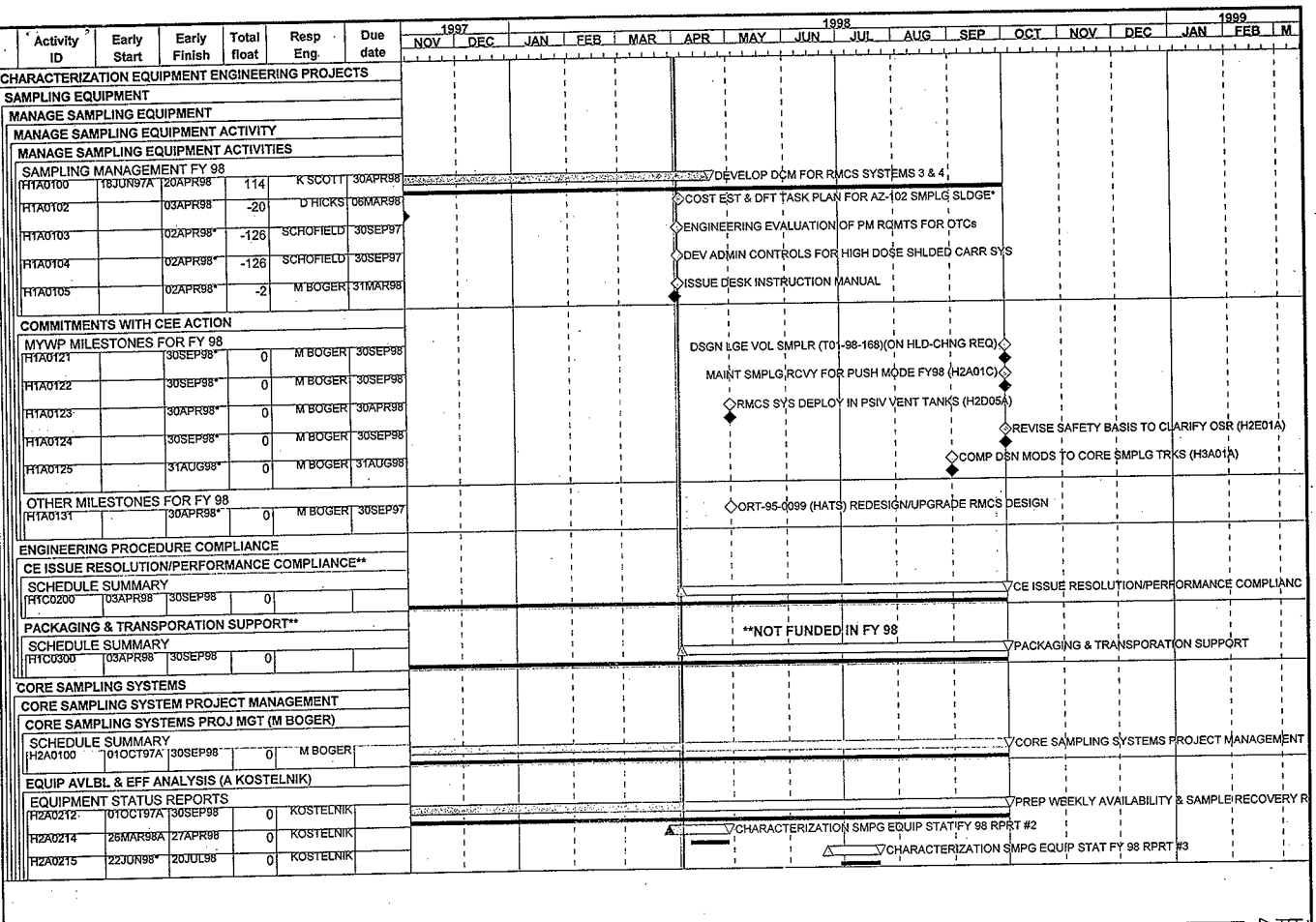


Figure 16: Master Schedule for Characterization Project Engineering as of 04/03/98

Consisting of 8 Pages Including Cover page


Activity ID
Early Start
Early Finish
Total float
Resp Eng.
Due date
1997
1998
1999
NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB M
CHARACTERIZATION EQUIPMENT ENGINEERING PROJECTS
SAMPLING EQUIPMENT
MANAGE SAMPLING EQUIPMENT
MANAGE SAMPLING EQUIPMENT ACTIVITY
MANAGE SAMPLING EQUIPMENT ACTIVITIES
SAMPLING MANAGEMENT FY 98
H1A0100 18JUN97A 20APR98 114 K SCOTT 30APR98
H1A0102 03APR98 -20 D HICKS 06MAR98
H1A0103 02APR98* -126 SCHOFIELD 30SEP97
H1A0104 02APR98* -126 SCHOFIELD 30SEP97
H1A0105 02APR98* -2 M BOGER 31MAR98
DEVELOP DCM FOR RMCS SYSTEMS 3 & 4
COST EST & DFT TASK PLAN FOR AZ-102 SMPLG SLDGE*
ENGINEERING EVALUATION OF PM RQMTS FOR OTCs
DEV ADMIN CONTROLS FOR HIGH DOSE SHLDED CARR SYS
ISSUE DESK INSTRUCTION MANUAL
COMMITMENTS WITH CEE ACTION
MYWP MILESTONES FOR FY 98
H1A0121 30SEP98* 0 M BOGER 30SEP98
H1A0122 30SEP98* 0 M BOGER 30SEP98
H1A0123 30APR98* 0 M BOGER 30APR98
H1A0124 30SEP98* 0 M BOGER 30SEP98
H1A0125 31AUG98* 0 M BOGER 31AUG98
DSGN LGE VOL SMPLR (T01-98-168)(ON HLD-CHNG REQ)
MAINT SMPLG RCVY FOR PUSH MODE FY98 (H2A01C)
RMCS SYS DEPLOY IN PSIV VENT TANKS (H2D05A)
REVISE SAFETY BASIS TO CLARIFY OSR (H2E01A)
COMP DSN MODS TO CORE SMPLG TRKS (H3A01A)
OTHER MILESTONES FOR FY 98
H1A0131 30APR98* 0 M BOGER 30SEP97
ORT-95-0099 (HATS) REDESIGN/UPGRADE RMCS DESIGN
ENGINEERING PROCEDURE COMPLIANCE
CE ISSUE RESOLUTION/PERFORMANCE COMPLIANCE**
SCHEDULE SUMMARY
H1C0200 03APR98 30SEP98 0
CE ISSUE RESOLUTION/PERFORMANCE COMPLIANC
PACKAGING & TRANSPORATION SUPPORT**
SCHEDULE SUMMARY
H1C0300 03APR98 30SEP98 0
**NOT FUNDED IN FY 98
PACKAGING & TRANSPORATION SUPPORT
CORE SAMPLING SYSTEMS
CORE SAMPLING SYSTEM PROJECT MANAGEMENT
CORE SAMPLING SYSTEMS PROJ MGT (M BOGER)
SCHEDULE SUMMARY
H2A0100 01OCT97A 30SEP98 0 M BOGER
CORE SAMPLING SYSTEMS PROJECT MANAGEMENT
EQUIP AVLBL & EFF ANALYSIS (A KOSTELNIK)
EQUIPMENT STATUS REPORTS
H2A0212 01OCT97A 30SEP98 0 KOSTELNIK
H2A0214 26MAR98A 27APR98 0 KOSTELNIK
H2A0215 22JUN98* 20JUL98 0 KOSTELNIK
PREP WEEKLY AVAILABILITY & SAMPLE RECOVERY R
CHARACTERIZATION SMPG EQUIP STAT FY 98 RPRT #2
CHARACTERIZATION SMPG EQUIP STAT FY 98 RPRT #3
Project Start 01SEP97
Project Finish 07OCT98
Data Date 03APR98
Run Date 03APR98
Early Bar
Target Bar
Progress Bar
Critical Activity
CEEP
LMH
CHARACTERIZATION EQPT ENGRG PROJECTS
Master Schedule
Sheet 1 of 7
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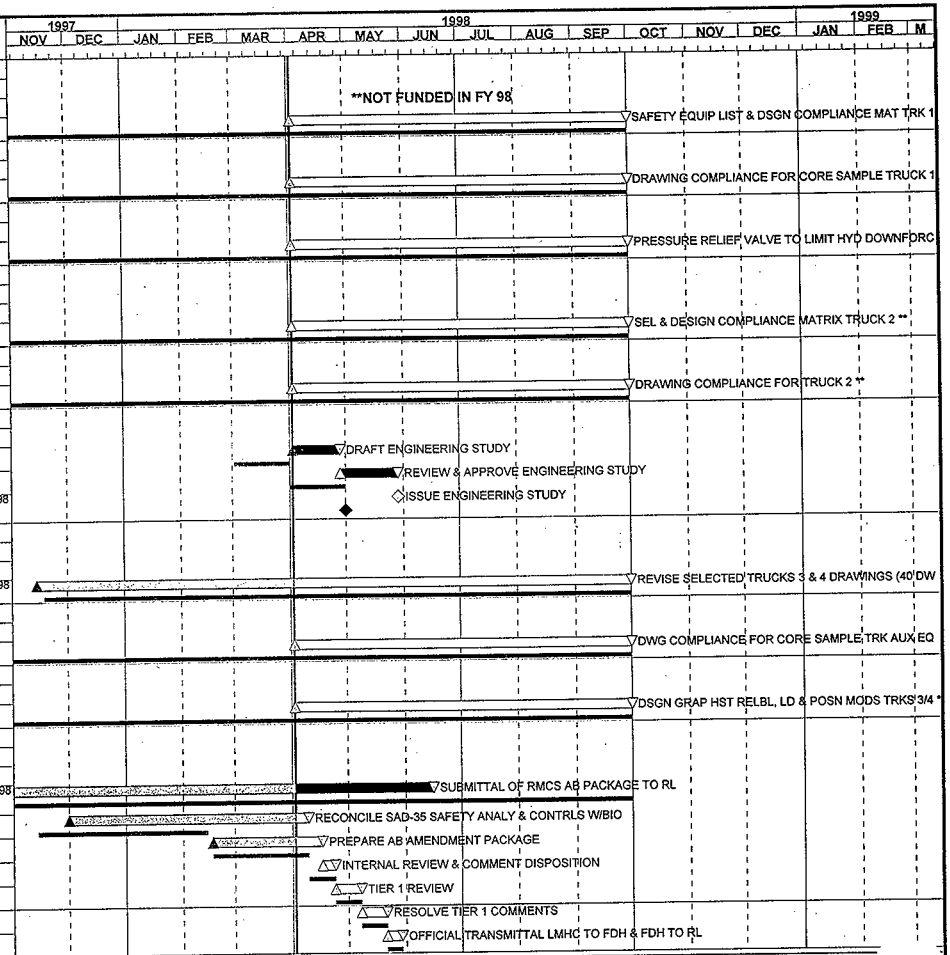
Activity ID	Early Start	Early Finish	Total float	Resp Eng	Due date
TRUCK #1 PUSH CORE SYSTEM					
SAF EQUIP LIST & DSGN COMPLIANCE MAT TRK #1 **					
DOCUMENTATION (LOI'S & ETP'S)					
H2B0100	03APR98	30SEP98	0		
DRAWING COMPLIANCE FOR CORE SAMPLE TRUCK #1 **					
SCHEDULE SUMMARY					
H2B0300	03APR98	30SEP98	0		
PRESS RELIEF VALVE TO LIMIT HYD DOWN FORCE **					
SCHEDULE SUMMARY					
H2B0400	03APR98	30SEP98	0		
TRUCK #2 RMCS SYSTEM					
SAF EQUIP LIST & DSGN COMPLIANCE MAT TRK #2 **					
SCHEDULE SUMMARY					
H2C0100	03APR98	30SEP98	0		
DRAWING COMPLIANCE FOR TRUCK #2 **					
SCHEDULE SUMMARY					
H2C0400	03APR98	30SEP98	0		
PLAN FOR TRUCK #2 STANDBY STATUS (K SCOTT)					
DOCUMENTATION (LOI'S & ETP'S)					
H2C0602	03APR98A	27APR98	-19	K SCOTT	
H2C0602A	28APR98	28MAY98	-19	K SCOTT	
H2C0602B		28MAY98	-19	K SCOTT	30APR98
TRUCKS #3 & 4 RMCS SYSTEM (C HANSON)					
DWG COMPLIANCE FOR TRUCKS #3 & 4 (G WILSON)					
DOCUMENTATION (LOI'S & ETP'S)					
H2D0101	14NOV97A	30SEP98	0	G WILSON	30SEP98
DWG COMPLIANCE FOR CORE SAMPLE TRK AUX EQUIP **					
SCHEDULE SUMMARY					
H2D0200	03APR98	30SEP98	0		
DSGN GRAP HST RELBL, L & POSN MODS-TRKS 3 & 4 **					
SCHEDULE SUMMARY					
H2D0600	03APR98	30SEP98	0		
MAINTENANCE OF AUTHORIZATION BASIS					
CORE SAMPLE A. B. RECONCILIATION (T GOETZ)					
DOCUMENTATION (LOI'S & ETP'S)					
H2E0102	01OCT97A	15JUN98	-11	T GOETZ	31MAY98
H2E0104	01DEC97A	09APR98	0	T GOETZ	
H2E0105	17FEB98A	16APR98	0	T GOETZ	
H2E0106	17APR98	23APR98	0	T GOETZ	
H2E0107	24APR98	07MAY98	0	T GOETZ	
H2E0108	08MAY98	21MAY98	0	T GOETZ	
H2E0109	22MAY98	29MAY98	0	T GOETZ	



Project Start	01SEP97
Project Finish	07OCT98
Data Date	03APR98
Run Date	03APR98

Early Bar
Target Bar
Progress Bar
Critical Activity

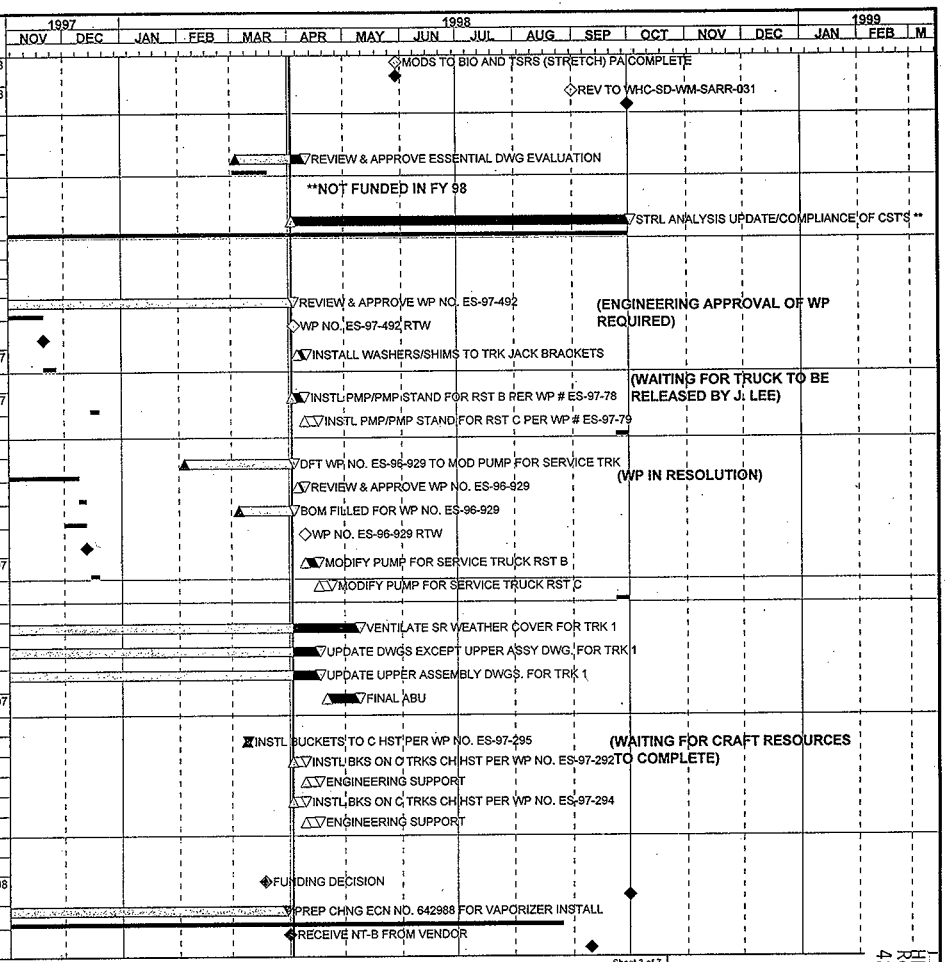
CEEP

LMH

CHARACTERIZATION EQPT ENGRG PROJECTS

Master Schedule

Activity ID	Early Start	Early Finish	Total float	Resp Eng	Due date
H2E0110		29MAY98	0	T GOETZ	31MAY98
H2E0111		31AUG98*	21	T GOETZ	30SEP98
ESSENTIAL DRAWING EVALUATION (G WILSON)					
DOCUMENTATION (LOI'S & ETP'S)					
H2E0300D	04MAR98A	10APR98	-15	G WILSON	
STRUCTURAL ANALYSIS UPDATE/COMPLIANCE OF CST'S					
SCHEDULE SUMMARY					
H2E0400	03APR98	01OCT98	-1		
TROUBLE SHOOTING & FIELD MAINTENANCE					
TROUBLE SHOOTING & FIELD ASSISTANCE (G WILSON)					
TRUCK JACK BRACKETS FOR TRK 2 (A KOSTELNIK)					
H2H0102A	24SEP97A	03APR98	-91	SCHOFIELD	
H2H0102D		03APR98	-91	D MOORE	
H2H0103	06APR98	10APR98	-91	SHOEMAKE	26NOV97
PMP SPRT STAND FOR SVCE TRKS RST B/C (G WILSON)					
H2H0113	03APR98	09APR98	-80	SHOEMAKE	19DEC97
H2H0114	10APR98	16APR98	111	SHOEMAKE	
MOD SPRAY WASH PMP FOR SVCE TRKS RST B & C					
H2H0121	04FEB98A	03APR98	-80	D MOORE	
H2H0121A	06APR98	09APR98	-80	D MOORE	
H2H0121C	05MAR98A	03APR98	-76	D MOORE	
H2H0121D		09APR98	-80	D MOORE	
H2H0122	10APR98	16APR98	-80	SHOEMAKE	19DEC97
H2H0123	17APR98	23APR98	111	SHOEMAKE	
VENT SR WEA COV & SMPL HST BX FOR TRK 1					
H2H0130	09JAN97A	08MAY98	-152	WILJAKERS	
H2H0131	01APR97A	17APR98	-151	G WILSON	
H2H0132	27AUG97A	17APR98	-151	G WILSON	
H2H0135	21APR98	08MAY98	-152	G WILSON	30SEP97
CASK TRUCK HOIST BRAKE INSTALLATION (D MOORE)					
H2H0142	09MAR98A	09MAR98A		D MOORE	
H2H0140	03APR98	09APR98	116	D MOORE	
H2H0140A	10APR98	16APR98	116	KOSTELNIK	
H2H0141	03APR98	09APR98	116	D MOORE	
H2H0141A	10APR98	16APR98	116	KOSTELNIK	
NITROGEN TRAILER ACTIVITIES (A KOSTELNIK)					
VAPORIZER REPLACEMENT (A KOSTELNIK)					
H2H0150		18MAR98A		M BOGER	30JAN98
H2H0152	15JUL97A	30MAR98A		KOSTELNIK	
H2H0151		31MAR98A			



Project Start 01SEP97
Project Finish 07OCT98
Data Date 03APR98
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Early Bar
Target Bar
Progress Bar
Critical Activity

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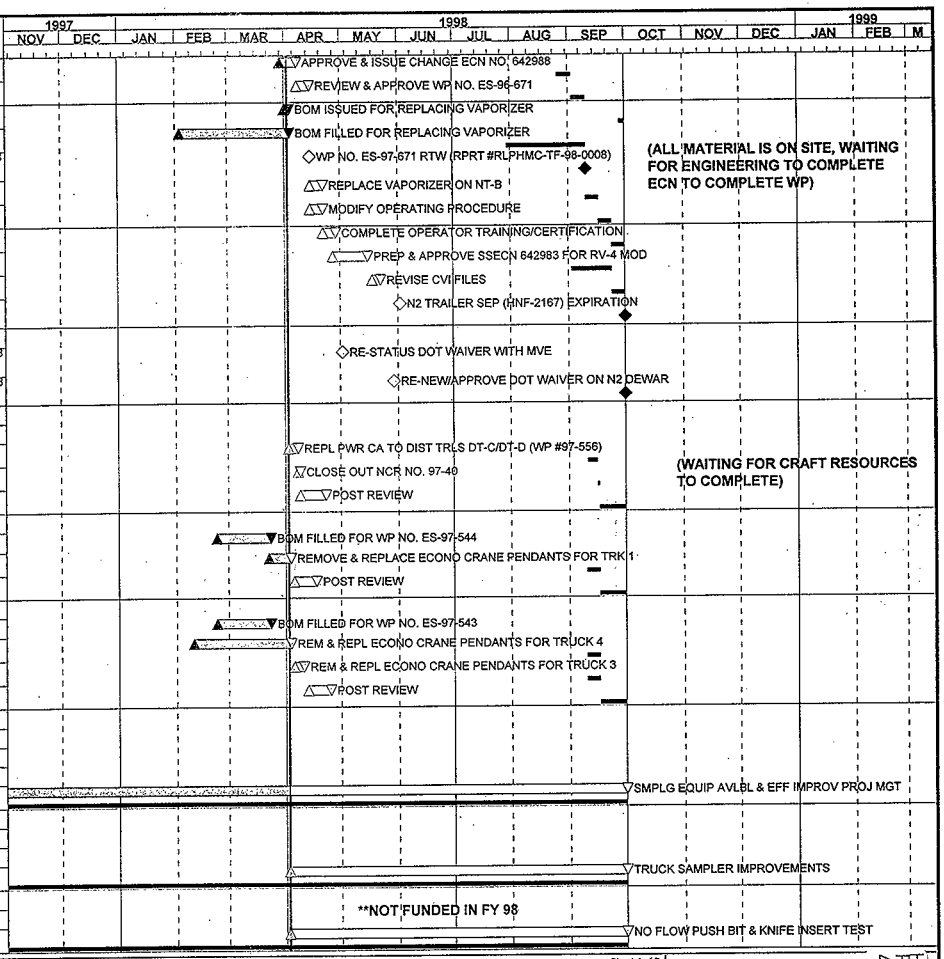
CHARACTERIZATION EQPT ENGRG PROJECTS

Master Schedule

Activity ID	Early Start	Early Finish	Total float	Resp Eng	Due date
H2H0152A	30MAR98A	07APR98	1	KOSTELNIK	
H2H0153A	08APR98	14APR98	1	D MOORE	
H2H0153B	01APR98A	03APR98A		D MOORE	
H2H0153C	03FEB98A	03APR98A		D MOORE	
H2H0153D		14APR98	1	D MOORE	15APR98
H2H0154	15APR98	21APR98	108	B SHOEMAKE	
H2H0155	15APR98	21APR98	108		
H2H0156	22APR98	28APR98	108		
H2H0157	27APR98*	15MAY98	90	KOSTELNIK	
H2H0158	18MAY98	22MAY98	90	KOSTELNIK	
H2H0159		01JUN98*	85		
WAIVER ON NITROGEN DEWARS (A KOSTELNIK)					
H2H0160		01MAY98*	0	KOSTELNIK	01MAY98
H2H0161		29MAY98*	0	KOSTELNIK	31MAY98
FIELD ENGINEERING ELECTRICAL SUPPORT (B JOHNS)					
DIST TRAILERS DT-C/DT-D POWER CABLE (B JOHNS)					
H2H0201	03APR98	07APR98	112	B SHOEMAKE	
H2H0202	08APR98	08APR98	112	MCELROY	
H2H0203	09APR98	22APR98	112	B JOHNS	
WEATHERPROOF ECONO CRANE PENDANTS FOR TK 1					
H2H0210F	23FEB98A	23MAR98A		D MOORE	
H2H0211	23MAR98A	03APR98	115	B SHOEMAKE	
H2H0212	06APR98	17APR98	115	B JOHNS	
WEATHERPROOF ECONO CRN PENDANTS FOR TRKS 3 & 4					
H2H0220F	23FEB98A	23MAR98A		D MOORE	
H2H0221	10FEB98A	03APR98	110	B SHOEMAKE	
H2H0221A	06APR98	10APR98	110	B SHOEMAKE	
H2H0222	13APR98	24APR98	110	B JOHNS	
SAMPLING EQUIPMENT AVLBL & EFF IMPROVEMENTS					
SAMPLING EQUIPMENT AVLBL & EFFECTIVE IMPROVE					
SAMPLING EQUIP AVLBL & EFF IMPROV PROJ MGT					
SCHEDULE SUMMARY					
H3A0100	01OCT97A	30SEP98	0	C HANSON	
SAMPLER IMPROVEMENTS					
TRUCK SAMPLER IMPROVEMENTS**					
SCHEDULE SUMMARY					
H3B0100	03APR98	30SEP98	0		
NO FLOW PUSH BIT & KNIFE INSERT TESTING**					
SCHEDULE SUMMARY					
H3B0300	03APR98	30SEP98	0		



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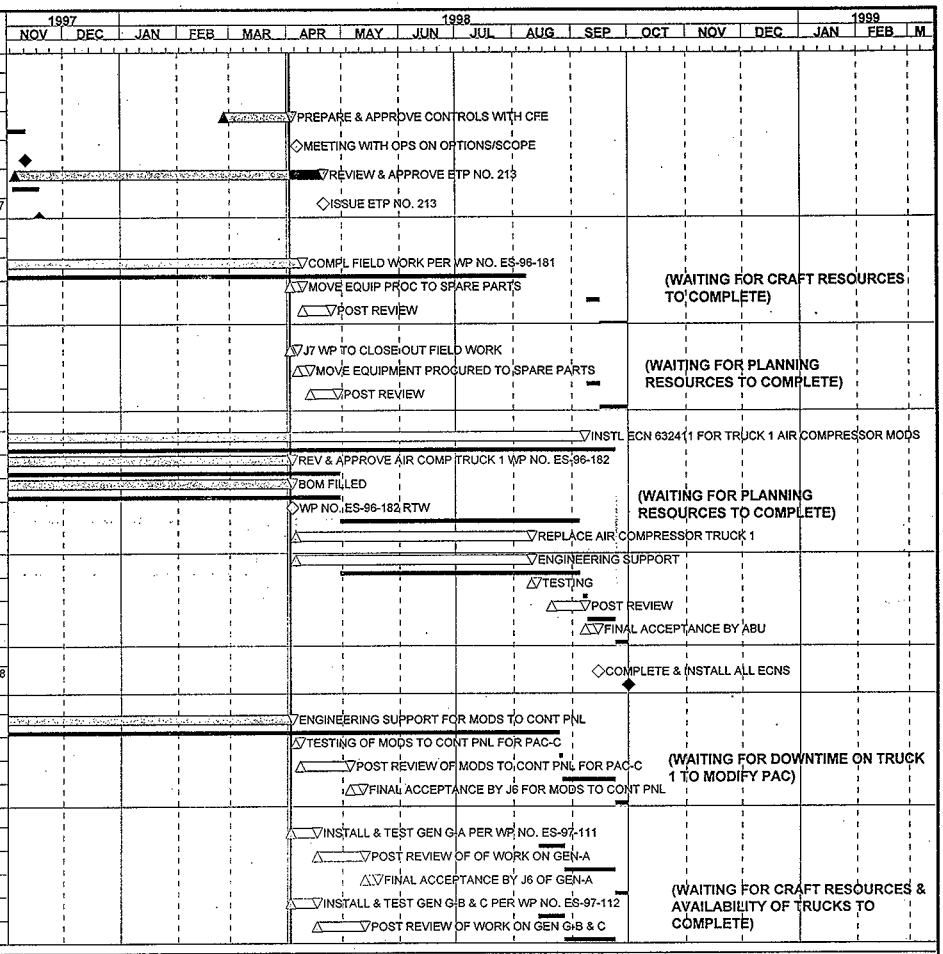
Master Schedule

Activity ID	Early Start	Early Finish	Total float	Resp Eng	Due date
SAFETY IMPROVEMENTS					
ENGRG ANAL OF SAF OF TRK JACKS (KOSTELNIK)					
DOCUMENTATION (LOI'S & ETP'S)					
H3C0100B	26FEB98A	03APR98	-104	KOSTELNIK	
H3C0100C		06APR98	-104	KOSTELNIK	
H3C0100D	05NOV97A	20APR98	-104	KOSTELNIK	
H3C0100E		20APR98	-104	KOSTELNIK	17NOV97
NEC CORRECTIONS & MODS DEFERRED FROM FY97					
CONVERT SERVICE TRAILER #2 (B JOHNS)					
H3C0310	15SEP97A	09APR98	110	SHOEMAKE	
H3C0313	03APR98	09APR98	110	B SHOEMAKE	
H3C0314	10APR98	24APR98	110	B JOHNS	
CONSTRUCT NEW DISTRIBUTION TRAILER (B JOHNS)					
H3C0320A	03APR98	06APR98	108	MOORE/JOHN	
H3C0321	07APR98	13APR98	108	B SHOEMAKE	
H3C0322	14APR98	28APR98	108	B JOHNS	
REPLACE AIR COMPRESSOR TRUCK 1 (B JOHNS)					
H3C0330	06JAN97A	07SEP98	12	D MOORE	
H3C0331	06JAN97A	03APR98	18	D MOORE	
H3C0331A	06JAN97A	03APR98	18	D MOORE	
H3C0331C		03APR98	18	D MOORE	
H3C0331D	06APR98	10AUG98	18	SHOEMAKE	
H3C0332	06APR98	10AUG98	18	B JOHNS	
H3C0332A	11AUG98	12AUG98	18	B JOHNS	
H3C0332B	21AUG98	07SEP98	12	B JOHNS	
H3C0332C	08SEP98	14SEP98	12	B JOHNS	
MILESTONES					
H3C0340		14SEP98	12	SHOEMAKE	30SEP98
AIR COMPRESSORS BAC-C & D (B JOHNS)					
H3C0371	03OCT97A	03APR98	99	B JOHNS	
H3C0371A	06APR98	07APR98	99	B JOHNS	
H3C0371B	08APR98	04MAY98	99	B JOHNS	
H3C0371C	05MAY98	11MAY98	99	B JOHNS	
GENERATOR G-A, B, C & D (B JOHNS)					
H3C0380E	03APR98	16APR98	93	SHOEMAKE	
H3C0380F	17APR98	12MAY98	93	B JOHNS	
H3C0380G	13MAY98	19MAY98	93	B JOHNS	
H3C0381E	03APR98	16APR98	93	SHOEMAKE	
H3C0381F	17APR98	12MAY98	93	B JOHNS	



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Early Bar
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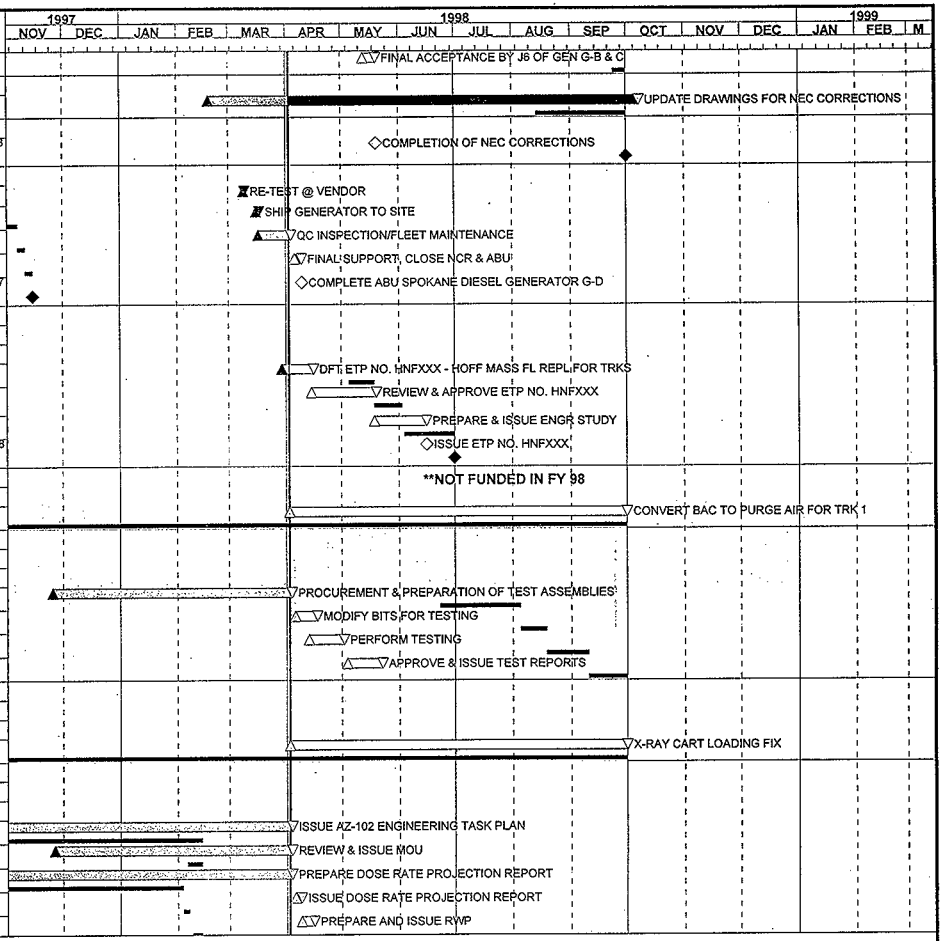
Activity ID	Early Start	Early Finish	Total float	Resp Eng	Due date
H3C0381G	13MAY98	19MAY98	93	B JOHNS	
OTHER (B JOHNS)					
H3C0392	18FEB98A	07OCT98	-5	B JOHNS	
MILESTONES					
H3C03100		19MAY98	93	B JOHNS	30SEP98
SPOKANE DIESEL GENERATOR: G-D (B JOHNS)					
H3C03125B	09MAR98A	09MAR98A		VEND/JOHNS	
H3C03126	16MAR98A	17MAR98A		B JOHNS	
H3C03127	17MAR98A	03APR98	-98	B JOHNS	
H3C03128	06APR98	09APR98	-98	B JOHNS	
H3C03129		09APR98	-98	B JOHNS	15NOV97
AVAILABILITY & EFFECTIVENESS IMPROVEMENTS					
HOFFER MASS FL REPLACEMENT FOR TRKS #2, 3 & 4					
DOCUMENTATION (LOI'S & ETP'S)					
H3D0200A	30MAR98A	15APR98	11	J AKERS	
H3D0200B	15APR98	19MAY98	11	J AKERS	
H3D0200C	19MAY98	15JUN98	11	J AKERS	
H3D0200D		15JUN98	11	J AKERS	30JUN98
CONVERT BAC TO PURGE AIR FOR TRUCK #1**					
SCHEDULE SUMMARY					
H3D0300	03APR98	30SEP98	0		
ENGINEERING STUDIES & TESTING					
TESTING TO SUPPORT CHANGE IN A. B. (A KOSTELNIK)					
ENVELOPE TESTING					
H3E0211	25NOV97A	03APR98	90	WITWER	
H3E0211A	06APR98	17APR98	90	WITWER	
H3E0211B	13APR98	01MAY98	90	WITWER	
H3E0212	04MAY98	22MAY98	90	KOSTELNIK	
X-RAY IMPROVEMENTS					
X-RAY CART LOADING FIX**					
SCHEDULE SUMMARY					
H3F0100	03APR98	30SEP98	0		
EQUIP CHANGES TO SAMPLE AZ-102 TANK					
SMPLG EQUIP SYS DSGN TO SMPL AZ-102 TK (D HICKS)					
H3G0210	02SEP97A	03APR98	-20	D'HICKS	
H3G0210A	26NOV97A	03APR98	11	SCHREIBER	
H3G0211	15AUG97A	03APR98	8	J POPPITI	
H3G0211A	06APR98	08APR98	8	B ROGERS	
H3G0211B	09APR98	15APR98	8	B ROGERS	



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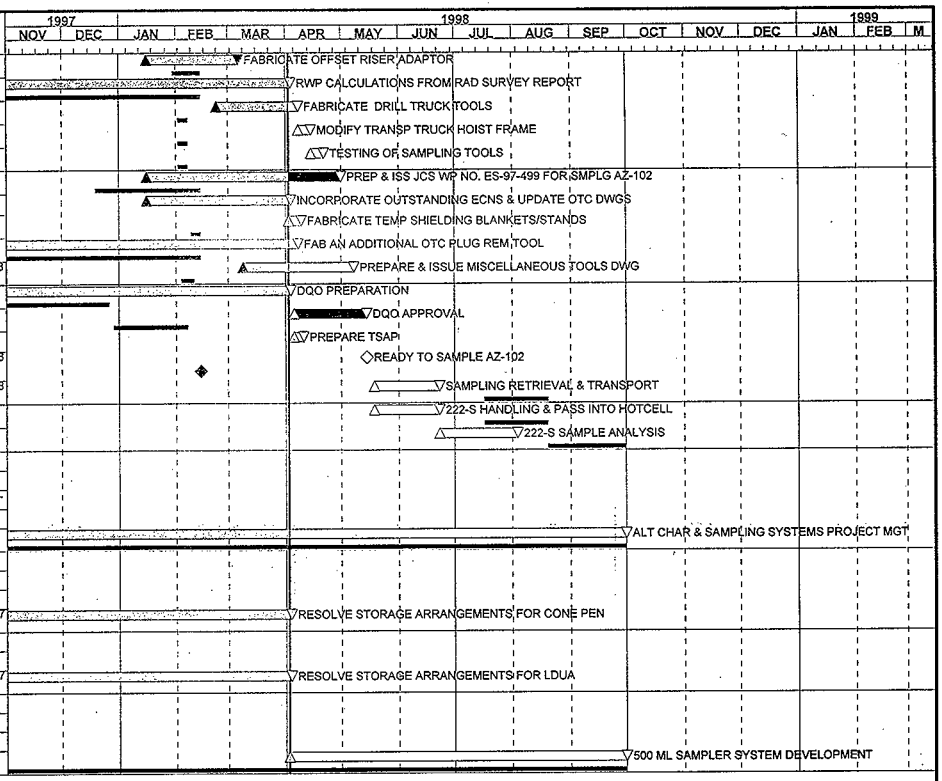
CHARACTERIZATION EQPT ENGRG PROJECTS

Master Schedule

Activity ID	Early Start	Early Finish	Total float	Resp Eng	Due date
H3G0213	16JAN98A	06MAR98A		FAB SHOP	
H3G0214	01OCT97A	03APR98	11	B ROGERS	
H3G0217	23FEB98A	07APR98	4	LINSCHOOTE	
H3G0218	08APR98	14APR98	4	LINSCHOOTE	
H3G0219	15APR98	21APR98	4	LINSCHOOTE	
H3G0221	16JAN98A	30APR98	-3	D MOORE	
H3G0222A	16JAN98A	03APR98	125	G WILSON	
H3G0224	03APR98	09APR98	12	FAB SHOP	
H3G0225A	01OCT97A	07APR98	14	FAB SHOP	
H3G0225	09MAR98A	07MAY98	15	LINSCHOOTE	31MAY98
H3G0226	01OCT97A	03APR98	-13	T CRAWFORD	
H3G0226A	06APR98	14MAY98	-13	T CRAWFORD	
H3G0226B	06APR98	10APR98	11	SCHREIBER	
H3G0227		14MAY98	-13		27APR98
H3G0228	19MAY98	22JUN98	41		13APR98
H3G0229	19MAY98	22JUN98	41	222-S LAB	
H3G0230	23JUN98	03AUG98	41	222-S LAB	
ALTERNATE SAMPLING SYSTEMS					
ALT CHARACTERIZATION & SAMPLING SYS PROJ MGT					
ALT CHARACTERIZATION SAMPLING PROJECT MANAGEMENT					
SCHEDULE SUMMARY					
H4A0100	01OCT97A	30SEP98	0	T RAINEY	
NEW EQUIPMENT STORAGE/MAINTENANCE					
CONE PEN SYS SPRT STBY & STOR (T RAINEY)					
DOCUMENTATION (LOI'S & ETP'S)					
H4B0100	03OCT97A	03APR98	-86	T RAINEY	30NOV97
LDUA SYSTEM SUPPORT STORAGE (T RAINEY)					
DOCUMENTATION (LOI'S & ETP'S)					
H4B0200	03OCT97A	03APR98	-86	T RAINEY	30NOV97
NEW SAMPLER SYSTEM DEVELOPMENT					
500 ML SAMPLER SYSTEM DEVELOPMENT (J SMALLEY)					
SCHEDULE SUMMARY					
H4D0300	03APR98	30SEP98	0		



Project Start	01SEP97
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CHARACTERIZATION EQPT ENGRG PROJECTS

Master Schedule

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DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	Characterization Engineering	Date 05/08/98
Project Title/Work Order		EDT No. 622148
CHARACTERIZATION ENGINEERING STATUS REPORT JANUARY 1998 TO MARCH 1998		ECN No. N/A

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
Central Files	A3-88				
LMHC					
Biggs, J. R.	S7-03	X			
Burton, J. G.	S7-21	X			
Janicek, G. P.	S7-12	X			
Kristofzski, J. R.	R2-12	X			
Payne, M. A.	R2-58	X			
Popielarczyk, R. S.	S7-01	X			
Raymond, R. E.	R2-38	X			
Ross, W. E.	S7-84	X			
Schofield, J. S.	S7-12	X			
D. H. Shuford	S7-01	X			
NHC					
Boger, R. M.	S7-12	X			
Mattichak, R. W.	S7-12	X			
Rainey, T. E.	S7-12	X			
RL					
Bowser, D. W.	S7-54	X			
Silko, J. M.	S7-54	X			
Thompson, Jr., J. F.	S7-54	X			
COGEMA ENGINEERING					
Criddle, Jr., J. D.	S7-12	X			
Hanson, C. E.	S7-12	X			
Kostelnik, A. J.	S7-12	X			
Scott, K. V.	S7-12	X			