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Rev. 0

Interim Characterization Report for the REDOX Plutonium Loadout Hood

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Office of Environmental Restoration

Submitted by: Bechtel Hanford, Inc.

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Interim Characterization Report for the REDOX Plutonium Loadout Hood

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Date Published

March 1999

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ACRONYMS AND ABBREVIATIONS

BHI	Bechtel Hanford, Inc.
DQO	data quality objective
EE/CA	engineering evaluation/cost analysis
GEA	gamma energy analysis
ICP/MS	inductively couple plasma/mass spectroscopy
LCS	Laboratory Control Sample
LOI	letter of instruction
PCB	polychlorinated biphenyl
QC	quality control
REDOX	reduction oxidation
SAP	sampling and analysis plan
TCLP	toxic characteristic leaching procedure
TRU	transuranic

1.0 INTRODUCTION

This interim report presents the analytical results from the initial-phased characterization of the Reduction Oxidation (REDOX) Plutonium Loadout Hood.

The sampling and analysis plan (SAP) for the REDOX Plutonium Loadout Hood (DOE-RL 1998) outlines a phased approached for characterization of the REDOX Plutonium Loadout Hood. This phased approach allows the same SAP to be used from the initial characterization through the final dismantlement and disposal of components of the Plutonium Loadout Hood. This characterization originally had two overall objectives during the initial planning phase, as follows:

- To provide characterization data for materials contained within the general area inside the hood and sump

- To provide isotopic analysis of materials contained within the piping and vessels in order to recalculate the nondestructive assay results from an in situ nondestructive radiological characterization of selected areas of the REDOX Plutonium Loadout Hood that was completed in January 1997 and documented in *In-Situ Non-Destructive Radiological Characterization of Selected 202-S Reduction Oxidation (REDOX) Facility Sample Gallery Pipes and Vessels* (BHI 1997).

The results from this initial characterization will support preparation of an alternative determination document for the REDOX Plutonium Loadout Hood, similar to the Engineering Evaluation/Cost Analysis (EE/CA) under the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) process.

2.0 BACKGROUND

The REDOX Facility (202-S), located in the 200 West Area of the Hanford Site, was constructed between 1950 and 1952 and became the first large-scale, continuous-flow, solvent-extraction process plant built in the United States for the recovery of plutonium from irradiated uranium fuel. The extraction process, which replaced the batch precipitation methods first used at the Hanford Site, was designed to separate uranium, plutonium, and neptunium as individual product streams from associated fission products in the irradiated fuel.

The 202-S Building is a reinforced-concrete structure consisting of the canyon area; the galleries, storage, sample, pipe, operating, and crane cab; the silo area; the east end; and the attached service areas. The building is 142.6 m (468 ft) long and 49 m (161 ft) wide. The canyon area is 25.2 m (83 ft) high, with 18.2 m (60 ft) above grade. The silo area is 40.2 m (132 ft) high, with 35.6 m (117 ft) above grade.

The Plutonium Loadout Hood is located at the west end of the North Sample Gallery (Figure 1). It received plutonium-rich solutions from the REDOX separations process and, in a two-step process, concentrated the solutions in the E-16 pre-concentrator and E-17 concentrator, respectively, to reach the required concentrations. The concentrated solution was transferred from the E-17 concentrator to the product removal cans in 30-L batches for transfer to the 234-5Z facility for final processing.

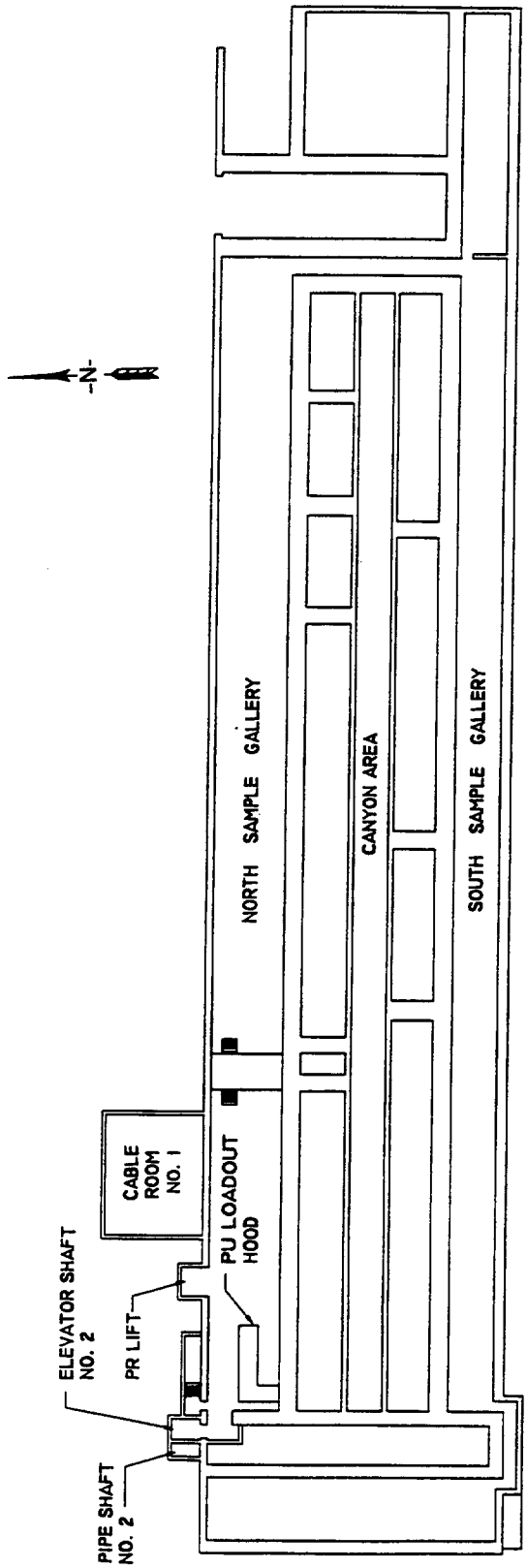
The Plutonium Loadout Hood operated from 1951 until 1955 when it was taken out of service and flushed with nitric acid solutions. It was replaced with the 233-S facility. The REDOX facility continued to operate until it was shut down in 1967. Deactivation of the facility started in 1967 and was completed in 1969. Since deactivation, surveillance and maintenance operations have been performed at the facility.

The Plutonium Loadout Hood (Figure 2) is composed of a metal frame supporting a series of Lucite (a registered trademark of E. I. duPont de Nemours & Company, Wilmington, Delaware) panels. This enclosure isolates the process vessels and piping from the North Sample Gallery. The Lucite part of the hood is approximately 2.55 m (8 ft 6 in.) high and sits on a raised concrete curb 15.2 cm (6 in.) high. The topmost 0.6 m (2 ft) of the hood is enclosed by stainless steel panels. The hood is configured in an "L" shape with the base leg 3.4 m (11 ft) long and 1.5 m (5 ft) wide and the other leg 5.2 m (17 ft) long and 1.5 m (5 ft) wide. Originally, this section of the hood was 6.4 m (21 ft) long, but a section of frame and paneling at the east end was removed, along with the equipment associated with the product removal can, at the completion of loadout hood operations in 1955. A metal panel was used to cover the opening left by removing the east end section. The two stainless steel pipes that were originally connected to the equipment that filled the product removal cans, a fill line from the E-17 concentrator and a vacuum return line to the E-21 plutonium transfer trap tank, were cut and now extend outside the enclosure approximately 10 cm (4 in.) from the surface of the metal panel.

The floor of the hood area was built at two different levels to accommodate several large process vessels. On the base end of the "L," the floor is depressed 1.35 m (4 ft 6 in.) deeper than the floor level in the North Sample Gallery and forms what is called the pit. The E-16 pre-concentrator and E-17 concentrator are located in this depression. A 15.2-cm (6-in.) cubical sump, equipped with a vacuum transfer jet, is located at the northwest corner of this depression. The sump also receives drain overflow from the 233-S pipe trenches.

The major vessels located inside the hood that were used to concentrate plutonium nitrate solutions are described in Table 1. A detailed description of the REDOX Plutonium Loadout Hood is contained in the SAP (DOE-RL 1998). A number of pipes connect the vessels or provide access from utility services such as the steam, vacuum transfer, or cooling water systems.

Figure 1. REDOX Sample Gallery Level.



W:012699A.DWG

Figure 2. Plutonium Loadout Hood.

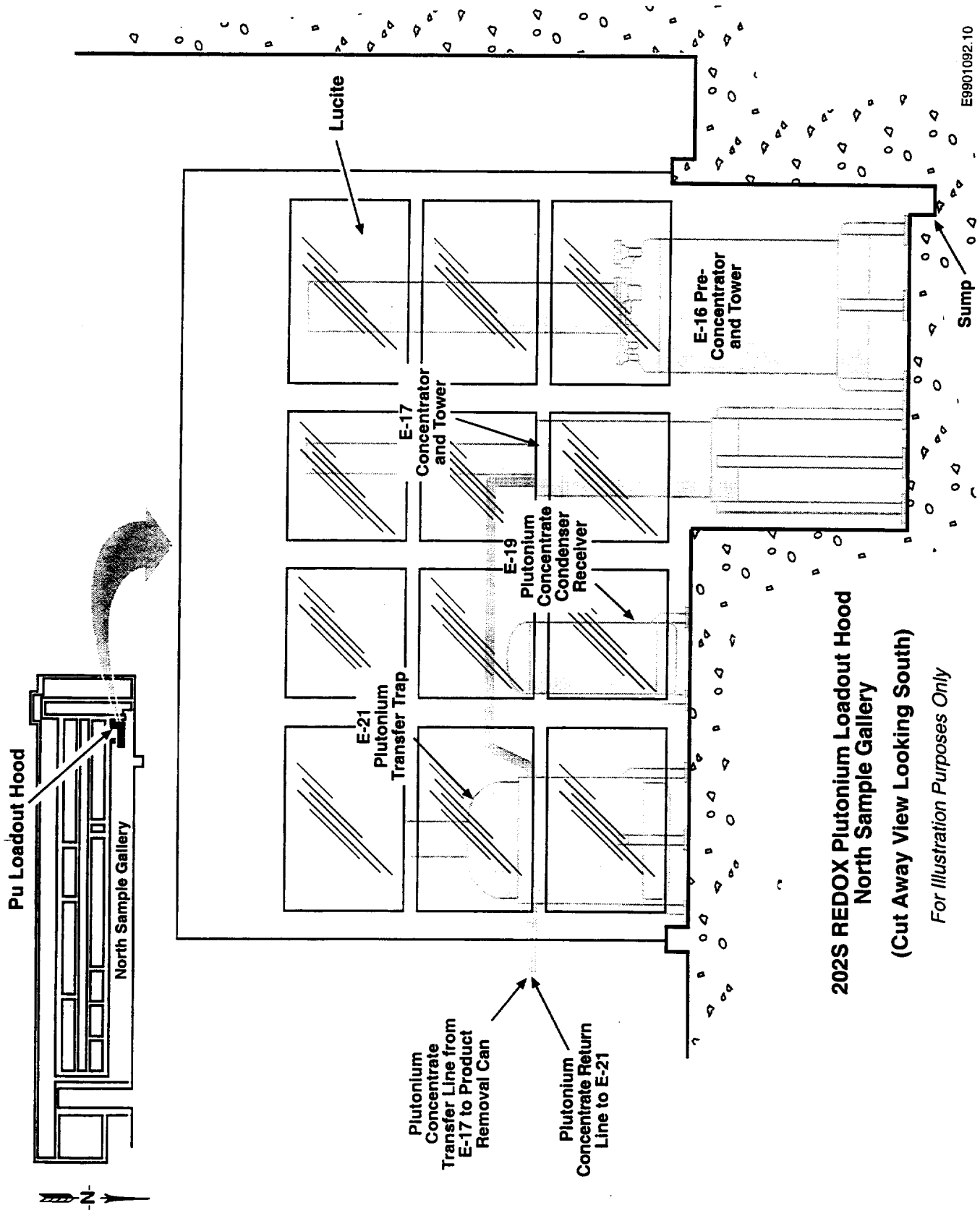


Table 1. Major Plutonium Loadout Hood Process Vessels.

Vessel Designation[a,b]	Vessel Use
E-16, Pre-Concentrator and Tower	First-step concentration of plutonium nitrate solution from E-cell
E-15, Pre-Concentrator Condenser	Condense E-16 vapors
E-14, Pre-Concentrator Condenser Receiver Tank	Receives condensed E-16 vapors from the E-15 condenser
E-17, Concentrator and Tower	Second-step concentration of plutonium nitrate solution from E-16 for loadout to the product removal cans
E-18, Plutonium Concentrator Condenser	Condense E-17 vapors
E-19, Plutonium Concentrate Condenser Receiver Tank	Collect E-18 condensed E-17 vapors
E-21, Plutonium Transfer Trap Tank	Collect vacuum transfer plutonium nitrate solutions for rework

[a]The section of the hood that contained the equipment to fill the product removal cans was disassembled and moved to 233-S in 1955.

[b]The approximate locations of shaded entries are shown in Figure 3.

3.0 PROJECT OBJECTIVE

The objective of this initial-phased characterization is to collect information about the types and quantities of radiological and chemical constituents located within the Plutonium Loadout Hood to support criticality assessments, waste designation, and worker health and safety issues as identified in Table 1-7 of the SAP (DOE-RL 1998). These elements then support preparation of the alternative determination document.

The sample locations planned as part of this characterization are shown in Figure 3. Table 2 identifies the type of sample and the expected data use. It is consistent with Section 3, "Field Sampling Guide," of the SAP, except no sample is collected from a line associated with the E-15 pre-concentrator unit. The initial criticality evaluation did not permit breaking a piping connection around the E-15 pre-concentrator vessel because of the limited information available about plutonium distribution. Therefore, this sample was omitted from the sampling scope and will be included in future sampling efforts that determine the final disposition of these vessels.

Figure 3. Sample Locations.

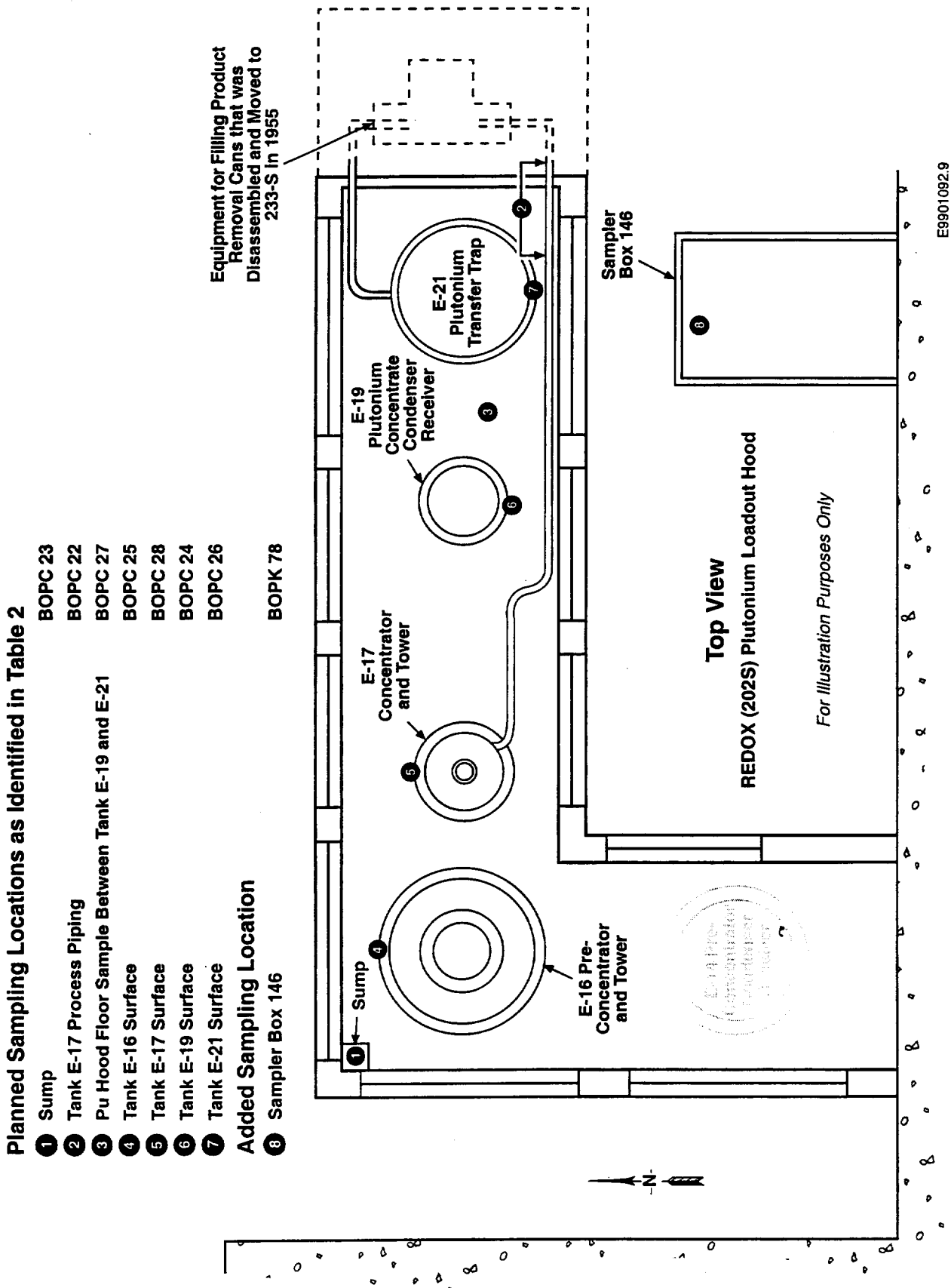


Table 2. REDOX Plutonium Loadout Hood Planned Samples.

Sample Location	Type of Sample Planned	Data Use		
		Waste Characterization	Criticality Assessment	Health and Safety
Sump	Sump sludge solid	X	X	X
Tank E-17 process piping	Solid residue within the pipe	X	X	X
	Liquid sample	X	X	X
Pu hood floor sample between Tanks E-19 and E-21	Solid residue (if sufficient residue is not available, four technical smears in the general area of highest contamination will be collected and analyzed as a single sample)	X	X	X
Tank E-16 surface	A technical smear from top and side outside surface of the tank		X[a]	X
Tank E-17 surface	A technical smear from top and side outside surface of the tank		X[a]	X
Tank E-19 surface	A technical smear from top and side outside surface of the tank		X[a]	X
Tank E-21 surface	A technical smear from top and side outside surface of the tank		X[a]	X

[a]Radioisotope distribution data from the technical smears support evaluation of nondestructive assay surveys of the tanks.

4.0 CHARACTERIZATION

This initial-phased characterization of REDOX Plutonium Loadout Hood was conducted in accordance with the requirements of Bechtel Hanford, Inc. (BHI) Field Support Work Package No. 19980325002, "202-S Plutonium Loadout Hood Sampling." Prior to initiating work, a readiness assessment was conducted, and the successful completion is documented in the *Readiness Assessment Report for the REDOX Plutonium Loadout Hood* (BHI 1998b).

Because of the expected levels of alpha loose surface contamination greater than 1 x 10^6 dpm/ 100 cm^2, all access into the Plutonium Loadout Hood required the use of glovebags as the engineered barrier and the Plutonium Loadout Hood was maintained at a slightly negative pressure relative to the North Sample Gallery, thus ensuring that sampling personnel were physically isolated from the alpha inventory contained within the hood.

The sample analysis was performed by the 222-S Laboratory in accordance with letter of instruction (LOI), "Letter of Instruction for the Sample Analysis of the Reduction Oxidation Facility 9202-S) Plutonium Loadout Hood," dated July 24, 1998 (BHI 1998a).

A discussion of the sample collection activities and laboratory analysis results is provided in Sections 4.1 and 4.2, respectively.

4.1 SAMPLE COLLECTION

A summary of the actual samples collected with their associated Hanford Environmental Information System identifying number and a brief description is presented in Table 3. In addition, quality-controlled (QC)-required samples used to assess possible cross-contamination of samples from the equipment used or during movement to the laboratory were collected using deionized water.

Samples consisted of one sample (two phases) recovered from the hood sump, one section of process line pipe, and five technical smear samples taken from surfaces within the hood and one technical smear sample taken from a suspected contaminated area outside of the hood.

All samples were collected and packaged in accordance with Work Package 19980325002 and controlled as required from the point of origin to the analytical laboratory as required by BHI-EE-01, *Environmental Investigations Procedures*, EIP 3.0, "Chain of Custody." The field logbook pages associated with this sampling event are provided in Appendix A.

The radiological conditions within the Plutonium Loadout Hood were consistent with initial planning and historical data. The removable alpha contamination ranged between 3 x 10^5 dpm/100 cm^2 and 6.7 x 10^6 dpm/100 cm. A copy of the surveys associated with the collection of samples is presented in Appendix B.

Two significant developments were not accounted for in the original plan. One was the collection of a technical smear from a contaminated area on the top of the 146 sampler box, and the other was the determination that the sump contained a wet sludge rather than the dry sludge that was expected. In each case, the work package was revised to account for the change. A brief discussion of each case is presented in Sections 4.1.1 and 4.1.2.

Table 3. REDOX Plutonium Loadout Hood Collected Sample Summary. (2 Pages)

Sample Location[a]	Type of Sample Planned	Type of Sample Collected	HEIS Number	Collection Date	Comment
Plutonium Loadout Hood					
Sump (1)	Sump sludge solid	Wet sludge	B0PC23	8/31/98	The wet sludge was centrifuged and analyzed as a liquid and as a wet centrifuged solid.
Tank E-17 process piping (2)	Solid residue within the pipe	Pipe section 21.4 cm long, 2.6 cm ID	B0PC22	8/25/98	The pipe sample contained no removable residue and the pipe internal structure was leached and the leachate analyzed.
	Liquid sample	--	--	8/31/98	No liquid was found in the pipe.
Pu hood floor sample between Tanks E-19 and E-21 (3)	Solid residue (if sufficient residue is not available, four technical smears in the general area of highest contamination will be collected and analyzed as a single sample)	Four technical smears	B0PC27	8/24/98	Four technical smears were collected and analyzed as one sample due to insufficient floor material available for solid sample.
Tank E-16 surface (4)	A technical smear from top and side outside surface of the tank	A technical smear from top and side outside surface of the tank	B0PC25	8/20/98	Two technical smears were collected and analyzed as one sample.
Tank E-17 surface (5)	A technical smear from top and side outside surface of the tank	A technical smear from top and side outside surface of the tank	B0PC28	--	Two technical smears were collected and analyzed as one sample.
Tank E-19 surface (6)	A technical smear from top and side outside surface of the tank	A technical smear from top and side outside surface of the tank	B0PC24	8/24/98	Two technical smears were collected and analyzed as one sample.
Tank E-21 surface (7)	A technical smear from top and side outside surface of the tank	A technical smear from top and side outside surface of the tank	B0PC26	8/24/98	Two technical smears were collected and analyzed as one sample.

Table 3. REDOX Plutonium Loadout Hood Collected Sample Summary. (2 Pages)

Sample Location[a]	Type of Sample Planned	Type of Sample Collected	HEIS Number	Collection Date	Comment
North Sample Gallery West End					
146 sampler box (8)	Not in initial group of planned samples	Single technical smear	B0PK78	8/11/98	A single technical smear was collected from the stained area on the top of the sampler box that was discovered during the installation of a glovebox and secondary containment tent on the south side of the hood.
Quality control sample blanks					
Plastic sleeves for core tool	Liquid	Liquid	B0PPC1	8/10/98	Deionized water poured over plastic sleeves for core tools and collected as a sample for analysis.
Stainless steel sampling equipment	Liquid	Liquid	B0PPC2	8/10/98	Deionized water poured over stainless steel sampling equipment and collected as a sample for analysis.
Pipe cutter	Liquid	Liquid	B0PPC3	8/10/98	Deionized water poured over pipe cutter and collected as a sample for analysis.
Sample cooler movement blank	Liquid	Liquid	B0PPC5	8/31/98	Deionized water in a sample bottle placed in a cooler during movement of the samples to 222-S.

[a] Numbers in parentheses ( ) correspond to location number provided in Figure 3, "Planned Sample Locations."

4.1.1 Sampler Box

During a pre-job radiological survey conducted prior to the set up of the glovebag and secondary containment tent on the south side of the Plutonium Loadout Hood, an area of high alpha contamination was discovered on the top of the 146 sampler box. The 146 sampler box is located south of the Plutonium Loadout Hood. It was determined that a drop from a valve flange on the L-16 to E-4 pipeline located above the sampler box was the source of the contamination.

Collection of a technical smear from the contaminated area was added to the sampling scope to determine the isotopic constituents of the material that leaked from the valve. This data would then be used to compare with the material from within the hood in order to obtain the relative age of the respective materials.

4.1.2 Sump Sludge

The planned sampling of the sump sludge was based on removing a solid core sample of dry sludge with a core tool. The sump is located approximately 1.3 m (4.5 ft) below the sample gallery floor level, is not directly visible from the glovebag, and has obstructed access due to piping located over the sump. When sample collection was attempted with the core tool, only a coating of wet sludge was recovered. The work package was revised and a sample was collected using a peristaltic pump. Because of the consistency of the sump sludge, only the required minimum volume for the analyses was collected.

4.2 LABORATORY ANALYSIS AND RESULTS

Tables 4 through 6 contain results for the analysis of samples recovered from the Plutonium Loadout Hood. The LOI covered the analytes identified in the SAP. The analytes identified were all "routine" reporting components for the analysis techniques. Actinide evaluation by inductively coupled plasma/mass spectroscopy (ICP/MS) was added to evaluate an alternative and more cost-effective analytical technique in place of separate analyses for plutonium isotopes, americium, and neptunium.

Sample breakdown and most analytical work was performed by the 222-S Laboratory. Polychlorinated biphenyl (PCB) analysis was performed at the Waste Sampling and Characterization Facility after extraction at 222-S, and hexone analysis was performed by Special Analytical Services.

The sump sample was centrifuged, solid and liquid phases were separated, and each phase was analyzed separately. These results are summarized in Table 4. The solid fraction is reported on a "wet centrifuged" basis.

Table 4. Plutonium Loadout Hood Sump Sludge Multiphase Sample Results. (2 Pages)

HEIS Sample Number B0PC23								
Analyte	**Liquid Phase**			**Solid Phase**				
Gross Alpha	2.39E+01			6.91E+01	µCi/g		--	
Gross Beta	4.70E+00	µCi/mL		7.49E+00	µCi/g		--	
Strontium-90	2.92E-04	µCi/mL		3.47E-04	µCi/g	J	--	
Cobalt-60	9.40E-06	µCi/mL	U	2.61E-04	µCi/g	U	--	
Antimony-125	4.18E-05	µCi/mL	U	6.88E-04	µCi/g	U	--	
Cesium-134	9.75E-06	µCi/mL	U	2.24E-04	µCi/g	U	--	
Cesium-137	1.38E-03	µCi/mL		2.82E-03	µCi/g		--	
Europium-152	1.42E-04	µCi/mL	U	5.97E-04	µCi/g	U	--	
Europium-154	2.49E-05	µCi/mL	U	8.11E-04	µCi/g	U	--	
Europium-155	4.54E-04	µCi/mL	U	5.93E-04	µCi/g	U	--	
Radium-226	3.73E-04	µCi/mL	U	5.43E-03	µCi/g	U	--	
Actinium-228	3.90E-05	µCi/mL	U	1.44E-03	µCi/g	U	--	
Americium-241 (GEA)	1.24E+01	µCi/mL		8.93E+00	µCi/g		--	
Neptunium-237	1.84E-04	µCi/mL	U	2.20E-02	µCi/g		--	
Plutonium-238	7.67E-01	µCi/mL	U	3.40E+00	µCi/g	U	--	
Plutonium-239/240	1.29E+01	µCi/mL		7.71E+01	µCi/g		--	
Americium-241	1.14E+01	µCi/mL		1.02E+01	µCi/g		--	
Curium-243/244	9.28E-01	µCi/mL	U	1.07E+00	µCi/g	U	--	
Silver	5.10E+00	µg/mL	U	--			TCLP Ag	1.67E-01 µg/mL U
Arsenic	5.10E+01	µg/mL	U	--			TCLP As	1.67E+00 µg/mL U
Barium	2.55E+01	µg/mL	U	--			TCLP Ba	8.33E-01 µg/mL U
Cadmium	2.44E+02	µg/mL		1.47E+02	µg/g		TCLP Cd	4.32E+00 µg/mL
Chromium	2.33E+04	µg/mL		1.63E+04	µg/g		TCLP Cr	4.22E+02 µg/mL J
Iron	5.01E+02	µg/mL		2.29E+04	µg/g		--	
Nickel	3.86E+02	µg/mL		2.52E+02	µg/g		--	
Lead	5.10E+01	µg/mL	U	4.15E+01	µg/g	J	TCLP Pb	1.67E+00 µg/mL U
Selenium	5.10E+01	µg/mL	U	--			TCLP Se	1.67E+00 µg/mL U
Mercury	1.46E+02	µg/mL		1.19E+02	µg/g		TCLP Hg	5.31E+00 µg/mL J
Fluoride	2.03E+02	µg/mL	J	1.71E+02	µg/g	J	--	
Chloride	4.68E+03	µg/mL		3.61E+03	µg/g		--	
Nitrite	1.10E+03	µg/mL	U	8.73E+02	µg/g	U	--	
Nitrate	4.44E+05	µg/mL		3.53E+05	µg/g		--	
Phosphate	1.22E+03	µg/mL	U	9.70E+02	µg/g	U	--	
Sulfate	5.60E+04	µg/mL		7.83E+04	µg/g		--	
Oxalate	1.98E+03	µg/mL	J	1.37E+03	µg/g	J	--	

Table 4. Plutonium Loadout Hood Sump Sludge Multiphase Sample Results. (2 Pages)

HEIS Sample Number B0PC23							
Analyte	**Liquid Phase**			**Solid Phase**			
Aroclor -1016	6.00E-02	µg/mL	UJ	3.30E-01	µg/g	UJ	--
Aroclor -1221	6.00E-02	µg/mL	UJ	3.30E-01	µg/g	UJ	--
Aroclor -1232	6.00E-02	µg/mL	UJ	3.30E-01	µg/g	UJ	--
Aroclor -1242	6.00E-02	µg/mL	UJ	3.30E-01	µg/g	UJ	--
Aroclor -1248	6.00E-02	µg/mL	UJ	3.30E-01	µg/g	UJ	--
Aroclor -1254	5.71E-02	µg/mL	J	2.21E-01	µg/g	J	--
Aroclor -1260	6.00E-02	µg/mL	UJ	3.30E-01	µg/g	UJ	--
Hexone	2.56E+00	µg/mL	UJ	2.20E-02	µg/g	UJ	--
Asbestos	--			No solids remained from digestion, no asbestos-like material for analysis.			
Resin bead	--			No solids remained from digestion, no resin bead-like material for analysis.			
Density	1.53	g/mL		1.55	g/mL		
Vol %	74.3	%		25.7	%		

Table 5. Tank E-17 Process Piping Leach Sample Results.

HEIS Sample Number B0PC22		
Analyte	**Liquid Phase**	
Gross alpha	2.15 E-01 µCi/mL	
Gross beta	7.44 E-03 µCi/mL	
Stronium-90	9.65 E-05 µCi/mL	
Cobalt-60	7.06 E-07 µCi/mL	U
Antimony-125	1.90 E-06 µCi/mL	U
Cesium-134	5.92 E-07 µCi/mL	U
Cesium-137	1.61 E-06 µCi/mL	U
Europium-152	1.79 E-06 µCi/mL	U
Europium-154	1.83 E-06 µCi/mL	U
Europium-155	2.80 E-06 µCi/mL	U
Radium-226	1.26 E-05 µCi/mL	U
Actinium-228	3.45 E-06 µCi/mL	U
Americium-241 (GEA)	1.05 E-02 µCi/mL	
Neptunium-237	1.66 E-05 µCi/mL	U
Plutonium-238	1.08 E-02 µCi/mL	U
Plutonium-239/240	2.65 E-01 µCi/mL	
Americium-241	1.03 E-02 µCi/mL	
Curium-243/244	1.32 E-03 µCi/mL	U
Cadmium	5.00 E-03 µg/mL	U
Chromium	9.61 E+00 µg/mL	U
Iron	4.28 E+01 µg/mL	U
Nickel	1.25 E+01 µg/mL	U
Lead	1.00 E-01 µg/mL	U
Mercury	1.00 E-02 µg/mL	U
Total Leachate Volume	198 mL	

Table 6. Plutonium Loadout Hood Technical Smear Sample Results.

Smear Location: HEIS Sample #	Tank E19 B0PC24	Tank E16 B0PC25	Tank E21 B0PC26	Hood Floor Between E19 and E12 B0PC27	Tank E17 B0PC28	L-16 Leak Area Sample Box 146 B0PK78
	µCi per sample					
Gross alpha	2.38 E+00 J	2.98 E+00	3.66 E-01	6.24 E-02	6.78 E-01	5.34 E+01
Gross beta	2.39 E-01 J	2.69 E-01 J	3.45 E-02 J	5.44 E-03 J	4.82 E-02	4.29 E+00
Strontium-90	2.43 E-05 J	1.98 E-05 J	7.17 E-06 U	1.11 E-05 U	6.30 E-06 U	2.17 E-05
Cobalt-60	2.00 E-04 U	1.86 E-04 U	6.44 E-05 U	5.87 E-05 U	6.60 E-05 U	6.47 E-05 U
Antimony-125	6.11 E-04 U	6.31 E-04 U	1.71 E-04 U	1.61 E-04 U	1.65 E-04 U	1.69 E-04 U
Cesium-134	2.04 E-04 U	2.10 E-04 U	5.42 E-05 U	5.47 E-05 U	5.42 E-05 U	5.52 E-05 U
Cesium-137	2.67 E-04 U	2.70 E-04 U	7.91 E-05 U	7.44 E-05 U	7.56 E-05 U	7.54 E-05 U
Europium-152	5.53 E-04 U	5.35 E-04 U	1.32 E-04 U	1.33 E-04 U	1.35 E-04 U	1.54 E-04 U
Europium-154	6.28 E-04 U	6.14 E-04 U	2.04 E-04 U	1.87 E-04 U	2.05 E-04 U	1.98 E-04 U
Europium-155	4.38 E-04 U	4.47 E-04 U	1.00 E-04 U	9.62 E-05 U	9.81 E-05 U	1.98 E-04 U
Radium-226	4.74 E-03 U	4.77 E-03 U	1.31 E-03 U	1.28 E-03 U	1.29 E-03 U	1.33 E-03 U
Actinium-228	1.19 E-03 U	1.20 E-03 U	3.61 E-04 U	3.58 E-04 U	3.55 E-04 U	3.57 E-04 U
Americium-241 (GEA)	4.01 E-01	4.13 E-01	5.35 E-02	9.10 E-03	9.10 E-02	5.25 E+00
Neptunium-237	1.30 E-03 U	1.83 E-03 U	1.68 E-03 U	9.37 E-04 U	1.19 E-03 U	1.87 E-03 U
Plutonium-238	1.37 E-01 U	1.76 E-01 U	2.40 E-02 U	4.64 E-03 U	4.05 E-02 U	5.65 E+00 J
Plutonium-239/240	2.66 E+00	3.24 E+00	3.98 E-01	6.52 E-02	7.19 E-01	3.58 E+01
Americium-241	3.68 E-01	3.87 E-01	6.35 E-02	1.02 E-02	1.09 E-01	2.41 E+01
Curium-243/244	7.06 E-02 U	6.84 E-02 U	1.13 E-02 U	1.90 E-03 U	1.34 E-02 U	3.48 E+00 U

Field Instrument Readings:

(DPM Alpha)	6.00 E+04 top 6.00 E+04 side	5.20 E+06 top 2.70 E+05 side	1.35 E+05 top 1.80 E+05 side	4.50 E+05 3.60 E+05 8.70 E+05 4.50 E+05	6.00E+05 top 3.00 E+05 side	3.00 E+06

The pipe sample was leached with strong acid and the resultant liquid analyzed. The results for this leach solution analysis are provided in Table 5. Contaminant inventory removed from the pipe may be calculated based on the volume and concentration of the leach solution.

The smear samples were acid digested and the 50-mL digestate analyzed. Results for the smear samples were reported by the laboratory as μCi per sample and are provided in Table 6. Sample breakdown/preparation/analysis details are contained in Appendix C, "Final Report for the Reduction Oxidation Facility (202-S) Plutonium Loadout Hood Samples."

The analysis results from the QC blank samples were performed by Thermo Nutech Laboratory and are included in Appendix D. They confirmed that no cross-contamination occurred from the sampling equipment or during delivery of the samples to the 222-S Laboratory.

4.3 RESULT VALIDATION

The data (including associated analysis QC blank samples) have been reviewed and evaluated based on the criteria defined for Level C validation (WHC-SD-EN-SPP-001; *Data Validation Procedures for Radiochemistry Analysis* [WHC 1992b], and WHC-SD-EN-SPP-002, *Data Validation Procedures for Chemical Analysis* [WHC 1992a]) of analytical results. The project instructed the laboratory as part of the LOI (BHI 1998a) not to perform matrix spike/matrix spike duplicate analyses after a cost/benefit analysis indicated that minimal additional information would be obtained from the matrix spike/matrix spike duplicate analyses. This had no affect on validation of the radiochemistry analyses (the analyses performed require no matrix spike/matrix spike duplicate samples). The validation procedure does not specifically address qualifying results if no matrix spike/matrix spike duplicate analyses are performed. Evaluation of the information available from the chemical analyses indicates that the lack of matrix spike/matrix spike duplicate analysis has not significantly degraded the quality of the data. The results of the validation activity are summarized as follows:

1. "J" flag added to all PCB results due to variability of the PCB surrogate recoveries.

2. "J" flag added to toxic characteristic leaching procedure (TCLP) mercury and chromium sump solids due to low recovery in the associated batch Laboratory Control Samples (LCS). The TCLP mercury was also measured after the maximum established hold time had expired (also results in "J").

3. "J" flag added to strontium-90 results for sump solids due to blank contamination. The blank contamination was low, but so was the result, and may have been influenced by external contamination.

4. "J" flag added to neptunium-237 result on pipe leach due to low recovery of associated batch LCS.

5. "J" flag added to hexone results due to measurement after maximum established hold time and no duplicate analysis performed.

6. "J" flag added to lead, fluoride, and oxalate results for sump solids.

7. "J" flag added to fluoride and oxalate results for sump liquids.

8. "J" flag added to strontium-90 results for smears B0PC24 and B0PC25.

9. "J" flag added to gross beta results for smear samples B0PC24, B0PC25, B0PC26, and B0PC27.

Items 6 through 9 above do not specifically result from application of validation parameters. These "J" flags were added due to reported values being less than two times the associated analysis sample detection limit. They have been added based on technical judgement to better inform potential data users that the identified results have greater potential error bounds associated with them than the other results presented.

Level C validation does not specifically address assignment of nondetect qualifiers for radionuclide analysis results based on provided counting error data. During the validation activity it was noted that several values reported by the laboratory had associated counting errors of greater than 100%. This is one commonly used criterion for assigning nondetect status to radionuclide results. Based on technical judgement, "U" (nondetect) flags were added to the neptunium-237 results for the pipe-leach sample B0PC22 and smear samples B0PC24 and B0PC27, and to the strontium-90 result for smear sample B0PC27.

All data generated for this project meet the criteria as usable based on the requirements of the data validation procedure.

4.3.1 Data Completeness

Data completeness is an evaluation of the percentage of usable data provided by the laboratory in relation to the analyses requested to be performed.

Some analyses were deleted or modified after the samples had been received at the laboratory. The pipe-section sample contained no solids. Analysis was modified to perform an acid leach on the pipe itself. Analysis for organics, anions, and pH was deleted for this sample, as the change in sample preparation results in no useful information for these analytes if performed. Analysis for actinides by ICP/MS was deleted due to an equipment outage at the laboratory.

The laboratory failed to provide results for requested analysis of nickel in the TCLP extract from the solid fraction of the sump sample. Nickel is not a routine reporting compound for TCLP. Data completeness for this project based on the validation criteria (not including deleted analyses) exceeds 99%.

4.3.2 Target Detection Limit Evaluation

Detection limit requirements are contained in both the SAP (DOE-RL 1998) and the LOI (BHI 1998a). In many cases, the detection limit requirements specified in the SAP are lower than the comparable analysis detection limit requirement listed in the LOI. Detection limit evaluations

were performed for both sets of requirements. No detection limit requirement evaluations were performed for results reported as detected by the laboratory. Except as noted in items 6 through 9 of the validation discussion (Section 4.3), all detected results were sufficiently above the detection limit to ensure that results were not impacted by the method detection limit.

4.3.3 LOI-Based Detection Limit Requirements

Target detection limits were not met for plutonium-238, curium-234/244, nitrite, and phosphate for any of the samples. This was due to the presence of other constituents (plutonium-238/239, americium-241, and nitrate) at levels sufficient to require dilution of primary analytical aliquots before final analysis. TCLP target detection limits were also exceeded for arsenic, lead, and selenium for the liquid portion of the sump sample and for selenium for the solid fraction. This is primarily the result of large quantities of chromium in the samples requiring dilution of primary analytical aliquots. For the pipe-leach sample, detection limits for cesium-137, europium-154, and europium-155 were missed by approximately a factor of 2. For the sump liquid fraction, detection limits for all nondetect gamma energy analysis (GEA) analytes were missed by at least a factor of 5.

4.3.4 SAP-Based Detection Limit Requirements

All analytes noted as having missed detection limits in Section 4.3.3 also exceeded the detection limit goals, if defined, in the SAP. Additionally, SAP detection limit goals were missed: mercury in the pipe-leach solution; hexone in both sump samples; lead in the sump solid sample TCLP extract; and neptunium-237, total lead, and PCBs for the sump liquid sample. No detection limit goals were provided for the smear samples in the SAP (DOE-RL 1998).

5.0 DATA QUALITY ASSESSMENT

A data quality assessment has been performed based on the requirements identified in BHI-EE-01, EIP 1.22, "Data Quality Assessment." The "steps" for data quality assessment are summarized as follows:

Step 1, Review DQOs and Sampling Design

The results of the project DQO activity and sampling design are documented in the SAP Field Sampling Plan, Section 3.0 (DOE-RL 1998). The projected sampling identified in the SAP is consistent with the samples actually taken. No materials meeting the definition of waste stream 5 (potential unknown media in process vessels, piping, and Plutonium Loadout Hood) and waste stream 6 (decontamination wastes) were encountered; thus, no samples for these waste streams were taken. Only one pipe sample (from a process line) was taken instead of two as identified in the SAP.

Evaluation of the analytical detection limit requirements shown in the SAP shows most to be far lower than necessary in order to allow the decisions identified in the SAP to be made. This is particularly true for liquid fractions. It is possible that the units shown (pCi/L and μg/L) were entered in error and that actual units should have been pCi/mL and mg/L. The target detection limits shown in the LOI appear much more appropriate for this project.

Step 2, Conduct Preliminary Data Review

Data review of the actual hood samples for this project is summarized in Section 4.3.

In addition to the actual hood samples, three equipment blanks and one trip blank were also analyzed as part of the project. Equipment blanks are used to identify any potential contamination of the actual sample material with contaminants from the sampling equipment used. Trip blanks are used to identify any potential contamination of volatile organic components due to field handling and shipping. These samples were analyzed under the commercial analytical service contracts (RECRA Labs, Philadelphia, Pennsylvania, for chemical analysis; TNU Labs, Richmond, Virginia, for radionuclide analysis). Formalized validation of these analyses was not performed on these samples, but most elements of the validation activities (e.g., lab batch QC samples, analysis hold time) were reviewed along with the sample results. No deficiencies impacting the use of the equipment blank and trip blank results were noted. The analysis of the equipment blanks and trip blank shows that no contaminants of concern for the project were potentially added during sampling or transport activities.

Step 3, Select the Statistical Test

All samples associated with this project were essentially "unique" samples. No statistical evaluation is appropriate for single-sample-set samples.

Step 4, Verify the Assumptions of the Statistical Hypothesis Test

All samples associated with this project were essentially "unique" samples. No statistical evaluation is appropriate for single-sample-set samples.

Step 5, Draw Conclusions from the Data

The data provided appear to be very self-consistent. Where different analytical techniques provide "overlapping" information (e.g., americium-241 by GEA and alpha spectroscopy methods), results match very well. All data provided appear to be within expectations.

Two action statements were identified as part of the DQO summarized in the SAP:

1. Determine whether each piece of vessel/piping from the waste streams in the Plutonium Loadout Hood contains transuranic (TRU) constituents in concentrations that exceed the TRU waste definition of 100 nCi/g and therefore is designated as TRU waste.

2. Determine if waste streams in the Plutonium Loadout Hood contain dangerous waste, low-level radioactive waste, mixed waste, TRU waste, or TRU-mixed waste.

The results of the analysis from the leached pipe section address action statement 1. No samples of the hood vessels were obtained. Contamination in process piping would be expected to represent a "worst case" approach for all pipe in the hood. If this sample remained below the TRU limit, the other piping and equipment would also be likely to be below TRU limits. The results show that the leach solution was well above the TRU limit. If the TRU components recovered were actually "part" of the pipe and the leach solution removed all TRU components, the pipe in bulk is just below the TRU limit (pipe weight estimated at 0.6 kg yields 87.5 nCi/g plutonium-239/240 and 3.5 nCi/g americium-241). It is unlikely that all TRU components were removed by the leaching solution, and no determination was made of contamination on the outside of the pipe. It is likely that the bulk pipe exceeds TRU limits. Because of the closeness to the limit and other variables potentially seen in the piping and vessels, this data cannot be used to reliably determine if other pipe materials must be treated as TRU or can be treated as only low-level contamination. It is likely that pipe materials both above and below the TRU limit exist in the hood.

The results from the sump sample address action statement 2. Both phases are above 100 nCi/g. This sample also exceeds several dangerous waste limits (TCLP limits for chromium, cadmium, and mercury – pH <2). The "missed" target detection limits have no real impact on this designation. Strict use of the data would require additional "designation" as toxic from lead, selenium, and arsenic. However, this does not affect the potential disposal paths for this material. The laboratory's failure to report TCLP nickel results on the sump solids fraction also has minimal impact. The TCLP determination for the total sample is dominated by the concentrations of metals in the liquid fraction. If all of the nickel in the solid phase "leached" (other metals appear to have been highly soluble), it represents only about 10% of the liquid fraction contribution. The sump material exceeds both TRU and dangerous waste designation limits.

Therefore, in summary, these results can be used to support the characterization objectives of the alternative determination document for the REDOX Plutonium Loadout Hood, similar to the EE/CA under the CERCLA process.

6.0 REFERENCES

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BHI, 1998a, "Letter of Instruction for the Sample Analysis of the Reduction Oxidation Facility (202-S) Plutonium Loadout Hood," letter 054016, dated July 24, 1998, Bechtel Hanford, Inc., Richland, Washington.

BHI, 1998b, *Readiness Assessment Report for the REDOX Plutonium Loadout Hood*, RA-9800004, Bechtel Hanford, Inc., Richland, Washington.

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DOE-RL, 1998, *Sampling and Analysis Plan for the REDOX Plutonium Loadout Hood*, DOE/RL-97-75, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

EPA, 1986, *Test Methods for Evaluating solid Waste: Physical/Chemical Methods*, SW-846, Third Edition, as revised, U.S. Environmental Protection Agency, Washington, D.C.

WHC, 19992a Data Validation *Procedures for Chemical Analysis*, WHC-SD-EN-SPP-002, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

WHC, 1992b, *Data Validation Procedures for Radiochemistry Analysis*, WHC-SD-EN-SPP-001, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

APPENDIX A

FIELD LOGBOOK PAGES ASSOCIATED WITH THE REDOX 202S PLUTONIUM LOADOUT HOOD SAMPLING

OJECT 202-S P/U Lundcut Head

Notebook No. E-1429

Continued From Page N/A

1200 ARRIVED at 271-U for Pre Job for Sampling (with Tech Smear) The Stain on The Top of the 146 Sampler Box. The Stain was caused By a Leak From a Flange in the L-16 Line over The 146 Sampler Box. Do To ALARA Considerations I (Doug Bryant) will not enter the Sample gallery. ~~Tim~~ 8-10-98 To observe the taking of the Tech Smear. Tim Malley will be Taking the Tech Smear.

1215 Begin Pre Job. Greg Funnel Reviewed the work Package ~~work~~ 8-10-98 1998-03-23002 Rev 2. Mike Crocket Reviewed the QWP 15FM-031 Rev 1. Tim will need DI water to wet area To have Tech Smear Taken to control Airborne.

1:30 Pre Job over.

DLB 8-10-98

~~Tim~~ 8-10-98 ~~1400~~ DLB 8-10-98

1500 Poured Equipment Blank on Decanned Plastic Sleeves Sample number BOPPC01. DLB 8-10-98

1505 Poured Equipment Blank on Decanned Stainless steel which was Decanned By SML. Sample number BOPPC2.

1520 Decanned Equipment Blank of Decanned Pipe cutter. Sample # BOPCX3

DLB 8-10-98

Continued on Page N/A

Doug BRYANT

Read and Understood By

Signed	Date	Signed	Date
Doug Bryant	8-10-98		

JECT 202-S P/U Load out Head

Notebook No. EL-1429
Continued From Page N/A

00 Left Sampling Facility for 271-U
25 Arrived at 271-U for Plan of the Day.
30 Begin Plan of Day To cover The Taking of The Tech smears from the stain caused By The Leak in The L16 Line over the 146 Sampler Box. Reviewed work Package 1998-03-25002 Rev 2 and RWP ISFM-021 Rev 1. Mike Peck from DOE will Be entering Sample Gallery with The Team to support The Taking of The Tech Smear. Doug Bryant will Be staying at The step off PAD to Take notes and Complete Paperwork for the Tech smear sample. The Tech smear Sample will Be stored at the 202-S RMA until it can Be shipped to 222-S with The Primary Samples to be taken next week.
The following People attended The ~~Daily~~ Plan of The Day:
Doug Bryant
Greg Funnel
Mike Crocket
Tim Malley
Mike Peck
Jeff Gilley
Chris Callaghan
715 Plan of Day over
45 Arrived 202-S Facility
00 Entered 202-S. The Team to support the tech smear Sampling. Sample (tech smear) will Be called B0PK78.
850 Team Entered CA
920 Approximate Time Tech Smear was taken
05 Tim Malley & Mike Crocket ~~Leaving~~ 8-11-98 Left CA. Tim Malley stated stain on Top of 146 Sampler Box from The L16 Leak was Dry. Tim wetted area as Directed in The work Package to control Air borne Particulates. Stained area and Tech Smear area was ≃ 100 cm sq. Stain D.O not show any sign of excessive corrosion or Build up of material. Stain Had Direct Reading

Continued on Page 3

Doug Bryant

Read and Understood By

Signed | 8-11-98 Date | Signed | Date

OJECT 202-S P/U Loadout Hood Notebook No. EL-1429
Continued From Page 2

of ≈ 7,500,000 D/m Alpha Direct. The Tech Smear Had a Read of ≈ 3,000,000 D/m Alpha.

1040 Remainder of Team exited CA. and surveyed out Tech smear. Lable was completed for 130PK58 and Placed on Bag containing Tech smear. Tech smear was Then Doubled Bag with Two Clean Bag and custody taped. Tech smear sample was Then Placed in Slip Lid Can with the Chain of custody. The slip Lid can was then Placed in the 202-S RMA # 1FSM-95-0002. CRIS CARRAGAN was to complete RAD survey Documentation and Place a copy with the Sample to Be included with the Paper work + Samples to 222-S. Samples will not be shipped untill Primary Samples are shipped Some time next week.

DUB 8-11-98

Continued on Page N/A

Doug BRYant

Read and Understood By

Signed	Date	Signed	Date
Doug Bryant	8-11-98		

:0 202-S PU Loadout Hood

Notebook No. EL-1429
Continued From Page N/A

Sampler Doug Bryant / Tim Malley Doug Bryant 8-19-98 20 DOB 8/20/98

30 Arrived at Shipping facility. Loaded Sample Equipment, Poured trip Blanks and got Blue Ice.
15 Left Shipping Facility for 271-U for Pre Job meeting.
5 Arrived At 271-U.
15 Begin Pre-Job. Lead By Greg Funnel. Key Personnel at Prejob are: Mikael Galgall, mike Crocket, Steve Maske, Jeff Gilley, Doug Bryant, Chris Callaghan, Tim Malley
Reviewed the work Package # 19980325002
Reviewed RWP # 1FSM-022 REV2
5 End of Pre Job.
30 Arrived at 202-S Sample Gallery.
0 Donned PPE an Entered Zone. After Removing Panel from Hood into Glove Bag #3. Smear counts were Taken from the Ledge just inside the Hood. The Smear from the Right side of the Ledge and the Smear from The Left side of the Ledge each had the Same Reading of ≈ 144,000 DPM Alpha. An Attempt was made to take a Smear for Analysis from tank ~~from~~ E17 But the glove Bag Reach was 1½ FOOT short of reaching the tank. No Tech Smear was ~~taken~~ Taken from Tank E-17. Tech Smears from TANK E16 were Taken. The Smear from the TOP of The tank had a Reading of ≈ 5.2 Million DPM Alpha. The Tech smear from The center of TANK E-16 Had a Reading of ≈ 270,000 DPM Alpha. The Two Tech smears from TANK E16 were Placed into a Single plastic and Labled with a Sample number B0FC25 and a Sample Time of 10:30.
45 Sample Equipment for Sampling sludge in the Sump was Assembled and an Attempt was made to Take a Sludge Sample. visual inspection of the Sampling Equipment indicate That The Sump Contained a High Level of Liquid. No physical

Continued on Page 7

Doug Bryant

Read and Understood By

Doug Bryant 8-20-98

Signed Date Signed Date

OJECT 202-S PU Landout Hood

Notebook No. EL-1424

Continued From Page ~~N/A~~ 6 8-20-98

Sample was able to be obtained but from inspection of the Sample Equipment the material in the Sump ~~appeared~~ 8-20-98 SEEMED to Be a Slurry of clear liquid with granular solids the size of course sand in/or on The Liquid. The Sampling Equipment Had a Direct Reading of 1.2 million DPM alpha. ~~There~~ 8-20-98 A Tech smear of The Sample Equipment Had a Reading of 600000 DPM Alpha.

1115 Tape was Removed from The END of Pipe in glove Bag #2. The Pipe ~~appeared~~ to have Been cut off with a Steel saw. Inside of Pipe was very clean with no sludge or scale on the ~~appeared~~ 8-20-98 inner surface. Some metal cuttings were in the ~~pipe~~ First 1" ~~tube~~ 8-20-98 of pipe. This was likly caused By cutting the Pipe.

1145 Left ~~Sump~~ 8-20-98 Zone And Doffed PPE.

210 Loaded Tech Smears from Tank E-16, place Them in Two clear plastic Baggs and placed Them in RMA # 1FSM-98-0002.

1220 BREAK for Lunch

1300 meeting with Michael Galgoul To Discuss The Day's events

1420 Left 291-U for the shipping facility To unload Equipment and Complete Paperwork.

Doffed 8-20-98

Continued on Page N/A

Read and Understood By

Signed	Date	Signed	Date
Doug Bryant	8-20-98		

JECT 202-S PU Loadout Hood

Notebook No. EL-1429
Continued From Page N/A

Sampler Doug BRYANT / Ray Brant 08/24/98

500 Arrived at shipping facility. Load Sampling Equipment and Blue Ice and Poured trip ~~Blankets~~ Blanks.
615 Arrived at 271-U
640 Begin Pre-Job meeting Lead By Grey Funnel. Reviewed the work Package # 19980325002. Reviewed Rwp 1FM-022 Rev2. Job will Be Placed on hold untill a Evaluation can be made ~~[illegible]~~ If a hole made By 233-S Personnel into The 202-S Sample Gallery is a problem
745 Pre-Job over. Waiting for Bob Eggs To contact 233-S To see if They will stop work untill we have completed Sampling

930 Bob Eggs Was Spoken with 233-S. 233-S we stop work for the remainder of Day in areas which may open a Pathway To Sample Gallery.
930 Break for Lunch
00 Return from Lunch
25 Arrived at 202-S
15 Donned PPE and Entered Zone. Removed Panel into Hood.
:45 Took Tech Smears from Tank E-21. The Tech smear from Top of Tank Had a reading of 135,000 DPM Alpha, and the Center of the tank Had a Reading of 180,000 DPM Alpha. Sample Number for this Tech Smear Sample was BOPC26. Sample time 1245
305 Took Tech smears from Top and Center of TANK E-19. Top Smear Had ~~Direct~~ reading of 60,000 DPM Alpha and the Center SMEAR HAD A Center Smear of 60,000 DPM. Both Smear were combined into 1 Sample # BOPC24 Sample time 1305
305 evaluation of Level of Activity was made of the Floor Area Between tank E21 and E19. A Discolored Area Had Reading as High as 9x10⁶ Direct. The Relatively Small Area of This High Activity Area and The Large sweep which would Be Required to get the Acquired Sample Volume Lead This Sample To Determine

Continued on Page 9

Read and Understood By

Bryant
Ray Brant — Signed — 8-24-98 — Date — Signed — Date

JECT 202-S PU LOADOUT HOOD Notebook No. EL-1429
Continued From Page 8

4 Tech smear combined into one sample would be the most appropriate way to go.

Direct Reading

1	2
$\times 10^6$ m alpha	4.5×10^6 Dpm Alpha
3	4
$\times 10^6$ Dpm	6.5×10^6 DPm

glove Bag

Tech Smear Reading

1	2
~~450,000 DPM~~	320,000 DPM
3	4
870,000 DPm	450,000 DPm

glove Bag

The 4 Tech Smears were combined into one sample numbered BOPC27.

1355 Pipe was attempted to be cut using a pipe cutter. Angel + Location of cut combined with this very Hard Nature of the Stainless Steel Pipe made cutting Difficult.

1415 ~~During~~ it was Determined that the Pipe would not be able to be cut today. the Panel was Replaced and the Time Left The Zone. Tech smears were Bagged out.

1430 Samples were Doubled Bagged, custody taped, Labled and Placed in the 202-S RMA# IFSM-95-0002.

1530 Gathered Sampling Equipment and left Site

DLB 9-2-98

Continued on Page MA

Doug BRYANT

Read and Understood By

Signed	Date	Signed	Date
Doug Bryant	8-24-98		

OJECT 202-S PU Load out Hood

NOTEBOOK NO. E- [illegible]

Continued From Page N/A

Sampler Doug Bryant [signature] 8-25-98

0500 ARRIved at shipping facility and Loaded Sampling Supplies and Poured trip Blanks
0615 ARRIved at 271-U for Pre-Job meeting
0635 Begin Pre-Job Lead By Greg Furrel. Review work Package # 19980325002. Field change has been made to use a SAWZAll To Cut a 10" section of the Process Pipe. Hand cutter used yesterday was Determined not To Be a workable method. Reviewed RWP # IFSM-022. IT was Determined That we will Be shipping the Tech smear Samples Taken to Date To 222-S and ship the Pipe Later this afternoon if The sample is able to be obtained.
0715 End of Pre-Job. Left for 202-S To Package And ship Tech Smear Samples Taken to Date
0845 Complete Packaging Tech Smear and walked Them over To 222-S.
0930 222-S Completed Recieving Tech Smear Samples
0935 Project Team Donned PPE for entry to complete The Pipe cutting. Pipe cutting will Be perform By Using a SAWZAll. Due To The confined work space in which The NPOs will Be work and for ALARA Reasons the Sampler (DougBRYANT) will Remain at The step off PAD and Prepare Paper work
1000 Team entered The ZONE.
1038 Pipe was cut. ~ 8½ of pipe was. Pipe Had Direct Readings on out side of Pipe of 2.7×10^6 DPM Alpha. And Smearable Readings of 4.5×10^5. Inside of Pipe very clean. outside of Pipe Had a Light Layer of Dust. strain Less showed slight Discoloration. Sample Number is BOPC22.
1105 Team exited Zone and Doffed PPE.
1300 Shipped ~~[illegible]~~ 8-25-98 Pipe To 222-S Lab
1500 Returned shipping facility, unloaded Sample Vehical and Completed Paper work

Continued on Page N/A

Doug Bryant
[signature]
Signed

8-25-98
Date

Read and Understood By

Signed

Date

OJECT 202-5 PU Lonout Hood 8-31-98 Notebook No. EL-14289
Continued From Page NA

Sampler Doug Bryant Doug Bryant

0500 Arrived at The Shipping. Loaded Sampling Equipment, Blue ice, Poured trip Blanks.
0620 Arrived at 271-U for pre Job
0700 Pre-Job Began: Key Players Greg Funnel, Bob Egge, Mike Galgan, Doug Bryant, Tim Malley, Chris Carrangan Rob Winslow.
Discussed work activities to be taking Place During Sampling. Sampling will Be of Liquid and Solids in the 202-5 PU Lonout Hood sump Sampling will Be Done with a Peristaltic Pump to obtain a 500 mL sample ~~which~~ 8-31-98 which will Hopfully contain Both Liquids and Solids. RWP Reviewed is 1FSM-022 Rev 2 Work Package Reviewed # 19980325002 Rev 3 8-31-98
0740 End Pre Job meeting. meeting time at ~~271-U~~ PU 202-5 is 815.
0825 Arrived at 202-5
0900 Entered Zone, Removed Panel Took Tech smear Sample from Tank 17 using a 1½ Foot extension Sample Time was 1010 and Sample number was BOPC28.
1030 Having great Difficulty obtaining sample from sump. End of Hose was Attached to The core sample Rod Left in the Glove Bag from the attempt to sample Sludge in the Sump. Flash Light was attached to Rod and Rod was lowered into The sump. Flash Light was ~~Hitt~~ 8-31-98 Hitting The Piles above The sump. Flash Light was Removed from Rod. Rod with Tubing was lowered into sump. Pump was turned on. No material was Being sucked into the ~~the~~ 8-31-98 Tubing. Tubing and Rod were Raised. Thick sludge was on The end of Sample Rod. PH was Taken from end of Sample Rod PH was ~ ~~1½ Pab~~ 8-31-98 1.5 PH. Sludge Appeared to Be Dryer Than when we attempted to Sample last week. Sludge was Too wet To use the core Sampler and Too dry to use The Peristaltic Pump.

Continued on Page 12

Read and Understood By

Doug Bryant / Doug Bryant — Signed — 8-31-98 — Date — Signed — Date

SUBJECT 222-S Pu Loadout Hood

Notebook No. EL 1429
Continued From Page 11

Pump was again lowered into the sump in a attempt to collect a sample. Small amount of material was sucked into the tube. material was liquid and thick solids. material pluged up the peristaltic pump. Pump was switched to reverse, material was then pushed into the bottle from the intake end of the tubing. ≈ 35 mL of material was obtained.

00 Sample Tech smear, and camera were bagged out

40 Sample Team Doffed PPG. Samples were labled and placed on blue ice and doubled ~~bagged~~ bagged. COC's were completed.

40 Break for lunch.

300 ~~Break~~ Lunch over. The sludge sample from the sump was labled BOPC23 and a time of 1100.

330 Delivered samples BOPC22 and BOPC28 to 222-S.

430 Held De-Briefing meeting with michael Gulgal. explained problem often with sampling with michael.

Note: Tech smear sample BOPC28 had 600,000 DPM alpha direct reading. sludge sample had 7 mR/hr gamma and 300,000 DPM alpha smearable. NO direct alpha reading was taken. Estimated Pu of sludge sample was 1056 grams

500 Returned to shipping facility to place trip blank associated with sludge sample BOPC23 in ~~fingerprint~~ refrigerator. Trip blank # BOPPLS. Unloaded equipment. Completed paper work.

Note: During entry, made observation that floor of hood was made of steel.

DLB 8-31-98

Continued on Page NA

Read and Understood By

Signed: [illegible] Date: 8-31-98

Signed: Date:

LOGBOOK NUMBER	DATE OF ISSUE
EL-1429	8-11-98

PROJECT NUMBER AND TITLE (INDICATE SUBJECT CONTENT)

Miscellaneous
Sampling

ASSIGNED TO P. R. NO.	DATE ASSIGNED ORG CODE	SIGNATURE & DATE
Danny E. Fabin	8-11-98	[illegible]
86046	CHE-8374	08-12-98

APPENDIX B

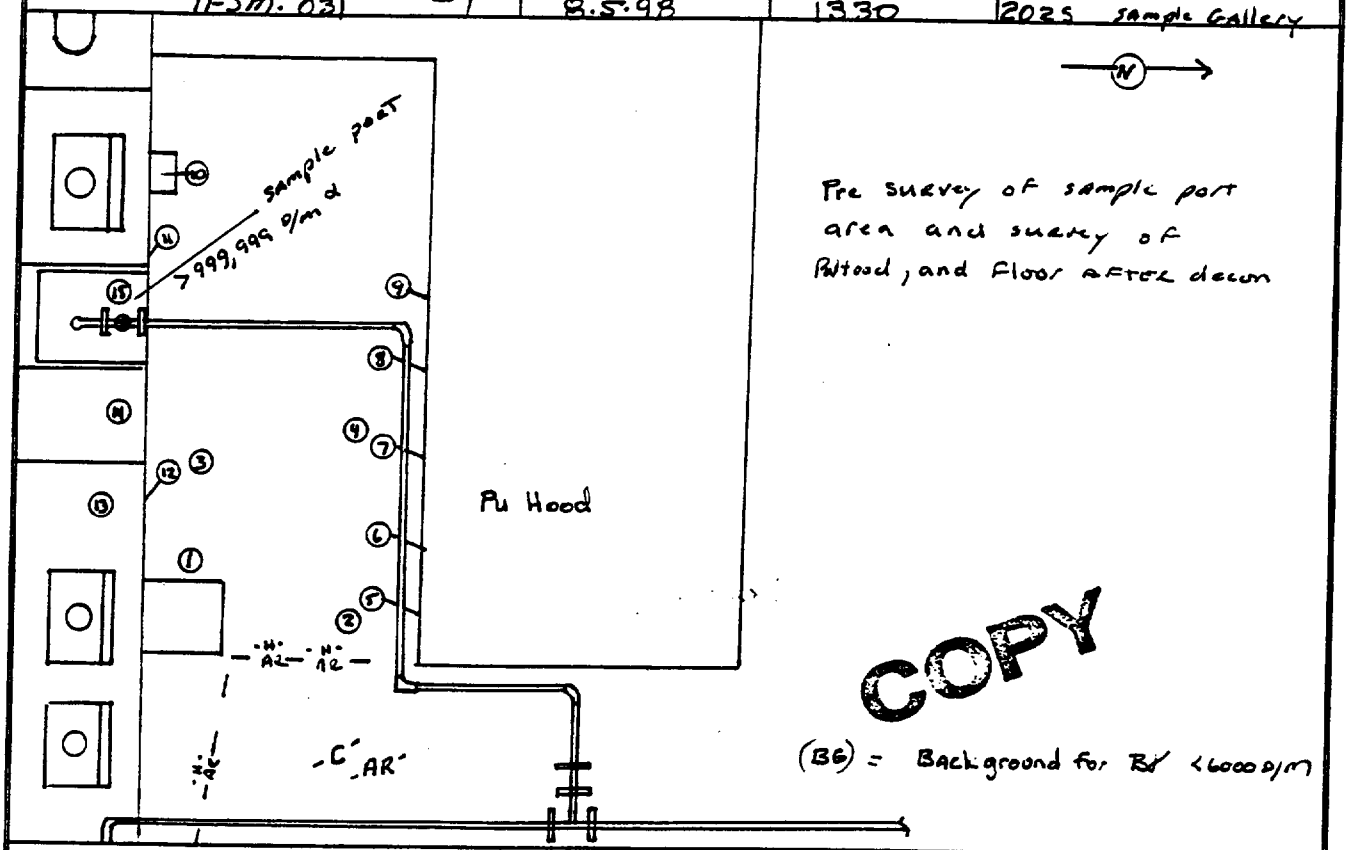
ERC RADIOLOGICAL SURVEY RECORDS FOR REDOX (202-S) PLUTONIUM LOADOUT HOOD SAMPLING

ERC RADIOLOGICAL SURVEY RECORD
Contamination

Page 1 of 2

Type of Survey (check one only)	Survey #
☐ Release ☐ Routine ■ Work Progress ☐ Shipment	RSR - 1FSM.98.1390

RWP # / Rev. #	Date	Time	Location
1FSM.031 #1	8.5.98	1330	2025 Sample Gallery



COPY

Unless noted, contamination levels are below the levels listed in Project Technical Assessment #: TA-97-MR-03

-C-	Contamination Area	-H-	High Contamination Area	-B-	Radiological Buffer Area	-AR-	Airborne Radioactivity Area	-RM-	Radioactive Materials Area	-R-	Radiation Area	-HR-	High Radiation Area
○	Technical Smear	#	Direct	M	Large Area Wipe	[AS]	Air Sample Location	-SCA-	Soil Contamination Area	-VHR-	Very High Radiation Area

Instruments

Model	Serial #	Source ✓ (Initial)	Cal Due Date	Model	Serial #	Source ✓ (Initial)	Cal Due Date
E600	1102		6.15.99				
380AB	1422	ML	6.30.99	NA			
NA				NA			

RCT Name/Signature/Date:	RCT Supervisor Name/Signature/Date:
Michael Crockett Michael Crockett 8.5.98	J.C. CRAIG 8-13-98

BHI-TM-R006e (10/97) RSR completed in accordance with BHI-SH-04, Procedure 3.1.

ERC RADIOLOGICAL SURVEY RECORD (continuation)
Contamination

Contamination Measurement Information

Circled values in Removable β-γ denotes mrad/hr β

Unless otherwise noted, use the following Correction Factors:

Source smaller than probe size: PAM = 7 P-11 probe = 10

Source larger than probe size: PAM = 14 P-11 probe = 50

List other Correction Factors, instruments, and source documents: E600 38AB β 4 α NA

No.	Description of Item or Location	Removable (dpm/100 cm²) α	Removable α C-F	Removable β-γ	Removable β-γ C-F	Total (dpm/100 cm²) α	Total α C-F	Total β-γ	Total β-γ C-F
1	Floor	30,000	NA	<BG	4	NA	NA	NA	NA
2	Floor	3000		<BG	4				
3	Floor	80,000		<BG	4				
4	Floor	400		<BG	4				
5	base of hood	300		<BG	4				
6	base of hood	400		<BG	4				
7	base of hood	1000		<BG	4				
8	base of hood	1000		<BG	4				
9	base of hood	300		<BG	4				
10	Sample station	20,000		<BG	4				
11	side of sample port	10,000		<BG	4				
12	side of sample port	3000		<BG	4				
13	Sampling area (Top)	10,000		<BG	4				
14	sampling area (Top)	8,000	↓	<BG	4				
15	Plate's cover of sample	NA	NA	8-5-98 ~~<BG~~	8-5-98 ~~4~~	NA	NA	NA	NA
—	Port	>999,999	NA	<BG	4				
NA	NA	NA	NA	NA	NA				

BHI-TM-R006e (10/97)

ERC RADIOLOGICAL SURVEY RECORD

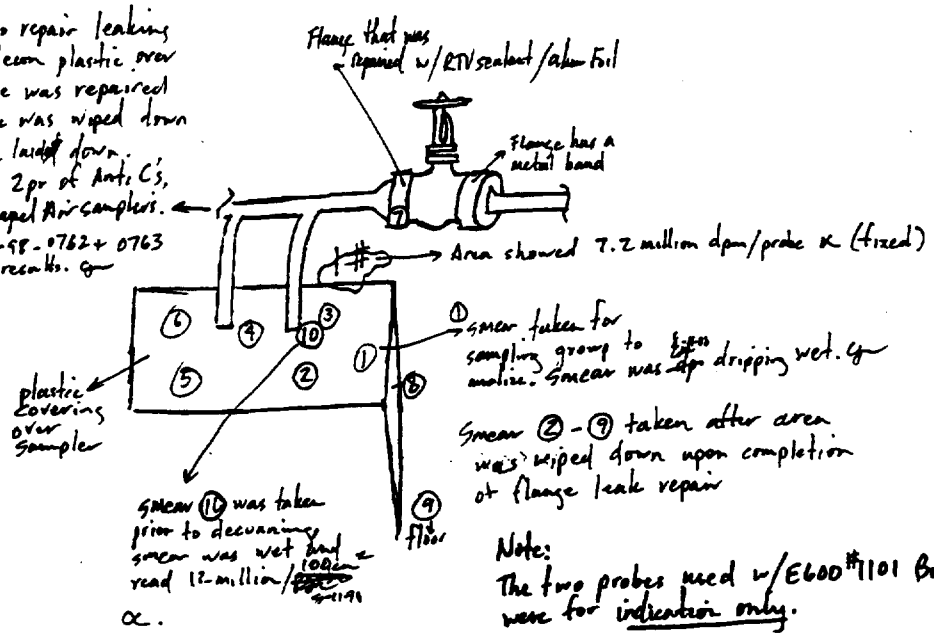
Type of Survey (check one only)				Survey #
☐ Release	☐ Routine	☒ Work Progress	☐ Shipment	RSR - IPSM-98- 1386

RWP # / Rev. #	Date	Time	Location
IFSM-031 / 2	8-11-98	1230	2025 / Sample Gallery

2025 Sample Gallery / Pa Hood

Note: Entry made to repair leaking flange and decon plastic over sampler. Flange was repaired and old plastic was wiped down and new plastic laid down. Entry made in 2pr of Anti C's, PAPR hood & Lapel Air samplers. See Air-IFSM-98-0762 + 0763 for Air Sample results. cr

Area posted: AR
H



Unless noted, contamination levels are below the levels listed in Project Technical Assessment #: TA-97-MR-03

-C- Contamination Area	-H- High Contamination Area	-B- Radiological Buffer Area	-AR- Airborne Radioactivity Area	-RM- Radioactive Materials Area	-R- Radiation Area	-HR- High Radiation Area	-VHR- Very High Radiation Area

○ Technical Smear	# Direct	M Large Area Wipe	Contact 30 cm γ / Contact 30 cm β	General Area Dose Rate = Uncorrected Meter Reading (mR/hr)	△ Micro Rem (μR/hr)	N Neutron (mRem/hr)	AS Air Sample Location	-SCA- Soil Contamination Area

Instruments

Model	Serial #	Source ✓ (Initial)	Cal Due Date	Model	Serial #	Source ✓ (Initial)	Cal Due Date
E-600	CMEBD-1101		7-22-99				
	DTECS-1210	CR	6-19-99				
	DTECS-1237		6-19-99				

RCT Name/Signature/Date:
C. CARERGA
C. Carerga 8-11-98

RCT Supervisor Name/Signature/Date:
J.C. CRAIG J Craig 8-13-98

BHI-TM-R006a (10/97) RSR completed in accordance with BHI-SH-04, Procedure 3.1.

ERC RADIOLOGICAL SURVEY RECORD (continuation)

Contamination Measurement Information

Circled values in Removable β-γ denotes mrad/hr β

Unless otherwise noted, use the following Correction Factors:

Source smaller than probe size: PAM = 7 P-11 probe = 10

Source larger than probe size: PAM = 14 P-11 probe = 50

List other Correction Factors, instruments, and source documents:

No.	Description of Item or Location	Removable (dpm/100 cm²)				Total (dpm/100 cm²)			
		α	α C-F	β-γ	β-γ C-F	α	α C-F	β-γ	β-γ C-F
1	(WET) TAKEN ON PLASTIC PRIOR TO WIPEDOWN	3,000,000	300						
2	TAKEN ON NEW PLASTIC AFTER FLANGE REPAIR	25,800	300						
3	"	29,400	300						
4	"	7,200	300						
5	"	9,000	300	N/A		N/A		N/A	
6	"	14,400	300						
7	FLANGE AFTER REPAIR	75,000	300						
8	SAMPLER WALL	54,000	300						
9	FLOUR	97,200	300						
#1	SPOT (AREA) AROUND PLASTIC	N/A				7,200,000	300		

Corrected Dose Rate Calculations

Show all work. CF = 1 unless noted.

Location	Contact Readings		30 cm Readings	
	β (mrad/hr) (WO-WC) X CF = DR	γ (mR/hr) WC X CF = DR	β (mrad/hr) (WO-WC) X CF = DR	γ (mR/hr) WC X CF = DR
		N/A		

COPY

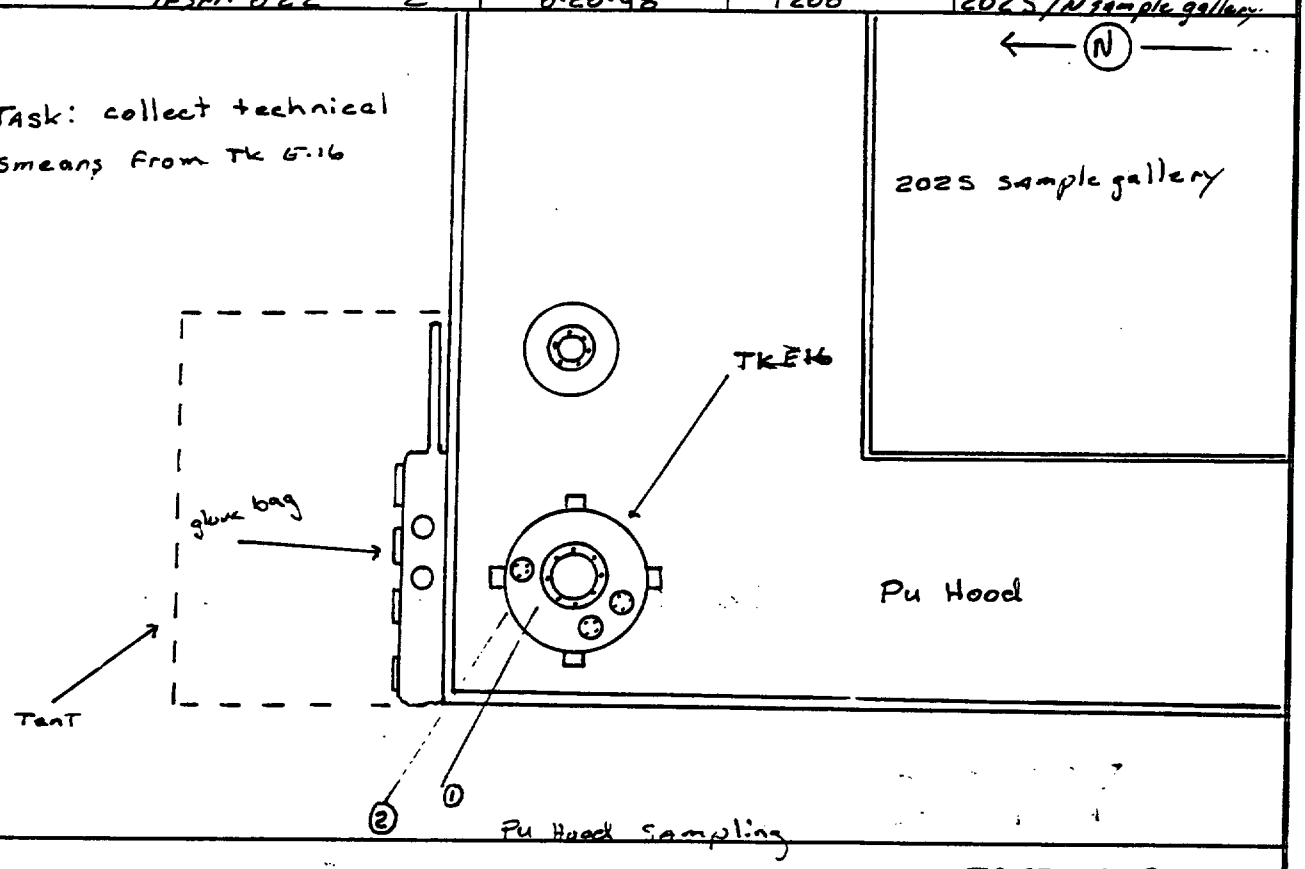
ERC RADIOLOGICAL SURVEY RECORD
Contamination

Type of Survey (check one only)
☐ Release ☐ Routine ■ Work Progress ☐ Shipment

Survey # RSR - IESM-98-1449

RWP # / Rev. #	Date	Time	Location
IESM-022 #2	8-20-98	1200	202S/N sample gallery

Task: collect technical smears from TK 5-16



Unless noted, contamination levels are below the levels listed in Project Technical Assessment #: TA-97-MR-03

-C-	Contamination Area	-H-	High Contamination Area	-B-	Radiological Buffer Area	-AR-	Airborne Radioactivity Area	-RM-	Radioactive Materials Area	-R-	Radiation Area	-HR-	High Radiation Area
○	Technical Smear	#	Direct	M	Large Area Wipe	[AS]	Air Sample Location	-SCA-	Soil Contamination Area	-VHR-	Very High Radiation Area

Instruments

Model	Serial #	Source ✓ (Initial)	Cal Due Date	Model	Serial #	Source ✓ (Initial)	Cal Due Date
E600	1210		6-19-99				
380H	1237	MC	6-19-99	NA			
E600	1102		6-15-99				
380AB	1427	MC	6-30-99	NA			

RCT Name/Signature/Date: 8-20-98
Michael Crockett Michael Crockett

RCT Supervisor Name/Signature/Date:
J.C. CRAIG 8-24-98

BHI-TM-R006e (10/97) RSR completed in accordance with BHI-SH-04, Procedure 3.1.

ERC RADIOLOGICAL SURVEY RECORD (continuation)
Contamination

Contamination Measurement Information

Circled values in Removable β-γ denotes mrad/hr β

Unless otherwise noted, use the following Correction Factors:

Source smaller than probe size: PAM = 7 P-11 probe = 10

Source larger than probe size: PAM = 14 P-11 probe = 50

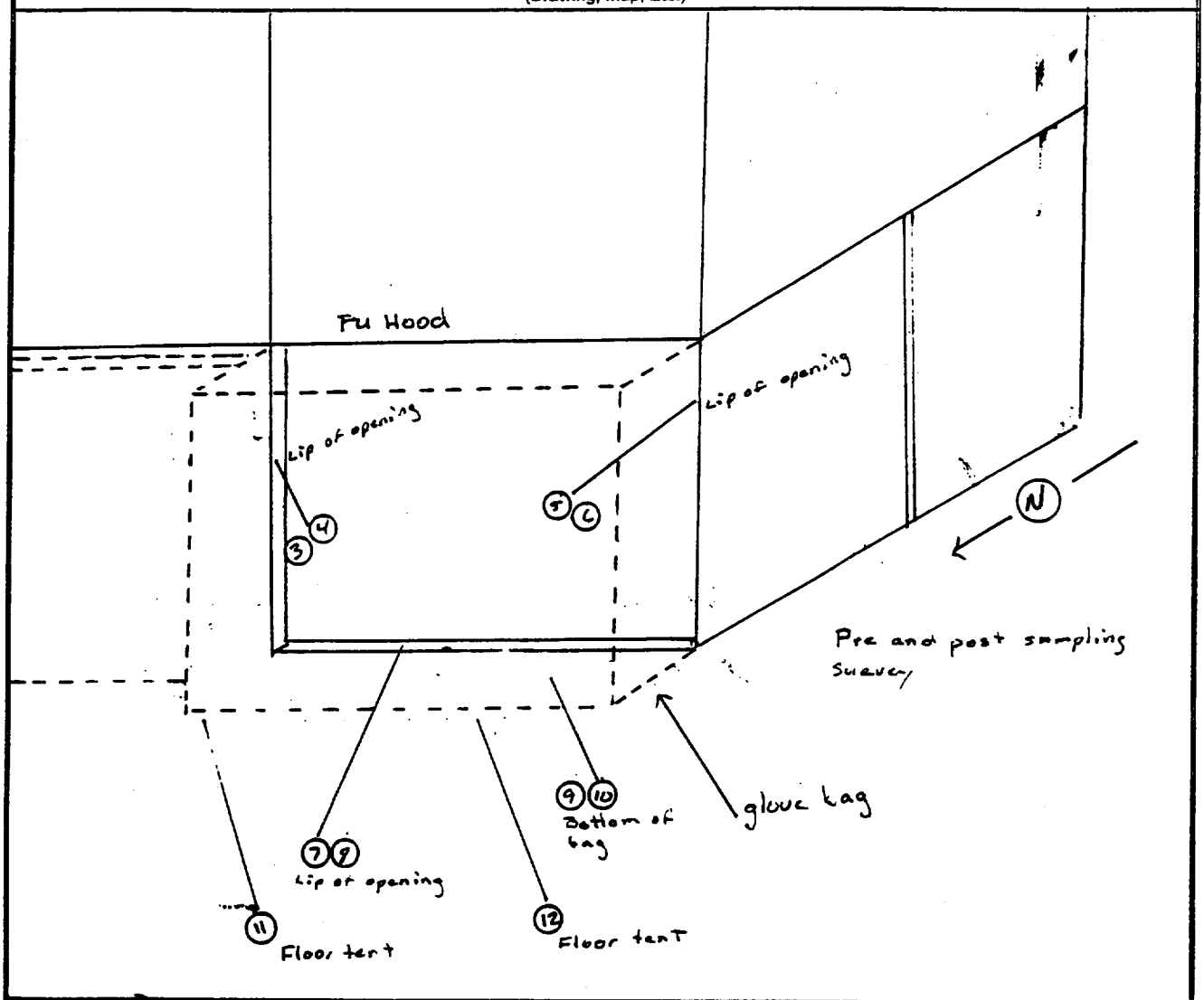
List other Correction Factors, instruments, and source documents: E600 3804 / E600 38046

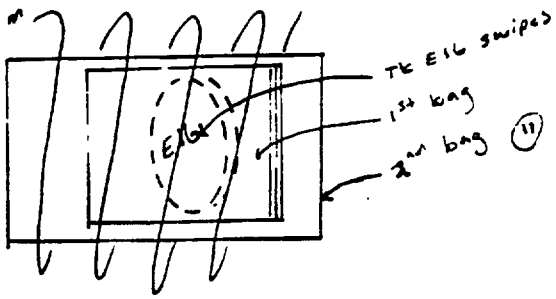
No.	Description of Item or Location	Removable (dpm/100 cm²) α	α C-F	β-γ	β-γ C-F	Total (dpm/100 cm²) α	α C-F	β-γ	β-γ C-F
1	Top of Tk E-16	5.2E6	5	NA	NA	NA	NA	NA	NA
2	center section of tk E-16	270,000	5						
3	AFTER panel removed	30,000	5						
4	AFTER samples taken	30,000	6						
5	After panel removed	15000	5						
6	After samples taken	30000	5						
7	After panel removed	144000	5						
8	After sampler taken	120,000	5						
9	After samples taken	60,000	5						
10	After samples taken	120,000	5						
11	Clean bag for smears	<100	NA						
12	core sampler (Wet)	600,000	5			1.2E6	5		
NA	NA	NA	NA			NA	NA		

ERC RADIOLOGICAL SURVEY RECORD (continuation)

Survey # RSR-IFSM-97-1047

Additional Information
(Drawing, Map, Etc.)



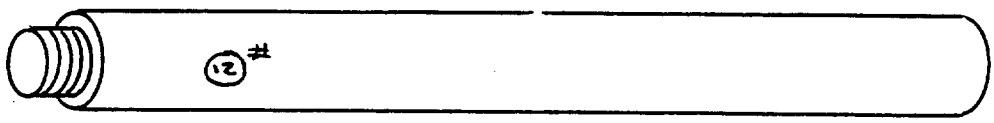


(bag place in rmd 2025)

ERC RADIOLOGICAL SURVEY RECORD (continuation)

Survey # RSR-15m-99-1444

Additional Information
(Drawing, Map, Etc.)



Core sampler used in sump
sampler was wet when surveyed

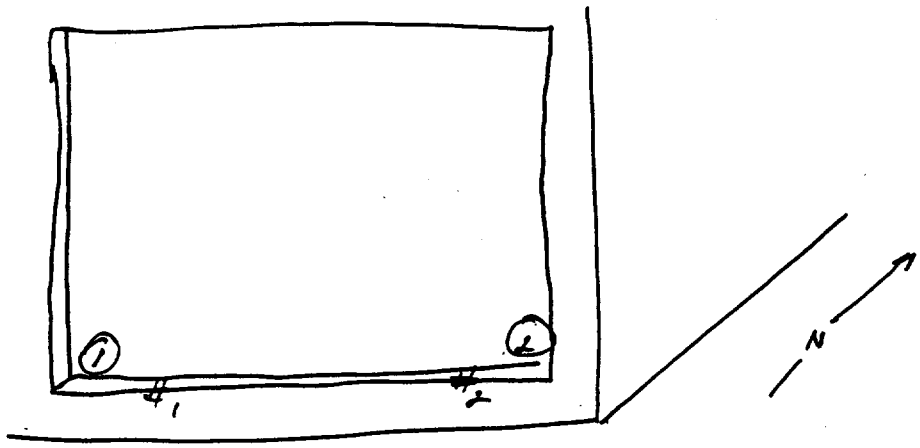
ERC RADIOLOGICAL SURVEY RECORD
Contamination

Page 1 of 4

Type of Survey (check one only)	Survey #
☐ Release ☐ Routine ☒ Work Progress ☐ Shipment	RSR - 1FSM-98-1455

RWP # / Rev. #	Date	Time	Location
1FSM 022/2	8-24-98	1500	2023/SAMPLE GALLERY

SURVEY OF ADJACENT PANEL AREAS UPON REMOVAL OF SOUTH PANEL AT GLOVE BAG #3 PU LOAD OUT HOOD



AREA POSTED C/AR

SMEARS & DIRECTS INSIDE OF GLOVE BAG ATTACHED TO HOOD

380AG α ONLY READS IN CPS - cf = 300

Unless noted, contamination levels are below the levels listed in Project Technical Assessment #: SR-97-MR-03

-C-	Contamination Area	-H-	High Contamination Area	-B-	Radiological Buffer Area	-AR-	Airborne Radioactivity Area	-RM-	Radioactive Materials Area	-R-	Radiation Area	-HR-	High Radiation Area
○	Technical Smear	#	Direct	M	Large Area Wipe	[AS]	Air Sample Location	-SCA-	Soil Contamination Area	-VHR-	Very High Radiation Area

Instruments

Model	Serial #	Source ✓ (Initial)	Cal Due Date	Model	Serial #	Source ✓ (Initial)	Cal Due Date
EL400 / 380AB	1145 / 1237	B	6-19-99 / 6-19-99	N/A			
N/A							

RCT Name/Signature/Date:	RCT Supervisor Name/Signature/Date:
M Bedingfield 8-24-98	J.C. CRAIG 8-25-98

BHI-TM-R006e (10/97) RSR completed in accordance with BHI-SH-04, Procedure 3.1.

ERC RADIOLOGICAL SURVEY RECORD (continuation)
Contamination

Contamination Measurement Information

Circled values in Removable β-γ denotes mrad/hr β

Unless otherwise noted, use the following Correction Factors:

Source smaller than probe size: PAM = 7 P-11 probe = 10

Source larger than probe size: PAM = 14 P-11 probe = 50

List other Correction Factors, instruments, and source documents:

No.	Description of Item or Location	Removable (dpm/100 cm²)				Total (dpm/100 cm²)			
		α	α C-F	β-γ	β-γ C-F	α	α C-F	β-γ	β-γ C-F
#1	DIRECT ON PANEL LIP	—		—		1.8×10^6	300	—	
#2	DIRECT ON PANEL LIP	—		—		1.5×10^6	300	—	
1	SMEAR PANEL EDGE	600 K	300	—		—		—	
2	SMEAR PANEL EDGE	600 K	300	—		—		—	
3	SMEAR TOP OF TK E-19	60 K	300	—		—		—	
4	SMEAR SIDE OF TK E-19	66 K	300	—		—		—	
5	SMEAR TOP OF TK E-21	135 K	300	—		—		—	
6	SMEAR SIDE OF TK E-21	180 K	300	—		—		—	
#3	DIRECT SIDE OF TK E-21	—		—		6.3×10^6	300	—	
#4	FLOOR SMEAR QUADRENT #1 DIRECT	—		—		9×10^6	300	—	
7	FLOOR SMEAR QUADRENT #1 SMEAR	450 K	300	—		—		—	
#5	FLOOR SMEAR QUADRENT #2 DIRECT	—		—		4.5×10^6	300	—	
8	FLOOR SMEAR QUADRENT #2 SMEAR	360 K	300	—		—		—	
#6	FLOOR SMEAR QUADRENT #3 DIRECT	—		—		6×10^6	300	—	
9	FLOOR SMEAR QUADRENT #3 SMEAR	870 K	300	—		—		—	
#7	FLOOR SMEAR QUADRENT #4 DIRECT	—		—		6.5×10^6	300	—	
10	FLOOR SMEAR QUADRENT #4 SMEAR	450 K	300	—		—		—	
N/A									
									N/A

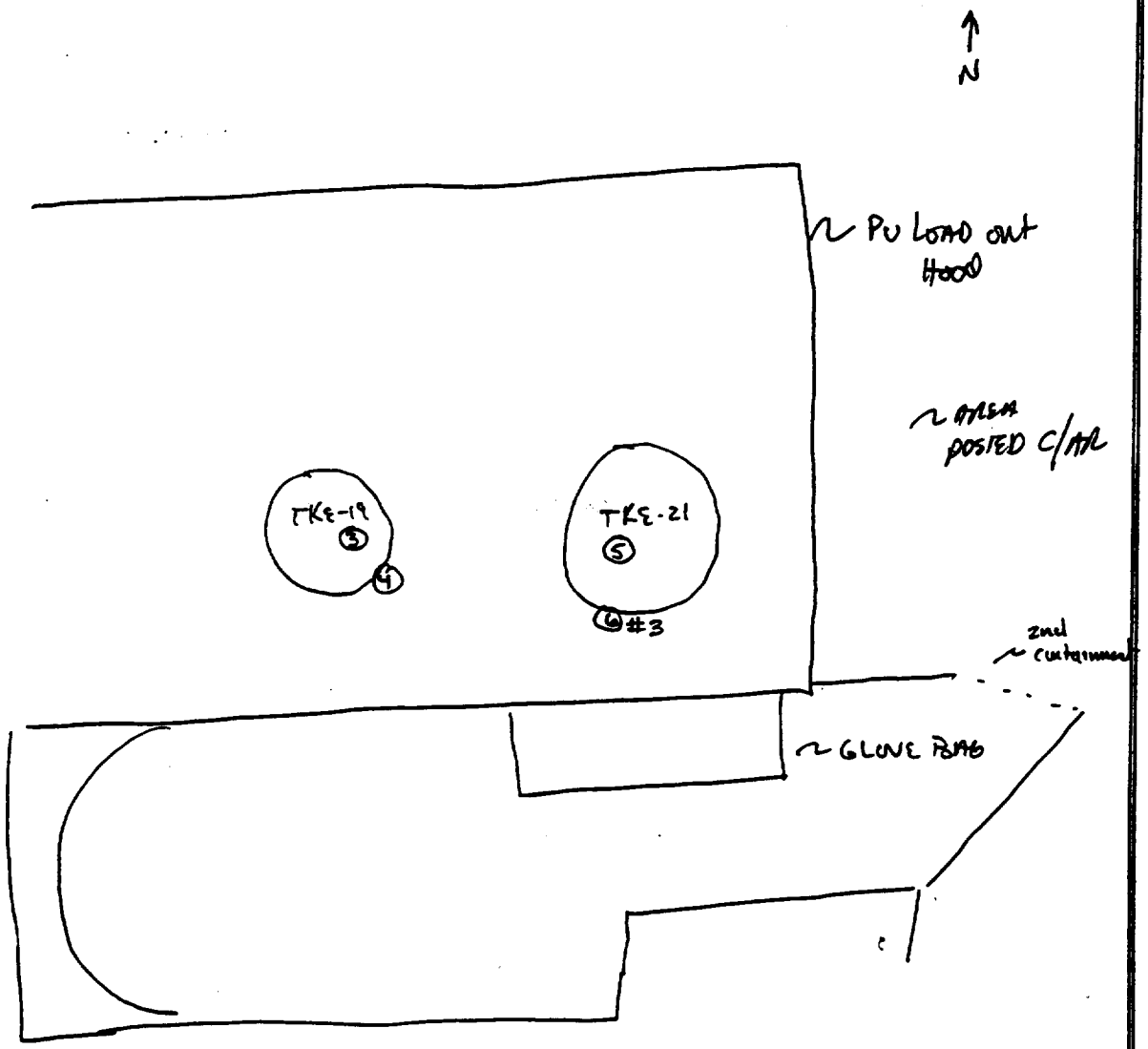
ERC RADIOLOGICAL SURVEY RECORD (continuation)

Page 3 of 4

Survey # RSR-1455A1-98-1455

Additional Information
(Drawing, Map, Etc.)

SMEAR SURVEY OF TANKS FOR LAB ANALYSIS



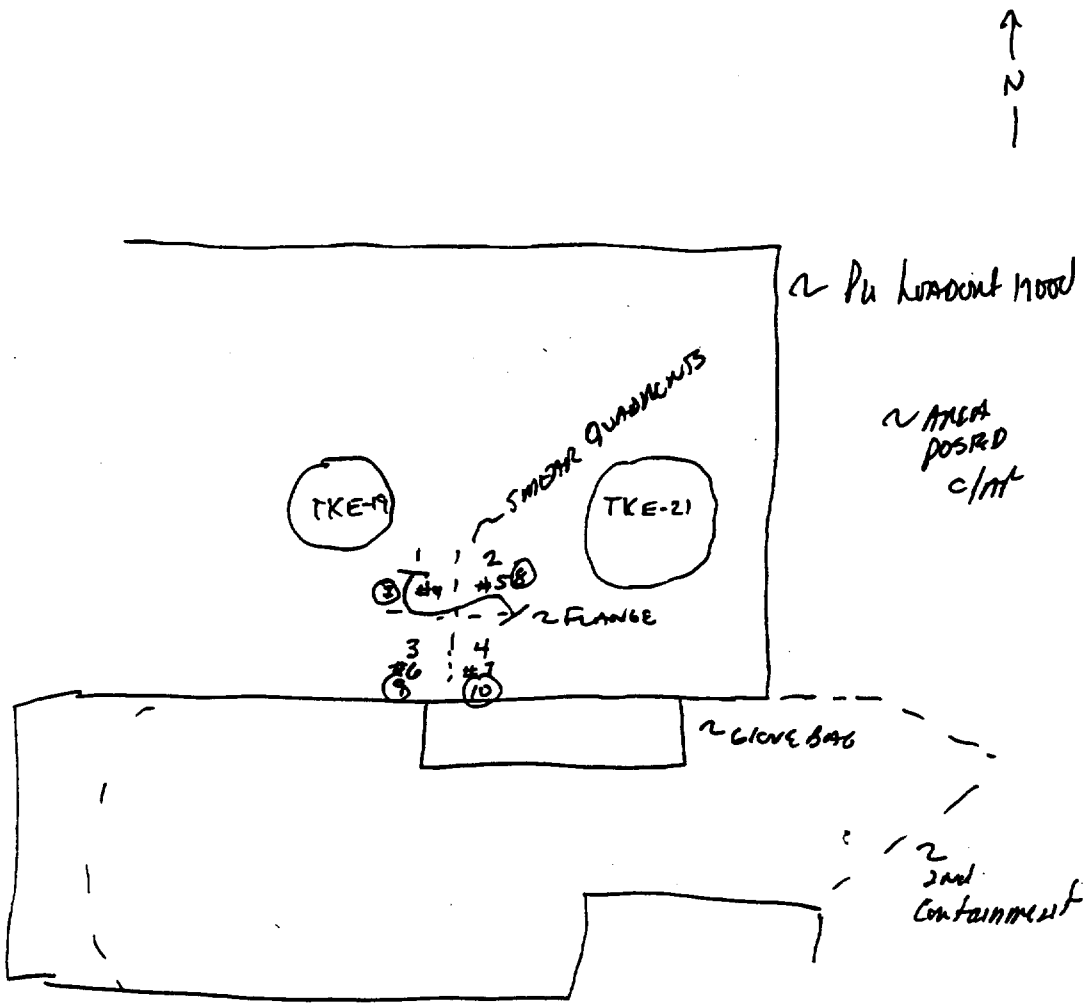
COPY

ERC RADIOLOGICAL SURVEY RECORD (continuation)

Survey # RSR- 1455

Additional Information
(Drawing, Map, Etc.)

SMEAR SURVEY OF FLOOR AREA FROM SOUTH ACCESS PANEL BETWEEN TKE-19 & TKE-21



ERC RADIOLOGICAL SURVEY RECORD
Contamination

Page 1 of 2

Type of Survey (check one only)				Survey #
☐ Release	☐ Routine	☒ Work Progress	☐ Shipment	RSR - 1FSM-98-1461

RWP # / Rev. #	Date	Time	Location
1FSM 022/2	8-25-98	1045	2025/Sample Gallery.

SURVEY OF PIPE SECTION REMOVED FROM PU LEAD out Hood. SURVEY PERFORMED IN GLOVE BAG #3 PRIOR TO BAGGING OUT.

COPY

380TA PROBE READS IN CPS ⇒ cf = 300

Unless noted, contamination levels are below the levels listed in Project Technical Assessment #: TA-97-MK-03

-C-	Contamination Area	-H-	High Contamination Area	-B-	Radiological Buffer Area	-AR-	Airborne Radioactivity Area	-RM-	Radioactive Materials Area	-R-	Radiation Area	-HR-	High Radiation Area

○	Technical Smear	#	Direct	M	Large Area Wipe	[AS]	Air Sample Location	-SCA-	Soil Contamination Area	-VHR-	Very High Radiation Area

Instruments

Model	Serial #	Source ✓ (Initial)	Cal Due Date	Model	Serial #	Source ✓ (Initial)	Cal Due Date
ELCO 380A	1145 / 1237	B	6-19-99 / 6-19-99	N/A			
N/A							

RCT Name/Signature/Date:	RCT Supervisor Name/Signature/Date:
CA Bedingfield 8-25-98	J. CRAIG 8-25-98

BHI-TM-R006e (10/97) RSR completed in accordance with BHI-SH-04. Procedure 3.1.

ERC RADIOLOGICAL SURVEY RECORD (continuation)
Contamination

Contamination Measurement Information

Circled values in Removable β-γ denotes mrad/hr β

Unless otherwise noted, use the following Correction Factors:

Source smaller than probe size:
PAM = 7 P-11 probe = 10

Source larger than probe size:
PAM = 14 P-11 probe = 50

List other Correction Factors, instruments, and source documents:

No.	Description of Item or Location	Removable (dpm/100 cm²)				Total (dpm/100 cm²)			
		α	α C-F	β-γ	β-γ C-F	α	α C-F	β-γ	β-γ C-F
1	swipe #1 on pipe	450K	300	—		—		—	
2	direct #1 on pipe highest reading	—		—		2.7×10^6	300	—	
N/A									

COPY

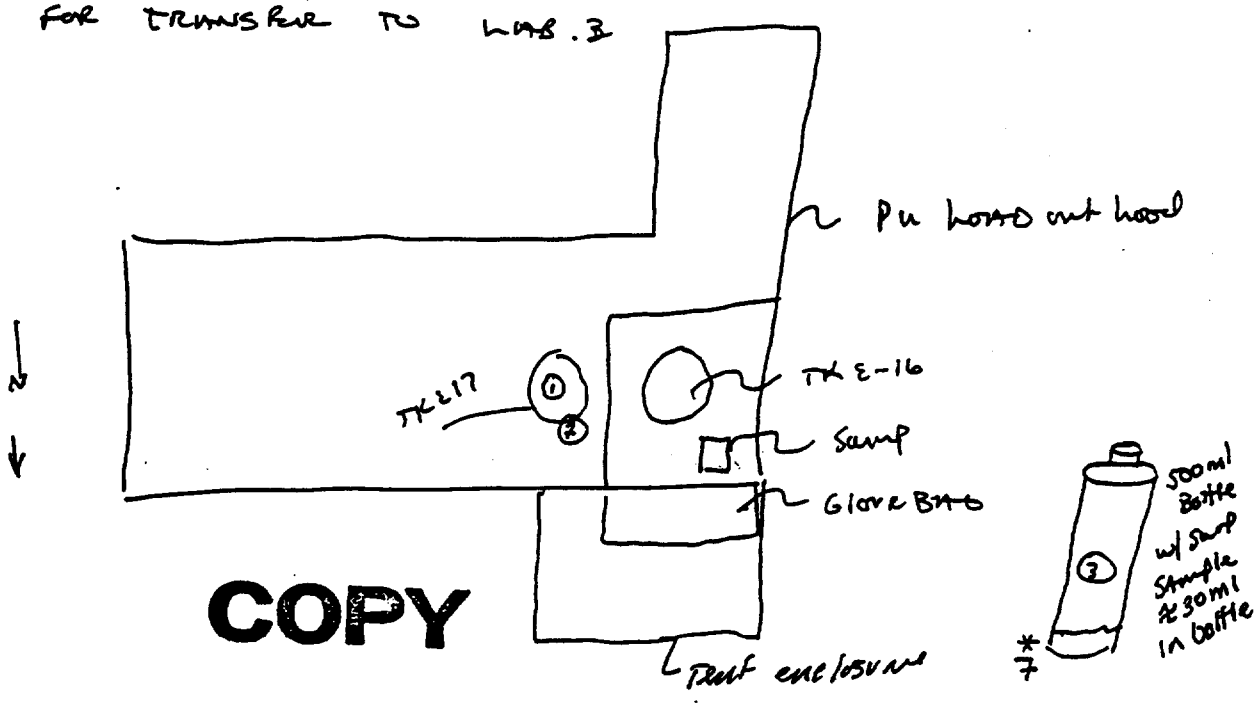
ERC RADIOLOGICAL SURVEY RECORD

Page 1 of 1

Type of Survey (check one only)	Survey #
☐ Release ☐ Routine ☒ Work Progress ☐ Shipment	RSR - 1FSM-98-1481

RWP # / Rev. #	Date	Time	Location
1FSM 022 / 2	8-31-98	1310	2025/SAMPLE GALLERY

SAMPLES OBTAINED FOR ANALYSIS BY 222S LAB FROM PU LOADOUT HOOD. AREA WAS POSTED C/AR. SAMPLES WERE COUNTED IN GLOVE BAG #1 PRIOR TO BAGGING OUT FOR TRANSFER TO LAB. B



COPY

* Denotes centimeter MR/Hr

Unless noted, contamination levels are below the levels listed in Project Technical Assessment #: TA-97-MR-05

-C- Contamination Area	-H- High Contamination Area	-B- Radiological Buffer Area	-AR- Airborne Radioactivity Area	-RM- Radioactive Materials Area	-R- Radiation Area	-HR- High Radiation Area	-VHR- Very High Radiation Area

○ Technical Smear	# Direct	M Large Area Wipe	Contact/30 cm γ Contact/30 cm β	General Area Dose Rate = Uncorrected Meter Reading (mR/hr)	△ Micro Rem (μR/hr)	N Neutrons (mRem/hr)	[AS] Air Sample Location	-SCA- Soil Contamination Area

Instruments

Model	Serial #	Source ✓ (Initial)	Cal Due Date	Model	Serial #	Source ✓ (Initial)	Cal Due Date
6600/380A	1145 / 1210	B	6-19-99 / 6-19-99	N/A			
RO20	1313	B	2-17-99				

RCT Name/Signature/Date: MR Bedingfield 8-31-98

RCT Supervisor Name/Signature/Date: J. CRAIG 8-31-98

ENGINEERED RADIOLOGICAL SURVEY RECORD (continuation) Page 2 of 6

Contamination Measurement Information

Circled values in Removable β-γ denotes mrad/hr β

Unless otherwise noted, use the following Correction Factors:

Source smaller than probe size: PAM = 7 P-11 probe = 10

Source larger than probe size: PAM = 14 P-11 probe = 50

List other Correction Factors, instruments, and source documents: Cf = 300 for α . PROBE CAL for CPS

No.	Description of Item or Location	Removable (dpm/100 cm²) α	α C-F	β-γ	β-γ C-F	Total (dpm/100 cm²) α	α C-F	β-γ	β-γ C-F
1	TOP OF TANK ~~HC~~ E-17	600K	300	—		—		—	
2	SIDE OF TANK E-17	300 K	300	—		—		—	
3	SMEAR OF BOTTLE BREAK TO RAD OUT	300K	300	—		—		—	
N/A									

Corrected Dose Rate Calculations

Show all work. CF = 1 unless noted.

Location	Contact Readings β (mrad/hr) (WO-WC) X CF = DR	Contact Readings γ (mR/hr) WC X CF = DR	30 cm Readings β (mrad/hr) (WO-WC) X CF = DR	30 cm Readings γ (mR/hr) WC X CF = DR
SAMPLE BOTTLE IN BAG	(8-7) x 3 = 3	7x1 = 7	(1.2 - .7) x 1 = .5	.7x1 = .7
N/A				

COPY

APPENDIX C

FINAL REPORT FOR REDOX (202-S) PLUTONIUM LOADOUT HOOD SAMPLES

WASTE MANAGEMENT FEDERAL SERVICES
OF HANFORD, INC.
A WASTE MANAGEMENT COMPANY

P.O. Box 700
Richland, WA 99352-0700

January 14, 1999

WMH-9950233

JAN 1999
RECEIVED
Data
Log In

J. H. Kessner, Program Manager
Analytical Services
Bechtel Hanford, Inc. H9-03
3350 George Washington Way
Richland, Washington 99352

Dear Ms. Kessner:

CORRECTED RESULTS FOR REDUCTION OXIDATION FACILITY (202-S) PLUTONIUM LOADOUT

Reference: External letter, R.A. Esch ,WHC, to J. H. Kessner ,BHI, "Final Report for the Reduction Oxidation Facility (202-S) Plutonium Loadout Hood Samples," WMH-9860237, dated December 3, 1998.

This letter presents corrections to the results previously presented in the referenced letter. As explained in the referenced letter report, the plutonium/americium analysis of the pipe leachate was going to be repeated due to a discrepancy in the results compared to the total alpha results. The bulk density for the sludge sample as received was reported incorrectly in the summary table. Reanalysis of the acid leach of the tech smear BOPK78 was performed to resolve a question concerning a possible discrepancy between the total alpha and plutonium/americium results. Finally, a discrepancy was noted concerning the large difference between the ^{241}Am results from alpha counting and GEA. These results were recalculated after it was discovered that a digest factor was missing for the GEA results. Please replace the ten pages contained in Attachment 2 of the WHC-9860237 with the pages contained in Attachment 1 of this letter.

Additional analyte information was requested from the ICP analysis of the sump liquid sample. This information is contained in Attachment 2 of this letter.

One further request concerned the lack of discussion in the referenced letter concerning the PCB analysis. Upon further examination of the reported results, it was determined that the information presented for the surrogate standards was misleading. For the surrogate standards, tetrachloro-m-xylene and decachlorobiphenyl, the result expected for each column heading is the surrogate recovery for that analysis portion (i.e. standard, blank, sample, duplicate). For the columns headed "Standard %", "Blank" and "Result", the reported results are correct. However, the surrogate results presented in the columns headed "Duplicate", "Average" and "RPD%" are mislabeled. The "Duplicate" and "Average" columns give the measured and average concentrations of the surrogate standards, not the surrogate recovery for those portions. The "RPD%: column shows the surrogate recovery for the duplicate aliquot, not an RPD.

Furthermore, low surrogate recoveries (16.75% and 14.2%) were obtained for the tetrachloro-m-xylene surrogate for the sample and duplicate aliquots of the liquid from the sump sample. Surrogate recoveries less than 50% are not acceptable. The recovery for the laboratory control sample was good (98.25%) and the surrogate recoveries for decachlorobiphenyl were good (>50% recovery).

Through previous experience it has been demonstrated that under conditions of low pH (pH <1) and high concentration of nitrate (as we have with the sump liquid), nitration reactions can occur with reactive surrogates such as tetrachloro-m-xylene or phenols. Several non-PCB peaks observed in the sample chromatograms are consistent with the formation of nitrated derivatives of the tetrachloro-m-xylene. Since PCBs and decachlorobiphenyl do not react under such conditions, the low recovery of the one surrogate due to matrix reaction does not invalidate the reported results for the PCBs.

If you have any questions, please call me at 373-4314.

Very truly yours,

R. A. Esch, Project Coordinator
Facility Planning
222-S Laboratory
Waste Management Laboratory

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Attachments (2)

WASTE MANAGEMENT FEDERAL SERVICES
OF HANFORD, INC.
A WASTE MANAGEMENT COMPANY

P.O. Box 700
Richland, WA 99352-0700

December 3, 1998

WMH-9860237

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J. H. Kessner, Program Manager
Analytical Services
Bechtel Hanford, Inc. H9-03
Post Office Box 969
Richland, Washington 99352

Dear Ms. Kessner:

FINAL REPORT FOR THE REDUCTION OXIDATION FACILITY (202-S) PLUTONIUM LOADOUT HOOD SAMPLES

This letter serves as the final analytical summary report for the sludge, pipe and technical smear samples received from the 202-S Facility plutonium loadout (Pu loadout) hood. Analyses were performed in accordance with the "Letter of Instruction for the Sample Analysis of the Reduction Oxidation Facility (202-S) Plutonium Loadout Hood," which is referenced in the attached narrative. The attachments provide the following information:

Attachment 1:	Narrative
Attachment 2:	Data Summary Report
Attachment 3:	Sample Breakdown Diagrams
Attachment 4:	Chain-of-Custody Forms
Attachment 5:	Sample Disposition Records
Attachment 6:	Analytical Report for Project 202-S Pu Loadout Hood Hexone Analysis - FR8-8016

If you have any questions, please call me on 373-4314.

Sincerely,

R. A. Esch, Project Coordinator
Facility Planning
222-S Laboratory
Waste Management Laboratory

amf

Attachments (6)

WMH-9860237

Attachment 1

Narrative

**Consisting of 9 Pages
including cover page**

WASTE MANAGEMENT LABORATORY

FINAL REPORT FOR THE REDUCTION OXIDATION FACILITY (202-S) PLUTONIUM LOADOUT HOOD SAMPLES

This document is the final analytical summary report for the analysis of samples from the Reduction Oxidation (REDOX) Facility (202-S) plutonium loadout (Pu Loadout) hood. The 222-S Laboratory received eight samples (one sludge from the sump, one piece of process pipe and six technical smears) from 202-S between August 25 and August 31, 1998. Analyses were performed in accordance with the *Letter of Instruction for the Sample Analysis of the Reduction Oxidation Facility (202-S) Plutonium Loadout Hood* (LOI) (McGuire 1998) and the *Sampling and Analysis Plan for the REDOX Plutonium Loadout Hood* (SAP) (DOE/RL 1998). The analytical results are included in the Data Summary Report (Attachment 2).

This project was split into two sets of analyses to be performed during fiscal year 1998 and fiscal year 1999. Specific information for which analyses to perform for each part of the project was provided in the *Letter of Instruction for Fiscal Year 1998 REDOX (202-S) Plutonium Loadout Hood Sample Analysis* (McGuire 1998a). Changes to sample handling and analysis were transmitted to the laboratory by means of the sample disposition records (SDR), which are included in Attachment 5.

Appearance and Sample Handling

Attachment 3 is provided as a cross-reference for relating the customer identification numbers to the 222-S Laboratory sample numbers and the portion of sample analyzed. The samples were prepared as described below.

BOPC22 – process vessel pipe. The piece of pipe was 21.4 cm in length with an inside diameter of 2.6 cm and an outside diameter of 3.5 cm. Although there appeared to be a light coating of brown material and metal filings on the interior of the pipe, there were not enough solids in the pipe to obtain a subsample by scraping the interior. Therefore, the interior of the pipe was leached with a 2M concentration of trace metal grade nitric acid (density of acid = 1.05 g/mL). A SDR was received for concurrence of this deviation.

A rubber stopper was placed in one end of the pipe. Approximately 103 mL of acid was added and a second stopper was inserted into the other end of the pipe. The pipe was allowed to stand with the acid for 22 - 23 hours. The liquid was transferred to a pre-weighed sample jar and the jar with the acid was weighed. The process was repeated with a second acid aliquot of approximately 97 mL.

The final weight of acid was 207.95 g. The final volume of 198 mL was calculated by correcting for the density. The pipe was too heavy to weigh on any of the conventional laboratory balances, which have a maximum capacity of 500 g. Therefore, an estimated weight of 0.6 kg was determined by placing the bag containing both the pipe and paper towel used for padding on the large scale that is used for weighing large waste drums.

The entire volume of acid was submitted for analysis. The results were reported as μg/mL or μCi/mL of leachate.

BOPC23 – sludge from the sump. This sample was described on the chain-of-custody form as sludge but was actually about 40 mL of slurry that contained about 40% – 50% settled solids. At first the entire sample appeared to be very dark green-blue in color. However, after allowing the solids to settle, when the bottle was carefully tipped it was apparent that the solids were green-blue and adhered to the side of the sample jar. The liquid alone was actually redder in color.

Since the sample contained a significant amount of liquid, a SDR was received requesting that the sample be centrifuged to separate the solid and liquid. There was 25.7% centrifuged solids by volume. The bulk density of the entire slurry sample was 1.54 g/mL, the centrifuged solid portion was 1.55 g/mL and the liquid density was 1.53 g/mL. The two portions were analyzed separately.

Following centrifugation the solids appeared to be a mixture of various sizes of sand-like material. Most of the solid had a fine texture and was tan in color. There were some solids that had a "salt & pepper" appearance and there were also some coarser textured solids that had a very dark green color. The solids were stirred to homogenize prior to subsampling for analysis.

Technical smear media

The sample preparation prior to analysis was identical for each of the following six samples:

BOPC24 – technical smear from the floor of the hood.
BOPC25 – technical smear from the Tank E16.
BOPC26 – technical smear from Tank E21.
BOPC27 – technical smear from Tank E19.
BOPC28 – technical smear from Tank E17.
BOPK78 – technical smear of the leak from L-16.

An acid digest was performed to leach any radionuclides from the filter media. One aliquot was prepared for each sample by using all filters from each sample's container. The final volume of

each sample aliquot was 50 mL. Although the results in Attachment 2 are reported as μCi/g, the data were corrected for the total sample volume and, therefore, the results reflect the total μCi per sample.

Analytical Results Summary

The data summary report included as Attachment 2 presents the analytical results.

In this table, the aliquot class (A#) column indicates the type of preparation performed prior to analysis. An "A" indicates the acid digestion of the centrifuged solid, a "D" the acid dilution of the sludge liquid, a "C" the acid digestion of the liquid from the Toxicity Characteristics Leachate Procedure (TCLP) extract, a "W" the water digest of the centrifuged solid and a blank indicates that the sample was analyzed directly.

The LOI (McGuire 1998) requested that all non-radionuclide analyses, with the exceptions of pH and physical measurements, be analyzed using SW-846 methods. The procedures used by the 222-S Laboratory are considered SW-846 equivalent. Deviations are made to accommodate smaller sample sizes for handling samples with radionuclides present.

Quality Control (QC)

A standard and blank was analyzed with every batch. One duplicate analysis was performed per matrix. That is, the centrifuged solid and the liquid from the sludge were analyzed in duplicate. For all other samples, only a single sample portion was analyzed.

The standard recoveries were all within the acceptance limits of the methods. The relative percent difference (RPD) between sample and duplicate analyses were all less than 20% except for neptunium-237 (^{237}Np) on the centrifuged solid (RPD = 100%) and oxalate (66.2%) on the liquid from the sump sludge. No reanalysis was performed because the results for both analytes were only about two times the detection limit, where the precision of the analysis is poor. In both analyses, the largest possible sample size was used and a reanalysis would not likely improve the quality of the results.

The standard results that were reported for the mercury and inductively coupled plasma (ICP) analyses for the Toxicity Characteristics Leachate Procedure (TCLP) reflect the recovery of a certified standard that went through the leaching process. Mercury, barium, chromium and lead all had low recoveries for this standard. The instrument control standard recoveries for these analytes were all within the acceptance limits of the procedures. Since the analysis of a leached

standard was not required, and there was insufficient solid to repeat the TCLP extraction, no reanalysis was performed.

Detection Limits

The LOI (McGuire 1998) requested that the laboratory meet the detection limits (DLs) listed in the SAP (DOE/RL 1998) whenever possible. If sample conditions prevented the achievement of the DLs, the laboratory was requested to meet the target practical quantitation limits (PQLs) provided in the LOI (McGuire 1998). In most cases, the DLs and or the PQLs were met.

Certain detection limits were not met due to dilutions required because of high concentrations of other analytes in multielement methods: plutonium-238 (^{238}Pu) and curium-243/244 ($^{243/244}$Cm) in the Pu/Americium analysis, nitrite and phosphate in the ion chromatography (IC) analysis and lead and selenium in the ICP analysis. Sample reanalysis was not performed because the sample size is limited by the concentration of the prominent analyte and, therefore, the detection limit cannot be improved.

For the pipe leachate, the detection limit reported for cesium-137 (^{137}Cs) was 1.61e-06 µCi/mL. The requested PQL was 1.0e-06 µCi/mL. A larger sample size could have been used, but since the reported detection limit was only slightly higher than the PQL, no reanalysis was performed.

The plutonium, americium and curium detection limits for the pipe leachate were all several orders of magnitude above the PQLs listed in the LOI (McGuire 1998). Comparing the results to the total alpha result, it was clear that the cause for the high detection limit was a small sample size. Since this was discovered so close to the project due date, these results were reported. However, a reanalysis using a larger sample size will be performed. The results of the reanalysis will be reported in a separate letter report.

Holding Times

The SW-846 holding times were met for all analyses except for mercury analysis of the TCLP extract (28 days from extraction), pH (24 hours), nitrate, and nitrite (48 hours). The holding times for pH, nitrate and nitrite were missed because of the special handling required due to the high alpha concentration in the samples. The TCLP extraction and a preliminary analysis were performed within the required 28 days for Hg, but a reanalysis was required due to QC failures. Because of delays due to instrument failure and equipment relocations, the reanalysis was performed 60 days after the extraction, missing the holding time of 28 days. Since the average reported result of 5.50 µg/mL mercury exceeds the regulatory level of 0.2 µg/mL, the procedure states that exceeding the holding time will not invalidate the characterization.

Method Specific Discussion

The methods discussed below had discrepancies or anomalies that warranted further discussion.

Asbestos Analysis

Asbestos analysis was requested for the solid from the sump sludge. The analysis is typically performed on solid residue remaining after acid digestion. Since there were no visible solids after acid digestion, this analysis was not performed.

Inductively Coupled Plasma/Mass Spectrometry (ICP/MS)

The ICP/MS analysis for actinides was requested in addition to the radionuclide analysis on the sludge sample aliquots and the leachate from the process pipe. For the technical smears, the LOI (McGuire 1998) requested only ICP/MS analysis for the actinides. However, the instrument was out-of-service for several weeks, and there was insufficient time to run the analysis prior to the report due date. A SDR was received for concurrence to omit the analysis.

Acid Dilutions

There was insufficient liquid available from the sludge sample to perform all of the requested analyses on the direct sample. Therefore, a ten-fold acid dilution was performed prior to the ICP and radionuclide analyses.

Toxicity Characteristics Leachate Procedure (TCLP)

Because of the limited amount of solid available, only 1 gram of sample was extracted for analysis. The normal sample size used by the laboratory is 10 grams. A SDR was received to allow this deviation. Although not required by the procedure, a certified standard was digested and analyzed with the samples.

Cadmium (Cd), chromium (Cr) and mercury (Hg) were all leached at concentrations above the regulatory levels. The average Hg result was 5.50 μg/mL, the regulatory level is 0.2 μg/mL. The average Cd result was 4.49 μg/mL, the regulatory level is 1.0 μg/mL. The average Cr result was 439 μg/mL, the regulatory level is 5.0 μg/mL.

Mercury Analysis (Hg)

The liquid portion of the sludge sample had a very high concentration of Hg. A 0.1-mL sample size gave a response that was well above the calibration range. Replicate dilutions were made on the digested duplicate aliquot. The two results were reported as sample and duplicate in the Data Summary Report. For additional information, and to check for interferences, post-digestion spike and post-digestion spike duplicate analyses were performed using two more dilutions of the digested duplicate aliquot. The spike recoveries were 83.2% and 96.7%, respectively. These results are reported in the raw data. The acceptable spike recoveries indicate that there were no spectral interferences causing the high results for this sample.

Hexone Analysis

Duplicate portions of the liquid and centrifuged solid from the sump sludge were sent to the Special Analytical Services (SAS) laboratory for hexone analysis. Duplicate analysis could not be performed because of unexpected clogging of the purge system. A separate narrative is provided in Attachment 5, which further discusses the results and discrepancies.

Total Alpha/Total Beta (AT/TB) Analysis

When the total alpha (AT) results are compared to the sum of the alpha emitters, there appears to be a discrepancy since the AT results are typically lower than the sum. However, the difference may be attributed to the geometry of the flood mount used for the AT and/or attenuation due to possible solids on the AT mount.

When comparing the total beta (TB) results to the sum of the beta emitters, the TB results are biased high. It was found that the high concentration of alpha emitters in the sample causes "cross talk", giving a false high beta result. To eliminate this problem in the strontium-90 (^{90}Sr) analysis, repeated nitric acid and hydroxide precipitations were performed to remove the alpha emitters from the sample prior to mounting for the beta counting.

Procedures

Table 1 lists the analytical procedures used for performing the analyses for this project. Abbreviations for analyses are defined in the table notes.

Table 1: Analytical Procedures

Analysis	Preparation Procedure	Analysis Procedure
Inorganic Analyses		
% Settled Solids	Direct Analysis	LA-519-151 Rev. F-0
Bulk Density	Direct Analysis	LO-160-103 Rev. D-0
pH	Direct Analysis	LA-212-106 Rev. C-2
ICP	Liquid – Acid Dilution Sludge - TCLP Extract and Acid Digest	LA-505-161 Rev. C-3
IC	Liquid – Direct Analysis Sludge – Water Digest	LA-533-105 Rev. F-0
Hg	Liquid – Direct Analysis Sludge - TCLP Extract and Direct Analysis	LA-325-104 Rev. E-0 and E-1 LA-325-106 Rev. A-0 for TCLP
Radionuclide Analyses		
Total Alpha	Liquid – Acid Dilution and Direct Analysis Sludge and Tech Smears - Acid digest	LA-508-101 Rev. G-0
Total Beta	Liquid – Acid Dilution and Direct Analysis Sludge and Tech Smears - Acid digest	LA-508-101 Rev. G-0
Alpha Energy Analysis	Liquid – Acid Dilution	LA-508-101 Rev. G-0
GEA	Liquid – Acid Dilution and Direct Analysis Sludge and Tech Smears - Acid digest	LA-548-121 Rev. F-0
^{90}Sr	Liquid – Acid Dilution and Direct Analysis Sludge and Tech Smears - Acid digest	LA-220-101 Rev. E-3
^{241}Am, $^{243/244}Cm$	Liquid – Acid Dilution and Direct Analysis Sludge and Tech Smears - Acid digest	LA-953-104 Rev. B-0
$^{238/239/240}Pu$	Liquid – Acid Dilution and Direct Analysis Sludge and Tech Smears - Acid digest	LA-953-104 Rev. B-0
^{237}Np	Liquid – Acid Dilution and Direct Analysis Sludge and Tech Smears - Acid digest	LA-933-141 Rev. H-2
Organic Analyses		
Hexone	Direct Analysis	EPA SW-846 methods 8260B, 5030B and 8000B
PCB	Extraction	LA-523-136 Rev. A-1

Acid dilution procedure – LA-505-158 Rev. E-0
TCLP extraction procedure - LA-544-134 Rev. B-0
Acid digest procedure for TCLP extract - LA-505-164 Rev. B-0
Acid digest procedure for solids - LA-505-163 Rev. B-0
Water digest procedure – LA-504-101 Rev. F-0
PCB Liquid Extraction – LA-523-115 Rev. B-0
PCB Solid Extraction – LA-523-138 Rev. A-2

Abbreviations:

ICP	= inductively coupled plasma spectrometry
IC	= ion chromatography
Hg	= mercury
GEA	= gamma energy analysis
^{90}Sr	= strontium-90
^{241}Am	= americium-241
$^{243/244}Cm$	= curium-243/244
$^{238/239/240}Pu$	= plutonium-238, plutonium-239/240
^{237}Np	= neptunium-237
PCB	= polychlorinated biphenyls
TCLP	= toxicity characteristics leachate procedure

References

McGuire, J. J., 1998, *Letter of Instruction for the Sample Analysis of the Reduction Oxidation Facility (202-S) Plutonium Loadout Hood*, (Letter number 054016 to J. L. Jacobsen, dated July 24), Bechtel Hanford, Inc., Richland WA 99352.

McGuire, J. J., 1998a, *Letter of Instruction for Fiscal Year 1998 REDOX (202-S) Plutonium Loadout Hood Sample Analysis*, (Letter number CCN: 060307 to J. L. Jacobsen, dated September 10), Bechtel Hanford, Inc., Richland WA 99352.

DOE/RL, 1998, *Sampling and Analysis Plan for the REDOX Plutonium Loadout Hood*, DOE/RL-97-75, Rev. 0, United States Department of Energy, Richland, WA 99352.

WMH-9860237

Attachment 2

Data Summary Report

**Consisting of 11 Pages
including cover page**

Data Summary Report
PU LOADOUT

CORE NUMBER: n/a
SEGMENT #: BOPC22

SEGMENT PORTION: Acid Leachate

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98M000315			Mercury by CVAA (PE) with FIAS	ug/mL	98.20	<5.00e-03	<0.010	n/a	n/a	n/a	n/a	1.00e-02	n/a
S98M000315			Strontium-89/90 High Level	uCi/mL	101.9	<1.32e-07	9.65e-05	n/a	n/a	n/a	n/a	2.14e-07	2.11E+00
S98M000315			Pu-239/240 by TRU-SPEC Resin	uCi/mL	117.9	<3.29e-04	2.65e-01	n/a	n/a	n/a	n/a	1.10e-02	1.58E+00
S98M000315			Pu-238 by Ion Exchange	uCi/mL	n/a	<3.29e-04	<1.08e-02	n/a	n/a	n/a	n/a	1.10e-02	1.00E+02
S98M000315			Np237 by TTA Extraction	uCi/mL	63.64	<2.62e-05	1.66e-05	n/a	n/a	n/a	n/a	2.80e-05	1.02E+02
S98M000315		D	Cadmium-ICP-Acid Dil.	ug/mL	100.8	<5.00e-03	<5.00e-03	n/a	n/a	n/a	n/a	5.00e-03	n/a
S98M000315		D	Chromium-ICP-Acid Dil.	ug/mL	98.40	<1.00e-02	9.610	n/a	n/a	n/a	n/a	1.00e-02	n/a
S98M000315		D	Iron-ICP-Acid Dil.	ug/mL	97.60	<5.00e-02	42.80	n/a	n/a	n/a	n/a	5.00e-02	n/a
S98M000315		D	Nickel-ICP-Acid Dil.	ug/mL	98.40	<2.00e-02	12.50	n/a	n/a	n/a	n/a	2.00e-02	n/a
S98M000315		D	Lead-ICP-Acid Dil.	ug/mL	99.80	<1.00e-01	<1.00e-01	n/a	n/a	n/a	n/a	1.00e-01	n/a
S98M000315			Cobalt-60 by GEA	uCi/mL	111.2	<7.91e-07	<7.06e-07	n/a	n/a	n/a	n/a	7.06e-07	n/a
S98M000315			Antimony-125 by GEA	uCi/mL	n/a	<1.86e-06	<1.90e-06	n/a	n/a	n/a	n/a	1.90e-06	n/a
S98M000315			Cesium-134 by GEA	uCi/mL	n/a	<6.02e-07	<5.92e-07	n/a	n/a	n/a	n/a	5.92e-07	n/a
S98M000315			Cesium-137 by GEA	uCi/mL	105.2	<1.63e-06	<1.61e-06	n/a	n/a	n/a	n/a	1.61e-06	n/a
S98M000315			Europium-152 by GEA	uCi/mL	n/a	<1.27e-06	<1.79e-06	n/a	n/a	n/a	n/a	1.79e-06	n/a
S98M000315			Europium-154 by GEA	uCi/mL	n/a	<2.06e-06	<1.83e-06	n/a	n/a	n/a	n/a	1.83e-06	n/a
S98M000315			Europium-155 by GEA	uCi/mL	n/a	<1.63e-06	<2.80e-06	n/a	n/a	n/a	n/a	2.80e-06	n/a
S98M000315			Radium-226 by GEA	uCi/mL	n/a	<1.24e-05	<1.26e-05	n/a	n/a	n/a	n/a	1.26e-05	n/a
S98M000315			Actinium-228 by GEA	uCi/mL	n/a	<3.21e-06	<3.45e-06	n/a	n/a	n/a	n/a	3.45e-06	n/a
S98M000315			Americium-241 by GEA	uCi/mL	n/a	<7.62e-06	1.05e-02	n/a	n/a	n/a	n/a	n/a	0.630
S98M000315			Am-241 by Extraction	uCi/mL	99.12	<6.11e-04	1.03e-02	n/a	n/a	n/a	n/a	1.00e-03	2.76E+00
S98M000315			Cm-243/244 by Extraction	uCi/mL	n/a	<6.11e-04	<1.32e-03	n/a	n/a	n/a	n/a	1.00e-03	1.00E+02
S98M000315			Alpha in Liquid Samples	uCi/mL	90.00	<1.87e-05	2.15e-01	2.15e-01	2.15e-01	0.00	n/a	4.51e-05	7.16E-01
S98M000315			Beta in Liquid Samples	uCi/mL	104.5	<1.15e-04	7.44e-03	7.37e-03	7.41e-03	0.95	n/a	1.25e-04	3.16E+00

JAN 1999
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Data Summary Report
PU LOADOUT

CORE NUMBER: n/a
SEGMENT #: BOPC23

SEGMENT PORTION: Centrifuged Solid

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98M000308			Aroclor-1016	ug/Kg	n/a	<330.0	<3.30e+02	<3.08e2	n/a	n/a	n/a	330.0	n/a
S98M000308			Aroclor-1221	ug/Kg	n/a	<330.0	<3.30e+02	<3.08e2	n/a	n/a	n/a	330.0	n/a
S98M000308			Aroclor-1232	ug/Kg	n/a	<330.0	<3.30e+02	<3.08e2	n/a	n/a	n/a	330.0	n/a
S98M000308			Aroclor-1242	ug/Kg	n/a	<330.0	<3.30e+02	<3.08e2	n/a	n/a	n/a	330.0	n/a
S98M000308			Aroclor-1248	ug/Kg	n/a	<330.0	<3.30e+02	<3.08e2	n/a	n/a	n/a	330.0	n/a
S98M000308			Aroclor-1254	ug/Kg	97.50	<330.0	2.21e+02	579.0	400.0	89.5	n/a	330.0	n/a
S98M000308			Aroclor-1260	ug/Kg	n/a	<330.0	<3.30e+02	<3.08e2	n/a	n/a	n/a	330.0	n/a
S98M000308			Tetrachloro-m-xylene Surr	% Recovery	64.25	60.00	66.90	2.64e+03	1.35e+03	70.8	n/a	1.000	n/a
S98M000308			Decachlorobiphenyl Surr	% Recovery	93.75	64.25	74.87	3.92e+03	2.00e+03	105	n/a	1.000	n/a
S98M000309			Mercury by CVAA (PE) with FIAS	ug/g	99.60	<5.00e-03	1.19e+02	120.0	119.5	0.84	n/a	10.60	n/a
S98M000310		W	Fluoride-IC-Dionex 4000/4500	ug/g	108.3	<1.20e-02	1.71e+02	189.0	179.8	10.0	n/a	97.05	n/a
S98M000310		W	Chloride-IC-Dionex 4000/4500	ug/g	107.4	1.20e-02	3.61e+03	3.68e+03	3.65e+03	1.92	n/a	137.5	n/a
S98M000310		W	Nitrite-IC - Dionex 4000/4500	ug/g	101.3	5.19e-01	<8.73e+02	<8.61e2	n/a	n/a	n/a	873.3	n/a
S98M000310		W	Nitrate by IC-Dionex 4000/4500	ug/g	105.2	2.09e-01	3.53e+05	3.49e+05	3.51e+05	1.14	n/a	1.12e+03	n/a
S98M000310		W	Phosphate-IC-Dionex 4000/4500	ug/g	102.2	<1.20e-01	<9.70e+02	<9.57e2	n/a	n/a	n/a	970.5	n/a
S98M000310		W	Sulfate by IC-Dionex 4000/4500	ug/g	103.9	<1.38e-01	7.83e+04	8.60e+04	8.21e+04	9.37	n/a	1.12e+03	n/a
S98M000310		W	Oxalate-IC-Dionex 4000/4500	ug/g	106.4	<1.05e-01	1.37e+03	973.0	1.17e+03	33.9	n/a	849.1	n/a
S98M000311		A	Strontium-89/90 High Level	uCi/g	104.8	8.24e-05	3.47e-04	4.06e-04	3.76e-04	15.7	n/a	1.14e-04	2.94E+01
S98M000311		A	Pu-239/240 by TRU-SPEC Resin	uCi/g	108.9	<5.94e-01	77.10	81.40	79.25	5.43	n/a	3.400	1.62E+00
S98M000311		A	Pu-238 by Ion Exchange	uCi/g	n/a	<5.94e-01	< 3.400	<3.79E+0	n/a	n/a	n/a	3.400	5.54E+00
S98M000311		A	Np237 by TTA Extraction	uCi/g	73.16	<4.14e-03	2.20e-02	7.33e-03	1.47e-02	100	n/a	9.00e-03	2.74E+01
S98M000311		A	Cadmium -ICP-Acid Digest	ug/g	91.60	<5.00e-03	1.47e+02	146.0	146.5	0.68	n/a	2.020	n/a
S98M000311		A	Chromium -ICP-Acid Digest	ug/g	92.00	<1.00e-02	1.63e+04	1.60e+04	1.62e+04	1.86	n/a	4.020	n/a
S98M000311		A	Iron -ICP-Acid Digest	ug/g	92.20	<5.00e-02	2.29e+04	2.22e+04	2.26e+04	3.10	n/a	20.20	n/a
S98M000311		A	Nickel -ICP-Acid Digest	ug/g	90.20	<2.00e-02	2.52e+02	250.0	251.0	0.80	n/a	8.040	n/a
S98M000311		A	Lead -ICP-Acid Digest	ug/g	88.60	<1.00e-01	41.50	41.10	41.30	0.97	n/a	40.20	n/a
S98M000311		A	Cobalt-60 by GEA	uCi/g	106.1	<2.26e-04	<2.61e-04	<2.31e-4	n/a	n/a	n/a	2.61e-04	n/a
S98M000311		A	Antimony-125 by GEA	uCi/g	n/a	<6.86e-04	<6.88e-04	<7.11e-4	n/a	n/a	n/a	1.00e-03	n/a
S98M000311		A	Cesium-134 by GEA	uCi/g	n/a	<2.10e-04	<2.24e-04	<2.21e-4	n/a	n/a	n/a	2.24e-04	n/a
S98M000311		A	Cesium-137 by GEA	uCi/g	102.6	<2.76e-04	2.82e-03	2.39e-03	2.60e-03	16.5	n/a	n/a	12.8
S98M000311		A	Europium-152 by GEA	uCi/g	n/a	<5.30e-04	<5.97e-04	<6.10e-4	n/a	n/a	n/a	1.00e-03	n/a
S98M000311		A	Europium-154 by GEA	uCi/g	n/a	<7.41e-04	<8.11e-04	<7.92e-4	n/a	n/a	n/a	1.00e-03	n/a
S98M000311		A	Europium-155 by GEA	uCi/g	n/a	<3.90e-04	<5.93e-04	<6.03e-4	n/a	n/a	n/a	1.00e-03	n/a
S98M000311		A	Radium-226 by GEA	uCi/g	n/a	<5.27e-03	<5.43e-03	<5.35e-3	n/a	n/a	n/a	5.00e-03	n/a
S98M000311		A	Actinium-228 by GEA	uCi/g	n/a	<1.39e-03	<1.44e-03	<1.38e-3	n/a	n/a	n/a	1.00e-03	n/a
S98M000311		A	Americium-241 by GEA	uCi/g	n/a	<3.18e-04	8.934	9.080	9.007	1.67	n/a	n/a	0.100
S98M000311		A	Am-241 by Extraction	uCi/g	83.04	<1.010	10.20	10.60	10.40	3.85	n/a	1.070	2.62E+00
S98M000311		A	Cm-243/244 by Extraction	uCi/g	n/a	<1.010	< 1.070	<1.17E+0	n/a	n/a	n/a	1.070	1.00E+02
S98M000311		A	Alpha of Digested Solid	uCi/g	95.56	<2.92e-03	69.10	70.80	69.95	2.43	n/a	6.00e-03	4.84E-01
S98M000311		A	Beta of Solid Sample	uCi/g	105.5	<1.74e-02	7.490	7.770	7.630	3.67	n/a	1.80e-02	1.17E+00
S98M000312			Mercury by CVAA (PE) with FIAS	ug/mL	7.37	1.17e-04	5.310	5.690	5.500	6.91	105.9	2.30e-04	n/a
S98M000313		C	Silver -ICP-TCLP Digest-Liquid	ug/mL	94.00	5.39e-02	<1.67e-01	<1.67e-1	n/a	n/a	n/a	1.67e-01	n/a
S98M000313		C	Arsenic -ICP-TCLP Digest-Liq	ug/mL	89.58	<1.00e-01	< 1.670	<1.67e0	n/a	n/a	n/a	1.670	n/a
S98M000313		C	Barium -ICP-TCLP Digest-Liquid	ug/mL	70.26	<5.00e-02	<8.33e-01	<8.33e-1	n/a	n/a	n/a	8.33e-01	n/a

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98M000313		C	Cadmium -ICP-TCLP Digest-Liq	ug/mL	93.70	<5.00e-03	4.320	4.660	4.490	7.57	n/a	8.30e-02	n/a
S98M000313		C	Chromium -ICP-TCLP Digest-Liq	ug/mL	37.66	<1.00e-02	4.22e+02	456.0	439.0	7.74	n/a	1.67e-01	n/a
S98M000313		C	Lead -ICP-TCLP Digest-Liquid	ug/mL	78.35	<1.00e-01	< 1.670	<1.67e0	n/a	n/a	n/a	1.670	n/a
S98M000313		C	Selenium -ICP-TCLP Digest-Liq	ug/mL	93.30	<1.00e-01	< 1.670	<1.67e0	n/a	n/a	n/a	1.670	n/a

Liquid: Liquid

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98M000296		D	Strontium-89/90 High Level	uCi/mL	104.8	<1.08e-05	2.92e-04	2.98e-04	2.95e-04	2.03	n/a	2.74e-05	1.52E+01
S98M000296		D	Pu-239/240 by TRU-SPEC Resin	uCi/mL	111.6	<2.94e-01	12.90	12.80	12.85	0.78	n/a	7.67e-01	1.94E+00
S98M000296		D	Pu-238 by Ion Exchange	uCi/mL	n/a	<2.94e-01	<7.67e-01	<7.80E-1	n/a	n/a	n/a	7.67e-01	7.68E+00
S98M000296		D	Np237 by TTA Extraction	uCi/mL	72.73	1.00e-03	<1.84e-04	<1.46E-4	n/a	n/a	n/a	2.80e-04	3.16E+02
S98M000296		D	Cadmium-ICP-Acid Dil.	ug/mL	100.8	<5.00e-03	2.44e+02	251.0	247.5	2.83	n/a	2.550	n/a
S98M000296		D	Chromium-ICP-Acid Dil.	ug/mL	98.40	<1.00e-02	2.33e+04	2.38e+04	2.36e+04	2.12	n/a	5.100	n/a
S98M000296		D	Iron-ICP-Acid Dil.	ug/mL	97.60	<5.00e-02	5.01e+02	515.0	508.0	2.76	n/a	25.50	n/a
S98M000296		D	Nickel-ICP-Acid Dil.	ug/mL	98.40	<2.00e-02	3.86e+02	398.0	392.0	3.06	n/a	10.20	n/a
S98M000296		D	Lead-ICP-Acid Dil.	ug/mL	99.80	<1.00e-01	< 51.00	<5.10e1	n/a	n/a	n/a	51.00	n/a
S98M000296		D	Cobalt-60 by GEA	uCi/mL	107.2	<8.14e-06	<9.40e-06	<8.10e-6	n/a	n/a	n/a	9.40e-06	n/a
S98M000296		D	Antimony-125 by GEA	uCi/mL	n/a	<2.25e-05	<4.18e-05	<4.21e-5	n/a	n/a	n/a	4.18e-05	n/a
S98M000296		D	Cesium-134 by GEA	uCi/mL	n/a	<6.81e-06	<9.75e-06	<1.00e-5	n/a	n/a	n/a	9.75e-06	n/a
S98M000296		D	Cesium-137 by GEA	uCi/mL	103.4	<1.76e-05	1.38e-03	1.35e-03	1.36e-03	2.20	n/a	n/a	3.13
S98M000296		D	Europium-152 by GEA	uCi/mL	n/a	<1.54e-05	<1.42e-04	<1.44e-4	n/a	n/a	n/a	1.42e-04	n/a
S98M000296		D	Europium-154 by GEA	uCi/mL	n/a	<2.41e-05	<2.49e-05	<2.23e-5	n/a	n/a	n/a	2.49e-05	n/a
S98M000296		D	Europium-155 by GEA	uCi/mL	n/a	<1.96e-05	<4.54e-04	<4.63e-4	n/a	n/a	n/a	4.54e-04	n/a
S98M000296		D	Radium-226 by GEA	uCi/mL	n/a	<1.27e-04	<3.73e-04	<3.82e-4	n/a	n/a	n/a	3.73e-04	n/a
S98M000296		D	Actinium-228 by GEA	uCi/mL	n/a	<4.32e-05	<3.90e-05	<4.13e-5	n/a	n/a	n/a	3.90e-05	n/a
S98M000296		D	Americium-241 by GEA	uCi/mL	n/a	<4.50e-05	12.40	12.60	12.50	1.60	n/a	n/a	0.0500
S98M000296		D	Am-241 by Extraction	uCi/mL	78.86	<4.70e-01	11.40	11.30	11.35	0.88	n/a	9.28e-01	2.19E+00
S98M000296		D	Cm-243/244 by Extraction	uCi/mL	n/a	<4.70e-01	<9.28e-01	<9.24E-1	n/a	n/a	n/a	9.28e-01	1.00E+02
S98M000296		D	Alpha in Liquid Samples	uCi/mL	97.78	<2.11e-03	24.30	25.20	24.75	3.64	n/a	3.00e-03	6.01E-01
S98M000296		D	Beta in Liquid Samples	uCi/mL	109.6	<9.35e-03	2.800	2.770	2.785	1.08	n/a	1.30e-02	1.43E+00
S98M000298			Pu 239/240 % by AEA	%	n/a	n/a	49.00	n/a	n/a	n/a	n/a	8.00e-15	n/a
S98M000298			Pu 238/ Am 241 % by AEA	%	n/a	n/a	51.00	n/a	n/a	n/a	n/a	8.00e-15	n/a
S98M000298			Alpha in Liquid Samples	uCi/mL	88.89	<3.02e-03	23.90	n/a	n/a	n/a	n/a	5.00e-03	9.03E-01
S98M000298			Beta in Liquid Samples	uCi/mL	102.5	<1.18e-02	4.700	n/a	n/a	n/a	n/a	2.20e-02	1.64E+00
S98M000302			Mercury by CVAA (PE) with FIAS	ug/mL	98.20	<5.00e-03	1.46e+02	150.4	148.0	3.24	n/a	20.00	n/a
S98M000302			Fluoride-IC-Dionex 4000/4500	ug/mL	100.2	<1.20e-02	2.03e+02	218.0	210.3	7.13	n/a	122.4	n/a
S98M000302			Chloride-IC-Dionex 4000/4500	ug/mL	101.3	<1.70e-02	4.68e+03	4.99e+03	4.83e+03	6.41	n/a	173.4	n/a
S98M000302			Nitrite-IC - Dionex 4000/4500	ug/mL	98.71	<1.08e-01	<1.10e+03	<1.10e3	n/a	n/a	n/a	1.10e+03	n/a
S98M000302			Nitrate by IC-Dionex 4000/4500	ug/mL	104.6	<1.39e-01	4.44e+05	4.46e+05	4.45e+05	0.45	n/a	1.42e+03	n/a
S98M000302			Phosphate-IC-Dionex 4000/4500	ug/mL	98.89	<1.20e-01	<1.22e+03	<1.22e3	n/a	n/a	n/a	1.22e+03	n/a
S98M000302			Sulfate by IC-Dionex 4000/4500	ug/mL	100.1	<1.38e-01	5.60e+04	5.87e+04	5.74e+04	4.71	n/a	1.41e+03	n/a
S98M000302			Oxalate-IC-Dionex 4000/450	ug/mL	101.7	<1.05e-01	1.98e+03	3.94e+03	2.96e+03	66.2	n/a	1.07e+03	n/a
S98M000303			Aroclor-1016	ug/L	n/a	<6.00e-01	< 60.00	<6.00e1	n/a	n/a	n/a	60.00	n/a
S98M000303			Aroclor-1221	ug/L	n/a	<6.00e-01	< 60.00	<6.00e1	n/a	n/a	n/a	60.00	n/a
S98M000303			Aroclor-1232	ug/L	n/a	<6.00e-01	< 60.00	<6.00e1	n/a	n/a	n/a	60.00	n/a
S98M000303			Aroclor-1242	ug/L	n/a	<6.00e-01	< 60.00	<6.00e1	n/a	n/a	n/a	60.00	n/a
S98M000303			Aroclor-1248	ug/L	n/a	<6.00e-01	< 60.00	<6.00e1	n/a	n/a	n/a	60.00	n/a
S98M000303			Aroclor-1254	ug/L	98.25	<6.00e-01	57.10	58.60	57.85	2.59	n/a	60.00	n/a
S98M000303			Aroclor-1260	ug/L	n/a	<6.00e-01	< 60.00	<6.00e1	n/a	n/a	n/a	60.00	n/a
S98M000303			Tetrachloro-m-xylene Surr	% Recovery	63.00	55.50	16.75	56.70	36.73	14.2	n/a	1.000	n/a

Sample#	R	A#	Analyte		Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98M000303			Decachlorobiphenyl	Surr	% Recovery	79.25	89.25	55.83	210.0	132.9	52.5	n/a	1.000	n/a

Whole Sample: Whole Sample

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98M000295			Bulk Density of Sample	g/mL	n/a	n/a	1.540	n/a	n/a	n/a	n/a	5.00e-01	n/a
S98M000295			pH Direct	pH	n/a	n/a	< 1.000	<1	n/a	n/a	n/a	1.00e-02	n/a

Data Summary Report
PU LOADOUT

CORE NUMBER: n/a
SEGMENT #: BOPC24

SEGMENT PORTION: Tech Smear

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98M000353			Strontium-89/90 High Level	uCi/g	105.8	<1.34e-05	2.43e-05	n/a	n/a	n/a	n/a	1.25e-05	4.78E+01
S98M000353			Pu-239/240 by TRU-SPEC Resin	uCi/g	113.4	<3.28e-02	2.660	n/a	n/a	n/a	n/a	1.37e-01	1.72E+00
S98M000353			Pu-238 by Ion Exchange	uCi/g	n/a	<3.28e-02	<1.37e-01	n/a	n/a	n/a	n/a	1.37e-01	5.50E+00
S98M000353			Np237 by TTA Extraction	uCi/g	92.64	1.00e-03	1.30e-03	n/a	n/a	n/a	n/a	2.00e-03	9.04E+01
S98M000353			Cobalt-60 by GEA	uCi/g	96.17	<1.96e-04	<2.00e-04	n/a	n/a	n/a	n/a	2.00e-04	n/a
S98M000353			Antimony-125 by GEA	uCi/g	n/a	<6.24e-04	<6.11e-04	n/a	n/a	n/a	n/a	1.00e-03	n/a
S98M000353			Cesium-134 by GEA	uCi/g	n/a	<1.99e-04	<2.04e-04	n/a	n/a	n/a	n/a	2.04e-04	n/a
S98M000353			Cesium-137 by GEA	uCi/g	102.1	<2.74e-04	<2.67e-04	n/a	n/a	n/a	n/a	2.67e-04	n/a
S98M000353			Europium-152 by GEA	uCi/g	n/a	<5.29e-04	<5.53e-04	n/a	n/a	n/a	n/a	1.00e-03	n/a
S98M000353			Europium-154 by GEA	uCi/g	n/a	<6.06e-04	<6.28e-04	n/a	n/a	n/a	n/a	1.00e-03	n/a
S98M000353			Europium-155 by GEA	uCi/g	n/a	<4.36e-04	<4.38e-04	n/a	n/a	n/a	n/a	4.38e-04	n/a
S98M000353			Radium-226 by GEA	uCi/g	n/a	<4.78e-03	<4.74e-03	n/a	n/a	n/a	n/a	5.00e-03	n/a
S98M000353			Actinium-228 by GEA	uCi/g	n/a	<1.25e-03	<1.19e-03	n/a	n/a	n/a	n/a	1.00e-03	n/a
S98M000353			Americium-241 by GEA	uCi/g	n/a	<3.59e-04	4.01e-01	n/a	n/a	n/a	n/a	n/a	0.610
S98M000353			Am-241 by Extraction	uCi/g	78.41	<3.99e-02	3.68e-01	n/a	n/a	n/a	n/a	7.10e-02	3.23E+00
S98M000353			Cm-243/244 by Extraction	uCi/g	n/a	<3.99e-02	<7.06e-02	n/a	n/a	n/a	n/a	7.10e-02	1.00E+02
S98M000353			Alpha of Digested Solid	uCi/g	91.67	<2.65e-02	2.380	n/a	n/a	n/a	n/a	4.00e-02	6.82E+00
S98M000353			Beta of Solid Sample	uCi/g	112.1	<1.77e-01	2.39e-01	n/a	n/a	n/a	n/a	1.87e-01	4.89E+01

Data Summary Report
PU LOADOUT

CORE NUMBER: n/a
SEGMENT #: BOPC25

SEGMENT PORTION: Tech Smear

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98M000354			Strontium-89/90 High Level	uCi/g	105.8	<1.34e-05	1.98e-05	n/a	n/a	n/a	n/a	1.85e-05	7.75E+01
S98M000354			Pu-239/240 by TRU-SPEC Resin	uCi/g	113.4	<3.28e-02	3.240	n/a	n/a	n/a	n/a	1.76e-01	1.72E+00
S98M000354			Pu-238 by Ion Exchange	uCi/g	n/a	<3.28e-02	<1.76e-01	n/a	n/a	n/a	n/a	1.76e-01	5.03E+00
S98M000354			Np237 by TTA Extraction	uCi/g	92.64	1.00e-03	<1.83e-03	n/a	n/a	n/a	n/a	2.00e-03	1.33E+02
S98M000354			Cobalt-60 by GEA	uCi/g	96.17	<1.96e-04	<1.86e-04	n/a	n/a	n/a	n/a	1.86e-04	n/a
S98M000354			Antimony-125 by GEA	uCi/g	n/a	<6.24e-04	<6.31e-04	n/a	n/a	n/a	n/a	1.00e-03	n/a
S98M000354			Cesium-134 by GEA	uCi/g	n/a	<1.99e-04	<2.10e-04	n/a	n/a	n/a	n/a	2.10e-04	n/a
S98M000354			Cesium-137 by GEA	uCi/g	102.1	<2.74e-04	<2.70e-04	n/a	n/a	n/a	n/a	2.70e-04	n/a
S98M000354			Europium-152 by GEA	uCi/g	n/a	<5.29e-04	<5.35e-04	n/a	n/a	n/a	n/a	1.00e-03	n/a
S98M000354			Europium-154 by GEA	uCi/g	n/a	<6.06e-04	<6.14e-04	n/a	n/a	n/a	n/a	1.00e-03	n/a
S98M000354			Europium-155 by GEA	uCi/g	n/a	<4.36e-04	<4.47e-04	n/a	n/a	n/a	n/a	4.47e-04	n/a
S98M000354			Radium-226 by GEA	uCi/g	n/a	<4.78e-03	<4.77e-03	n/a	n/a	n/a	n/a	5.00e-03	n/a
S98M000354			Actinium-228 by GEA	uCi/g	n/a	<1.25e-03	<1.20e-03	n/a	n/a	n/a	n/a	1.00e-03	n/a
S98M000354			Americium-241 by GEA	uCi/g	n/a	<3.59e-04	4.13e-01	n/a	n/a	n/a	n/a	n/a	0.510
S98M000354			Am-241 by Extraction	uCi/g	78.41	<3.99e-02	3.87e-01	n/a	n/a	n/a	n/a	6.80e-02	3.12E+00
S98M000354			Cm-243/244 by Extraction	uCi/g	n/a	<3.99e-02	<6.84e-02	n/a	n/a	n/a	n/a	6.80e-02	1.00E+02
S98M000354			Alpha of Digested Solid	uCi/g	91.67	<2.65e-02	2.980	n/a	n/a	n/a	n/a	4.00e-02	6.12E+00
S98M000354			Beta of Solid Sample	uCi/g	112.1	<1.77e-01	2.69e-01	n/a	n/a	n/a	n/a	1.87e-01	5.11E+01

Data Summary Report
PU LOADOUT

CORE NUMBER: n/a
SEGMENT #: BOPC26

SEGMENT PORTION: Tech Smear

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98M000355			Strontium-89/90 High Level	uCi/g	105.8	<1.34e-05	7.17e-06	n/a	n/a	n/a	n/a	1.40e-05	1.49E+02
S98M000355			Pu-239/240 by TRU-SPEC Resin	uCi/g	113.4	<3.28e-02	3.98e-01	n/a	n/a	n/a	n/a	2.40e-02	1.88E+00
S98M000355			Pu-238 by Ion Exchange	uCi/g	n/a	<3.28e-02	<2.40e-02	n/a	n/a	n/a	n/a	2.40e-02	7.00E+00
S98M000355			Np237 by TTA Extraction	uCi/g	92.64	1.00e-03	<1.68e-03	n/a	n/a	n/a	n/a	2.00e-03	1.58E+02
S98M000355			Cobalt-60 by GEA	uCi/g	96.17	<1.96e-04	<6.44e-05	n/a	n/a	n/a	n/a	6.44e-05	n/a
S98M000355			Antimony-125 by GEA	uCi/g	n/a	<6.24e-04	<1.71e-04	n/a	n/a	n/a	n/a	1.71e-04	n/a
S98M000355			Cesium-134 by GEA	uCi/g	n/a	<1.99e-04	<5.42e-05	n/a	n/a	n/a	n/a	5.42e-05	n/a
S98M000355			Cesium-137 by GEA	uCi/g	102.1	<2.74e-04	<7.91e-05	n/a	n/a	n/a	n/a	7.91e-05	n/a
S98M000355			Europium-152 by GEA	uCi/g	n/a	<5.29e-04	<1.32e-04	n/a	n/a	n/a	n/a	1.32e-04	n/a
S98M000355			Europium-154 by GEA	uCi/g	n/a	<6.06e-04	<2.04e-04	n/a	n/a	n/a	n/a	2.04e-04	n/a
S98M000355			Europium-155 by GEA	uCi/g	n/a	<4.36e-04	<1.00e-04	n/a	n/a	n/a	n/a	1.00e-04	n/a
S98M000355			Radium-226 by GEA	uCi/g	n/a	<4.78e-03	<1.31e-03	n/a	n/a	n/a	n/a	1.00e-03	n/a
S98M000355			Actinium-228 by GEA	uCi/g	n/a	<1.25e-03	<3.61e-04	n/a	n/a	n/a	n/a	3.61e-04	n/a
S98M000355			Americium-241 by GEA	uCi/g	n/a	<3.59e-04	5.35e-02	n/a	n/a	n/a	n/a	n/a	0.800
S98M000355			Am-241 by Extraction	uCi/g	78.41	<3.99e-02	6.35e-02	n/a	n/a	n/a	n/a	1.10e-02	3.42E+00
S98M000355			Cm-243/244 by Extraction	uCi/g	n/a	<3.99e-02	<1.13e-02	n/a	n/a	n/a	n/a	1.10e-02	1.00E+02
S98M000355			Alpha of Digested Solid	uCi/g	91.67	<2.65e-02	3.66e-01	n/a	n/a	n/a	n/a	4.00e-03	5.76E+00
S98M000355			Beta of Solid Sample	uCi/g	112.1	<1.77e-01	3.45e-02	n/a	n/a	n/a	n/a	2.00e-02	4.08E+01

Data Summary Report
PU LOADOUT

CORE NUMBER: n/a
SEGMENT #: BOPC27

SEGMENT PORTION: Tech Smear

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98M000356			Strontium-89/90 High Level	uCi/g	105.8	<1.34e-05	<1.11e-05	n/a	n/a	n/a	n/a	1.45e-05	2.85E+02
S98M000356			Pu-239/240 by TRU-SPEC Resin	uCi/g	113.4	<3.28e-02	6.52e-02	n/a	n/a	n/a	n/a	5.00e-03	1.97E+00
S98M000356			Pu-238 by Ion Exchange	uCi/g	n/a	<3.28e-02	<4.64e-03	n/a	n/a	n/a	n/a	5.00e-03	6.53E+00
S98M000356			Np237 by TTA Extraction	uCi/g	92.64	1.00e-03	9.37e-04	n/a	n/a	n/a	n/a	2.00e-03	1.23E+02
S98M000356			Cobalt-60 by GEA	uCi/g	96.17	<1.96e-04	<5.87e-05	n/a	n/a	n/a	n/a	5.87e-05	n/a
S98M000356			Antimony-125 by GEA	uCi/g	n/a	<6.24e-04	<1.61e-04	n/a	n/a	n/a	n/a	1.61e-04	n/a
S98M000356			Cesium-134 by GEA	uCi/g	n/a	<1.99e-04	<5.47e-05	n/a	n/a	n/a	n/a	5.47e-05	n/a
S98M000356			Cesium-137 by GEA	uCi/g	102.1	<2.74e-04	<7.44e-05	n/a	n/a	n/a	n/a	7.44e-05	n/a
S98M000356			Europium-152 by GEA	uCi/g	n/a	<5.29e-04	<1.33e-04	n/a	n/a	n/a	n/a	1.33e-04	n/a
S98M000356			Europium-154 by GEA	uCi/g	n/a	<6.06e-04	<1.87e-04	n/a	n/a	n/a	n/a	1.87e-04	n/a
S98M000356			Europium-155 by GEA	uCi/g	n/a	<4.36e-04	<9.62e-05	n/a	n/a	n/a	n/a	9.62e-05	n/a
S98M000356			Radium-226 by GEA	uCi/g	n/a	<4.78e-03	<1.28e-03	n/a	n/a	n/a	n/a	1.00e-03	n/a
S98M000356			Actinium-228 by GEA	uCi/g	n/a	<1.25e-03	<3.58e-04	n/a	n/a	n/a	n/a	3.58e-04	n/a
S98M000356			Americium-241 by GEA	uCi/g	n/a	<3.59e-04	9.10e-03	n/a	n/a	n/a	n/a	n/a	2.18
S98M000356			Am-241 by Extraction	uCi/g	78.41	<3.99e-02	1.02e-02	n/a	n/a	n/a	n/a	2.00e-03	3.34E+00
S98M000356			Cm-243/244 by Extraction	uCi/g	n/a	<3.99e-02	<1.90e-03	n/a	n/a	n/a	n/a	2.00e-03	1.00E+02
S98M000356			Alpha of Digested Solid	uCi/g	91.67	<2.65e-02	6.24e-02	n/a	n/a	n/a	n/a	3.96e-04	4.17E+00
S98M000356			Beta of Solid Sample	uCi/g	112.1	<1.77e-01	5.44e-03	n/a	n/a	n/a	n/a	2.00e-03	2.39E+01

Data Summary Report
PU LOADOUT

CORE NUMBER: n/a
SEGMENT #: BOPC28

SEGMENT PORTION: Tech Smear

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98M000358			Strontium-89/90 High Level	uCi/g	105.8	<1.34e-05	<6.30e-06	n/a	n/a	n/a	n/a	1.32e-05	2.12E+02
S98M000358			Pu-239/240 by TRU-SPEC Resin	uCi/g	113.4	<3.28e-02	7.19e-01	n/a	n/a	n/a	n/a	4.10e-02	1.76E+00
S98M000358			Pu-238 by Ion Exchange	uCi/g	n/a	<3.28e-02	<4.05e-02	n/a	n/a	n/a	n/a	4.10e-02	6.59E+00
S98M000358			Np237 by TTA Extraction	uCi/g	92.64	1.00e-03	<1.19e-03	n/a	n/a	n/a	n/a	2.00e-03	4.40E+02
S98M000358			Cobalt-60 by GEA	uCi/g	96.17	<1.96e-04	<6.60e-05	n/a	n/a	n/a	n/a	6.60e-05	n/a
S98M000358			Antimony-125 by GEA	uCi/g	n/a	<6.24e-04	<1.65e-04	n/a	n/a	n/a	n/a	1.65e-04	n/a
S98M000358			Cesium-134 by GEA	uCi/g	n/a	<1.99e-04	<5.42e-05	n/a	n/a	n/a	n/a	5.42e-05	n/a
S98M000358			Cesium-137 by GEA	uCi/g	102.1	<2.74e-04	<7.56e-05	n/a	n/a	n/a	n/a	7.56e-05	n/a
S98M000358			Europium-152 by GEA	uCi/g	n/a	<5.29e-04	<1.35e-04	n/a	n/a	n/a	n/a	1.35e-04	n/a
S98M000358			Europium-154 by GEA	uCi/g	n/a	<6.06e-04	<2.05e-04	n/a	n/a	n/a	n/a	2.05e-04	n/a
S98M000358			Europium-155 by GEA	uCi/g	n/a	<4.36e-04	<9.81e-05	n/a	n/a	n/a	n/a	9.81e-05	n/a
S98M000358			Radium-226 by GEA	uCi/g	n/a	<4.78e-03	<1.29e-03	n/a	n/a	n/a	n/a	1.00e-03	n/a
S98M000358			Actinium-228 by GEA	uCi/g	n/a	<1.25e-03	<3.55e-04	n/a	n/a	n/a	n/a	3.55e-04	n/a
S98M000358			Americium-241 by GEA	uCi/g	n/a	<3.59e-04	9.10e-02	n/a	n/a	n/a	n/a	n/a	0.520
S98M000358			Am-241 by Extraction	uCi/g	78.41	<3.99e-02	1.09e-01	n/a	n/a	n/a	n/a	1.30e-02	2.63E+00
S98M000358			Cm-243/244 by Extraction	uCi/g	n/a	<3.99e-02	<1.34e-02	n/a	n/a	n/a	n/a	1.30e-02	1.00E+02
S98M000358			Alpha of Digested Solid	uCi/g	91.67	<2.65e-02	6.78e-01	n/a	n/a	n/a	n/a	4.00e-03	4.24E+00
S98M000358			Beta of Solid Sample	uCi/g	112.1	<1.77e-01	4.82e-02	n/a	n/a	n/a	n/a	2.00e-02	2.94E+01

Data Summary Report
PU LOADOUT

CORE NUMBER: n/a
SEGMENT #: BOPK78

SEGMENT PORTION: Tech Smear

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98M000357			Strontium-89/90 High Level	uCi/g	105.8	<1.34e-05	2.17e-05	n/a	n/a	n/a	n/a	1.37e-05	5.62E+01
S98M000357			Pu-239/240 by TRU-SPEC Resin	uCi/g	116.1	<1.630	35.80	n/a	n/a	n/a	n/a	3.100	7.12E-01
S98M000357			Pu-238 by Ion Exchange	uCi/g	n/a	<1.630	5.650	n/a	n/a	n/a	n/a	3.100	1.40E+00
S98M000357			Np237 by TTA Extraction	uCi/g	92.64	1.00e-03	<1.87e-03	n/a	n/a	n/a	n/a	2.00e-03	1.28E+02
S98M000357			Cobalt-60 by GEA	uCi/g	96.17	<1.96e-04	<6.47e-05	n/a	n/a	n/a	n/a	6.47e-05	n/a
S98M000357			Antimony-125 by GEA	uCi/g	n/a	<6.24e-04	<1.69e-04	n/a	n/a	n/a	n/a	1.69e-04	n/a
S98M000357			Cesium-134 by GEA	uCi/g	n/a	<1.99e-04	<5.52e-05	n/a	n/a	n/a	n/a	5.52e-05	n/a
S98M000357			Cesium-137 by GEA	uCi/g	102.1	<2.74e-04	<7.54e-05	n/a	n/a	n/a	n/a	7.54e-05	n/a
S98M000357			Europium-152 by GEA	uCi/g	n/a	<5.29e-04	<1.54e-04	n/a	n/a	n/a	n/a	1.54e-04	n/a
S98M000357			Europium-154 by GEA	uCi/g	n/a	<6.06e-04	<1.98e-04	n/a	n/a	n/a	n/a	1.98e-04	n/a
S98M000357			Europium-155 by GEA	uCi/g	n/a	<4.36e-04	<1.98e-04	n/a	n/a	n/a	n/a	1.98e-04	n/a
S98M000357			Radium-226 by GEA	uCi/g	n/a	<4.78e-03	<1.33e-03	n/a	n/a	n/a	n/a	1.00e-03	n/a
S98M000357			Actinium-228 by GEA	uCi/g	n/a	<1.25e-03	<3.57e-04	n/a	n/a	n/a	n/a	3.57e-04	n/a
S98M000357			Americium-241 by GEA	uCi/g	n/a	<3.59e-04	5.250	n/a	n/a	n/a	n/a	n/a	0.0700
S98M000357			Am-241 by Extraction	uCi/g	95.59	<1.600	24.10	n/a	n/a	n/a	n/a	3.480	8.87E-01
S98M000357			Cm-243/244 by Extraction	uCi/g	n/a	<1.600	< 3.480	n/a	n/a	n/a	n/a	3.480	1.00E+02
S98M000357			Alpha of Digested Solid	uCi/g	96.55	3.60e-02	53.40	n/a	n/a	n/a	n/a	2.70e-02	1.45E+00
S98M000357			Beta of Solid Sample	uCi/g	100.7	<2.79e-01	4.290	n/a	n/a	n/a	n/a	1.15e-01	4.25E+00

Additional ICP Results
PU LOADOUT

CORE NUMBER: n/a
SEGMENT #: BOPC23

SEGMENT PORTION: Liquid

Sample#	R	A#	Analyte	Unit	Standard %	Blank		Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98M000296		D	Silver-ICP-Acid Dil.	ug/mL	100.0	<1.00e-02	<	5.100	<5.10e0	n/a	n/a	n/a	5.100	n/a
S98M000296		D	Arsenic-ICP-Acid Dil.	ug/mL	103.2	<1.00e-01	<	51.00	<5.10e1	n/a	n/a	n/a	51.00	n/a
S98M000296		D	Barium-ICP-Acid Dil.	ug/mL	99.00	<5.00e-02	<	25.50	<2.55e1	n/a	n/a	n/a	25.50	n/a
S98M000296		D	Selenium-ICP-Acid Dil.	ug/mL	95.80	<1.00e-01	<	51.00	<5.10e1	n/a	n/a	n/a	51.00	n/a

JAN 1999
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Data
Log In

WMH-9860237

Attachment 3

Sample Breakdown Diagrams

**Consisting of 4 Pages
including cover page**

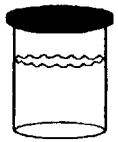
202S Pu Load-Out Hood Samples

Process Piping
BOPC22

S98M000287

Leached inside of pipe with 198 mL 2M Nitric Acid.

Collected leachate

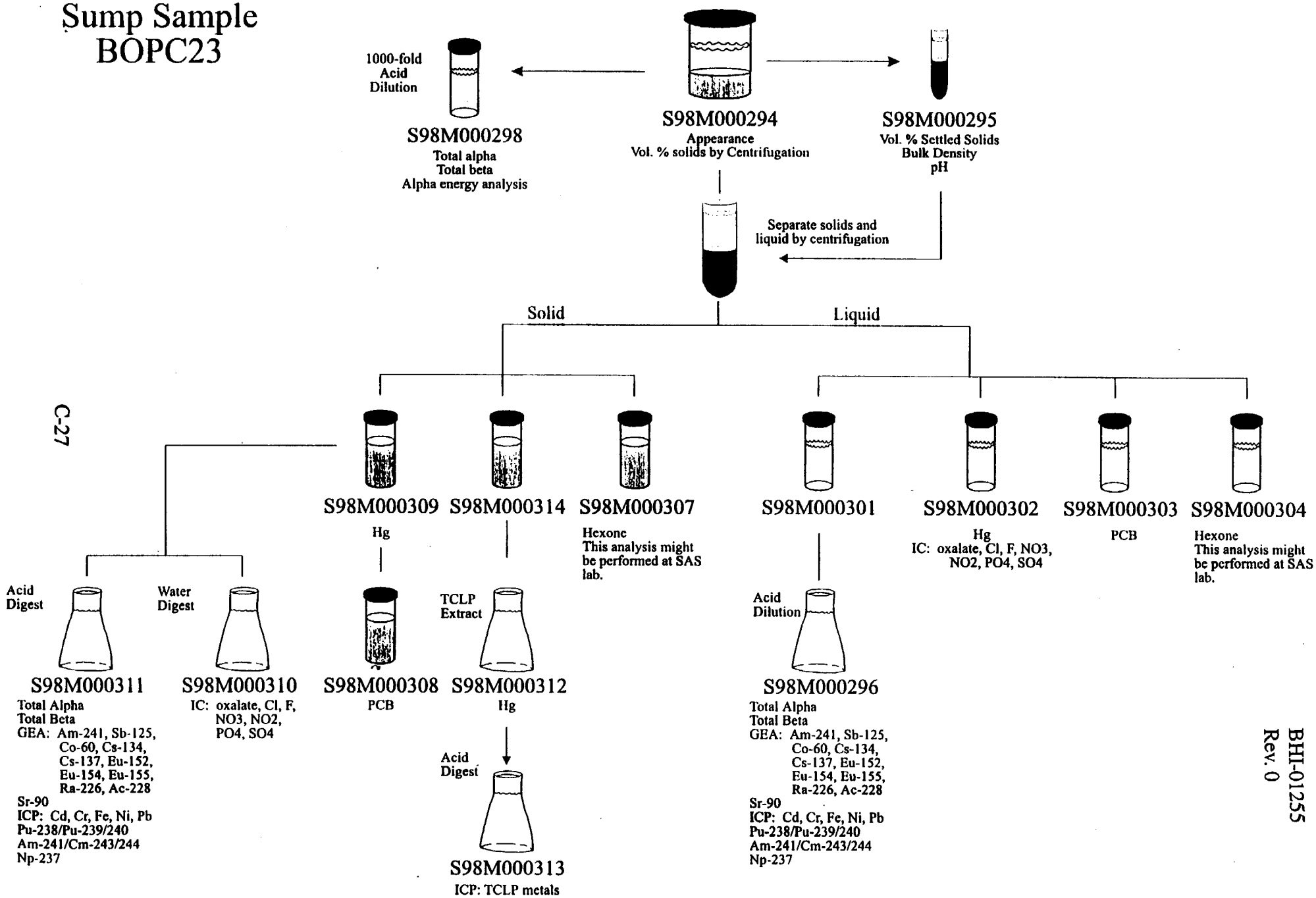


S98M000315

Hg
Total Alpha
Total Beta
GEA: Am-241, Sb-125, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Eu-155, Ra-226, Ac-228
Sr-90
Np-237
Am-241/Cm-243
Pu-238/Pu-239/240
ICP: Cd, Cr, Fe, Ni, Pb

202S Pu Load-Out Hood Samples

Sump Sample BOPC23



202S Pu Load-Out Hood Samples

Technical Smears

BOPC24 Floor Smear	BOPC25 Tank E16 Smear	BOPC26 Tank E21 Smear	BOPC27 Tank E19 Smear	BOPK78 Leak from L-16 Smear	BOPC28 Tank E17 Smear
S98M000347	S98M000348	S98M000349	S98M000350	S98M000351	S98M000352
Acid Digest	Acid Digest	Acid Digest	Acid Digest	Acid Digest	Acid Digest
S98M000353	S98M000354	S98M000355	S98M000356	S98M000357	S98M000358
Total Alpha Total Beta GEA: Am-241, Sb-125, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Eu-155, Ra-226, Ac-228 Sr-90	Total Alpha Total Beta GEA: Am-241, Sb-125, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Eu-155, Ra-226, Ac-228 Sr-90	Total Alpha Total Beta GEA: Am-241, Sb-125, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Eu-155, Ra-226, Ac-228 Sr-90	Total Alpha Total Beta GEA: Am-241, Sb-125, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Eu-155, Ra-226, Ac-228 Sr-90	Total Alpha Total Beta GEA: Am-241, Sb-125, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Eu-155, Ra-226, Ac-228 Sr-90	Total Alpha Total Beta GEA: Am-241, Sb-125, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Eu-155, Ra-226, Ac-228 Sr-90

WMH-9860237

Attachment 4

Chain-Of-Custody Forms

**Consisting of 8 Pages
including cover page**

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-059-01	Page 1 of 1
Collector		Company Contact: Michael Galgoul — Telephone No.: 373-5681	Project Coordinator: WEISS, RL	Data Turnaround: 60 Days
Project Designation: 202-S Building - Plutonium Loadout Hood - Other Solid		Sampling Location: 200 West	SAF No.: B98-059	
Ice Chest No.		Field Logbook No.: EL-1429	Method of Shipment: Hand deliver	
Shipped To: 222-S Lab Operations		Offsite Property No.: N/A	Bill of Lading/Air Bill No.: N/A	
Waste Designation: Client determined no waste codes associated with this project.			COA	

POSSIBLE SAMPLE HAZARDS/REMARKS

Process Vessel Pipe

Special Handling and/or Storage

Preservation	None										
Type of Container	P										
No. of Container(s)	1										
Volume	25g										
SAMPLE ANALYSIS	See Item (1) in Special Instructions										

Sample No.	Matrix *	Sample Date	Sample Time								
B0PC22	Pipe	8-25-98	1038	X		2.7 x10^6 DPM		Alpha			
								Process Pipe			
								PU Estimate - .413g			

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: [signature]	Date/Time: 8-25-98 1302	Received By: RL Thurber	Date/Time: 8-25-98 1302
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

LABORATORY SECTION — Received By: RL Thurber — Title: Sample Custodian — Date/Time: 8-25-98 1302

FINAL SAMPLE — Disposal Method — Disposed By — Date/Time

SPECIAL INSTRUCTIONS

~~Close COC upon receipt of samples.~~ If insufficient material, use FSR as a guideline. Analyses listed in order of priority. ~~222-S is to determine Resin Bead concentration during sample analysis. Quantify Resin Bead concentration to <1%~~ RJN

Actinides by ICP MS

(1) Isotopic Plutonium; Americium-241/Curium-244; Neptunium-237; Gamma Spectroscopy (Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226); Gamma Spec - Add-on (Antimony-125, Cesium-134, Radium-228); Strontium-90; Gross Alpha; Gross Beta; ICP Metals - 6010A (SW-846) Cadmium, Chromium, Iron, Nickel; ICP Metals - 6010A (Add-On) Lead; Mercury - 7471 (CV); ~~Metals by ICP (TCLP) 1311/6010; Mercury (TCLP) 1311/7470~~; VOA - 8260A - Complete 4-Methyl-2-Pentanone; PCBs - 8080; IC Anions - 9056 Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate; IC Anions - Add-On Oxalate; pH(Soil) - 9045; ~~Asbestos~~ RJN

Matrix *	
S	= Soil
SS	= Sediment
SO	= Solid
SL	= Sludge
W	= Water
O	= Oil
A	= Air
DS	= Drum Solids
DL	= Drum Liquids
T	= Tissue
WI	= Wipe
RJN	= Liquid
V	= Vegetation
X	= Other

chitel Hanford, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Date Turnaround
☐ Priority
☐ Normal

tor RAYANT	Company Contact [illegible]	Telephone 375-5681
t Designation 202-S P/U Loadout Hood	Sampling Location 202-S PU Loadout Hood	SAF No. B98-060
eet No. ERC-96-077 RLB 8-31-98	Field Logbook No. EL-1429	Method of Shipment HAND CARRY
ed To 222-S	Offsite Property No. N/A	Bill of Lading/Air Bill No. N/A
le Sample Hazards/Remarks	Preservation	Cool
RAD	Type of Container	Poly
	No. of Container(s)	1
el Handling and/or Storage	Volume	500mL

SAMPLE ANALYSIS

Sample No.	Matrix*	Date Sampled	Time Sampled		
OPC23	Other	8-31-98	1100	X	Approximately 35 mL of Sludge in Bottle
					~~600,000 DPM Alpha RADS 8-31-98~~
					7 MR/hr gamma
					300,000 DPM Alpha smearable
					PU = .056g PH 1.5

IN OF POSSESSION	Sign/Print Names		
quished By	Date/Time 1310	Received By	Date/Time 1310
uished By	Date/Time	Received By	Date/Time
quished By	Date/Time	Received By	Date/Time
quished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS LAB To Separate Liq + Solids As Directed in LOI FY98 Redox (202-S) PU Loadout Hood Sample Analysis." Liq + Solid phase to be analyzed As Directed in LOI FY98 REDOX (202-S) PU Loadout Hood Sampling and Analysis and 202-S Analytical Instruction
202-S P/U Loadout Hood Sump RLB 8-31-98

Matrix*
S = Soil
SE = Sediment
SO = Solid
SL = Sludge
W = Water
O = Oil
A = Air
DS = Drum Solids
DL = Drum Liquids
T = Tissue
WI = Wipe
L = Liquid
V = Vegetation
X = Other

ORATORY SECTION	Received By	Title	Date/Time
AL SAMPLE SPOSITION	Disposal Method	Disposed By	Date/Time

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-059-01	Page 1 of 1

Collector: BRYANT	Company Contact: Michael Galgoul	Telephone No.: 373-5681	Project Coordinator: WEISS, RL
Project Designation: 202-S-Building - Plutonium Loadout Hood - Other Solid	Sampling Location: 200 West		SAF No.: B98-059
Ice Chest No.	Field Logbook No.: EL-1429		Method of Shipment: Hand deliver
Shipped To: 222-S Lab Operations	Offsite Property No.: N/A		N/A
Waste Designation: Client determined no waste codes associated with this project.			COA

Data Turnaround: 60 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None										
Type of Container	P										
No. of Container(s)	1										
Volume	25g										
SAMPLE ANALYSIS	See item (1) in Special Instructions										
Sample No.	Matrix *	Sample Date	Sample Time								
BOPC24	Other Solid	8-24-98	1335	X		870,000	DPM		Floor		
							3.95e-7	Ci			

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
[signature]	0855 8-25-98	[signature]	0855 8-25-98

LABORATORY SECTION — Received By — Title — Date/Time

FINAL SAMPLE DISPOSITION — Disposal Method — Disposed By: Tech Smears — Date/Time

SPECIAL INSTRUCTIONS

~~Close SDG upon receipt of samples.~~ If insufficient material, use FSR as a guideline. Analyses listed in order of priority. 222-S is to determine Resin Bead concentration during asbestos analysis. Quantify Resin Bead concentration to <1%

Actinides by ICP MS

(1) Isotopic Plutonium; Americium-241/Curium-244; Neptunium-237; Gamma Spectroscopy (Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226); Gamma Spec - Add-on (Antimony-125, Cesium-134, Radium-228); Strontium-90; Gross Alpha; Gross Beta; ICP Metals - 6010A (SW-846) Cadmium, Chromium, Iron, Nickel; ICP Metals - 6010A (Add-On) Lead; Mercury-7471 (CV); Metals by ICP (TCLP) - 1311/6010; Mercury (TCLP) 1311/7470; VOA - 8260A - Complete 4-Methyl-2-Pentanone; PCBs - 8080; IC Anions - 9056 Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate; IC Anions - Add-On Oxalate; pH (Soil) - 9045; Asbestos

Matrix *

S	= Soil
SE	= Sediment
SO	= Solid
SL	= Sludge
W	= Water
O	= Oil
A	= Air
DS	= Drum Solids
DL	= Drum Liquids
T	= Tissue
WI	= Wipe
L	= Liquid
V	= Vegetation
X	= Other

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-059-01	Page 1 of 2
Collector	Company Contact: Michael Galeoul	Telephone No.: 373-5681	Project Coordinator: WEISS, RL	Data Turnaround: 60 Days
Project Designation: 202-S Building - Plutonium Loadout Hood - Other Solid	Sampling Location: 200 West		SAF No.: B98-059	
Ice Chest No.	Field Logbook No.: EL-1429		Method of Shipment: Hand deliver	
Shipped To: 222-S Lab Operations	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: N/A	
Waste Designation: Client determined no waste codes associated with this project.			COA	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None											
Type of Container	P											
No. of Container(s)	1											
Volume	25g											
SAMPLE ANALYSIS	See item (1) in Special Instructions											

Sample No.	Matrix *	Sample Date	Sample Time										
B0PC25	Other Solid	8-10-98	1030	X				5.2*10 DPM Alpha					
~~B0PC26~~ → DCB 8-10-98	Other Solid							2.34 e-6 Ci					
~~B0PC27~~ DLB 8-10-98	Other Solid												
~~B0PC28~~ DLB 8-10-98	Other Solid												
~~B0PC29~~ DLB 8-10-98	Other Solid												

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Tony Bryant/Tony Bryant	Date/Time: 0855 8-25-98	Received By: [illegible] Jim Knight/JK	Date/Time: 0855 8-25-98
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

If insufficient material, use FSR as a guideline. Analyses listed in order of priority.

(1) ~~Isotopic Plutonium; Americium-241/Curium-244; Neptunium-237;~~ RJN Gamma Spectroscopy (Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226); Gamma Spec - Add-on (Antimony-125, Cesium-134, Radium-228); Strontium-90; Gross Alpha; Gross Beta; Actinides by ICPMS

Tech Smear

TANK E16

Matrix *

S	=	Soil
SE	=	Sediment
SO	=	Solid
SL	=	Sludge
W	=	Water
O	=	Oil
A	=	Air
DS	=	Drum Solids
DL	=	Drum Liquids
T	=	Tissue
WI	=	Wipe
L	=	Liquid
V	=	Vegetation
X	=	Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B98-059-01 Page 2 of 2

Collector	Company Contact: Michael Galgoul	Telephone No.: 373-5681	Project Coordinator: WEISS, RL
Project Designation: 202-S Building - Plutonium Loadout Hood - Other Solid	Sampling Location: 200 West		SAF No.: B98-059
Ice Chest No.	Field Logbook No.: EL-1429		Method of Shipment: Hand deliver
Shipped To: 222-S Lab Operations	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: N/A
Waste Designation: Client determined no waste codes associated with this project.			COA

Data Turnaround: 60 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None											
Type of Container	P											
No. of Container(s)	1											
Volume	25g											
SAMPLE ANALYSIS	See item (1) in Special Instructions											
							6.13e-8 Ci					
Sample No.	Matrix *	Sample Date	Sample Time									
B0PC26 DLB 8-25-98	Other Solid	8-24-98	1245	X		135,000	DPM			Tank	E21	
B0PC27	other Solid	8-24-98	1305	X		~~135,000~~ 66,000 DLB	DPM		3.0e-8 Ci	Tank	E19	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
[signature] Tony BRYANT	0855 8-25-98	[signature]	0855 8-25-98

SPECIAL INSTRUCTIONS

If insufficient material, use FSR as a guideline. Analyses listed in order of priority.

(1) ~~Isotopic Plutonium; Americium-241/Curium-244; Neptunium-237~~; RUN Gamma Spectroscopy (Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226); Gamma Spec - Add-on (Antimony-125, Cesium-134, Radium-228); Strontium-90; Gross Alpha; Gross Beta; Actinides by ICPMS

Tech Smears

Matrix *

S	Soil
SE	Sediment
SO	Solid
SL	Sludge
W	Water
O	Oil
A	Air
DS	Drum Solids
DL	Drum Liquids
T	Tissue
WI	Wipe
L	Liquid
V	Vegetation
X	Other

LABORATORY SECTION: Received By | Title | Date/Time

FINAL SAMPLE DISPOSITION: Disposal Method | Disposed By | Date/Time

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B98-059-01

Collector: BRYANT	Company Contact: Michael Galgoul	Telephone No.: 373-5681	Project Coordinator: WEISS, RL
Project Designation: 202-S Building - Plutonium Loadout Hood - Other Solid	Sampling Location: 200 West		SAF No.: B98-059
Ice Chest No.: ERC-077	Field Logbook No.: EL-1429		Method of Shipment: Hand deliver
Shipped To: 222-S Lab Operations	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: N/A

Data Turnaround: 60 Days

Waste Designation: Client determined no waste codes associated with this project.

COA

POSSIBLE SAMPLE HAZARDS/REMARKS: RAD

Special Handling and/or Storage

Preservation	None											
Type of Container	P											
No. of Container(s)	1											
Volume	25g											
SAMPLE ANALYSIS	See item (1) in Special Instructions											

Sample No.	Matrix *	Sample Date	Sample Time									
B0PC3028	Other Solid	8-31-98	1010	X	600,000 DPM Alpha							

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Bryant/Bryant	8-31-98 1310	Knight/Jim Knight	8-31-98 1310

SPECIAL INSTRUCTIONS

If insufficient material, use FSR as a guideline. Analyses listed in order of priority.

(1) ~~Isotopic Plutonium, Americium 241/Curium 244, Neptunium 237~~; Gamma Spectroscopy (Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226); Gamma Spec - Add-on (Antimony-125, Cesium-134, Radium-228); Strontium-90; Gross Alpha; Gross Beta; RUN

Actinides by ICPMS

TANK - E17

Tech Smear

Matrix *

S	=	Soil
SE	=	Sediment
SO	=	Solid
SL	=	Sludge
W	=	Water
O	=	Oil
A	=	Air
DS	=	Drum Solids
DL	=	Drum Liquids
T	=	Tissue
WI	=	Wipe
L	=	Liquid
V	=	Vegetation
X	=	Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

C-35

BHI-01255
Rev. 0

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B98-059-02	Page 1 of 1

Collector: D. BRYANT / T Malley	Company Contact: Michael Gilgoul	Telephone No.: 372-5681	Project Coordinator: WEISS. RL
Project Designation: 202-S Building - Plutonium Loadout Hood - Other Solid	Sampling Location: 200 West		SAF No.: B98-059
Ice Chest No.	Field Logbook No.: EL-1429		Method of Shipment: Hand deliver
Shipped To: 222-S Lab Operations	Offsite Property No.: N/A		Bill of Lading/Air Bill No.: N/A
Waste Designation: Client determined no waste codes associated with this project.			COA

Data Turnaround: 60 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

SAMPLE ANALYSIS

Preservation	None											
Type of Container	P											
No. of Container(s)	1											
Volume	25g											
SAMPLE ANALYSIS	See item (1) in Special Instructions.											
Sample No.	Matrix *	Sample Date	Sample Time	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
B0PK78	Other Solid	8-11-98	0920	X		1	~~120,000 dpm~~ Alpha on the Smear					
~~B0PK79~~ DLB 8-11-98	Other Solid						3,000,000 D/m Alpha				1.35e-6 Ci	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Doug Bryant	0855 8-25-98	Linkwight Linkwight Jr	0855 8-25-98

SPECIAL INSTRUCTIONS

If insufficient material, use FSR as a guideline. Analyses listed in order of priority.

RJN 8/6/98

(1) ~~Isotopic Plutonium, Americium-241/Curium-244, Neptunium-237~~; Actinides ICPMS; Gamma Spectroscopy (Americium-241, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Radium-226); Gamma Spec - Add-on (Antimony-125, Cesium-134, Radium-228); Strontium -90; Gross Alpha; Gross Beta

Tech Smear

Leak from L-16

Matrix *

S	=	Soil
SE	=	Sediment
SO	=	Solid
SL	=	Sludge
W	=	Water
O	=	Oil
A	=	Air
DS	=	Drum Solids
DL	=	Drum Liquids
T	=	Tissue
WI	=	Wipe
L	=	Liquid
V	=	Vegetation
X	=	Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

WMH-9860237

Attachment 5

Sample Disposition Records

**Consisting of 7 Pages
including cover page**

FROM THE DESK OF: Doris Ayres
BHI Sample and Data Management
373-5683/L0-20

TO: Ruth Esch **DATE:** September 15, 1998

SUBJECT: SAMPLE DISPOSITION RECORDS B98-075, B98-079, B98-080 AND B98-081

Sample disposition records (SDRs) are the mechanism by which BHI Sample and Data Management (SDM) documents analysis instructions and changes to the laboratories during the sample analysis process. SDR B98-075 gives direction on which analyses to run in FY 1998 and FY 1999 for samples B0PC22 and B0PC23. SDR B98-079 gives the laboratory direction for sample breakdown and analysis of sample B0PC22. SDR B98-080 gives direction on the handling of the liquid and solid phases of sample B0PC23. SDR B98-081 gives the laboratory direction on proceeding with the TCLP analyses for sample B0PC23.

Please incorporate these SDRs into the final data package when delivered to SDM. If you have any questions please feel free to call me on 373-5683.

Doris Ayres

Sample Disposition Record

Control #: B98-081
Revision#: 0
Date Initiated: 9/10/98

Section 1 - BACKGROUND

SAF#: B98-059
OU: N/A
Project ID: 202-S Building
Task ID: 1
Sampling Event: 202-S Building - Plutonium Loadout Hood
Laboratory: 222-S Lab Operations
Project Coordinator: WEISS, RL
Task Manager: GALGOUL, MJ

Section 2 - SAMPLE INFORMATION

Number of Samples: 1
ID Numbers: B0PC23
MATRIX: Other Solid
Collection Date: 08/31/98

Section 3 - ISSUE

Class: Lab Direction
NCR Number: N/A
Type: Insufficient Volume
Description: Insufficient volume to meet TCLP protocol

N/A
NCR Validation (Print/Sign) Date

Section 4 - DISPOSITION

Type: Use As Is
Description: The laboratory will use the minimum volume required by internal laboratory procedures to run TCLP for metals on the solid phase of sample number B0PC23.

WEISS, RL Richard L Weiss 9-10-98
Project Coordinator (Print/Sign) Date

GALGOUL, MJ Michael J Galgoul 9-10-98
Task Manager (Print/Sign) Date

N/A
QA (Print/Sign) Date

Section 5 - INSPECTION (Issue Class: Nonconformance Only)

Inspection Number: N/A
Inspection Results: N/A

N/A
Inspector (Print/Sign) Date

Sample Disposition Record

Control #: B98-080
Revision#: 0
Date Initiated: 9/10/98

Section 1 - BACKGROUND

SAF#: B98-059
OU: N/A
Project ID: 202-S Building
Task ID: 1
Sampling Event: 202-S Building - Plutonium Loadout Hood
Laboratory: 222-S Lab Operations
Project Coordinator: WEISS, RL
Task Manager: GALGOUL, MJ

Section 2 - SAMPLE INFORMATION

Number of Samples: 1
ID Numbers: B0PC23
MATRIX: Other Solid
Collection Date: 08/31/98

Section 3 - ISSUE

Class: Lab Direction
NCR Number: N/A
Type: Multiple Phase Sample
Description: Separation of liquid and solid phases in sample B0PC23

N/A
NCR Validation (Print/Sign) Date

Section 4 - DISPOSITION

Type: Use As Is
Description: The laboratory is to separate and analyze liquid and solid phases. The liquid phase is to be analysed as an "other liquid" per the analytical requirements for liquids specified in the 202-S Analytical Instruction. The solid phase is to be analyzed as an "other solid" per the analytical requirements for sump solids specified in the 202-S Analytical Instruction. pH for liquid and solid phases is not required.

WEISS, RL Rachel L Weiss 9-10-98
Project Coordinator (Print/Sign) Date

GALGOUL, MJ Michael J Galgoul 9-10-98
Task Manager (Print/Sign) Date

N/A
QA (Print/Sign) Date

Section 5 - INSPECTION (Issue Class: Nonconformance Only)

Inspection Number: N/A
Inspection Results: N/A

N/A
Inspector (Print/Sign) Date

Sample Disposition Record

Control #: B98-079
Revision#: 0
Date Initiated: 9/9/98

Section 1 - BACKGROUND

SAF#: B98-059
OU: N/A
Project ID: 202-S Building
Task ID: 1
Sampling Event: 202-S Building - Plutonium Loadout Hood
Laboratory: 222-S Lab Operations
Project Coordinator: WEISS, RL
Task Manager: GALGOUL, MJ

Section 2 - SAMPLE INFORMATION

Number of Samples: 1
ID Numbers: B0PC22
MATRIX: Other Solid
Collection Date: 08/25/98

Section 3 - ISSUE

Class: Lab Direction
NCR Number: N/A
Type: Revision of Direction - Cancellation of Analyses
Description: Revised direction for sample breakdown and analysis of sample BOPC22

N/A

NCR Validation (Print/Sign) Date

Section 4 - DISPOSITION

Type: Use As Is
Description: Due to the lack of residues in the 202-S Pipe Sample (B0PC22), the laboratory is directed to leach the interior of the sample with an acidified solution as discussed in the 202-S Analytical Instruction. Since acid leaching is required, the laboratory is directed to delete the following analyses: VOA, PCB, Anions and pH.

WEISS, RL Robert F Weiss 9-10-98
Project Coordinator (Print/Sign) Date

GALGOUL, MJ Michael Galgoul 9-10-98
Task Manager (Print/Sign) Date

N/A
QA (Print/Sign) Date

Section 5 - INSPECTION (Issue Class: Nonconformance Only)

Inspection Number: N/A
Inspection Results: N/A

N/A

Inspector (Print/Sign) Date

Sample Disposition Record

Control #: B98-075
Revision#: 0
Date Initiated: 9/9/98

Section 1 - BACKGROUND

SAF#: B98-059
OU: N/A
Project ID: 202-S Building
Task ID: 1
Sampling Event: 202-S Building - Plutonium Loadout Hood
Laboratory: 222-S Lab Operations
Project Coordinator: WEISS, RL
Task Manager: GALGOUL, MJ

Section 2 - SAMPLE INFORMATION

Number of Samples: 8
ID Numbers: B0PC24, B0PC27, B0PC28, B0PC23, B0PC22, B0PC26, B0PK78, B0PC25
MATRIX: Other Solid
Collection Date: 08/10/98 - 08/31/98

Section 3 - ISSUE

Class: Lab Direction
NCR Number: N/A
Type: Clarification of Direction
Description: Scope of analytical work for fiscal years 1998 and 1999

N/A
NCR Validation (Print/Sign) Date

Section 4 - DISPOSITION

Type: Use As Is
Description: Complete all sample preparation activities for samples B0PC23 and B0PC22, and analyze short holding time constituents (VOA, PCB, Hg-TCLP, Hg-total, pH, anions) in fiscal year 1998 for sample B0PC23. In addition, sample B0PC23 is to be analysed for gross alpha and gross beta in fiscal year 1998. Analyses and sample prep for all other samples are to be completed in fiscal year 1999.

WEISS, RL Richard L Weiss 9-11-98
Project Coordinator (Print/Sign) Date

GALGOUL, MJ Michael J Galgoul 9-11-98
Task Manager (Print/Sign) Date

N/A
QA (Print/Sign) Date

Section 5 - INSPECTION (Issue Class: Nonconformance Only)

Inspection Number: N/A
Inspection Results: N/A

N/A
Inspector (Print/Sign) Date

Sample Disposition Record

Control #: B99-007
Revision#: 0
Date Initiated: 12/4/98

Section 1 - BACKGROUND

SAF#: B98-059
OU: N/A
Project ID: 202-S Building
Task ID: 1
Sampling Event: 202-S Building - Plutonium Loadout Hood
Laboratory: 222-S Lab Operations
Project Coordinator: WEISS, RL
Task Manager: GALGOUL, MJ

Section 2 - SAMPLE INFORMATION

Number of Samples: 12
ID Numbers: B0PC24, B0PC27, B0PC28, B0PC29, B0PC30, B0PC31, B0PC23, B0PC22, B0PK79, B0PC26, B0PK78, B0PC25
MATRIX: Other Solid
Collection Date:

Section 3 - ISSUE

Class: Lab Direction
NCR Number: N/A
Type: Revision of Direction - Cancellation of Analyses
Description: Deletion of ICP-MS analysis for actinides

N/A
NCR Validation (Print/Sign) Date

Section 4 - DISPOSITION

Type: Use As Is
Description: The 222-S laboratory experienced an equipment outage that impacted the ICP-MS analysis for actinides on the listed samples. The laboratory has agreed to run Alpha Energy Analysis in place of the ICP-MS for no additional cost to the ERC on samples where ICP-MS was the only requested method for determining Actinide concentration.

WEISS, RL for 12/4/98
Project Coordinator (Print/Sign) Date

GALGOUL, MJ
Task Manager (Print/Sign) Date

N/A
QA (Print/Sign) Date

Section 5 - INSPECTION (Issue Class: Nonconformance Only)

Inspection Number: N/A
Inspection Results: N/A

N/A
Inspector (Print/Sign) Date

WMH-9860237

Attachment 6

Analytical Report for Project 202-S Pu Loadout Hood Hexone Analysis – FR8-8016

**Consisting of 61 Pages
including cover page**

NHC
Numatec
Hanford Corporation

An SGN/Cogema, Inc. Company

Internal Memo

From: Special Analytical Support 82300-FAST-98-100
Phone: 373-4771 S3-90
Date: October 20, 1998
Subject: ANALYTICAL REPORT FOR PROJECT 202S Pu LOADOUT HOOD HEXONE ANALYSIS - FR8-8016

To: R. A. Esch T6-12

cc: D. B. Bonfoey S3-90 GAF for DBB
R. S. Viswanath S3-90 RSV
Project File

Attached is the analytical report in support of this project.

If you have any questions regarding analysis, please contact Mr. Douglas Bonfoey at 373-2482 or myself at 373-4771.

L. L. Lockrem, Manager
Special Analytical Support

sir

Attachments

82300-FAST-98-100

Attachment

ANALYTICAL REPORT

for

SAS PROJECT FR8-8016

202S Pu Loadout Hood Hexone Analysis

Consisting of
58 pages

ANALYTICAL REPORT

for

SAS PROJECT FR8-8016

202S Pu Loadout Hood Hexone Analysis

prepared for

Waste Management Federal Services of Hanford, Inc.
P.O. Box 700
Richland, Washington 99352

October, 1998

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Quality Control 4

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MS Tunes and BFB Spectral Scans 12

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Sample Analysis Data 39

End of Package 58

Case Narrative

INTRODUCTION

On September 11, 1998, Special Analytical Support (SAS) personnel received 1 sample in duplicate from Sampling and Mobile Laboratory (SML) personnel. Another sample was received in duplicate from SML personnel on September 17, 1998. The samples were prepared at 222S laboratory and transported with chain of custody to the SAS facility for analysis.

ANALYSIS RESULTS

SAS Sample ID	Customer ID	Date Sampled	Analysis Requested	Analytical Result
8016-01	S98M000304 Samp	08/31/98	VOA - Hexone	<0.011 mg/kg
8016-02	S98M000304 Dup	08/31/98	VOA - Hexone	None
8016-03	S98M000307 Samp	08/31/98	VOA - Hexone	None
8016-04	S98M000307 Dup	08/31/98	VOA - Hexone	<0.022 mg/kg

ANALYSIS

Hexone (methyl isobutyl ketone, MIBK, or 4-methyl-2-pentanone) concentrations in liquid and sludge samples were determined using EPA SW-846 methods 8260B, 5030B, and 8000B. In this purge and trap technique, the samples were purged with helium gas and the analyte was trapped and concentrated on a sorbent trap, focused on a narrow bore sorbent trap to improve the chromatographic efficiency, and injected into a gas chromatograph equipped with a mass selective detector.

The method was optimized for hexone analysis by using an option in 5030B that does not require the use of sorbents specifically designed to trap gases and high molecular weight compounds if those compounds are not required for the analysis. This modification reduced the time required for sample analysis and thereby allowed analysts to review analytical results while working in the RCA. It also reduced potential water carry-over problems and allowed the use of lower desorption temperatures which favors recovery of thermally labile compounds.

Since hexone was the only analyte requested, the surrogates were changed to better reflect hexone recovery; 2-hexanone and tetrachloroethylene were used. 2-Hexanone was chosen because it is close to hexone with

respect to chemical structure and physical properties. Tetrachloroethylene was chosen because its boiling point and chromatographic retention time are close to hexone. Tetrachloroethylene is an ideal analyte for purge and trap analysis compared to the ketones which have lower purge efficiencies.

The instrumentation consisted of a Dynatherm Dynamic Thermal Stripper for purging the samples and a Hewlett-Packard 5890 Series II gas chromatograph (GC) with a 5972 mass selective detector (MSD) for analysis. The sorbent traps were packed with Tenax-TA to optimize for hexone analysis, as discussed above. An Rtx-502.2, 105 m length, 0.53 mm internal diameter, 3 um film thickness, capillary column was used. The purge rate and purge times were set to EPA method 5030B specifications. The samples were purged at 40 deg. C to improve the purge efficiencies of the ketones. An optional dry purge step was used to remove water from the sorbent tubes after the purge step was completed.

Two samples, a liquid and a sludge, each in duplicate, were received for analysis. One liquid sample (8016-02) and one sludge sample (8016-03) were lost during the analysis. The liquid sample foamed during the purge step. The analysis was stopped at that point to prevent any contamination of the instrument. The foam apparently plugged the purge vent because the purge flow stopped during the subsequent analysis of the sludge sample. Work was stopped at that point. The remaining sludge sample was analyzed after the instrument was repaired.

The samples were received in purge tubes ready for connection to the purge instrument. Reagent water, containing the surrogates and internal standards, was injected through a side port septum prior to analysis. The sludge sample was thoroughly mixed with the reagent water before it was connected to the purge instrument.

The sampling date was 8/31/98. The liquid sample (8016-01) was received by SAS on 9/11/98 and analyzed on 9/18/98, thus exceeding the 14 day hold time by 4 days. The sludge sample (8016-04) was received by SAS on 9/17/98 and analysis was completed on 9/23/98, thus exceeding the hold time by 9 days.

QUALITY CONTROL

Logbooks

Sample and standard preparation was documented in logbook HNF-N-91-1. The instrument maintenance, analytical settings, and run log were recorded in WHC-N-943-1.

Mass Selective Detector Tune

The MSD was tuned to EPA method 8260B criteria for 4-bromofluorobenzene (BFB) prior to the initial calibration of the instrument. The instrument tune was checked each day of analysis by performing a spectral scan of the BFB peak and verifying that the mass intensity criteria were met. In addition, BFB was added to each standard, blank, and sample to verify that tune criteria were met. Tune reports are included in this

document. The BFB acceptance criteria is shown on the BFB tune reports. The requirements for EPA method 8260B were met.

Initial Calibration of the Instrument

Calibration standards were prepared in reagent water and analyzed using the same instrument settings used for sample analysis. Certified, neat standards were purchased from Chem Service, Inc. Weighed aliquots were measured and diluted to the required concentrations in the laboratory. A 6-point calibration curve at concentrations of 5, 10, 25, 50, 100, and 200 ug/L was established for the target analyte (hexone) and the surrogates. The average relative response factor method, based on internal standards, was used to calculate the amount of analyte in the samples (EPA method 8000B).

EPA method 8260B required a relative standard deviation (RSD) of ≤15% for the response factors in order to use the average relative response factor method. An RSD of 5% or less was achieved for all the analytes of interest. The Response Factor Report and calibration plots are included in this report.

System Performance Check

Method 8260B required that the mean response factors of system performance check compounds (SPCCs) exceed a minimum value. Since the target list for this analysis was limited to compounds of interest, the SPCCs specified in 8260B were not required. In general, the average response factors should exceed a value of 0.10. With the exception of 2-hexanone, a surrogate, the response factor requirement was achieved. The average response factor for 2-hexanone was 0.077 which may explain the slightly high variability observed for this compound. The response factors for hexone (0.126) and 2-hexanone were based on the response to the 100 m/z ion. The 100 m/z ion is a lower intensity ion in the spectra of the ketones, however, it was used for quantitation because it is specific to the analytes of interest.

Calibration Verification

A calibration verification standard (CVS) was analyzed daily to validate the initial calibration. Method 8260B required the response factors of the target analyte (hexone) and calibration check compounds (CCCs) to be within 20% of the average response factor obtained during initial calibration. The CVS response factors for hexone met this requirement. Due to the abbreviated target list, the CCCs were not required for this analysis. 2-Hexanone (-21.2%) and tetrachloroethylene (-22.4%), both analytical surrogates, exceeded 20% one time each during the analytical run.

Internal Standards

An internal standard (a,a,a-trifluorotoluene) was added to each standard, sample, LCS, and blank at a concentration of 50 ug/L. The response for the internal standard was required by EPA method 8260B to be within 50 - 200% of the response of the daily CVS. Retention times for each internal standard were required to be within +/- 30 seconds from that in the daily CVS. The internal standard acceptance criteria was met for all the samples in this sample set. The results are summarized in the Internal Standards Summary Table.

Method Detection Limit (MDL)
MDL studies were not conducted for this analysis. Therefore, extrapolation below the calibration curve was not allowed.

Method Blanks
A method blank was analyzed each day of analysis to ensure the analytical system was free of interference. The concentrations of hexone detected in the method blanks were below the lowest calibration standard.

Matrix Spikes
Matrix spikes were not requested nor was sufficient sample submitted for preparing matrix spikes.

Surrogate Recoveries
Two surrogate compounds were spiked into each sample and blank just prior to analysis. EPA method 8260B required a recovery of 70 - 130%. The 2-hexanone recovery in sample 8016-01 was 138%. The target analyte was not detected above the lower quantitation limit in this sample, therefore, the higher recovery did not affect positive sample results. All the remaining surrogate recoveries were within acceptable limits. The results are presented in the Surrogate Standards Summary Table.

Laboratory Control Sample (LCS)
An LCS is an aliquot of reagent water spiked with the same analytes as the matrix spike. The LCS was prepared using an independent lot of hexone as a check on standard purity. EPA method 8260B required a recovery of 70 - 130%. A hexone recovery of 101% was obtained.

REFERENCES

EPA, December 1996, *Test Methods for Evaluating Solid Waste (SW-846)*, Third Edition; U.S. Environmental Protection Agency, Washington, D.C.

Chain of Custody Forms

Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. No.

Page 1 of 1

Collector: 222S Lab	Contact/Requestor: Ruth Esch	Telephone No.: 373-4314 MSIN: T6-12 FAX: 372-1878
SAF No.	Sample Origin: 202S Facility Pu Loadout Hood	Purchase Order/Charge Code: DB8211
Project Title: 202S Pu Loadout Hood	Logbook No.	Ice Chest No. Temp.
Shipped To (Lab): 622R c/o Joy Smith or Doug Bonfoey	Method of Shipment	Bill of Lading/Air Bill No.
Protocol: SW-846/8260 VOA	Data Turnaround: 1 Week	Offsite Property No.

COPY

Sample No.	Lab ID	*	Date	Time	No./Type Container	Sample Analysis	Preservative
SAMP 8016-01	S98M000304	L			Purge & Trap	VOA analysis for Hexone. 2.234 g liquid density = 1.53 g/mL	None
DUP 8016-02	S98M000304	L			Purge & Trap	VOA analysis for Hexone. 2.306 g liquid density = 1.53 g/mL	None

POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes)

MSDS ☐ Yes ☒ No

23.9 uCi/mL alpha activity
4.70 uCi/mL beta activity

49% Pu-239/240, 51% Pu-238 or Am-241

SPECIAL INSTRUCTIONS

Analyze for VOA ASAP.
Sampling data was 8/31/98

The "SAMP" and "DUP" labels are marked directly on sample tubes.

Hold Time

14 days from sampling

Relinquished By (Print / Sign)	Date/Time	Received By (Print / Sign)	Date/Time
Jim Knight Jr / [signature]	9/4/98 1330	JM Hogan / JG Hogan	9-11-98 1330
JM Hogan / JG Hogan	9-11-98 / 1345	Greg Fics / [signature]	09-11-98 1345

Matrix*

S = Soil	DS = Drum Solids		
SE = Sediment	DL = Drum Liquids		
SO = Solid	T = Tissue		
SL = Sludge	WI = Wipe		
W = Water	L = Liquid		
O = Oil	V = Vegetation		
A = Air	X = Other		

FINAL SAMPLE DISPOSITION

Disposal Method (e.g., Return to customer, per lab procedure, used in process): Return to customer

Disposed By

Date/Time

All samples containing hazardous materials shall be picked up by requestor and returned to parent container or site of origin.

DISTRIBUTION: White - Remain with Samples Color - Customer

BC-6000-828 (12/95)

Westinghouse Hanford Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. No.

Page 1 of 1

Collector: 202S Laboratory	Contact/Requestor: Ruth Esch	Telephone No.: 373-4314 MSIN: T6-12 FAX: 372-1878
SAF No.	Sample Origin: 202S Facility Pu Loadout Hood	Purchase Order/Charge Code: DB8211
Project Title: 202S Pu Loadout - FR8-8016	Logbook No.	Ice Chest No. Temp.
Shipped To (Lab): SAS (622G) c/o Joy Smith or Doug Bonfoey	Method of Shipment: Sampling and Mobile Labs	Bill of Lading/Air Bill No.
Protocol: SW-846 Method 8260 for Hexone	Date Turnaround	Offsite Property No.

COPY

Sample ID	Lab ID	*	Date	Time	No./Type Container	Sample Analysis	Preservative
SAMP	S98M000307 8016-83	S			prge/trap tube	VOA analysis for hexone. Sample amount = 1.21 g	NONE
DUP	S98M000307 8016-84	S			prge/trap tube	VOA analysis for hexone. Duplicate sample amount = 1.16 g	NONE
						Dose rate on contact <0.5 mrad/hr for each	

POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS ☐ Yes ☒ No

Sample contains
70 uCi/g alpha activity

7.5 uCi/g beta activity

SPECIAL INSTRUCTIONS

Analyze for hexone.
Sampling date 8/31/98

Hold Time

14 days from sampling date, 9/14/98

Relinquished By (Print / Sign)	Date/Time	Received By (Print / Sign)	Date/Time
Jim Knight Jr / JD Knight	9/17/98 13:00	JF Hogan / JG Hogan	9-17-98/1300
JF Hogan / JG Hogan	9-17-98/1310	DB Bonfoey / Doug Bonfoey	9/17/98 1310

Matrix*

S = Soil	DS = Drum Solids		
SE = Sediment	DL = Drum Liquids		
SO = Solid	T = Tissue		
SL = Sludge	WI = Wipe		
W = Water	L = Liquid		
O = Oil	V = Vegetation		
A = Air	X = Other		

FINAL SAMPLE DISPOSITION: Disposal Method (e.g., Return to customer, per lab procedure, used in process): per lab procedure — Disposed By — Date/Time

All samples containing hazardous materials shall be picked up by requestor and returned to parent container or site of origin.

DISTRIBUTION: White - Remain with Samples Color - Customer

BC-6000-020 (12/95)

Quality Control Summary Tables

Internal Standards Summary Table

		a,a,a-Trifluorotoluene		
Sample Name	Data File	Response (EICP Area)	% of CVS Standard	Retention Time
50 ug/ml CVS	38091409.D	8187830	100%	18.14
100 ug/ml LCS	38091410.D	7916251	97%	18.17
50 ug/ml CVS	38091413.D	8730504	100%	18.03
Method Blank	38091414.D	7737661	89%	18.15
8016-01	38091415.D	7693221	88%	18.05
Method Blank	38091417.D	8253986	115%	18.07
50 ug/ml CVS	38091418.D	7168204	100%	18.12
8016-04	38091419.D	6821940	95%	18.10

Acceptance Limits = Response (EICP area) must be within 50 - 200% of the response obtained in the daily CVS. Retention times must be +/-30 seconds from that in the daily CVS.

Surrogate Standards Summary Table

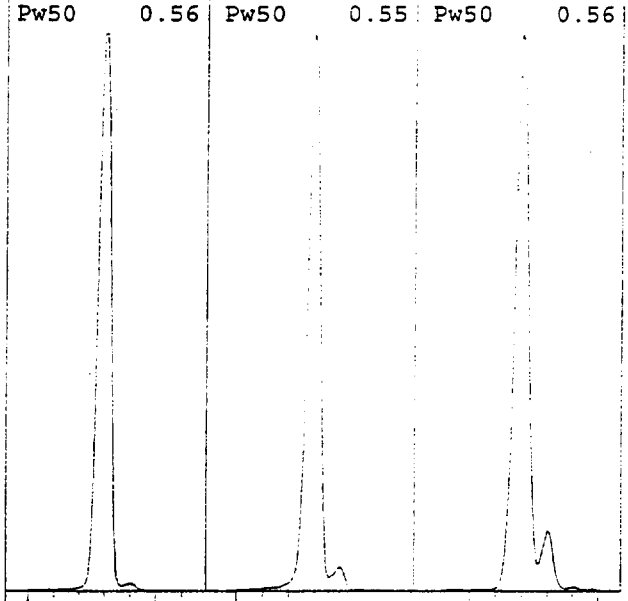
		2-Hexanone	Tetrachloroethylene
Sample Name	Data File	%Recovery	%Recovery
50 ug/ml CVS	38091409.D	120%	110%
100 ug/ml LCS	38091410.D	125%	108%
50 ug/ml CVS	38091413.D	121%	99%
8016-01	38091415.D	138%	102%
50 ug/ml CVS	38091418.D	92%	122%
8016-04	38091419.D	91%	97%

Acceptance Limit = 70 - 130% Recovery

MS Tunes and BFB Spectral Scans

HP5972 Standard Spectra AutoTune
Instrument: 5972 INSTRUMENT 4 TEMP
Mon Sep 14 09:29:56 1998 C:\HPCHEM\4\5972\ATUNE.U

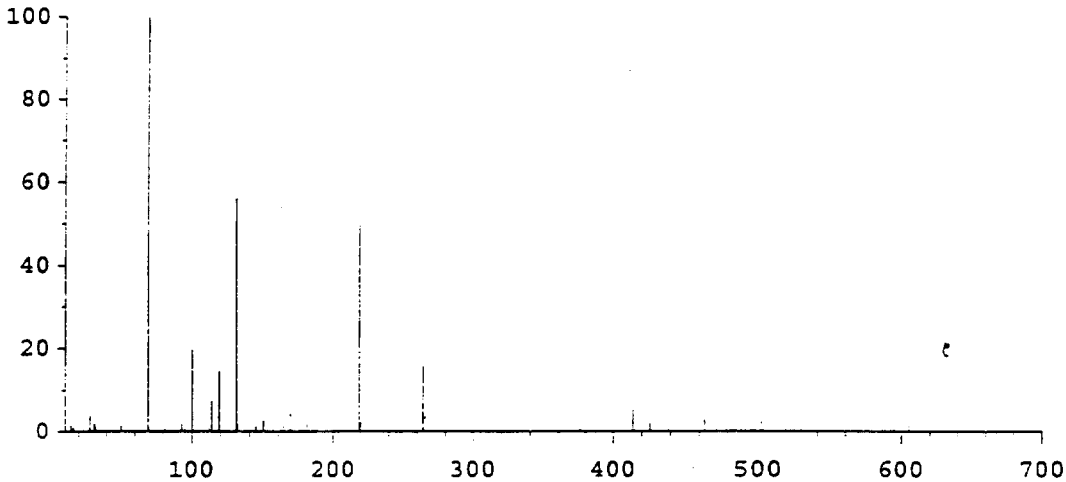
Mass	69.05	Mass	218.95	Mass	501.95
Ab	259101	Ab	133991	Ab	11556
Pw50	0.56	Pw50	0.55	Pw50	0.56



EMVolts	2200	AmuGain	541
Xray	64.1	AmuOffs	84
Emission	35.0	Wid219	0.031
MS Temp	168	TTI	OFF
Vacuum	91	DC Pol	NEG
Samples	8	Repeller	25.03
Averages	3	IonFocus	82.0
StepSize	0.10	EntLens	40.16
MassGain	221	EntOffs	4.02
MassOffs	-1	Filament	2

PFTBA OPEN

Scan: 10.00 - 700.00 Samples: 8 Thresh: 100 Step: 0.10
129 peaks Base: 68.95 Abundance: 228032

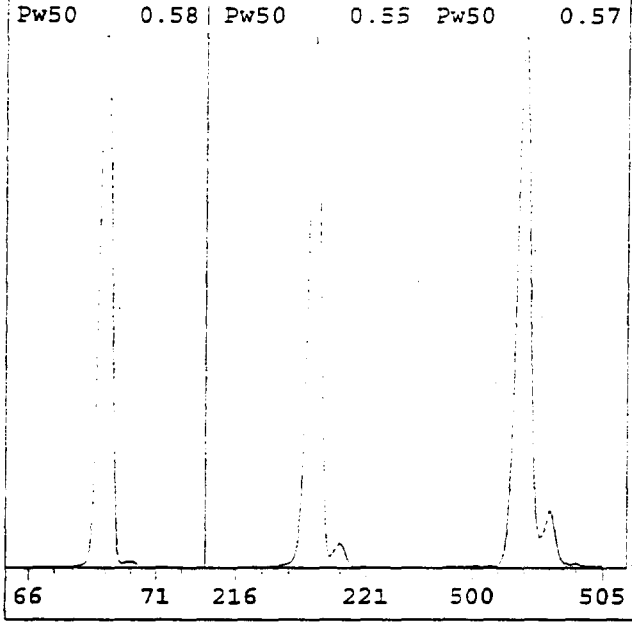


Mass	Abund	Rel Abund	Iso Mass	Iso Abund	Iso Ratio
68.95	228032	100.00	69.85	2658	1.17
218.95	113784	49.90	219.95	5016	4.41
502.00	10070	4.42	502.90	1047	10.40

HP5972 BFB Dynamic Target Tune

Mon Sep 14 09:47:48 1998 C:\HPCHEM\4\5972\BFB.U

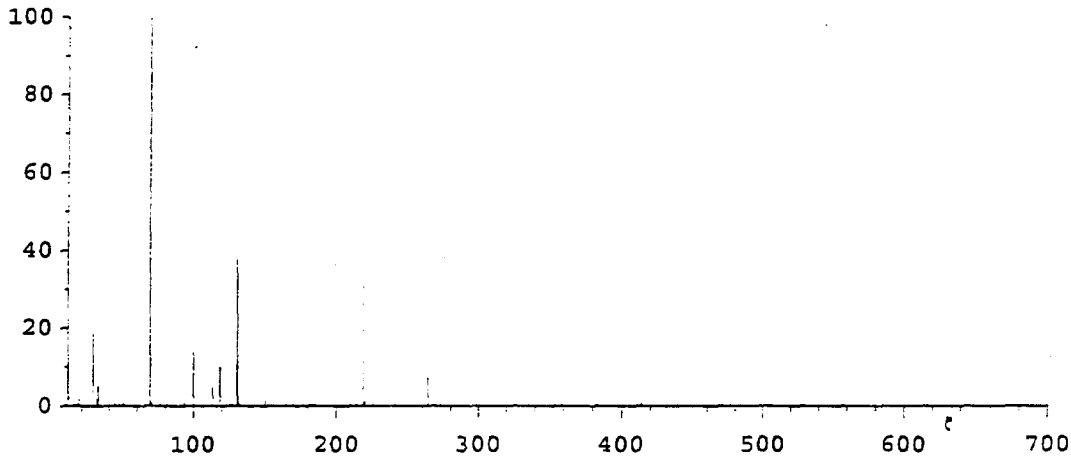
Mass	69.05	Mass	218.95	Mass	502.05
Ab	911098	Ab	302329	Ab	7357
Pw50	0.58	Pw50	0.55	Pw50	0.57



EMVolts	2106	AmuGain	538
Xray	68.4	AmuOffs	84
Emission	35.0	Wid219	0.052
MS Temp	168	TTI	OFF
Vacuum	92	DC Pol	NEG
Samples	8	Repeller	20.83
Averages	3	IonFocus	86.0
StepSize	0.10	EntLens	0.00
MassGain	216	EntOffs	VAR
MassOffs	0	Filament	2

PFTBA OPEN

Scan: 10.00 - 700.00 Samples: 8 Thresh: 100 Step: 0.10
138 peaks Base: 69.00 Abundance: 823680



Mass	Abund	Rel Abund	Iso Mass	Iso Abund	Iso Ratio
69.00	823680	100.00	70.00	9218	1.12
219.00	255360	31.00	220.00	11559	4.53
502.00	6056	0.74	502.90	601	9.92

TARGET MASS:	69	131	219	502
DYNAMIC ENT OFFSET:	14.6	14.8	17.3	22.3
TARGET ABUND(%):	100.0	35.0	30.0	0.8
ACTUAL TUNE ABUND(%):	100.0	37.8	31.0	0.7

Instrument: 5972 INSTRUMENT 4 TEMP
Mon Sep 14 11:03:53 1998 C:\HPCHEM\4\5972\380914BF.U

EMVolts	2106	AmuGain	538
Xray	68.4	AmuOffs	84
Emission	35.0	Wid219	0.052
MS Temp	172	TTI	OFF
Vacuum	91	DC Pol	NEG
Samples	8	Repeller	20.83
Averages	3	IonFocus	86.0
StepSize	0.10	EntLens	22.09
MassGain	216	EntOffs	VAR
MassOffs	0	Filament	2

PFTBA OPEN

Saved as 380914BF.U

BFB

Data File : C:\HPCHEM\1\DATA\HEXONE\38091401.D
Acq On : 14 Sep 98 11:39 am
Sample : Method Blank N-91-1-02.08
Misc :

Vial: 1
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis

Scan Number 3131

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	15	40	16.4	179763	PASS
75	95	30	60	42.7	469515	PASS
95	95	100	100	100.0	1099237	PASS
96	95	5	9	6.7	74007	PASS
173	174	0	2	0.0	0	PASS
174	95	50	100	97.2	1068432	PASS
175	174	5	9	7.5	80131	PASS
176	174	95	101	98.6	1053888	PASS
177	176	5	9	6.7	70234	PASS

38091401.D HEXONE.M Tue Sep 15 15:08:41 1998

BFB

Data File : C:\HPCHEM\1\DATA\HEXONE\38091409.D
Acq On : 15 Sep 98 12:59 pm
Sample : 50 ug/L std N-91-1-21.04
Misc :

Vial: 9
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis

Scan Number 3131

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	15	40	15.9	192629	PASS
75	95	30	60	41.3	498949	PASS
95	95	100	100	100.0	1208165	PASS
96	95	5	9	6.8	81770	PASS
173	174	0	2	0.0	0	PASS
174	95	50	100	94.4	1140176	PASS
175	174	5	9	7.5	85943	PASS
176	174	95	101	98.9	1127429	PASS
177	176	5	9	6.7	75918	PASS

38091409.D HEXONE.M Wed Sep 30 14:53:33 1998

BFB

Data File : C:\HPCHEM\1\DATA\HEXONE\38091413.D
Acq On : 18 Sep 98 10:34 am
Sample : 50 ug/L std n-91-1-21.09
Misc :

Vial: 10
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis

Scan Number 3131

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	15	40	16.5	235397	PASS
75	95	30	60	42.9	611599	PASS
95	95	100	100	100.0	1426900	PASS
96	95	5	9	6.8	96599	PASS
173	174	0	2	0.0	0	PASS
174	95	50	100	94.7	1351887	PASS
175	174	5	9	7.6	102375	PASS
176	174	95	101	98.4	1330166	PASS
177	176	5	9	6.7	89564	PASS

38091413.D HEXONE.M Wed Sep 30 14:55:12 1998

BFB

Data File : C:\HPCHEM\1\DATA\HEXONE\38091415.D
Acq On : 18 Sep 98 2:47 pm
Sample : 8016-01
Misc :

Vial: 10
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis

Scan Number 3131

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	15	40	16.2	228964	PASS
75	95	30	60	41.9	593252	PASS
95	95	100	100	100.0	1414656	PASS
96	95	5	9	6.8	96313	PASS
173	174	0	2	0.0	0	PASS
174	95	50	100	93.4	1321287	PASS
175	174	5	9	7.6	100260	PASS
176	174	95	101	98.8	1305031	PASS
177	176	5	9	6.7	88002	PASS

38091415.D HEXONE.M Wed Sep 30 14:59:33 1998

BFB

Data File : C:\HPCHEM\1\DATA\HEXONE\38091416.D
Acq On : 23 Sep 98 11:38 am
Sample : 50 ug/L std N-91-1-22.01
Misc :

Vial: 10
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis

Scan Number 3131

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	15	40	16.2	212397	PASS
75	95	30	60	42.3	552941	PASS
95	95	100	100	100.0	1307142	PASS
96	95	5	9	6.7	87301	PASS
173	174	0	2	0.0	0	PASS
174	95	50	100	94.7	1237638	PASS
175	174	5	9	7.5	93005	PASS
176	174	95	101	98.8	1222534	PASS
177	176	5	9	6.7	82218	PASS

38091416.D HEXONE.M Wed Sep 30 14:58:17 1998

BFB

Data File : C:\HPCHEM\1\DATA\HEXONE\38091419.D
Acq On : 23 Sep 98 4:11 pm
Sample : 8016-04 N-91-1-22.04
Misc :

Vial: 10
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis

Scan Number 3131

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	15	40	16.0	182616	PASS
75	95	30	60	41.2	471352	PASS
95	95	100	100	100.0	1143768	PASS
96	95	5	9	6.7	76869	PASS
173	174	0	2	0.0	0	PASS
174	95	50	100	93.1	1065040	PASS
175	174	5	9	7.4	79135	PASS
176	174	95	101	98.6	1050600	PASS
177	176	5	9	6.7	70012	PASS

38091419.D HEXONE.M Wed Sep 30 14:58:59 1998

Initial Calibration Data

Response Factor Report 5972 INST

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Initial Calibration

Calibration Files
50 =38091405.D 5 =38091402.D 10 =38091403.D
25 =38091404.D 100 =38091406.D 200 =38091407.D

		Compound	50	5	10	25	100	200	Avg	%RSD
1)		a,a,a-Trifluorotoluen	----------ISTD----------							
2)		MIBK	0.123	0.132	0.136	0.120	0.123	0.122	0.126	5.00
3)	S	2-Hexanone	0.076	0.080	0.082	0.076	0.074	0.075	0.077	3.91
4)	S	Tetrachloroethylene	0.635	0.665	0.719	0.626	0.656	0.646	0.658	5.00
5)		4-Bromofluorobenzen	0.642	0.643	0.660	0.645	0.657	0.661	0.651	1.35

(#) = Out of Range

HEXONE.M Wed Sep 30 13:30:11 1998

Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091402.D
Acq On : 14 Sep 98 12:40 pm
Sample : 5 ug/L std N-91-1-20.09
Misc :
Quant Time: Oct 6 11:30 1998

Vial: 2
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) a,a,a-Trifluorotoluene	18.14	146	6938699	50.00 ug/L	-0.01
System Monitoring Compounds					%Recovery
3) 2-Hexanone	20.10	100	55074	5.14 ug/L	10.29%
4) Tetrachloroethylene	20.82	166	461225	5.05 ug/L	10.11%
Target Compounds					Qvalue
2) MIBK	18.99	100	88670	5.08 ug/L m	1
5) 4-Bromofluorobenzene	23.42	95	4462970	49.37 ug/L	99

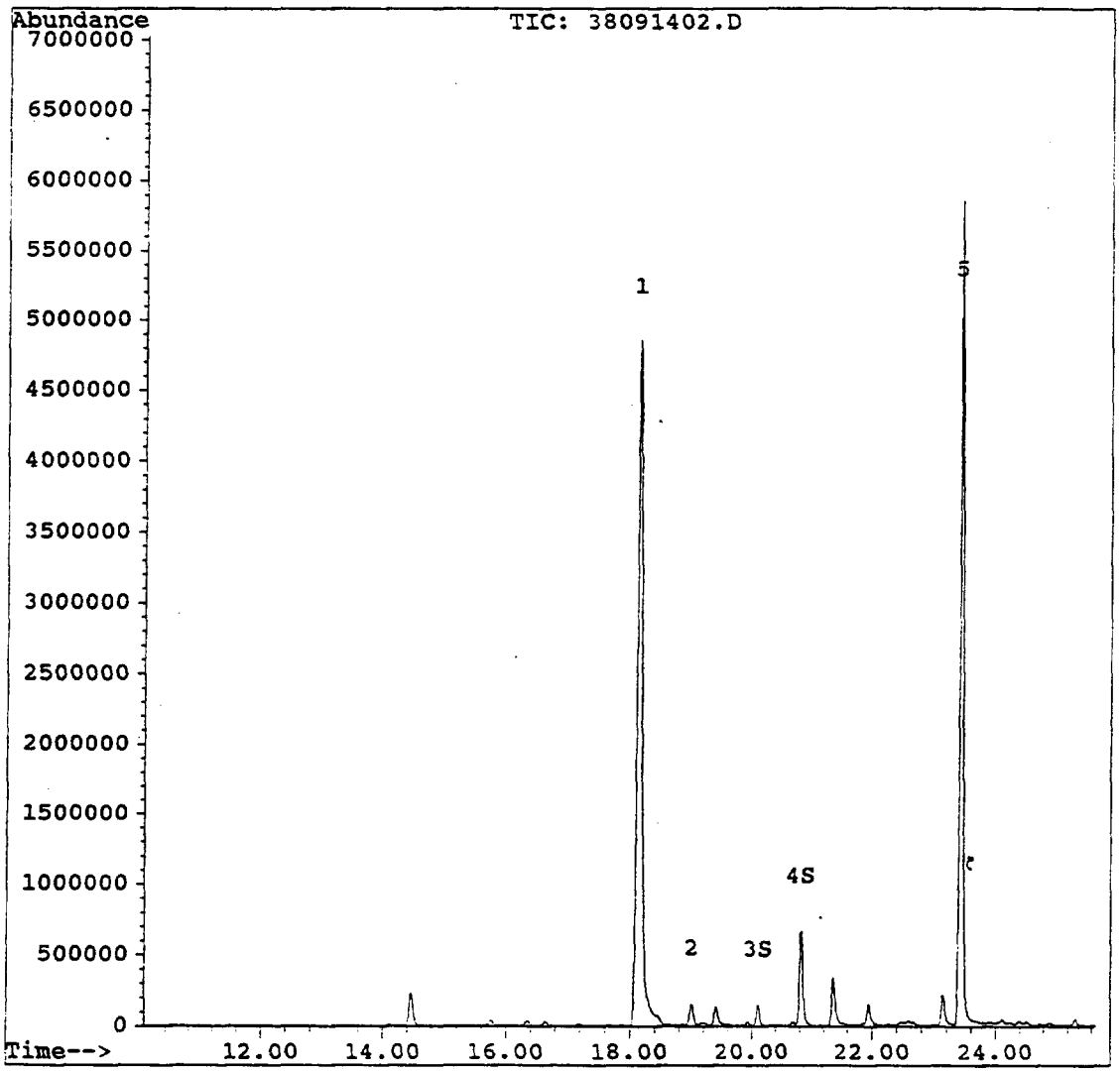
(#) = qualifier out of range (m) = manual integration
38091402.D HEXONE.M Tue Oct 06 11:30:29 1998 Page 1

Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091402.D
Acq On : 14 Sep 98 12:40 pm
Sample : 5 ug/L std N-91-1-20.09
Misc :
Quant Time: Oct 6 11:30 1998

Vial: 2
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration



Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091403.D
Acq On : 14 Sep 98 1:14 pm
Sample : 10 ug/L std N-91-1-20.10
Misc :
Quant Time: Oct 6 11:31 1998

Vial: 3
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) a,a,a-Trifluorotoluene	18.12	146	7793759	50.00 ug/L	-0.03
System Monitoring Compounds					%Recovery
3) 2-Hexanone	20.09	100	127361	10.59 ug/L	21.18%
4) Tetrachloroethylene	20.81	166	1120060	10.93 ug/L	21.85%
Target Compounds					Qvalue
2) MIBK	18.98	100	211807	10.79 ug/L m	1
5) 4-Bromofluorobenzene	23.42	95	5143320	50.66 ug/L	99

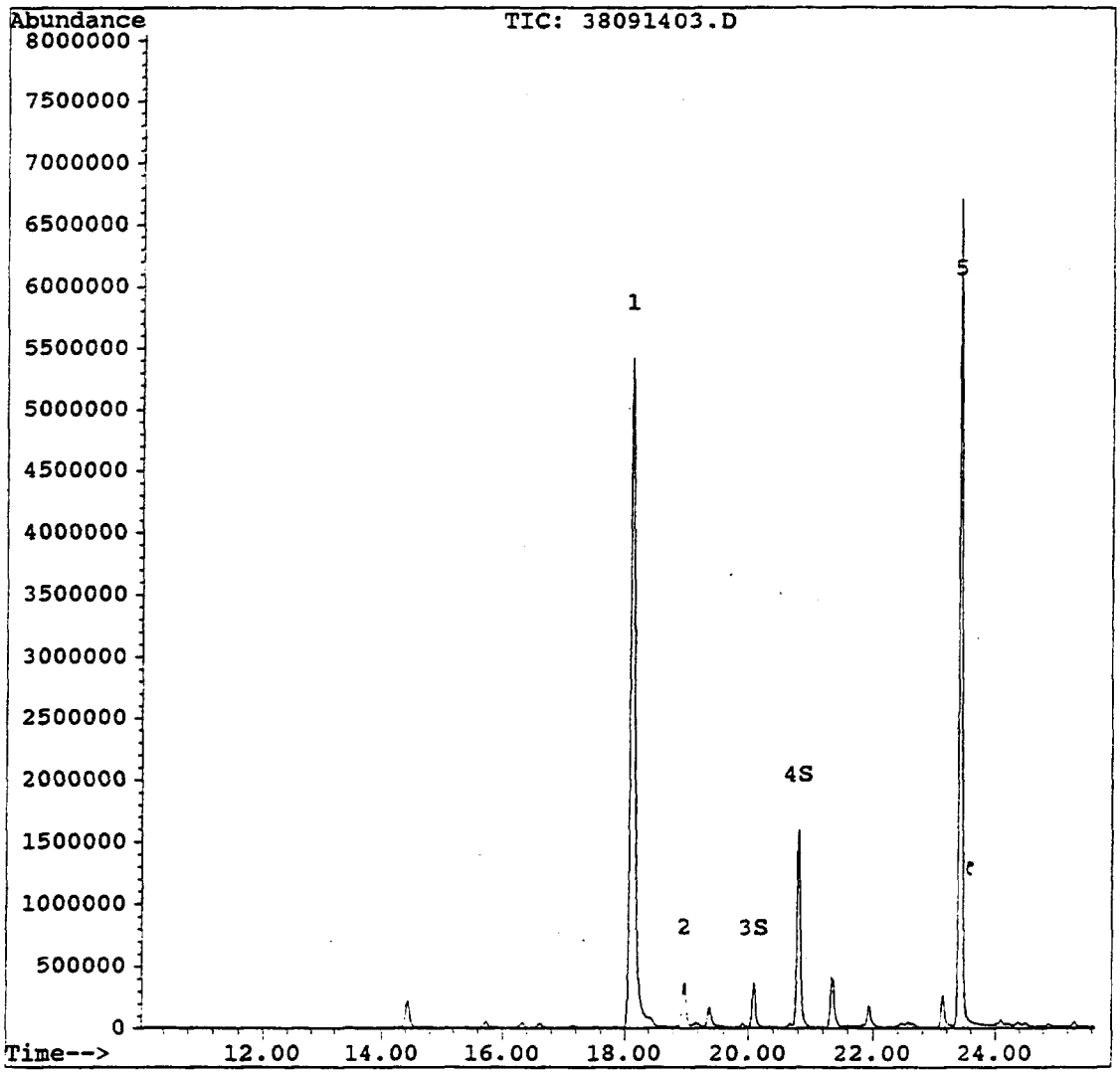
(#) = qualifier out of range (m) = manual integration
38091403.D HEXONE.M Tue Oct 06 11:31:30 1998 Page 1

Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091403.D
Acq On : 14 Sep 98 1:14 pm
Sample : 10 ug/L std N-91-1-20.10
Misc :
Quant Time: Oct 6 11:31 1998

Vial: 3
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration



Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091404.D
Acq On : 14 Sep 98 1:49 pm
Sample : 25 ug/L std N-91-1-20.11
Misc :
Quant Time: Oct 6 14:30 1998

Vial: 4
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) a,a,a-Trifluorotoluene	18.14	146	8523510	50.00 ug/L	-0.01
System Monitoring Compounds					%Recovery
3) 2-Hexanone	20.09	100	324569	24.68 ug/L	49.36%
4) Tetrachloroethylene	20.82	166	2668386	23.80 ug/L	47.60%
Target Compounds					Qvalue
2) MIBK	18.99	100	511974	23.86 ug/L	95
5) 4-Bromofluorobenzene	23.42	95	5500877	49.54 ug/L	99

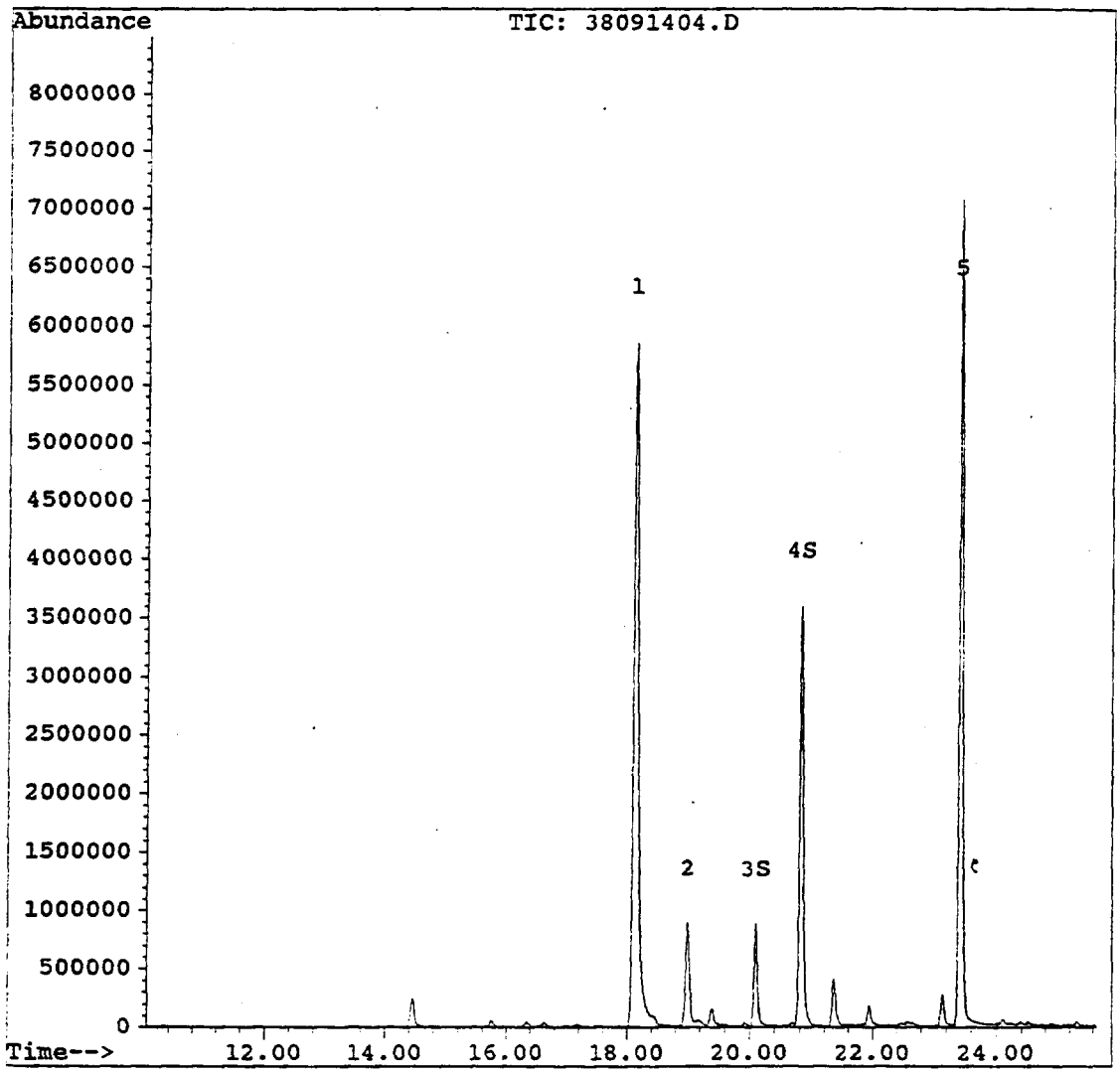
(#) = qualifier out of range (m) = manual integration
38091404.D HEXONE.M Tue Oct 06 14:30:54 1998 Page 1

Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091404.D
Acq On : 14 Sep 98 1:49 pm
Sample : 25 ug/L std N-91-1-20.11
Misc :
Quant Time: Oct 6 14:30 1998

Vial: 4
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration



38091404.D HEXONE.M Tue Oct 06 14:30:55 1998 Page 2

Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091405.D
Acq On : 14 Sep 98 2:24 pm
Sample : 50 ug/L std N-91-1-20.12
Misc :
Quant Time: Oct 6 11:31 1998

Vial: 5
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) a,a,a-Trifluorotoluene	18.15	146	8821831	50.00 ug/L	0.00
System Monitoring Compounds					%Recovery
3) 2-Hexanone	20.11	100	674100	49.52 ug/L	99.05%
4) Tetrachloroethylene	20.83	166	5599068	48.25 ug/L	96.51%
Target Compounds					Qvalue
2) MIBK	19.01	100	1083853	48.80 ug/L	95
5) 4-Bromofluorobenzene	23.44	95	5663663	49.28 ug/L	99

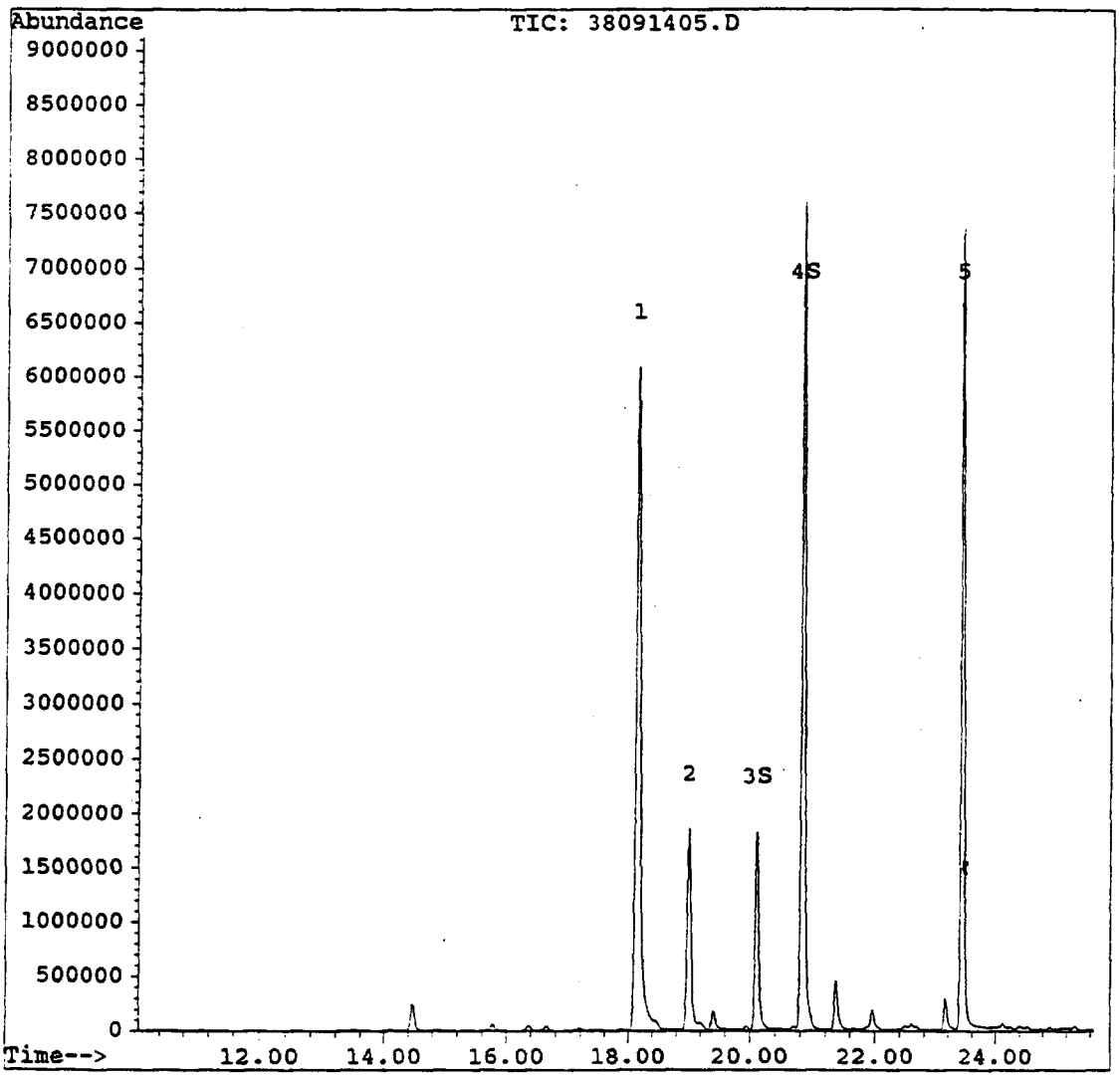
(#) = qualifier out of range (m) = manual integration
38091405.D HEXONE.M Tue Oct 06 11:32:42 1998 Page 1

Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091405.D
Acq On : 14 Sep 98 2:24 pm
Sample : 50 ug/L std N-91-1-20.12
Misc :
Quant Time: Oct 6 11:31 1998

Vial: 5
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration



Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091406.D
Acq On : 14 Sep 98 2:59 pm
Sample : 100 ug/L std N-91-1-20.13
Misc :
Quant Time: Sep 14 15:58 1998

Vial: 6
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) a,a,a-Trifluorotoluene	18.16	146	8662030	50.00 ug/L	0.01
System Monitoring Compounds					%Recovery
3) 2-Hexanone	20.12	100	1285081	96.15 ug/L	192.30%
4) Tetrachloroethylene	20.84	166	11358845	99.70 ug/L	199.39%
Target Compounds					Qvalue
2) MIBK	19.02	100	2135113	97.91 ug/L	99
5) 4-Bromofluorobenzene	23.44	95	5689663	50.42 ug/L	99

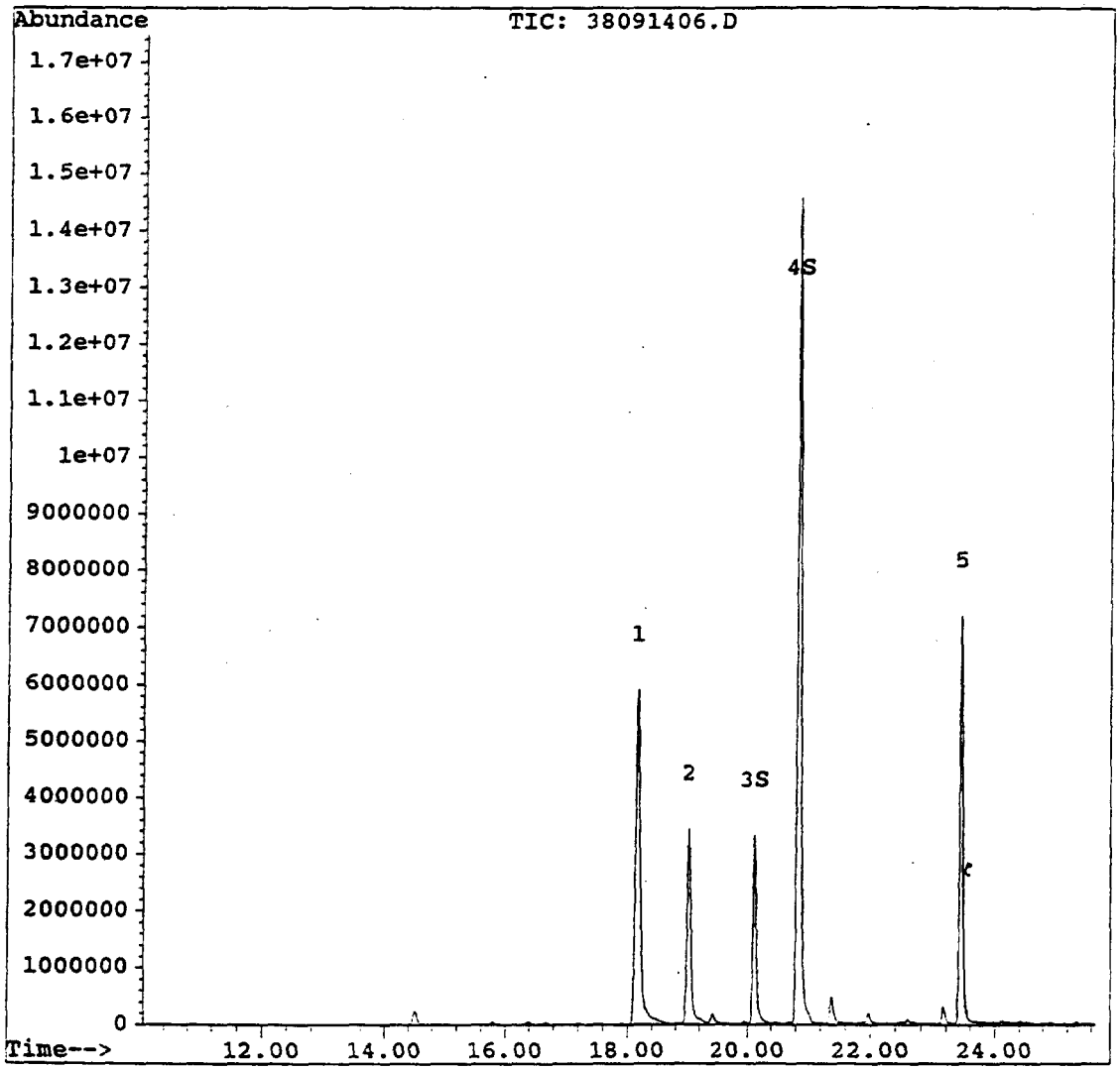
(#) = qualifier out of range (m) = manual integration
38091406.D HEXONE.M Tue Oct 06 11:33:23 1998 Page 1

Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091406.D
Acq On : 14 Sep 98 2:59 pm
Sample : 100 ug/L std N-91-1-20.13
Misc :
Quant Time: Sep 14 15:58 1998

Vial: 6
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration



38091406.D HEXONE.M Tue Oct 06 11:33:24 1998 Page 2

Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091407.D
Acq On : 14 Sep 98 3:33 pm
Sample : 200 ug/L std N-91-1-20.14
Misc :
Quant Time: Sep 14 15:51 1998

Vial: 7
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) a,a,a-Trifluorotoluene	18.16	146	8352203	50.00 ug/L	0.00
System Monitoring Compounds					%Recovery
3) 2-Hexanone	20.12	100	2490072	191.92 ug/L	383.84%
4) Tetrachloroethylene	20.84	166	21589228	195.84 ug/L	391.67%
Target Compounds					Qvalue
2) MIBK	19.01	100	4062810	191.91 ug/L	98
5) 4-Bromofluorobenzene	23.44	95	5519820	13.78 ug/L	98

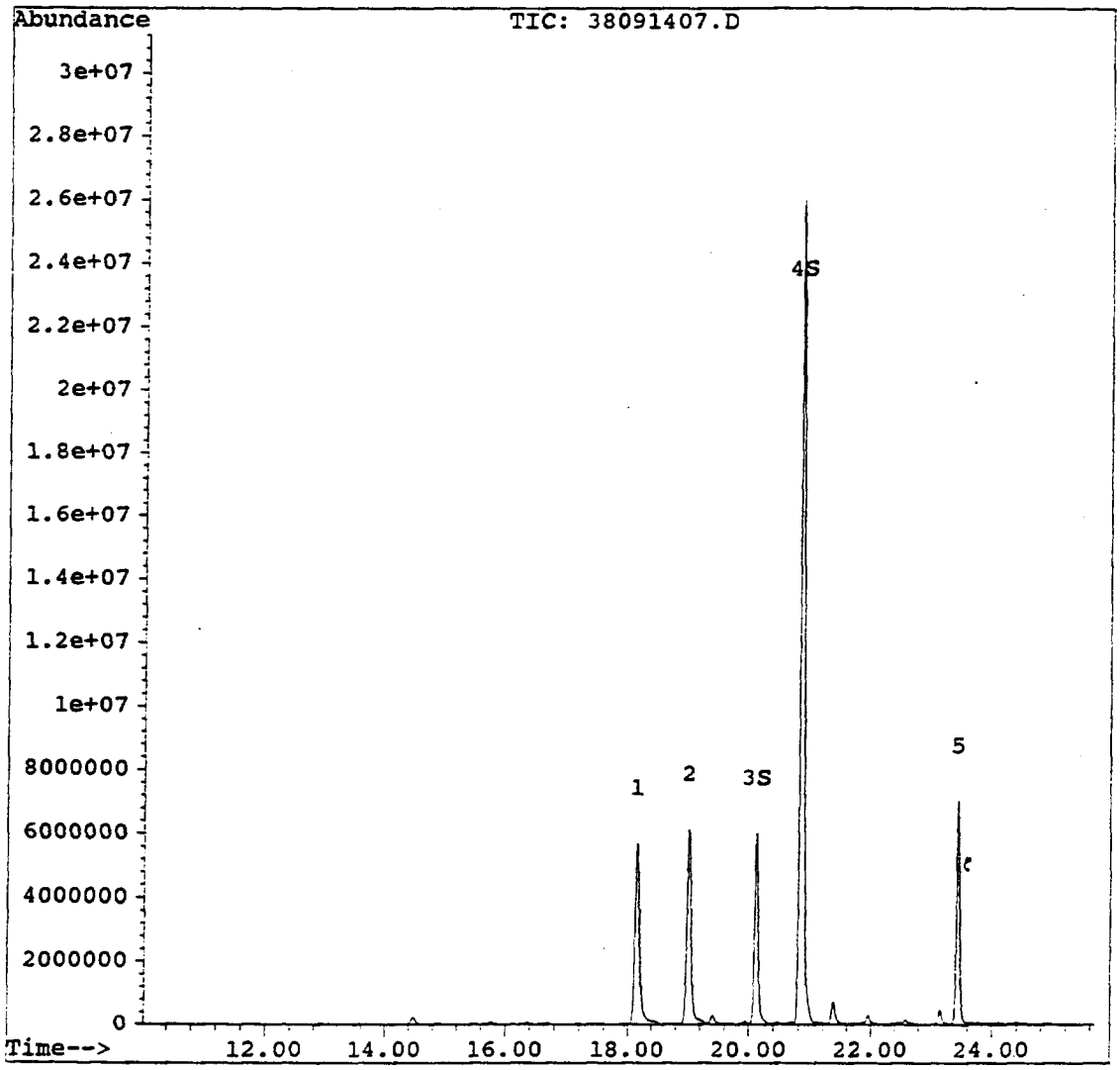
(#) = qualifier out of range (m) = manual integration
38091407.D HEXONE.M Tue Oct 06 11:34:49 1998 Page 1

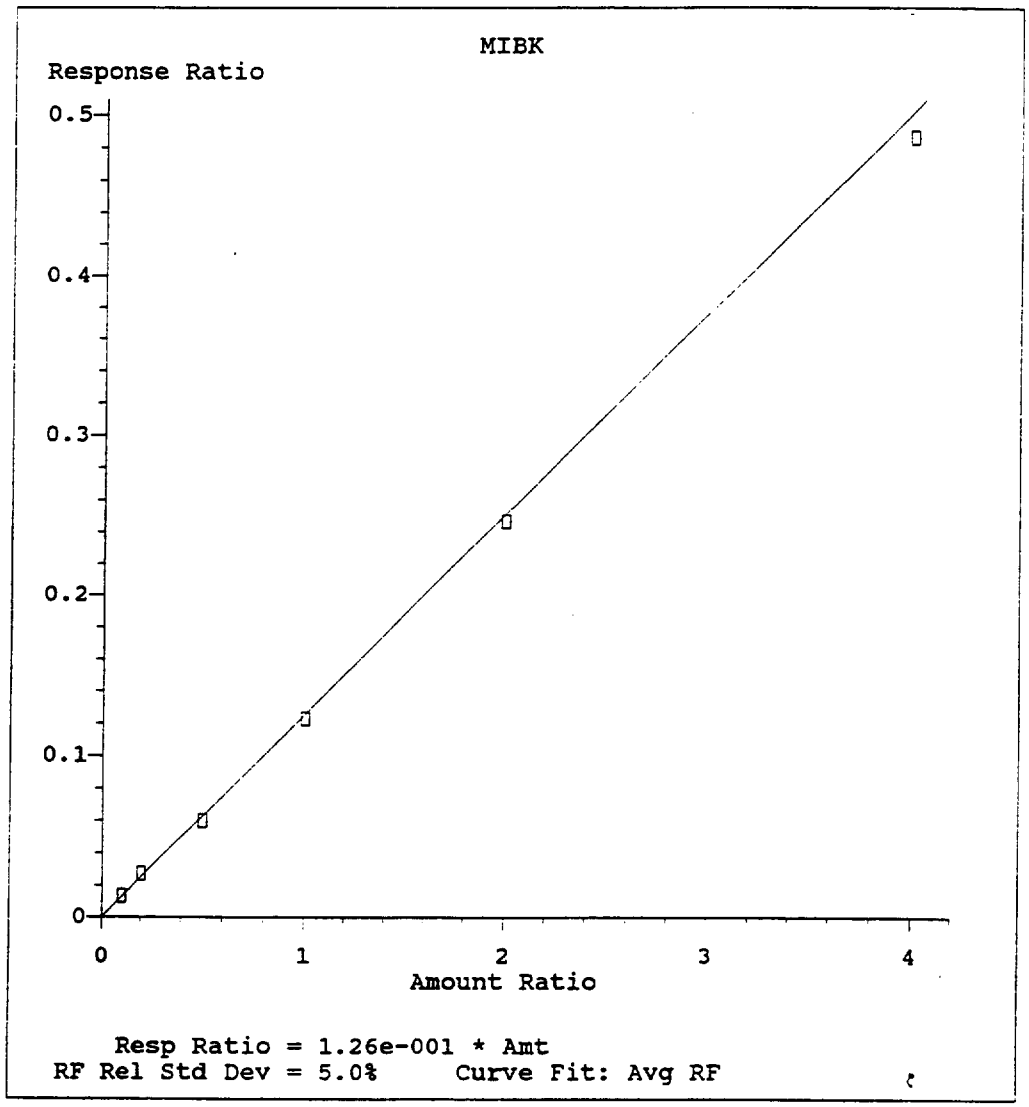
Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091407.D
Acq On : 14 Sep 98 3:33 pm
Sample : 200 ug/L std N-91-1-20.14
Misc :
Quant Time: Sep 14 15:51 1998

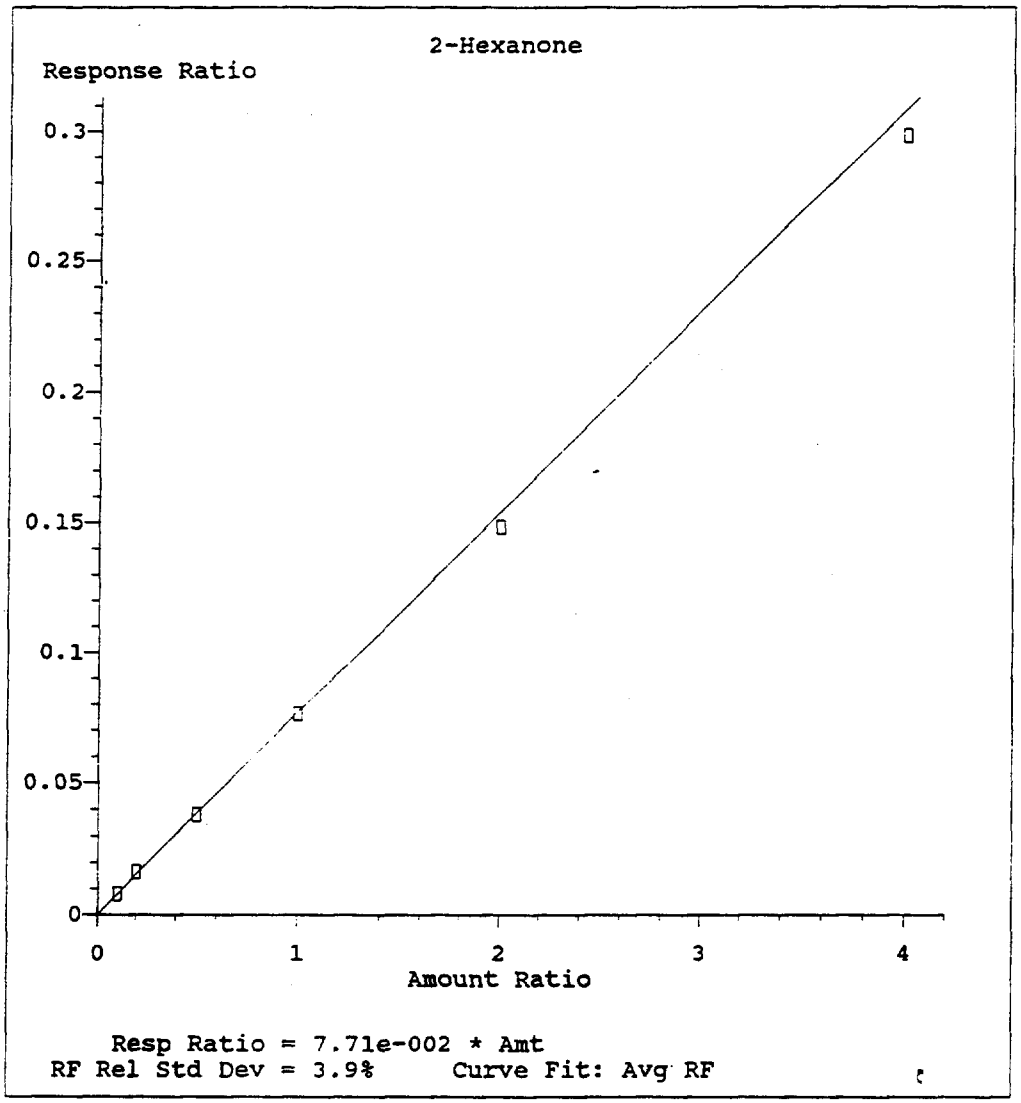
Vial: 7
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration

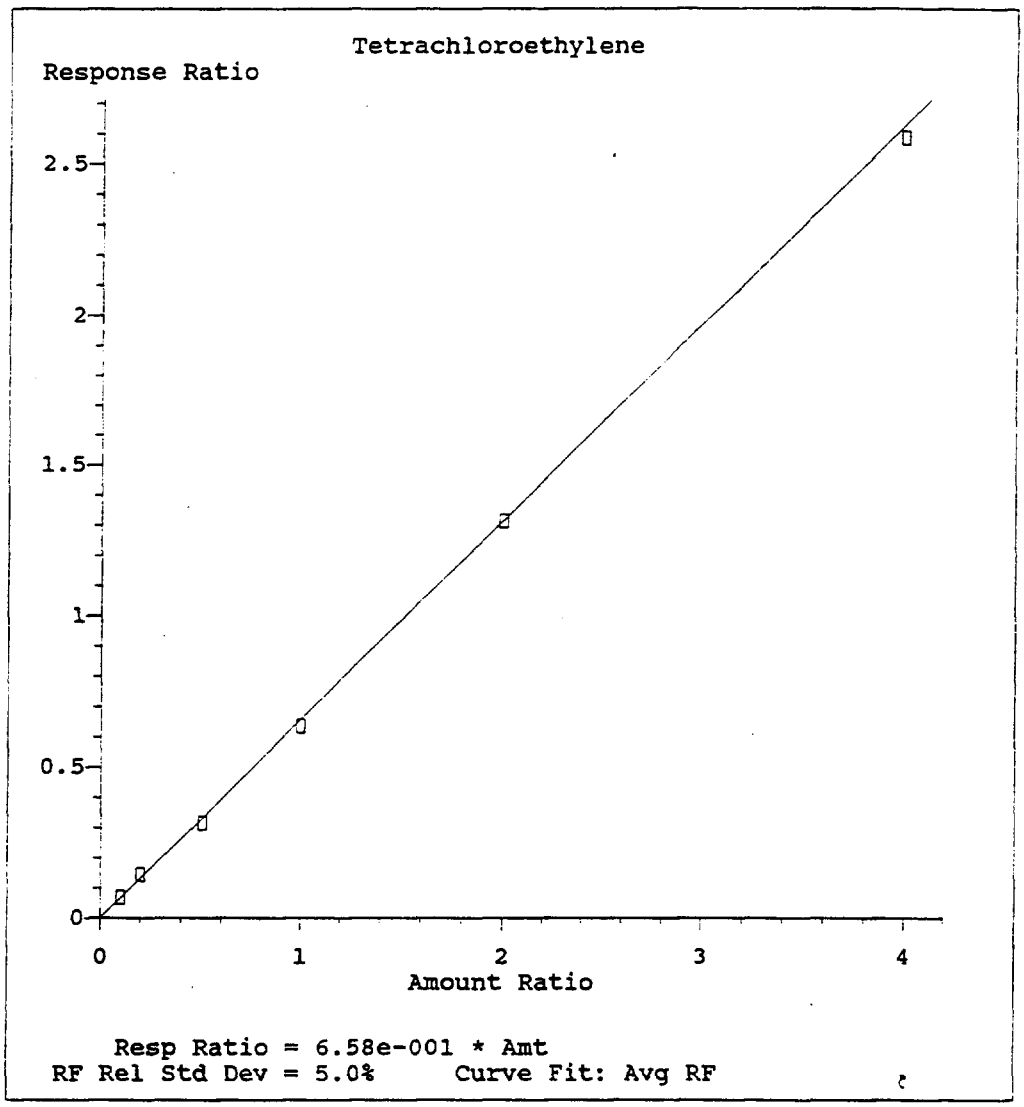




Method Name: C:\HPCHEM\2\METHODS\HEXONE.M
Calibration Table Last Updated: Mon Sep 14 15:53:28 1998



Method Name: C:\HPCHEM\2\METHODS\HEXONE.M
Calibration Table Last Updated: Mon Sep 14 15:53:28 1998



Method Name: C:\HPCHEM\2\METHODS\HEXONE.M
Calibration Table Last Updated: Mon Sep 14 15:53:28 1998

Sample Analysis Data

Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091409.D
Acq On : 15 Sep 98 12:59 pm
Sample : 50 ug/L std N-91-1-21.04
Misc :
Quant Time: Sep 15 13:28 1998

Vial: 9
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) a,a,a-Trifluorotoluene	18.14	146	8187830	50.00 ug/L	-0.01
System Monitoring Compounds					%Recovery
3) 2-Hexanone	20.10	100	755085	59.77 ug/L	119.54%
4) Tetrachloroethylene	20.82	166	5932493	55.09 ug/L	110.17%
Target Compounds					Qvalue
2) MIBK	19.00	100	1188065	57.64 ug/L	97
5) 4-Bromofluorobenzene	23.43	95	5309620	49.78 ug/L	99

(#) = qualifier out of range (m) = manual integration
38091409.D HEXONE.M Thu Oct 01 10:12:29 1998

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091409.D
Acq On : 15 Sep 98 12:59 pm
Sample : 50 ug/L std N-91-1-21.04
Misc :

Vial: 9
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1		a,a,a-Trifluorotoluene	1.000	1.000	0.0	93	-0.01
2		MIBK	0.126	0.145	-15.3	110	-0.01
3	S	2-Hexanone	0.077	0.092	-19.5	112	-0.01
4	S	Tetrachloroethylene	0.658	0.725	-10.2	106	0.00
5		4-Bromofluorobenzene	0.651	0.648	0.4	94	-0.01

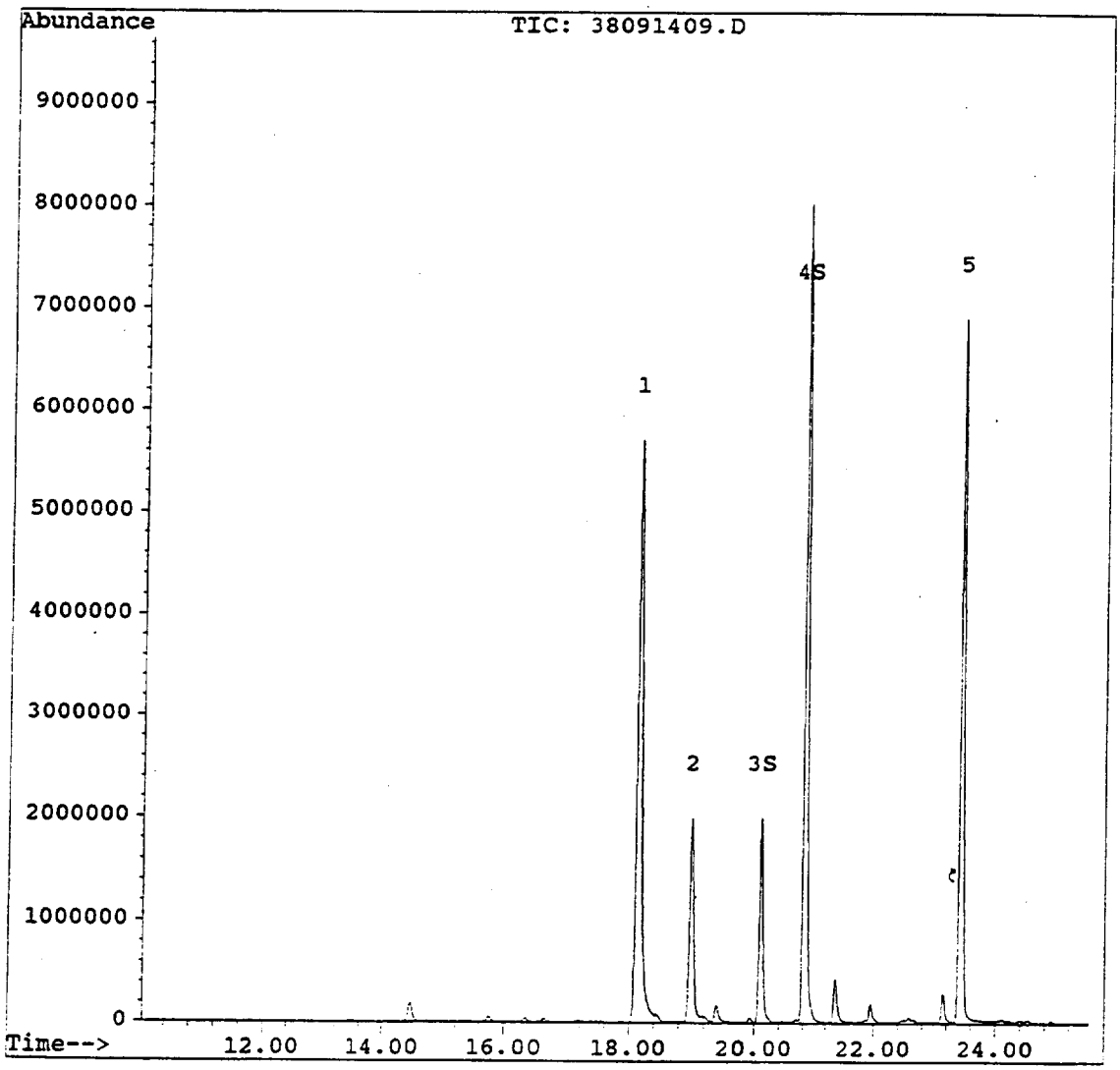
(#) = Out of Range SPCC's out = 0 CCC's out = 0
38091405.D HEXONE.M Wed Sep 30 13:35:24 1998

Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091409.D
Acq On : 15 Sep 98 12:59 pm
Sample : 50 ug/L std N-91-1-21.04
Misc :
Quant Time: Sep 15 13:28 1998

Vial: 9
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration



Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091410.D
Acq On : 15 Sep 98 2:02 pm
Sample : 100 ug/L LCS N-91-1-21.05
Misc :
Quant Time: Sep 30 13:39 1998

Vial: 9
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) a,a,a-Trifluorotoluene	18.17	146	7916251	50.00 ug/L	0.02
System Monitoring Compounds					%Recovery
3) 2-Hexanone	20.12	100	765576	62.68 ug/L	125.35%
4) Tetrachloroethylene	20.84	166	5636447	54.13 ug/L	108.26%
Target Compounds					Qvalue
2) MIBK	19.02	100	2010279	100.87 ug/L	98
5) 4-Bromofluorobenzene	23.45	95	5213167	50.55 ug/L	99

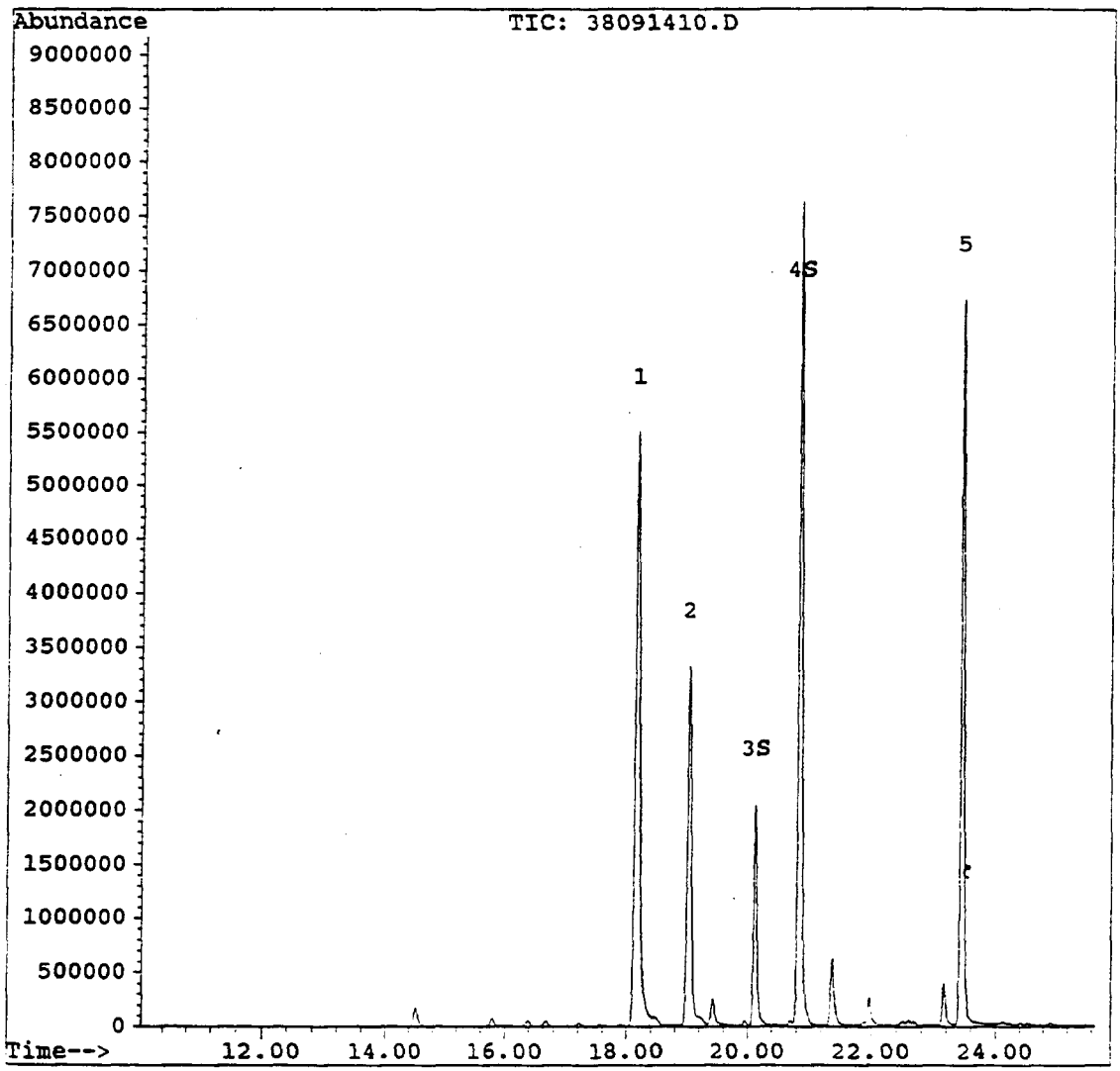
(#) = qualifier out of range (m) = manual integration
38091410.D HEXONE.M Wed Sep 30 13:40:15 1998

Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091410.D
Acq On : 15 Sep 98 2:02 pm
Sample : 100 ug/L LCS N-91-1-21.05
Misc :
Quant Time: Sep 30 13:39 1998

Vial: 9
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration



Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091413.D
Acq On : 18 Sep 98 10:34 am
Sample : 50 ug/L std n-91-1-21.09
Misc :
Quant Time: Sep 18 10:59 1998

Vial: 10
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) a,a,a-Trifluorotoluene	18.03	146	8730504	50.00 ug/L	-0.12
System Monitoring Compounds					%Recovery
3) 2-Hexanone	20.01	100	816624	60.62 ug/L	121.24%
4) Tetrachloroethylene	20.73	166	5687903	49.53 ug/L	99.06%
Target Compounds					Qvalue
2) MIBK	18.90	100	1216420	55.34 ug/L	94
5) 4-Bromofluorobenzene	23.33	95	6233348	54.81 ug/L	98

(#) = qualifier out of range (m) = manual integration
38091413.D HEXONE.M Wed Sep 30 13:43:08 1998

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091413.D
Acq On : 18 Sep 98 10:34 am
Sample : 50 ug/L std n-91-1-21.09
Misc :

Vial: 10
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	a,a,a-Trifluorotoluene	1.000	1.000	0.0	99	-0.12
2	MIBK	0.126	0.139	-10.7	112	-0.11
3 S	2-Hexanone	0.077	0.094	-21.2	121	-0.10
4 S	Tetrachloroethylene	0.658	0.651	0.9	102	-0.10
5	4-Bromofluorobenzene	0.651	0.714	-9.6	110	-0.11

(#) = Out of Range SPCC's out = 0 CCC's out = 0
38091405.D HEXONE.M Mon Oct 05 10:57:02 1998

Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091414.D
Acq On : 18 Sep 98 11:46 am
Sample : Method Blank N-91-1-21.10
Misc :
Quant Time: Sep 30 13:23 1998

Vial: 10
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) a,a,a-Trifluorotoluene	18.15	146	7737661	50.00 ug/L	0.00
System Monitoring Compounds					%Recovery
3) 2-Hexanone	20.08	100	3285	0.28 ug/L	0.55%
4) Tetrachloroethylene	20.80	166	20131	0.20 ug/L	0.40%
Target Compounds					Qvalue
2) MIBK	19.00	100	2857	0.15 ug/L m	1
5) 4-Bromofluorobenzene	23.37	95	5719406	56.74 ug/L	98

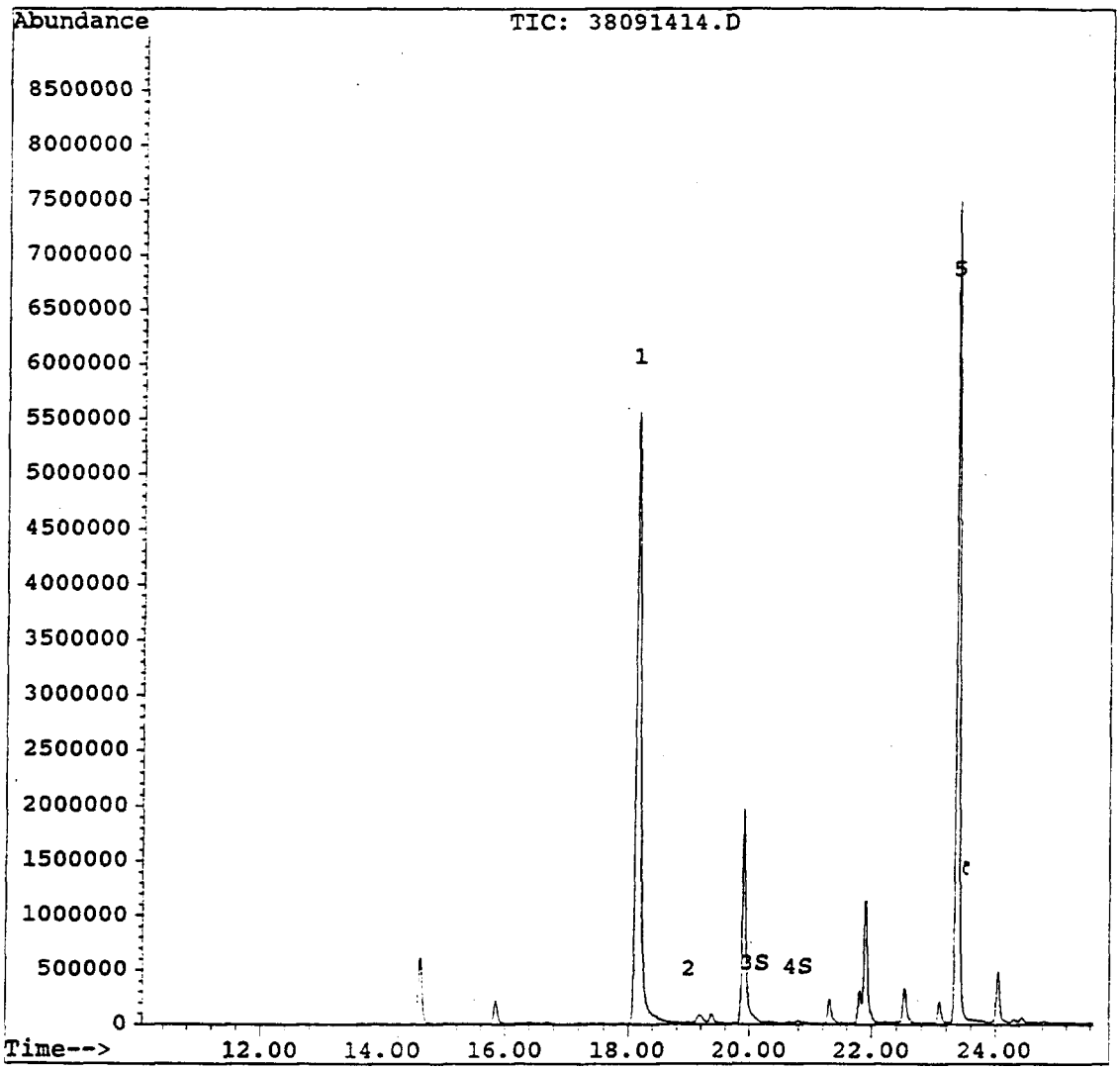
(#) = qualifier out of range (m) = manual integration
38091414.D HEXONE.M Wed Sep 30 13:25:00 1998

Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091414.D
Acq On : 18 Sep 98 11:46 am
Sample : Method Blank N-91-1-21.10
Misc :
Quant Time: Oct 6 14:35 1998

Vial: 10
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration



38091414.D HEXONE.M Tue Oct 06 14:35:05 1998 Page 2

Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091415.D
Acq On : 18 Sep 98 2:47 pm
Sample : 8016-01
Misc :
Quant Time: Sep 18 15:52 1998

Vial: 10
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) a,a,a-Trifluorotoluene	18.05	146	7693221	50.00 ug/L	-0.10
System Monitoring Compounds					%Recovery
3) 2-Hexanone	20.02	100	818612	68.96 ug/L	137.92%
4) Tetrachloroethylene	20.74	166	5185671	51.25 ug/L	102.49%
Target Compounds					Qvalue
2) MIBK	18.91	100	6252	0.32 ug/L #	58
5) 4-Bromofluorobenzene	23.35	95	5676890	56.64 ug/L	98

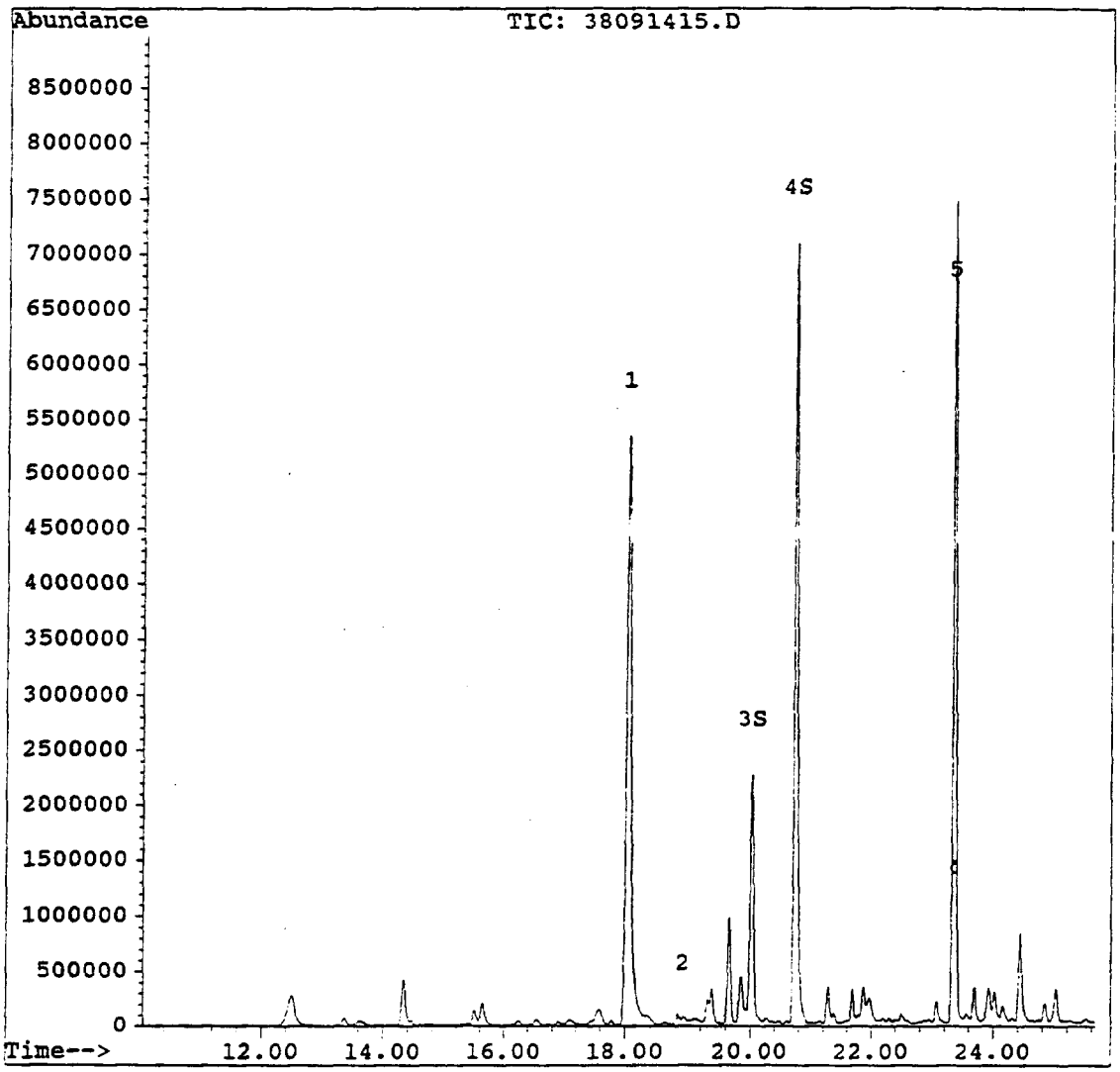
(#) = qualifier out of range (m) = manual integration
38091415.D HEXONE.M Wed Sep 30 13:44:53 1998

Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091415.D
Acq On : 18 Sep 98 2:47 pm
Sample : 8016-01
Misc :
Quant Time: Sep 18 15:52 1998

Vial: 10
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration



Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091417.D
Acq On : 23 Sep 98 2:38 pm
Sample : Method Blank N-91-1-22.02
Misc :
Quant Time: Sep 29 10:58 1998

Vial: 10
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) a,a,a-Trifluorotoluene	18.07	146	8253986	50.00 ug/L	-0.08
System Monitoring Compounds					%Recovery
3) 2-Hexanone	20.05	100	7072	0.56 ug/L	1.11%
4) Tetrachloroethylene	20.77	166	39519	0.36 ug/L	0.73%
Target Compounds					Qvalue
2) MIBK	18.94	100	10159	0.49 ug/L m	1
5) 4-Bromofluorobenzene	23.37	95	5434399	50.54 ug/L	99

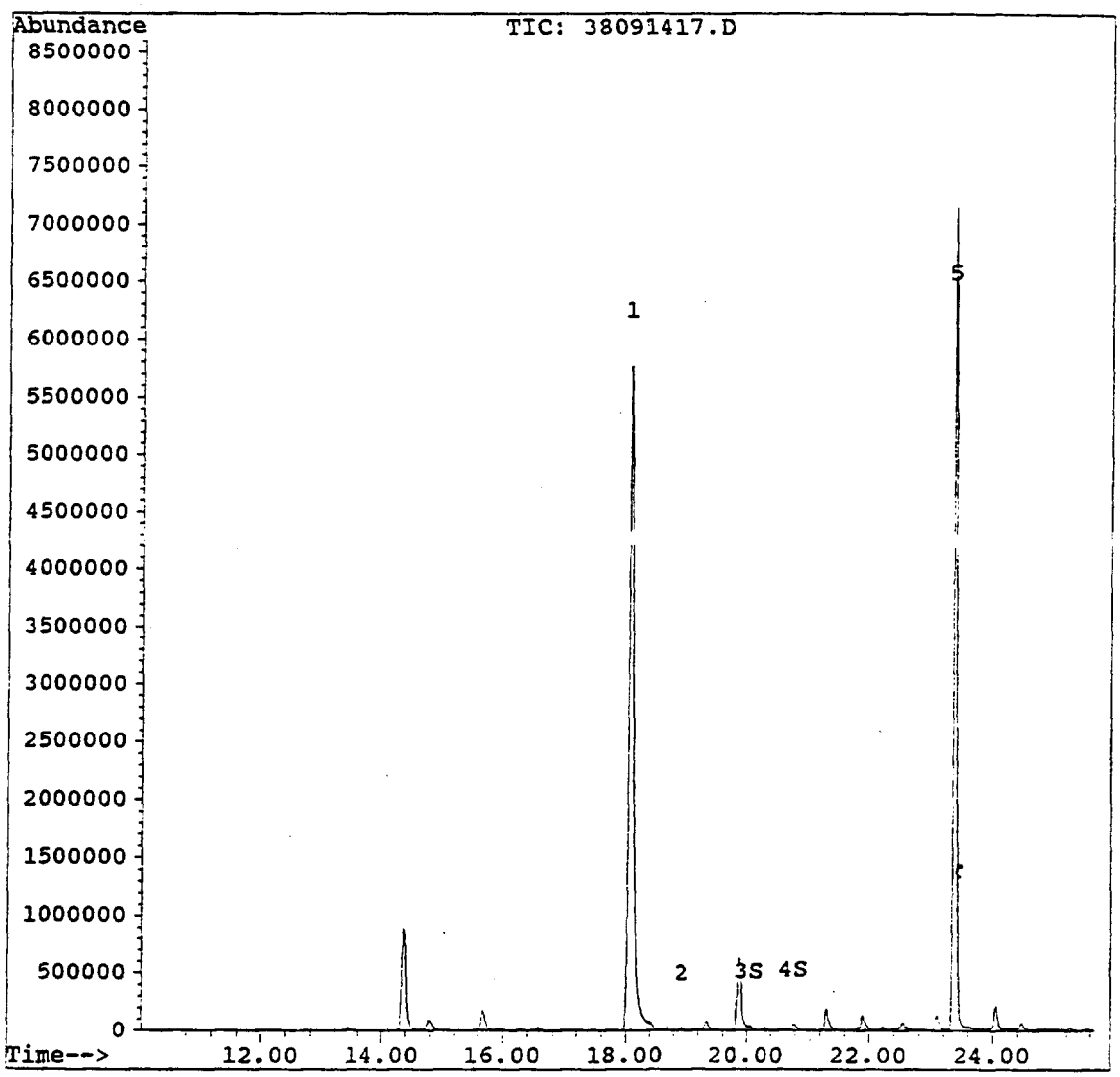
(#) = qualifier out of range (m) = manual integration
38091417.D HEXONE.M Wed Sep 30 14:45:27 1998

Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091417.D
Acq On : 23 Sep 98 2:38 pm
Sample : Method Blank N-91-1-22.02
Misc :
Quant Time: Sep 29 10:58 1998

Vial: 10
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration



Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091418.D
Acq On : 23 Sep 98 3:15 pm
Sample : 50 ug/L std N-91-1-22.03
Misc :
Quant Time: Sep 29 10:55 1998

Vial: 10
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) a,a,a-Trifluorotoluene	18.12	146	7168204	50.00 ug/L	-0.03
System Monitoring Compounds					%Recovery
3) 2-Hexanone	20.07	100	510876	46.19 ug/L	92.38%
4) Tetrachloroethylene	20.80	166	5768320	61.18 ug/L	122.36%
Target Compounds					Qvalue
2) MIBK	18.97	100	868020	48.10 ug/L	95
5) 4-Bromofluorobenzene	23.39	95	5165901	55.32 ug/L	98

(#) = qualifier out of range (m) = manual integration
38091418.D HEXONE.M Wed Sep 30 14:46:22 1998

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091418.D
Acq On : 23 Sep 98 3:15 pm
Sample : 50 ug/L std N-91-1-22.03
Misc :

Vial: 10
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	a,a,a-Trifluorotoluene	1.000	1.000	0.0	81	-0.03
2	MIBK	0.126	0.121	3.8	80	-0.04
3 S	2-Hexanone	0.077	0.071	7.6	76	-0.04
4 S	Tetrachloroethylene	0.658	0.805	-22.4	103	-0.03
5	4-Bromofluorobenzene	0.651	0.721	-10.6	91	-0.05

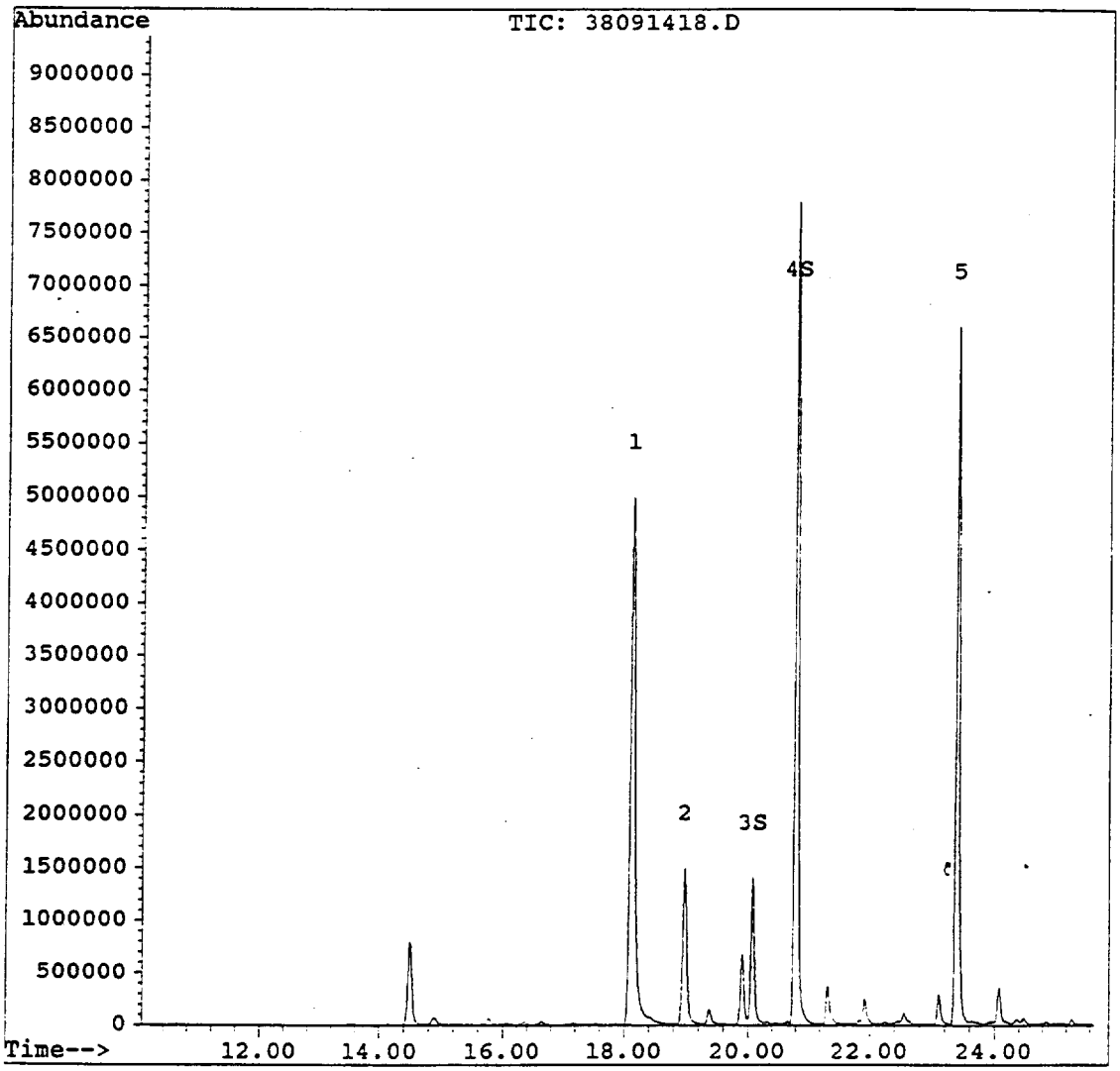
(#) = Out of Range SPCC's out = 0 CCC's out = 0
38091405.D HEXONE.M Mon Oct 05 11:30:35 1998

Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091418.D
Acq On : 23 Sep 98 3:15 pm
Sample : 50 ug/L std N-91-1-22.03
Misc :
Quant Time: Sep 29 10:55 1998

Vial: 10
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration



Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091419.D
Acq On : 23 Sep 98 4:11 pm
Sample : 8016-04 N-91-1-22.04
Misc :
Quant Time: Sep 30 14:47 1998

Vial: 10
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) a,a,a-Trifluorotoluene	18.10	146	6821940	50.00 ug/L	-0.05
System Monitoring Compounds					%Recovery
3) 2-Hexanone	20.06	100	477295	45.34 ug/L	90.69%
4) Tetrachloroethylene	20.79	166	4332395	48.28 ug/L	96.56%
Target Compounds					Qvalue
2) MIBK	18.97	100	24003	1.40 ug/L m	1
5) 4-Bromofluorobenzene	23.39	95	4508795	50.73 ug/L	98

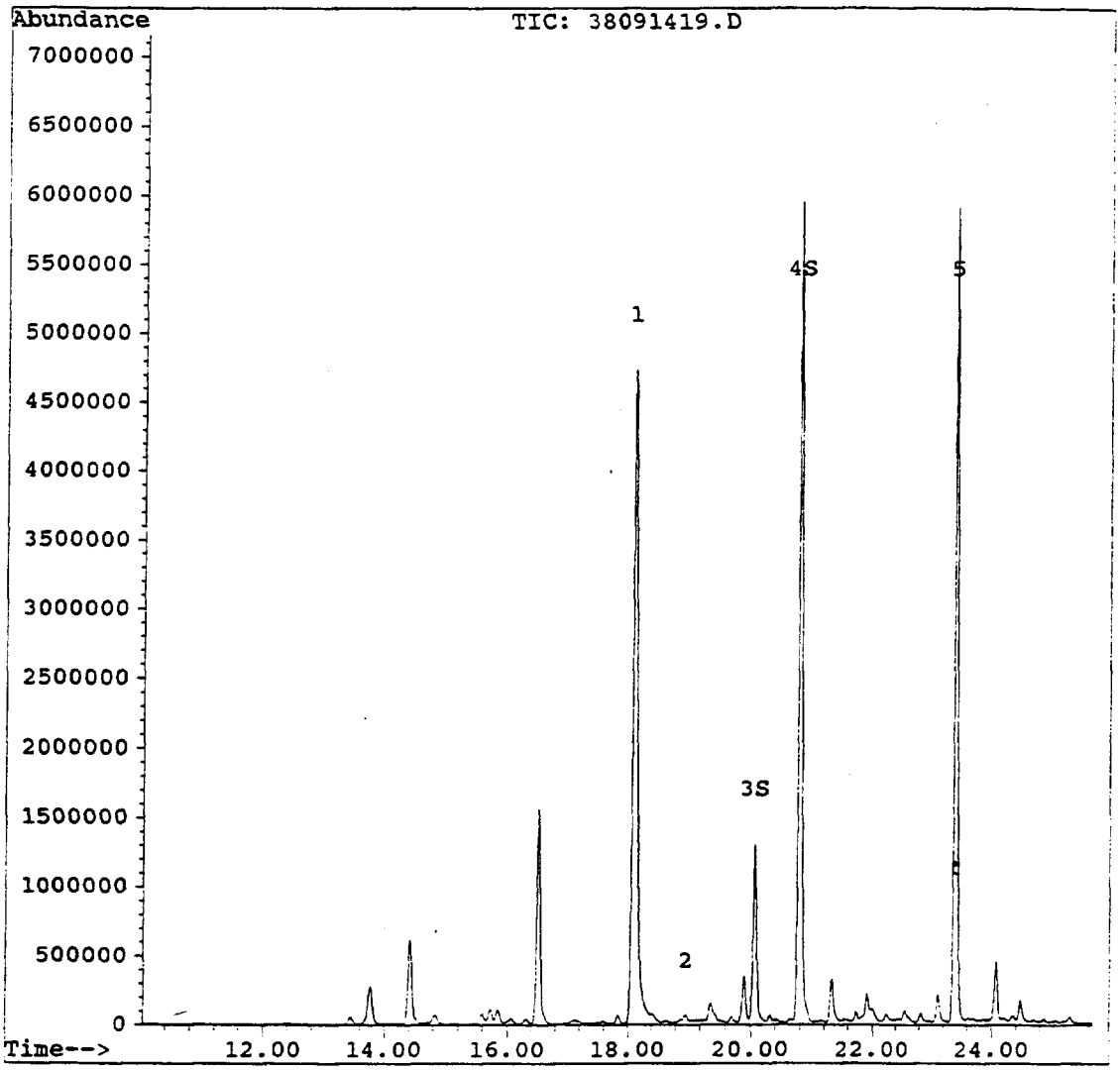
(#) = qualifier out of range (m) = manual integration
38091419.D HEXONE.M Wed Sep 30 14:47:27 1998

Quantitation Report

Data File : C:\HPCHEM\1\DATA\HEXONE\38091419.D
Acq On : 23 Sep 98 4:11 pm
Sample : 8016-04 N-91-1-22.04
Misc :
Quant Time: Sep 29 10:54 1998

Vial: 10
Operator: Bonfoey
Inst : 5972 INST
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\HEXONE.M
Title : Hexone Analysis
Last Update : Mon Sep 14 15:53:28 1998
Response via : Multiple Level Calibration



End of Package

APPENDIX D

ANALYSIS RESULTS FROM THE QC BLANK SAMPLES PERFORMED BY THERMO NUTECH LABORATORY

HEIS ANALYTICAL RESULTS FOR SAMPLES B0PPC1, C2, C3, C5

samp_num	media	samp_date_time	con_id	con_long_name	value_rptd	count_er	MDA	total_er	anal_units	lab_q	rev_q
B0PPC1	WM	98/08/10 15:00	71-55-6	1,1,1-Trichloroethane	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	79-34-5	1,1,2,2-Tetrachloroethane	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	79-00-5	1,1,2-Trichloroethane	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	75-34-3	1,1-Dichloroethane	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	75-35-4	1,1-Dichloroethene	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	107-06-2	1,2-Dichloroethane	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	540-59-0	1,2-Dichloroethene(Total)	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	78-87-5	1,2-Dichloropropane	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	78-93-3	2-Butanone	3				ug/L	BJ	
B0PPC1	WM	98/08/10 15:00	591-78-6	2-Hexanone	10				ug/L	U	
B0PPC1	WM	98/08/10 15:00	108-10-1	4-Methyl-2-Pentanone	10				ug/L	U	
B0PPC1	WM	98/08/10 15:00	7429-90-5	Aluminum	76.2				ug/L	B	
B0PPC1	WM	98/08/10 15:00	14596-10-2	Americium-241			17		pCi/L	U	
B0PPC1	WM	98/08/10 15:00	7440-36-0	Antimony	25.8				ug/L	U	
B0PPC1	WM	98/08/10 15:00	14234-35-6	Antimony-125			35		pCi/L	U	
B0PPC1	WM	98/08/10 15:00	12674-11-2	Aroclor-1016	10				ug/L	U	
B0PPC1	WM	98/08/10 15:00	11104-28-2	Aroclor-1221	20				ug/L	U	
B0PPC1	WM	98/08/10 15:00	11141-16-5	Aroclor-1232	10				ug/L	U	
B0PPC1	WM	98/08/10 15:00	53469-21-9	Aroclor-1242	10				ug/L	U	
B0PPC1	WM	98/08/10 15:00	12672-29-6	Aroclor-1248	10				ug/L	U	
B0PPC1	WM	98/08/10 15:00	11097-69-1	Aroclor-1254	10				ug/L	U	
B0PPC1	WM	98/08/10 15:00	11096-82-5	Aroclor-1260	10				ug/L	U	
B0PPC1	WM	98/08/10 15:00	7440-38-2	Arsenic	38.1				ug/L	U	
B0PPC1	WM	98/08/10 15:00	7440-39-3	Barium	95.4				ug/L	B	
B0PPC1	WM	98/08/10 15:00	71-43-2	Benzene	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	7440-41-7	Beryllium	0.2				ug/L	U	
B0PPC1	WM	98/08/10 15:00	75-27-4	Bromodichloromethane	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	75-25-2	Bromoform	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	74-83-9	Bromomethane	10				ug/L	U	
B0PPC1	WM	98/08/10 15:00	7440-43-9	Cadmium	4				ug/L	U	
B0PPC1	WM	98/08/10 15:00	7440-70-2	Calcium	193				ug/L	B	
B0PPC1	WM	98/08/10 15:00	75-15-0	Carbon disulfide	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	56-23-5	Carbon tetrachloride	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	13967-70-9	Cesium-134			22		pCi/L	U	
B0PPC1	WM	98/08/10 15:00	10045-97-3	Cesium-137			16		pCi/L	U	
B0PPC1	WM	98/08/10 15:00	16887-00-6	Chloride	0.54				mg/L		
B0PPC1	WM	98/08/10 15:00	108-90-7	Chlorobenzene	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	75-00-3	Chloroethane	10				ug/L	U	
B0PPC1	WM	98/08/10 15:00	67-66-3	Chloroform	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	74-87-3	Chloromethane	10				ug/L	U	
B0PPC1	WM	98/08/10 15:00	7440-47-3	Chromium	5.6				ug/L	U	
B0PPC1	WM	98/08/10 15:00	10061-01-5	cis-1,3-Dichloropropene	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	7440-48-4	Cobalt	5.8				ug/L	U	
B0PPC1	WM	98/08/10 15:00	10198-40-0	Cobalt-60			19		pCi/L	U	
B0PPC1	WM	98/08/10 15:00	7440-50-8	Copper	3.4				ug/L	B	
B0PPC1	WM	98/08/10 15:00	13981-15-2	Curium-244	0	0.08	0.15	0.08	pCi/L	U	
B0PPC1	WM	98/08/10 15:00	124-48-1	Dibromochloromethane	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	100-41-4	Ethylbenzene	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	14683-23-9	Europium-152			45		pCi/L	U	
B0PPC1	WM	98/08/10 15:00	15585-10-1	Europium-154			56		pCi/L	U	
B0PPC1	WM	98/08/10 15:00	14391-16-3	Europium-155			27		pCi/L	U	
B0PPC1	WM	98/08/10 15:00	16984-48-8	Fluoride	0.5				mg/L	U	
B0PPC1	WM	98/08/10 15:00	12587-46-1	Gross alpha	-0.3	0.53	1.1	0.53	pCi/L	U	
B0PPC1	WM	98/08/10 15:00	12587-47-2	Gross beta	-1	1.7	2.8	1.7	pCi/L	U	
B0PPC1	WM	98/08/10 15:00	7439-89-6	Iron	48.5				ug/L	B	
B0PPC1	WM	98/08/10 15:00	7439-92-1	Lead	37.2				ug/L	U	
B0PPC1	WM	98/08/10 15:00	7439-95-4	Magnesium	38.4				ug/L	U	
B0PPC1	WM	98/08/10 15:00	7439-96-5	Manganese	1.2				ug/L	U	
B0PPC1	WM	98/08/10 15:00	7439-97-6	Mercury	0.1				ug/L	U	
B0PPC1	WM	98/08/10 15:00	75-09-2	Methylenechloride	6				ug/L	B	
B0PPC1	WM	98/08/10 15:00	13994-20-2	Neptunium-237	-0.012	0.069	0.17	0.069	pCi/L	U	
B0PPC1	WM	98/08/10 15:00	7440-02-0	Nickel	9.5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	14797-55-8	Nitrate	0.25				mg/L	U	
B0PPC1	WM	98/08/10 15:00	14797-65-0	Nitrite	0.25				mg/L	U	
B0PPC1	WM	98/08/10 15:00	PH	pH Measurement	9.4				pH		
B0PPC1	WM	98/08/10 15:00	13981-16-3	Plutonium-238	0.14	0.14	0.25	0.14	pCi/L	U	
B0PPC1	WM	98/08/10 15:00	PU-239/240	Plutonium-239/240	0	0.11	0.22	0.11	pCi/L	U	
B0PPC1	WM	98/08/10 15:00	9/7/40	Potassium	606				ug/L	U	

HEIS ANALYTICAL RESULTS FOR SAMPLES B0PPC1, C2, C3, C5

samp_num	media	samp_date_time	con_id	con_long_name	value_rptd	count_er	MDA	total_er	anal_units	lab_q	rev_q
B0PPC1	WM	98/08/10 15:00	13966-00-2	Potassium-40			180		pCi/L	U	
B0PPC1	WM	98/08/10 15:00	13982-63-3	Radium-226			28		pCi/L	U	
B0PPC1	WM	98/08/10 15:00	15262-20-1	Radium-228			81		pCi/L	U	
B0PPC1	WM	98/08/10 15:00	7782-49-2	Selenium	44				ug/L	U	
B0PPC1	WM	98/08/10 15:00	7440-22-4	Silver	4.6				ug/L	U	
B0PPC1	WM	98/08/10 15:00	7440-23-5	Sodium	1500				ug/L	B	
B0PPC1	WM	98/08/10 15:00	100-42-5	Styrene	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	14808-79-8	Sulfate	0.25				mg/L	U	
B0PPC1	WM	98/08/10 15:00	127-18-4	Tetrachloroethene	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	7440-28-0	Thallium	50.2				ug/L	U	
B0PPC1	WM	98/08/10 15:00	108-88-3	Toluene	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	SR-RAD	Total beta radiostrontium	0.58	1.8	2.2	1.8	pCi/L	U	
B0PPC1	WM	98/08/10 15:00	10061-02-6	trans-1,3-Dichloropropene	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	79-01-6	Trichloroethene	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	7440-62-2	Vanadium	3.5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	75-01-4	Vinyl chloride	10				ug/L	U	
B0PPC1	WM	98/08/10 15:00	1330-20-7	Xylenes (total)	5				ug/L	U	
B0PPC1	WM	98/08/10 15:00	7440-66-6	Zinc	2.8				ug/L	B	
B0PPC2	WM	98/08/10 15:05	71-55-6	1,1,1-Trichloroethane	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	79-34-5	1,1,2,2-Tetrachloroethane	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	79-00-5	1,1,2-Trichloroethane	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	75-34-3	1,1-Dichloroethane	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	75-35-4	1,1-Dichloroethene	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	107-06-2	1,2-Dichloroethane	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	540-59-0	1,2-Dichloroethene(Total)	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	78-87-5	1,2-Dichloropropane	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	78-93-3	2-Butanone	10				ug/L	U	
B0PPC2	WM	98/08/10 15:05	591-78-6	2-Hexanone	10				ug/L	U	
B0PPC2	WM	98/08/10 15:05	108-10-1	4-Methyl-2-Pentanone	10				ug/L	U	
B0PPC2	WM	98/08/10 15:05	67-64-1	Acetone	5				ug/L	BJ	
B0PPC2	WM	98/08/10 15:05	7429-90-5	Aluminum	36.1				ug/L	B	
B0PPC2	WM	98/08/10 15:05	14596-10-2	Americium-241			45		pCi/L	U	
B0PPC2	WM	98/08/10 15:05	7440-36-0	Antimony	25.8				ug/L	U	
B0PPC2	WM	98/08/10 15:05	14234-35-6	Antimony-125			34		pCi/L	U	
B0PPC2	WM	98/08/10 15:05	12674-11-2	Aroclor-1016	14				ug/L	U	
B0PPC2	WM	98/08/10 15:05	11104-28-2	Aroclor-1221	29				ug/L	U	
B0PPC2	WM	98/08/10 15:05	11141-16-5	Aroclor-1232	14				ug/L	U	
B0PPC2	WM	98/08/10 15:05	53469-21-9	Aroclor-1242	14				ug/L	U	
B0PPC2	WM	98/08/10 15:05	12672-29-6	Aroclor-1248	14				ug/L	U	
B0PPC2	WM	98/08/10 15:05	11097-69-1	Aroclor-1254	14				ug/L	U	
B0PPC2	WM	98/08/10 15:05	11096-82-5	Aroclor-1260	14				ug/L	U	
B0PPC2	WM	98/08/10 15:05	7440-38-2	Arsenic	38.1				ug/L	U	
B0PPC2	WM	98/08/10 15:05	7440-39-3	Barium	3.3				ug/L	U	
B0PPC2	WM	98/08/10 15:05	71-43-2	Benzene	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	7440-41-7	Beryllium	0.2				ug/L	U	
B0PPC2	WM	98/08/10 15:05	75-27-4	Bromodichloromethane	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	75-25-2	Bromoform	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	74-83-9	Bromomethane	10				ug/L	U	
B0PPC2	WM	98/08/10 15:05	7440-43-9	Cadmium	4				ug/L	U	
B0PPC2	WM	98/08/10 15:05	7440-70-2	Calcium	225				ug/L	B	
B0PPC2	WM	98/08/10 15:05	75-15-0	Carbon disulfide	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	56-23-5	Carbon tetrachloride	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	13967-70-9	Cesium-134			16		pCi/L	U	
B0PPC2	WM	98/08/10 15:05	10045-97-3	Cesium-137			16		pCi/L	U	
B0PPC2	WM	98/08/10 15:05	16887-00-6	Chloride	0.25				mg/L	U	
B0PPC2	WM	98/08/10 15:05	108-90-7	Chlorobenzene	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	75-00-3	Chloroethane	10				ug/L	U	
B0PPC2	WM	98/08/10 15:05	67-66-3	Chloroform	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	74-87-3	Chloromethane	10				ug/L	U	
B0PPC2	WM	98/08/10 15:05	7440-47-3	Chromium	5.6				ug/L	U	
B0PPC2	WM	98/08/10 15:05	10061-01-5	cis-1,3-Dichloropropene	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	7440-48-4	Cobalt	5.8				ug/L	U	
B0PPC2	WM	98/08/10 15:05	10198-40-0	Cobalt-60			18		pCi/L	U	
B0PPC2	WM	98/08/10 15:05	7440-50-8	Copper	5.3				ug/L	B	
B0PPC2	WM	98/08/10 15:05	13981-15-2	Curium-244	0.1	0.089	0.11	0.089	pCi/L	U	
B0PPC2	WM	98/08/10 15:05	124-48-1	Dibromochloromethane	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	100-41-4	Ethylbenzene	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	14683-23-9	Europium-152			38		pCi/L	U	

HEIS ANALYTICAL RESULTS FOR SAMPLES B0PPC1, C2, C3, C5

samp_num	media	samp_date_time	con_id	con_long_name	value_rptd	count_er	MDA	total_er	anal_units	lab_q	rev_q
B0PPC2	WM	98/08/10 15:05	15585-10-1	Europium-154			54		pCi/L	U	
B0PPC2	WM	98/08/10 15:05	14391-16-3	Europium-155			36		pCi/L	U	
B0PPC2	WM	98/08/10 15:05	16984-48-8	Fluoride	0.5				mg/L	U	
B0PPC2	WM	98/08/10 15:05	12587-46-1	Gross alpha	0.41	1.2	2.2	1.2	pCi/L	U	
B0PPC2	WM	98/08/10 15:05	12587-47-2	Gross beta	-0.071	3.3	5.6	3.3	pCi/L	U	
B0PPC2	WM	98/08/10 15:05	7439-89-6	Iron	24.9				ug/L	B	
B0PPC2	WM	98/08/10 15:05	7439-92-1	Lead	37.2				ug/L	U	
B0PPC2	WM	98/08/10 15:05	7439-95-4	Magnesium	107				ug/L	B	
B0PPC2	WM	98/08/10 15:05	7439-96-5	Manganese	1.2				ug/L	U	
B0PPC2	WM	98/08/10 15:05	7439-97-6	Mercury	0.1				ug/L	U	
B0PPC2	WM	98/08/10 15:05	75-09-2	Methylenechloride	2				ug/L	BJ	
B0PPC2	WM	98/08/10 15:05	13994-20-2	Neptunium-237	0.04	0.081	0.14	0.081	pCi/L	U	
B0PPC2	WM	98/08/10 15:05	7440-02-0	Nickel	9.5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	14797-55-8	Nitrate	0.25				mg/L	U	
B0PPC2	WM	98/08/10 15:05	14797-65-0	Nitrite	0.25				mg/L	U	
B0PPC2	WM	98/08/10 15:05	PH	pH Measurement	7.7				pH		
B0PPC2	WM	98/08/10 15:05	13981-16-3	Plutonium-238	0.039	0.078	0.15	0.078	pCi/L	U	
B0PPC2	WM	98/08/10 15:05	PU-239/240	Plutonium-239/240	0.02	0.078	0.15	0.078	pCi/L	U	
B0PPC2	WM	98/08/10 15:05	9/7/40	Potassium	606				ug/L	U	
B0PPC2	WM	98/08/10 15:05	13966-00-2	Potassium-40			230		pCi/L	U	
B0PPC2	WM	98/08/10 15:05	13982-63-3	Radium-226			23		pCi/L	U	
B0PPC2	WM	98/08/10 15:05	15262-20-1	Radium-228			60		pCi/L	U	
B0PPC2	WM	98/08/10 15:05	7782-49-2	Selenium	44				ug/L	U	
B0PPC2	WM	98/08/10 15:05	7440-22-4	Silver	4.6				ug/L	U	
B0PPC2	WM	98/08/10 15:05	7440-23-5	Sodium	903				ug/L	B	
B0PPC2	WM	98/08/10 15:05	100-42-5	Styrene	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	14808-79-8	Sulfate	0.25				mg/L	U	
B0PPC2	WM	98/08/10 15:05	127-18-4	Tetrachloroethene	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	7440-28-0	Thallium	50.2				ug/L	U	
B0PPC2	WM	98/08/10 15:05	108-88-3	Toluene	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	SR-RAD	Total beta radiostrontium	0.2	1.6	2	1.6	pCi/L	U	
B0PPC2	WM	98/08/10 15:05	10061-02-6	trans-1,3-Dichloropropene	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	79-01-6	Trichloroethene	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	7440-62-2	Vanadium	3.5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	75-01-4	Vinyl chloride	10				ug/L	U	
B0PPC2	WM	98/08/10 15:05	1330-20-7	Xylenes (total)	5				ug/L	U	
B0PPC2	WM	98/08/10 15:05	7440-66-6	Zinc	7.9				ug/L	B	
B0PPC3	WM	98/08/10 15:20	71-55-6	1,1,1-Trichloroethane	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	79-34-5	1,1,2,2-Tetrachloroethane	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	79-00-5	1,1,2-Trichloroethane	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	75-34-3	1,1-Dichloroethane	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	75-35-4	1,1-Dichloroethene	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	107-06-2	1,2-Dichloroethane	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	540-59-0	1,2-Dichloroethene(Total)	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	78-87-5	1,2-Dichloropropane	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	78-93-3	2-Butanone	3				ug/L	BJ	
B0PPC3	WM	98/08/10 15:20	591-78-6	2-Hexanone	10				ug/L	U	
B0PPC3	WM	98/08/10 15:20	108-10-1	4-Methyl-2-Pentanone	10				ug/L	U	
B0PPC3	WM	98/08/10 15:20	67-64-1	Acetone	10				ug/L	B	
B0PPC3	WM	98/08/10 15:20	7429-90-5	Aluminum	97.9				ug/L	B	
B0PPC3	WM	98/08/10 15:20	14596-10-2	Americium-241			17		pCi/L	U	
B0PPC3	WM	98/08/10 15:20	7440-36-0	Antimony	25.8				ug/L	U	
B0PPC3	WM	98/08/10 15:20	14234-35-6	Antimony-125			15		pCi/L	U	
B0PPC3	WM	98/08/10 15:20	12674-11-2	Aroclor-1016	14				ug/L	U	
B0PPC3	WM	98/08/10 15:20	11104-28-2	Aroclor-1221	29				ug/L	U	
B0PPC3	WM	98/08/10 15:20	11141-16-5	Aroclor-1232	14				ug/L	U	
B0PPC3	WM	98/08/10 15:20	53469-21-9	Aroclor-1242	14				ug/L	U	
B0PPC3	WM	98/08/10 15:20	12672-29-6	Aroclor-1248	14				ug/L	U	
B0PPC3	WM	98/08/10 15:20	11097-69-1	Aroclor-1254	14				ug/L	U	
B0PPC3	WM	98/08/10 15:20	11096-82-5	Aroclor-1260	14				ug/L	U	
B0PPC3	WM	98/08/10 15:20	7440-38-2	Arsenic	38.1				ug/L	U	
B0PPC3	WM	98/08/10 15:20	7440-39-3	Barium	137				ug/L	B	
B0PPC3	WM	98/08/10 15:20	71-43-2	Benzene	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	7440-41-7	Beryllium	0.2				ug/L	U	
B0PPC3	WM	98/08/10 15:20	75-27-4	Bromodichloromethane	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	75-25-2	Bromoform	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	74-83-9	Bromomethane	10				ug/L	U	
B0PPC3	WM	98/08/10 15:20	7440-43-9	Cadmium	4				ug/L	U	

HEIS ANALYTICAL RESULTS FOR SAMPLES B0PPC1, C2, C3, C5

samp_num	media	samp_date_time	con_id	con_long_name	value_rptd	count_er	MDA	total_er	anal_units	lab_q	rev_q
B0PPC3	WM	98/08/10 15:20	7440-70-2	Calcium	229				ug/L	B	
B0PPC3	WM	98/08/10 15:20	75-15-0	Carbon disulfide	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	56-23-5	Carbon tetrachloride	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	13967-70-9	Cesium-134			7.9		pCi/L	U	
B0PPC3	WM	98/08/10 15:20	10045-97-3	Cesium-137			6		pCi/L	U	
B0PPC3	WM	98/08/10 15:20	16887-00-6	Chloride	0.25				mg/L	U	
B0PPC3	WM	98/08/10 15:20	108-90-7	Chlorobenzene	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	75-00-3	Chloroethane	10				ug/L	U	
B0PPC3	WM	98/08/10 15:20	67-66-3	Chloroform	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	74-87-3	Chloromethane	10				ug/L	U	
B0PPC3	WM	98/08/10 15:20	7440-47-3	Chromium	5.6				ug/L	U	
B0PPC3	WM	98/08/10 15:20	10061-01-5	cis-1,3-Dichloropropene	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	7440-48-4	Cobalt	5.8				ug/L	U	
B0PPC3	WM	98/08/10 15:20	10198-40-0	Cobalt-60			7.6		pCi/L	U	
B0PPC3	WM	98/08/10 15:20	7440-50-8	Copper	2.4				ug/L	U	
B0PPC3	WM	98/08/10 15:20	13981-15-2	Curium-244	0.013	0.053	0.1	0.053	pCi/L	U	
B0PPC3	WM	98/08/10 15:20	124-48-1	Dibromochloromethane	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	100-41-4	Ethylbenzene	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	14683-23-9	Europium-152			18		pCi/L	U	
B0PPC3	WM	98/08/10 15:20	15585-10-1	Europium-154			20		pCi/L	U	
B0PPC3	WM	98/08/10 15:20	14391-16-3	Europium-155			17		pCi/L	U	
B0PPC3	WM	98/08/10 15:20	16984-48-8	Fluoride	0.5				mg/L	U	
B0PPC3	WM	98/08/10 15:20	12587-46-1	Gross alpha	-0.44	0.64	1.3	0.65	pCi/L	U	
B0PPC3	WM	98/08/10 15:20	12587-47-2	Gross beta	-0.89	1.6	2.8	1.6	pCi/L	U	
B0PPC3	WM	98/08/10 15:20	7439-89-6	Iron	71.2				ug/L	B	
B0PPC3	WM	98/08/10 15:20	7439-92-1	Lead	37.2				ug/L	U	
B0PPC3	WM	98/08/10 15:20	7439-95-4	Magnesium	80.1				ug/L	B	
B0PPC3	WM	98/08/10 15:20	7439-96-5	Manganese	1.2				ug/L	U	
B0PPC3	WM	98/08/10 15:20	7439-97-6	Mercury	0.1				ug/L	U	
B0PPC3	WM	98/08/10 15:20	75-09-2	Methylenechloride	9				ug/L	B	
B0PPC3	WM	98/08/10 15:20	13994-20-2	Neptunium-237	0.058	0.077	0.058	0.077	pCi/L		
B0PPC3	WM	98/08/10 15:20	7440-02-0	Nickel	9.5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	14797-55-8	Nitrate	0.25				mg/L	U	
B0PPC3	WM	98/08/10 15:20	14797-65-0	Nitrite	0.25				mg/L	U	
B0PPC3	WM	98/08/10 15:20	PH	pH Measurement	7.1				pH		
B0PPC3	WM	98/08/10 15:20	13981-16-3	Plutonium-238	-0.013	0.077	0.16	0.077	pCi/L	U	
B0PPC3	WM	98/08/10 15:20	PU-239/240	Plutonium-239/240	-0.013	0.077	0.16	0.077	pCi/L	U	
B0PPC3	WM	98/08/10 15:20	9/7/40	Potassium	606				ug/L	U	
B0PPC3	WM	98/08/10 15:20	13966-00-2	Potassium-40			170		pCi/L	U	
B0PPC3	WM	98/08/10 15:20	13982-63-3	Radium-226			12		pCi/L	U	
B0PPC3	WM	98/08/10 15:20	15262-20-1	Radium-228			28		pCi/L	U	
B0PPC3	WM	98/08/10 15:20	7782-49-2	Selenium	44				ug/L	U	
B0PPC3	WM	98/08/10 15:20	7440-22-4	Silver	4.6				ug/L	U	
B0PPC3	WM	98/08/10 15:20	7440-23-5	Sodium	1390				ug/L	B	
B0PPC3	WM	98/08/10 15:20	100-42-5	Styrene	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	14808-79-8	Sulfate	0.25				mg/L	U	
B0PPC3	WM	98/08/10 15:20	127-18-4	Tetrachloroethene	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	7440-28-0	Thallium	50.2				ug/L	U	
B0PPC3	WM	98/08/10 15:20	108-88-3	Toluene	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	SR-RAD	Total beta radiostrontium	-0.92	2	2.5	2	pCi/L	U	
B0PPC3	WM	98/08/10 15:20	10061-02-6	trans-1,3-Dichloropropene	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	79-01-6	Trichloroethene	5				bg/L	U	
B0PPC3	WM	98/08/10 15:20	7440-62-2	Vanadium	3.5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	75-01-4	Vinyl chloride	10				ug/L	U	
B0PPC3	WM	98/08/10 15:20	1330-20-7	Xylenes (total)	5				ug/L	U	
B0PPC3	WM	98/08/10 15:20	7440-66-6	Zinc	5.5				ug/L	B	
B0PPC5	WM	98/08/31 05:32	71-55-6	1,1,1-Trichloroethane	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	79-34-5	1,1,2,2-Tetrachloroethane	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	79-00-5	1,1,2-Trichloroethane	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	75-34-3	1,1-Dichloroethane	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	75-35-4	1,1-Dichloroethene	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	107-06-2	1,2-Dichloroethane	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	540-59-0	1,2-Dichloroethene(Total)	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	78-87-5	1,2-Dichloropropane	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	78-93-3	2-Butanone	10				ug/L	U	
B0PPC5	WM	98/08/31 05:32	591-78-6	2-Hexanone	10				ug/L	U	
B0PPC5	WM	98/08/31 05:32	108-10-1	4-Methyl-2-Pentanone	10				ug/L	U	
B0PPC5	WM	98/08/31 05:32	67-64-1	Acetone	7				ug/L	BJ	

HEIS ANALYTICAL RESULTS FOR SAMPLES B0PPC1, C2, C3, C5

samp_num	media	samp_date_time	con_id	con_long_name	value_rptd	count_er	MDA	total_er	anal_units	lab_q	rev_q
B0PPC5	WM	98/08/31 05:32	71-43-2	Benzene	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	75-27-4	Bromodichloromethane	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	75-25-2	Bromoform	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	74-83-9	Bromomethane	10				ug/L	U	
B0PPC5	WM	98/08/31 05:32	75-15-0	Carbon disulfide	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	56-23-5	Carbon tetrachloride	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	108-90-7	Chlorobenzene	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	75-00-3	Chloroethane	10				ug/L	U	
B0PPC5	WM	98/08/31 05:32	67-66-3	Chloroform	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	74-87-3	Chloromethane	10				ug/L	U	
B0PPC5	WM	98/08/31 05:32	10061-01-5	cis-1,3-Dichloropropene	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	124-48-1	Dibromochloromethane	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	100-41-4	Ethylbenzene	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	75-09-2	Methylenechloride	2				ug/L	BJ	
B0PPC5	WM	98/08/31 05:32	100-42-5	Styrene	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	127-18-4	Tetrachloroethene	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	108-88-3	Toluene	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	10061-02-6	trans-1,3-Dichloropropene	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	79-01-6	Trichloroethene	5				ug/L	U	
B0PPC5	WM	98/08/31 05:32	75-01-4	Vinyl chloride	10				ug/L	U	
B0PPC5	WM	98/08/31 05:32	1330-20-7	Xylenes (total)	5				ug/L	U	

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