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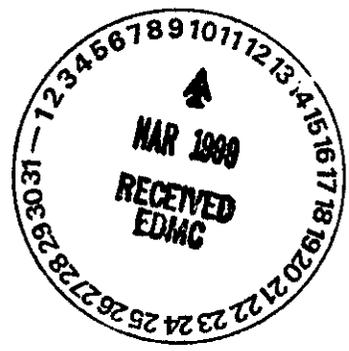
WASTE MANAGEMENT FEDERAL SERVICES  
OF HANFORD, INC.  
A WASTE MANAGEMENT COMPANY

P. O. Box 700  
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December 3, 1998

WMH-9860237

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  $\mu\text{g/mL}$  or  $\mu\text{Ci/mL}$  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  $\mu\text{Ci/g}$ , the data were corrected for the total sample volume and, therefore, the results reflect the total  $\mu\text{Ci}$  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 ( $^{237}\text{Np}$ ) 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 ( $^{238}\text{Pu}$ ) and curium-243/244 ( $^{243/244}\text{Cm}$ ) 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 ( $^{137}\text{Cs}$ ) was  $1.61\text{e-}06$   $\mu\text{Ci/mL}$ . The requested PQL was  $1.0\text{e-}06$   $\mu\text{Ci/mL}$ . 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. The TCLP extraction and a preliminary analysis were performed within the required 28 days, 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  $5.50$   $\mu\text{g/mL}$  mercury exceeds the regulatory level of  $0.2$   $\mu\text{g/mL}$ , 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  $\mu\text{g/mL}$ , the regulatory level is 0.2  $\mu\text{g/mL}$ . The average Cd result was 4.49  $\mu\text{g/mL}$ , the regulatory level is 1.0  $\mu\text{g/mL}$ . The average Cr result was 439  $\mu\text{g/mL}$ , the regulatory level is 5.0  $\mu\text{g/mL}$ .

### 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 (<sup>90</sup>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

<b>Analysis</b>	<b>Preparation Procedure</b>	<b>Analysis Procedure</b>
<b>Inorganic Analyses</b>		
% 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
<b>Radionuclide Analyses</b>		
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
<sup>90</sup> Sr	Liquid - Acid Dilution and Direct Analysis Sludge and Tech Smears - Acid digest	LA-220-101 Rev. E-3
<sup>241</sup> Am, <sup>243/244</sup> Cm	Liquid - Acid Dilution and Direct Analysis Sludge and Tech Smears - Acid digest	LA-953-104 Rev. B-0
<sup>238/239/240</sup> Pu	Liquid - Acid Dilution and Direct Analysis Sludge and Tech Smears - Acid digest	LA-953-104 Rev. B-0
<sup>237</sup> Np	Liquid - Acid Dilution and Direct Analysis Sludge and Tech Smears - Acid digest	LA-933-141 Rev. H-2
<b>Organic Analyses</b>		
Hexone	Direct Analysis	EPA SW-846 methods 8260B, 5030B and 8000B
PCB	Extraction	LA-523-156 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	$^{243/244}\text{Cm}$	= curium-243/244
IC	= ion chromatography	$^{238/239/240}\text{Pu}$	= plutonium-238, plutonium-239/240
Hg	= mercury	$^{237}\text{Np}$	= neptunium-237
GEA	= gamma energy analysis	PCB	= polychlorinated biphenyls
$^{90}\text{Sr}$	= strontium-90	TCLP	= toxicity characteristics leachate procedure
$^{241}\text{Am}$	= americium-241		

**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**

A-0002-1

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	112.5	<2.97e-03	<3.07e-03	n/a	n/a	n/a	n/a	3.00e-03	1.00E+02
S98M000315			Pu-238 by Ion Exchange	uCi/mL	n/a	<2.97e-03	<3.07e-03	n/a	n/a	n/a	n/a	3.00e-03	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	103.1	<2.76e-03	<2.95e-03	n/a	n/a	n/a	n/a	3.00e-03	1.00E+02
S98M000315			Cm-243/244 by Extraction	uCi/mL	n/a	<2.76e-03	<2.95e-03	n/a	n/a	n/a	n/a	3.00e-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

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 ITA 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	1.490	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	<3.91e-06	<3.99e-06	n/a	n/a	n/a	n/a	3.99e-06	n/a
S98M000353			Antimony-125 by GEA	uCi/g	n/a	<1.25e-05	<1.22e-05	n/a	n/a	n/a	n/a	1.22e-05	n/a
S98M000353			Cesium-134 by GEA	uCi/g	n/a	<3.98e-06	<4.07e-06	n/a	n/a	n/a	n/a	4.07e-06	n/a
S98M000353			Cesium-137 by GEA	uCi/g	102.1	<5.49e-06	<5.33e-06	n/a	n/a	n/a	n/a	5.33e-06	n/a
S98M000353			Europium-152 by GEA	uCi/g	n/a	<1.06e-05	<1.11e-05	n/a	n/a	n/a	n/a	1.11e-05	n/a
S98M000353			Europium-154 by GEA	uCi/g	n/a	<1.21e-05	<1.26e-05	n/a	n/a	n/a	n/a	1.26e-05	n/a
S98M000353			Europium-155 by GEA	uCi/g	n/a	<8.71e-06	<8.77e-06	n/a	n/a	n/a	n/a	8.77e-06	n/a
S98M000353			Radium-226 by GEA	uCi/g	n/a	<9.57e-05	<9.48e-05	n/a	n/a	n/a	n/a	9.48e-05	n/a
S98M000353			Actinium-228 by GEA	uCi/g	n/a	<2.51e-05	<2.38e-05	n/a	n/a	n/a	n/a	2.38e-05	n/a
S98M000353			Americium-241 by GEA	uCi/g	n/a	<7.19e-06	8.01e-03	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	<3.91e-06	<3.72e-06	n/a	n/a	n/a	n/a	3.72e-06	n/a
S98M000354			Antimony-125 by GEA	uCi/g	n/a	<1.25e-05	<1.26e-05	n/a	n/a	n/a	n/a	1.26e-05	n/a
S98M000354			Cesium-134 by GEA	uCi/g	n/a	<3.98e-06	<4.20e-06	n/a	n/a	n/a	n/a	4.20e-06	n/a
S98M000354			Cesium-137 by GEA	uCi/g	102.1	<5.49e-06	<5.40e-06	n/a	n/a	n/a	n/a	5.40e-06	n/a
S98M000354			Europium-152 by GEA	uCi/g	n/a	<1.06e-05	<1.07e-05	n/a	n/a	n/a	n/a	1.07e-05	n/a
S98M000354			Europium-154 by GEA	uCi/g	n/a	<1.21e-05	<1.23e-05	n/a	n/a	n/a	n/a	1.23e-05	n/a
S98M000354			Europium-155 by GEA	uCi/g	n/a	<8.71e-06	<8.94e-06	n/a	n/a	n/a	n/a	8.94e-06	n/a
S98M000354			Radium-226 by GEA	uCi/g	n/a	<9.57e-05	<9.54e-05	n/a	n/a	n/a	n/a	9.54e-05	n/a
S98M000354			Actinium-228 by GEA	uCi/g	n/a	<2.51e-05	<2.40e-05	n/a	n/a	n/a	n/a	2.40e-05	n/a
S98M000354			Americium-241 by GEA	uCi/g	n/a	<7.19e-06	8.27e-03	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	<3.91e-06	<1.29e-06	n/a	n/a	n/a	n/a	1.29e-06	n/a
S98M000355			Antimony-125 by GEA	uCi/g	n/a	<1.25e-05	<3.43e-06	n/a	n/a	n/a	n/a	3.43e-06	n/a
S98M000355			Cesium-134 by GEA	uCi/g	n/a	<3.98e-06	<1.08e-06	n/a	n/a	n/a	n/a	1.08e-06	n/a
S98M000355			Cesium-137 by GEA	uCi/g	102.1	<5.49e-06	<1.58e-06	n/a	n/a	n/a	n/a	1.58e-06	n/a
S98M000355			Europium-152 by GEA	uCi/g	n/a	<1.06e-05	<2.65e-06	n/a	n/a	n/a	n/a	2.65e-06	n/a
S98M000355			Europium-154 by GEA	uCi/g	n/a	<1.21e-05	<4.07e-06	n/a	n/a	n/a	n/a	4.07e-06	n/a
S98M000355			Europium-155 by GEA	uCi/g	n/a	<8.71e-06	<2.01e-06	n/a	n/a	n/a	n/a	2.01e-06	n/a
S98M000355			Radium-226 by GEA	uCi/g	n/a	<9.57e-05	<2.62e-05	n/a	n/a	n/a	n/a	2.62e-05	n/a
S98M000355			Actinium-228 by GEA	uCi/g	n/a	<2.51e-05	<7.22e-06	n/a	n/a	n/a	n/a	7.22e-06	n/a
S98M000355			Americium-241 by GEA	uCi/g	n/a	<7.19e-06	1.07e-03	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 ITA 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	<3.91e-06	<1.17e-06	n/a	n/a	n/a	n/a	1.17e-06	n/a
S98M000356			Antimony-125 by GEA	uCi/g	n/a	<1.25e-05	<3.23e-06	n/a	n/a	n/a	n/a	3.23e-06	n/a
S98M000356			Cesium-134 by GEA	uCi/g	n/a	<3.98e-06	<1.09e-06	n/a	n/a	n/a	n/a	1.09e-06	n/a
S98M000356			Cesium-137 by GEA	uCi/g	102.1	<5.49e-06	<1.49e-06	n/a	n/a	n/a	n/a	1.49e-06	n/a
S98M000356			Europium-152 by GEA	uCi/g	n/a	<1.06e-05	<2.65e-06	n/a	n/a	n/a	n/a	2.65e-06	n/a
S98M000356			Europium-154 by GEA	uCi/g	n/a	<1.21e-05	<3.73e-06	n/a	n/a	n/a	n/a	3.73e-06	n/a
S98M000356			Europium-155 by GEA	uCi/g	n/a	<8.71e-06	<1.93e-06	n/a	n/a	n/a	n/a	1.93e-06	n/a
S98M000356			Radium-226 by GEA	uCi/g	n/a	<9.57e-05	<2.56e-05	n/a	n/a	n/a	n/a	2.56e-05	n/a
S98M000356			Actinium-228 by GEA	uCi/g	n/a	<2.51e-05	<7.15e-06	n/a	n/a	n/a	n/a	7.15e-06	n/a
S98M000356			Americium-241 by GEA	uCi/g	n/a	<7.19e-06	1.82e-04	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	<3.91e-06	<1.32e-06	n/a	n/a	n/a	n/a	1.32e-06	n/a
S98M000358			Antimony-125 by GEA	uCi/g	n/a	<1.25e-05	<3.30e-06	n/a	n/a	n/a	n/a	3.30e-06	n/a
S98M000358			Cesium-134 by GEA	uCi/g	n/a	<3.98e-06	<1.08e-06	n/a	n/a	n/a	n/a	1.08e-06	n/a
S98M000358			Cesium-137 by GEA	uCi/g	102.1	<5.49e-06	<1.51e-06	n/a	n/a	n/a	n/a	1.51e-06	n/a
S98M000358			Europium-152 by GEA	uCi/g	n/a	<1.06e-05	<2.70e-06	n/a	n/a	n/a	n/a	2.70e-06	n/a
S98M000358			Europium-154 by GEA	uCi/g	n/a	<1.21e-05	<4.09e-06	n/a	n/a	n/a	n/a	4.09e-06	n/a
S98M000358			Europium-155 by GEA	uCi/g	n/a	<8.71e-06	<1.96e-06	n/a	n/a	n/a	n/a	1.96e-06	n/a
S98M000358			Radium-226 by GEA	uCi/g	n/a	<9.57e-05	<2.57e-05	n/a	n/a	n/a	n/a	2.57e-05	n/a
S98M000358			Actinium-228 by GEA	uCi/g	n/a	<2.51e-05	<7.10e-06	n/a	n/a	n/a	n/a	7.10e-06	n/a
S98M000358			Americium-241 by GEA	uCi/g	n/a	<7.19e-06	1.82e-03	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	113.4	<3.28e-02	36.80	n/a	n/a	n/a	n/a	2.730	1.94E+00
S98M000357			Pu-238 by Ion Exchange	uCi/g	n/a	<3.28e-02	5.440	n/a	n/a	n/a	n/a	2.730	3.49E+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	<3.91e-06	<1.30e-06	n/a	n/a	n/a	n/a	1.30e-06	n/a
S98M000357			Antimony-125 by GEA	uCi/g	n/a	<1.25e-05	<3.39e-06	n/a	n/a	n/a	n/a	3.39e-06	n/a
S98M000357			Cesium-134 by GEA	uCi/g	n/a	<3.98e-06	<1.10e-06	n/a	n/a	n/a	n/a	1.10e-06	n/a
S98M000357			Cesium-137 by GEA	uCi/g	102.1	<5.49e-06	<1.51e-06	n/a	n/a	n/a	n/a	1.51e-06	n/a
S98M000357			Europium-152 by GEA	uCi/g	n/a	<1.06e-05	<3.07e-06	n/a	n/a	n/a	n/a	3.07e-06	n/a
S98M000357			Europium-154 by GEA	uCi/g	n/a	<1.21e-05	<3.96e-06	n/a	n/a	n/a	n/a	3.96e-06	n/a
S98M000357			Europium-155 by GEA	uCi/g	n/a	<8.71e-06	<3.95e-06	n/a	n/a	n/a	n/a	3.95e-06	n/a
S98M000357			Radium-226 by GEA	uCi/g	n/a	<9.57e-05	<2.67e-05	n/a	n/a	n/a	n/a	2.67e-05	n/a
S98M000357			Actinium-228 by GEA	uCi/g	n/a	<2.51e-05	<7.13e-06	n/a	n/a	n/a	n/a	7.13e-06	n/a
S98M000357			Americium-241 by GEA	uCi/g	n/a	<7.19e-06	1.05e-01	n/a	n/a	n/a	n/a	n/a	0.0700
S98M000357			Am-241 by Extraction	uCi/g	78.41	<3.99e-02	24.20	n/a	n/a	n/a	n/a	2.030	2.34E+00
S98M000357			Cm-243/244 by Extraction	uCi/g	n/a	<3.99e-02	< 2.030	n/a	n/a	n/a	n/a	2.030	1.00E+02
S98M000357			Alpha of Digested Solid	uCi/g	91.67	<2.65e-02	4.790	n/a	n/a	n/a	n/a	4.40e-01	1.65E+01
S98M000357			Beta of Solid Sample	uCi/g	112.1	<1.77e-01	2.570	n/a	n/a	n/a	n/a	2.060	8.31E+01

**WMH-9860237**

**Attachment 3**

**Sample Breakdown Diagrams**

**Consisting of 4 Pages  
including cover page**

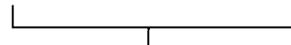
# 202S Pu Load-Out Hood Samples

Process Piping  
BOPC22



S98M000287

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



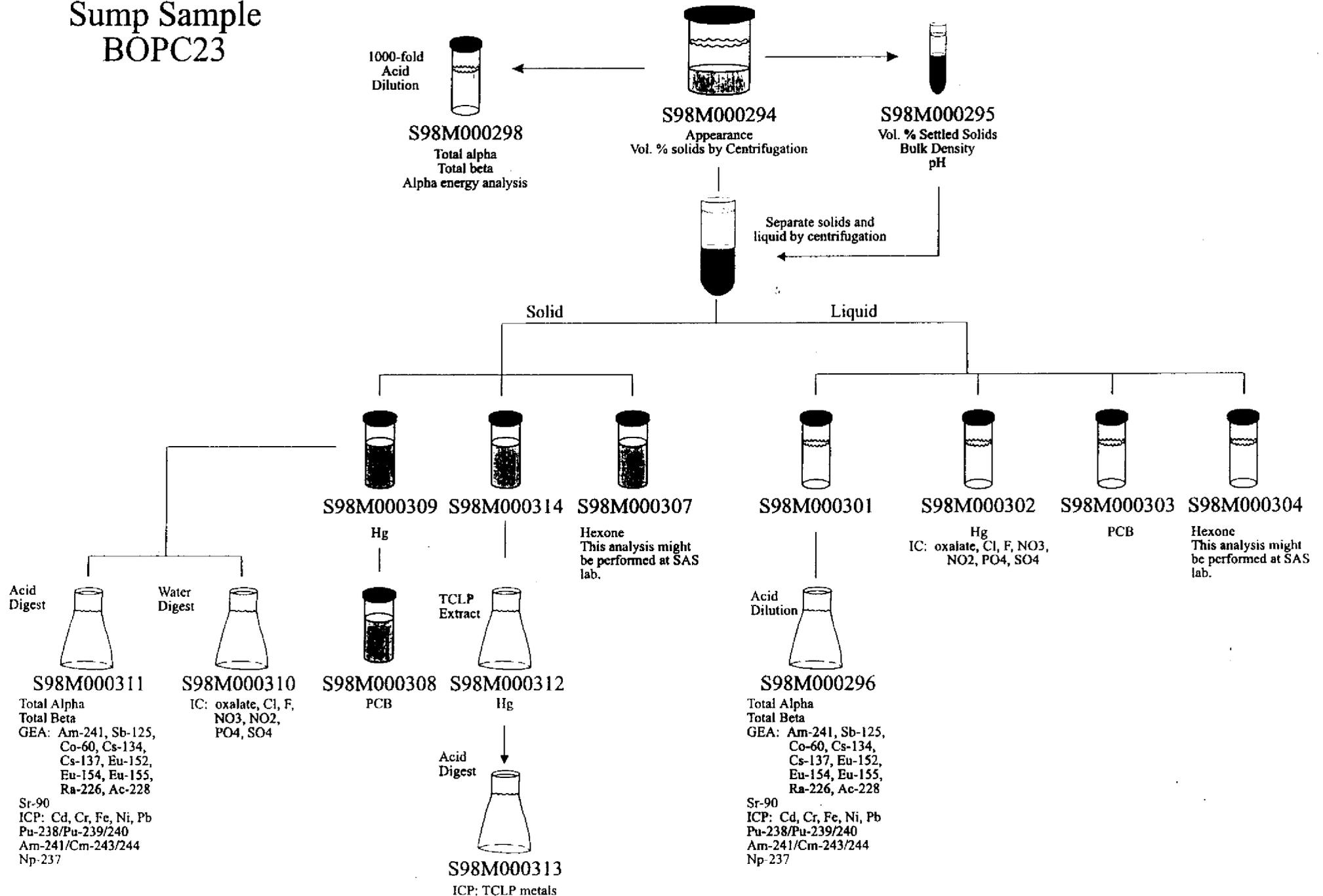
Collected  
leachate

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

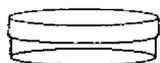
## Sump Sample BOPC23



# 202S Pu Load-Out Hood Samples

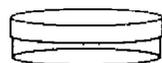
## Technical Smears

BOPC24  
Floor Smear



S98M000347

BOPC25  
Tank E16 Smear



S98M000348

BOPC26  
Tank E21 Smear



S98M000349

BOPC27  
Tank E19 Smear



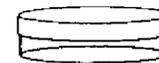
S98M000350

BOPK78  
Leak from L-16 Smear



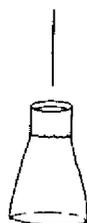
S98M000351

BOPC28  
Tank E17 Smear



S98M000352

Acid  
Digest

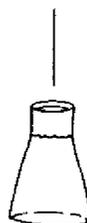


S98M000353

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

Acid  
Digest

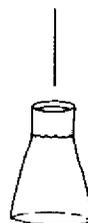


S98M000354

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

Acid  
Digest

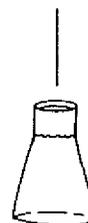


S98M000355

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

Acid  
Digest

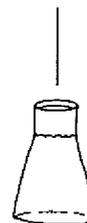


S98M000356

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

Acid  
Digest



S98M000357

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

Acid  
Digest



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

**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 <b>60 Days</b>		
Project Designation 202-S Building - Plutonium Loadout Hood - Other Solid		Sampling Location 200 West		SAF No. B98-059			
Ice Chest No.		Field Logbook No. LEL-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 P:Pe		Preservation	None				
		Type of Container	P				
		No. of Container(s)	1				
Special Handling and/or Storage		Volume	25g				
SAMPLE ANALYSIS				See item (1) in Special Instructions.			
Sample No.	Matrix *	Sample Date	Sample Time				
BOPC27	P:Pe	8-25-98	1038	X	2.7 x 10 <sup>6</sup> DPM	Alpha	
					process P:Pe		
					PC estimate - 1.13g		
CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS			Matrix *
Relinquished By	Date/Time/302	Received By	Date/Time	<p><b>Class EDG representative of sample. If insufficient material, use FSR as a guideline. Analyses listed in order of priority. 222-S is to determine Resin Bed concentration during subsequent analysis. Quantify Resin Bed concentration to &lt;1% R/W</b></p> <p><b>Actinides by ICP MS</b></p> <p>(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-TH1(CV); Metals by ICP (ICLP) - 1311/6010; Mercury (ICCP) 1311/410; VOA-8260A - Complete 4-Methyl-2-Pentanol; PCBs-600; IC Anions - 9056 Chloride, Fluoride, Nitrogen in Nitrate; Add-on Oxalate; pH (soil) - 9045; <del>Asbestos - R/W</del></p>			S - Soil
Relinquished By	Date/Time	Received By	Date/Time				SE - Sediment
Relinquished By	Date/Time	Received By	Date/Time				SO - Solid
Relinquished By	Date/Time	Received By	Date/Time				SL - Sludge
					W - Water		
					O - Oil		
					A - Air		
					DS - Drum Solids		
					DL - Drum Liquids		
					T - Tissue		
					WI - Wipe		
					LIQ - Liquid		
					V - Vegetation		
					X - Other		
LABORATORY SECTION	Received By	Title		Date/Time			
FINAL SAMPLE	Disposal Method	Sample Custodian		8-25-2002			
		Disposed By		Date/Time			

Date Turnaround

Priority

Normal

Director <b>RAYANT</b>	Company Contact <b>RAYANT</b> <i>Unlabeled</i>	Telephone <b>375-5601</b>
Project Designation <b>202-S P/U Loadout Hood</b>	Sampling Location <b>202-S P/U Loadout Hood</b>	SAF No. <b>R98-060</b>
Chest No. <b>ERC-96</b> <i>DOB 8-31-98</i> <b>077</b>	Field Logbook No. <b>FL-1429</b>	Method of Shipment <b>HAND CARRY</b>
Shipped To <b>222-S</b>	Offsite Property No. <b>N/A</b>	Bill of Lading/Air Bill No. <b>N/A</b>

Visible Sample Hazards/Remarks <b>RAD</b>	Preservation	<b>Cool</b>												
	Type of Container	<b>Poly</b>												
	No. of Container(s)	<b>1</b>												
	Special Handling and/or Storage	Volume	<b>500mL</b>											

SAMPLE ANALYSIS

Sample No.	Matrix*	Date Sampled	Time Sampled											
<b>BOPC23</b>	<b>Other</b>	<b>8-31-98</b>	<b>1100</b>	<b>X</b>	<b>Approximately 35ml of sludge in bottle</b>									
					<b><del>600,000 DPM ALPHA</del> <del>DOB 8-31-98</del></b>									
					<b>7MR/hr gamma</b>									
					<b>300,000 DPM Alpha smearable</b>									
					<b>PU = .056g PH 1.8</b>									

Date/Time		Sign/Print Names	
Acquiesced By	Date/Time	Received By	Date/Time
<i>[Signature]</i>	<b>8-31-98</b>	<i>[Signature]</i>	<b>8-31-98</b>
Acquiesced By	Date/Time	Received By	Date/Time
Acquiesced By	Date/Time	Received By	Date/Time
Acquiesced By	Date/Time	Received By	Date/Time

**SPECIAL INSTRUCTIONS** LAB to separate liq + Solids AS Directed in LOI FY 98 Redox (202S) PU Loadout Hood Sample Analysis. Lig + Solid phase to be analyzed as directed in LOI FY 98 Redox (202-S) PU Loadout Hood Sampling and Analysis and 202-S Analytical instruction *DOB* **202-S P/U Loadout Hood Sample** **8-31-98**

- Matrix\*
- S = Soil
  - SF = Sediment
  - SO = Solid
  - SL = Sludge
  - W = Water
  - O = Oil
  - A = Air
  - DS = Drum Solids
  - DL = Drum Liquids
  - T = Tissue
  - WT = 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 1 of 1
BRYANT		Company Contact Michael Galgoul	Telephone No. 373-5681	Project Coordinator WEISS, RL	Data Turnaround <b>60 Days</b>		
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		Onsite property no. N/A					N/A
Waste Designation Client determined no waste codes associated with this project.				COA			
POSSIBLE SAMPLE HAZARDS/REMARKS			Preservation	None			
			Type of Container	P			
Special Handling and/or Storage			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			SPECIAL INSTRUCTIONS		Matrix *
Relinquished By	Date/Time	Received By	Date/Time	<p><b>Class 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 &lt;1% Actinides by ICP MS</b></p> <p>(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 (SN-846) Cadmium, Chromium, Iron, Nickel; ICP Metals - 6010A (Add-on) Lead; Mercury-TH1 (CV); Metals by ICP (TCLP) - 1311/6010; Mercury (TCLP) 1311/7470; VOA-8260A - Complete 4 - Methyl-2-Pentanone; PCBs-508; IC Anions - 9056 Chloride, Fluoride, Nitrogen in Nitrate,</p>		S - Soil	
Relinquished By	Date/Time	Received By	Date/Time			DL - Drum Liquids	
Relinquished By	Date/Time	Received By	Date/Time			T - Tissue	
Relinquished By	Date/Time	Received By	Date/Time			WI - Wipe	
LABORATORY SECTION	Received By	Title		Nitrogen in Nitrite, Phosphate, Sulfate, IC Anions - Add-on Oxalate; pH (Soil) - 9045; Asbestos		Date/Time	
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By		Tech Smeas		Date/Time	

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				B98-059-01		Page 1 of 2	
Collector		Company Contact Michael Galgout		Telephone No. 373-5681		Project Coordinator WEISS, RL		Data Turnaround <b>60 Days</b>	
Project Designation 202-S Building - Plutonium Loadout Hood - Other Solid		Sampling Location 200 West		SAF No. B98-059					
Ice Chest No.		Field Logbook No. <b>EL-1429</b>		Method of Shipment Hand deliver					
222-S Lab Operations		Offsite Property No. <b>N/A</b>		Bill of Lading/Air Bill No. <b>N/A</b>					
Waste Designation		Client determined no waste codes associated with this project.				COA			
POSSIBLE SAMPLE HAZARDS/REMARKS			Preservation		None				
			Type of Container		P				
			No. of Container(s)		1				
			Special Handling and/or Storage		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 → PCB 8-10-98	Other Solid								2.34 e-6 Ci
B0PC27 OLB 8-10-98	Other Solid								
B0PC28 OLB 8-10-98	Other Solid								
B0PC29 OLB 8-10-98	Other Solid								
CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS				Matrix *	
Relinquished By <i>[Signature]</i>		Date/Time 8-25-98		Received By <i>[Signature]</i>		Date/Time 8-25-98		If insufficient material, use FSR as a guideline. Analyses listed in order of priority. <b>RN</b> (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; Actinides by ICPMS  <b>Tech Smotr</b>  <b>TANK E16</b>	
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	Title				Date/Time			
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By				Date/Time			

Collector	Company Contact Michael Galgout	Telephone No. 373-5681	Project Coordinator WEISS, RL	Data Turnaround <b>60 Days</b>
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 202-S Lab Operations	Offsite Property No. N/A	Bill of Lading/Air Bill No. 1/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

Sample No.	Matrix *	Sample Date	Sample Time	See item (1) in Special Instructions.									
BOPC38 <sup>DOB 8-25-98</sup> 26	Other Solid	8-24-98	1245	X						6.13e-8 Ci			
BOPC27	Other Solid	8-24-98	1305	X						135,000 DPM	Tank	E21	
										+35,000 DPM	Tank	E19	
										66,000 DPM			
										3.0e-8 Ci			

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS	Matrix *
Relinquished By <i>[Signature]</i>	Date/Time 0855	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; Actinides by ICPMS  Tech Smears	S = Soil
Received By <i>[Signature]</i>	Date/Time 0855		SE = Sediment
Relinquished By <i>[Signature]</i>	Date/Time 825-98		SO = Solid
Received By <i>[Signature]</i>	Date/Time 825-98		SL = Sludge
Relinquished By	Date/Time		W = Water
Relinquished By	Date/Time		O = Oil
Relinquished By	Date/Time		A = Air
Relinquished By	Date/Time		DS = Drum Solids
Relinquished By	Date/Time		DL = Drum Liquids
Relinquished By	Date/Time		T = Tissue
Relinquished By	Date/Time		WI = Wipe
Relinquished By	Date/Time		L = Liquid
Relinquished By	Date/Time		V = Vegetation
Relinquished By	Date/Time		X = Other

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

Collector <b>BRYANT</b>	Company Contact Michael Galgoul	Telephone No. 373-5681	Project Coordinator WEISS, RL	Data Turnaround <b>60 Days</b>
Project Designation 202-S Building - Plutonium Loadout Hood - Other Solid	Sampling Location 200 West	SAF No. B98-059		
Ice Chest No. <b>ERC-077</b>	Field Logbook No. <b>EL-1429</b>	Method of Shipment Hand deliver		
Shipped To 202 S Lab Operations	Offsite Property No. <b>N/A</b>	Bill of Lading/Air Bill No. <b>N/A</b>		
Waste Designation Client determined no waste codes associated with this project.			COA	

POSSIBLE SAMPLE HAZARDS/REMARKS  <b>RAD</b>	Preservation	None																	
	Type of Container	P																	
	No. of Container(s)	1																	
	Special Handling and/or Storage	Volume 25g																	

SAMPLE ANALYSIS				See item (1) in Special Instructions															
-----------------	--	--	--	--------------------------------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Sample No.	Matrix *	Sample Date	Sample Time																
<del>BOPC3028</del> <b>28</b>	Other Solid	<b>8-31-98</b>	<b>1010</b>	<b>X</b>	<b>600,000 DPM</b>	<b>Alpha</b>													

CHAIN OF POSSESSION		Sign/Print Names				SPECIAL INSTRUCTIONS						Matrix *	
Relinquished By <i>[Signature]</i>	Date/Time <b>8-31-98</b>	Received By <i>[Signature]</i>	Date/Time <b>8-31-98</b>			If insufficient material, use FSR as a guideline. Analyses listed in order of priority. <b>RUN</b> (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; Actinides by ICPMS <b>TANK - E17</b> <b>Tech Smear</b>						S - Soil SE - Sediment SO - Solid SL - Sludge W - Water O - Oil A - Air DS - Drum Solids DL - Drum Liquids T - Tissue W1 - Wipe L - Liquid V - Vegetation X - Other	
Relinquished By	Date/Time	Received By	Date/Time										
Relinquished By	Date/Time	Received By	Date/Time										
LABORATORY SECTION	Received By	Title										Date/Time	
FINAL SAMPLE DISPOSITION	Disposal Method					Disposed By						Date/Time	

Collector <i>D. BRYANT / T. Malley</i>	Company Contact Michael Gulgoul	Telephone No. 272-5681	Project Coordinator WEISS, RL	Data Turnaround <b>60 Days</b>
Project Designation 202-S Building - Plutonium Loadout Hood - Other Solid	Sampling Location 200 West	SAF No. B98-059		
Ice Chest No.	Field Logbook No. <i>EL-1429</i>	Method of Shipment Hand deliver		
Shipped To 222-S Lab Operations	Office Reference No. <i>N/A</i>	Bill of Lading/Air Bill No. <i>N/A</i>		
Waste Designation Client determined no waste codes associated with this project.		COA		

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None																		
	Type of Container	P																		
	No. of Container(s)	1																		
Special Handling and/or Storage	Volume	25g																		

SAMPLE ANALYSIS		See item (1) in Special Instructions.																		
-----------------	--	---------------------------------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Sample No.	Matrix *	Sample Date	Sample Time																		
BOPK78	Other Solid	8-11-98	0920	X																	
BOPK79 <i>DL By test</i>	Other Solid																				

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS								Matrix *					
Relinquished By <i>Doug Bryant</i>		Date/Time <i>0855</i>		Received By <i>[Signature]</i>		Date/Time <i>0855</i>		If insufficient material, use FSR as a guideline. Analyses listed in order of priority. <i>R/N 8/6/98</i> (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								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	
Relinquished By <i>[Signature]</i>		Date/Time <i>8-25-98</i>		Received By <i>[Signature]</i>		Date/Time <i>8-25-98</i>											
Relinquished By		Date/Time		Received By		Date/Time											
Relinquished By		Date/Time		Received By		Date/Time											

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/LO-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.

A handwritten signature in cursive script that reads "Doris Ayres". The signature is written in dark ink and is located in the lower-left quadrant of the page.

# 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

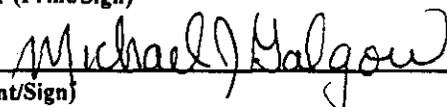


7-10-98

Project Coordinator (Print/Sign)

Date

GALGOUL, MJ



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

*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 #: B98-079

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



9-10-98

Project Coordinator (Print/Sign)

Date

GALGOUL, MJ

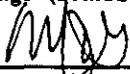


9-10-98

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

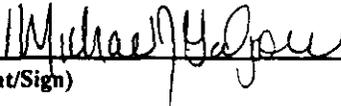


9-11-98

Project Coordinator (Print/Sign)

Date

GALGOUL, MJ



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

SAFW: 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)

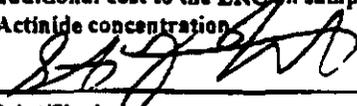
Date

## 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 <sup>for</sup>



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 Ken  
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

# 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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## 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  $\leq 15\%$  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**



page 9 of 58

Westinghouse Hanford Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				C.O.C. No.	
Collector 202S Laboratory		Contact/Requestor Ruth Esch		Telephone No. 373-4314		MSIN FAX 16-12 372-1878	
SAF No.		Sample Origin 202S Facility Pu Loadout Hood		Purchase Order/Charge Code BBB211		Temp.	
Project Title 202S Pu Loadout - FRB-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.		Offsite Property No.	
Protocol SW-846 Method/8268 for Hexone		Data Turnaround		Offsite Property No.			
Sample	Lab ID	Date	Time	No./Type Container	Sample Analysis	Preservation	
SAMP	8016-83 S98M00307			prge/trap tube	VOA analysis for hexone. Sample amount = 1.21 g	NONE	
DUP	8016-84 S98M00307			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 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		SPECIAL INSTRUCTIONS	
Sample contains 70 uCi/g alpha activity  7.5 uCi/g beta activity						Analyze for hexone. Sampling date 8/31/98	
						Hold Time 14 days from sampling date, 9/14/98	
Relinquished By	Print	Signature	Date/Time	Received By	Print	Signature	Date/Time
Relinquished By	Jim Knight	[Signature]	9/17/98/1300	Received By	JG HOGAN	[Signature]	9-17-98/1300
Relinquished By	JG HOGAN	[Signature]	9-17-98/1310	Received By	DOUG BONFOEY	[Signature]	9/17/98/1310
Relinquished By				Received By			
Matrix*				S = Soil DS = Drum Solids BE = 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

COPY

82300-FAST-98-100

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-G000-B2B (12/95)

## Quality Control Summary Tables

### Internal Standards Summary Table

Sample Name	Data File	a,a,a-Trifluorotoluene		
		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

Sample Name	Data File	2-Hexanone	Tetrachloroethylene
		%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%

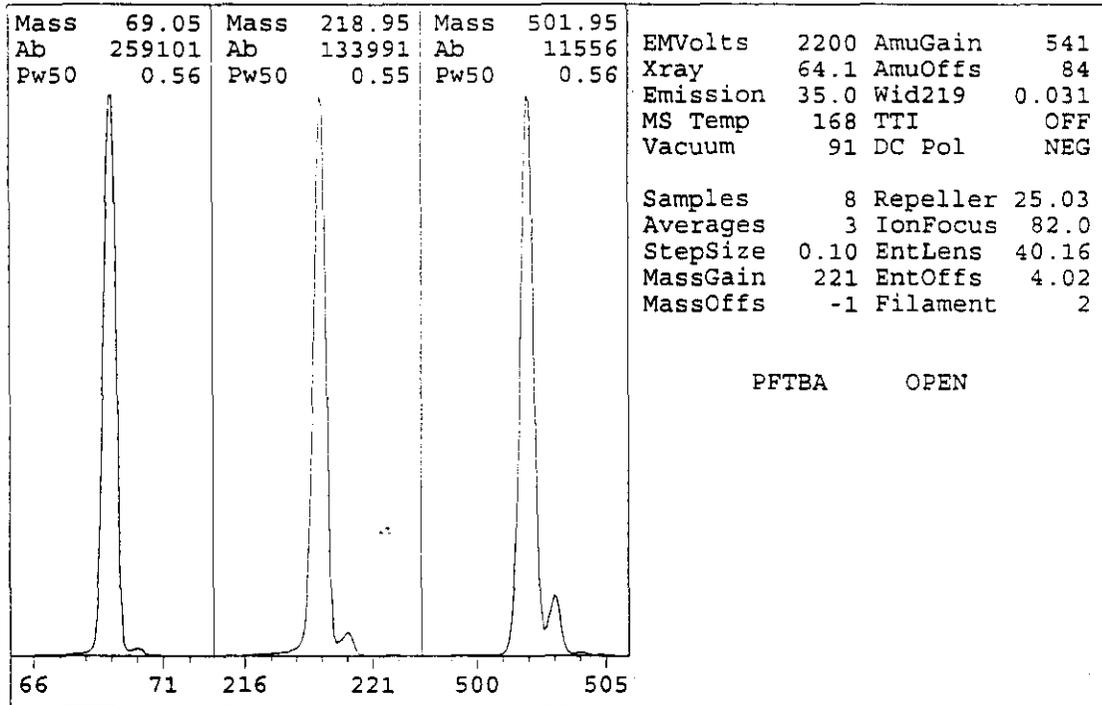
Acceptance Limit = 70 - 130% Recovery

## **MS Tunes and BFB Spectral Scans**

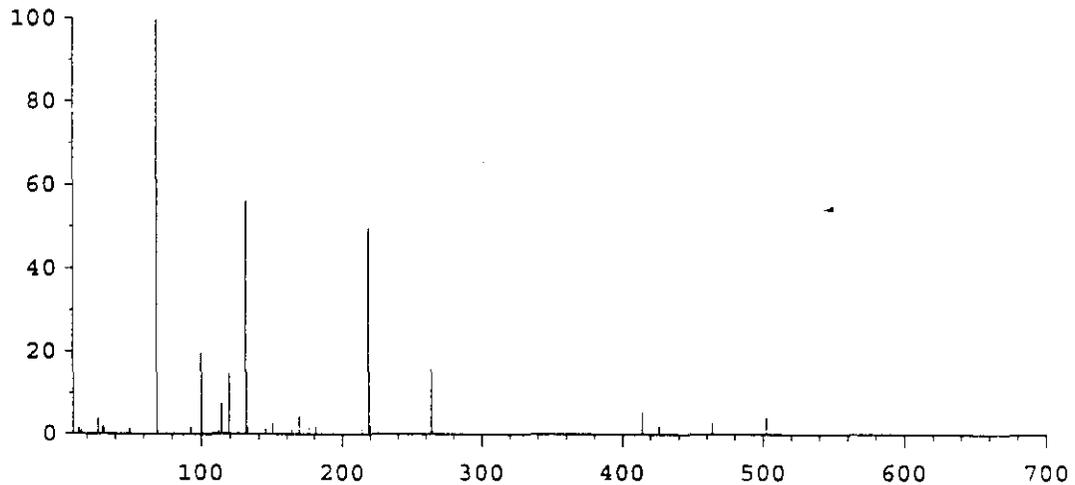
HP5972 Standard Spectra AutoTune

Instrument: 5972 INSTRUMENT 4 TEMP  
 Mon Sep 14 09:29:56 1998

C:\HPCHEM\4\5972\ATUNE.U

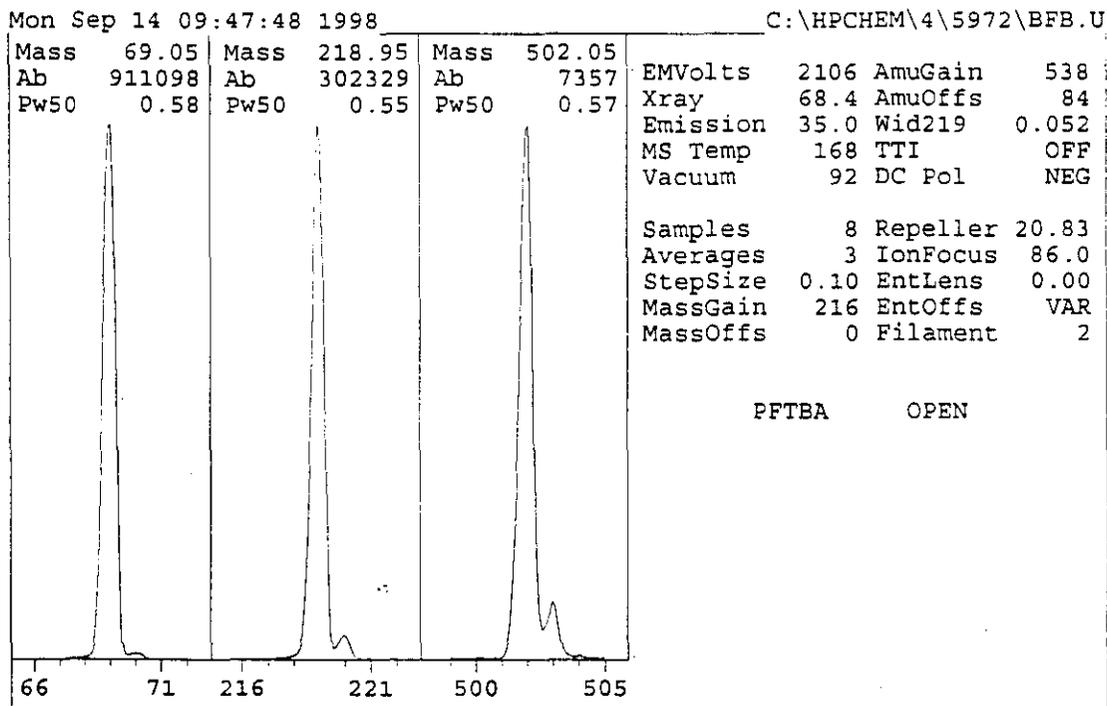


Scan: 10.00 - 700.00 Samples: 8 Thresh: 100 Step: 0.10  
 129 peaks Base: 68.95 Abundance: 228032

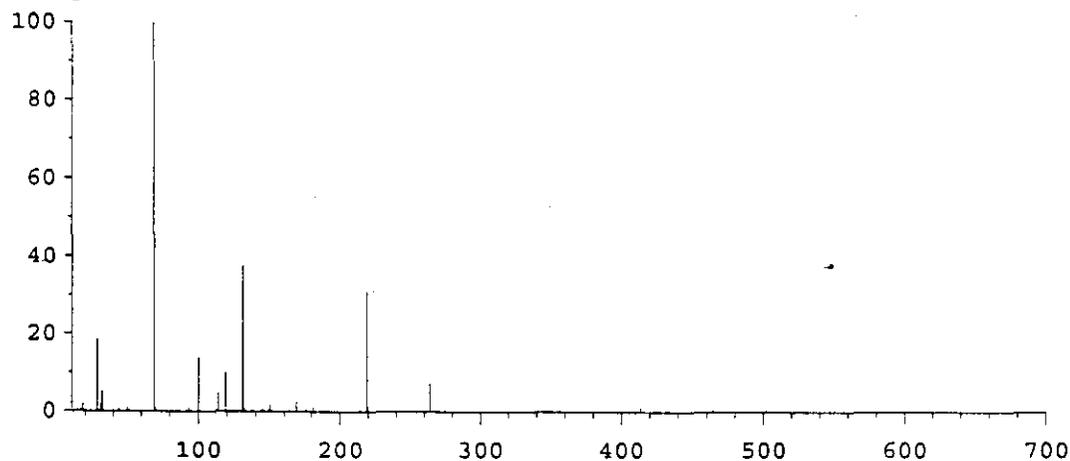


Mass	Abund	Rel Abund	Iso Mass	Iso Abund	Iso Ratio
68.95	228032	100.00	69.85	2658	1.17
218.95	113784	49.90	219.95	5016	4.41
502.00	10070	4.42	502.90	1047	10.40

HP5972 BFB Dynamic Target Tune



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 Vial: 1  
 Acq On : 14 Sep 98 11:39 am Operator: Bonfoey  
 Sample : Method Blank N-91-1-02.08 Inst : 5972 INST  
 Misc : 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

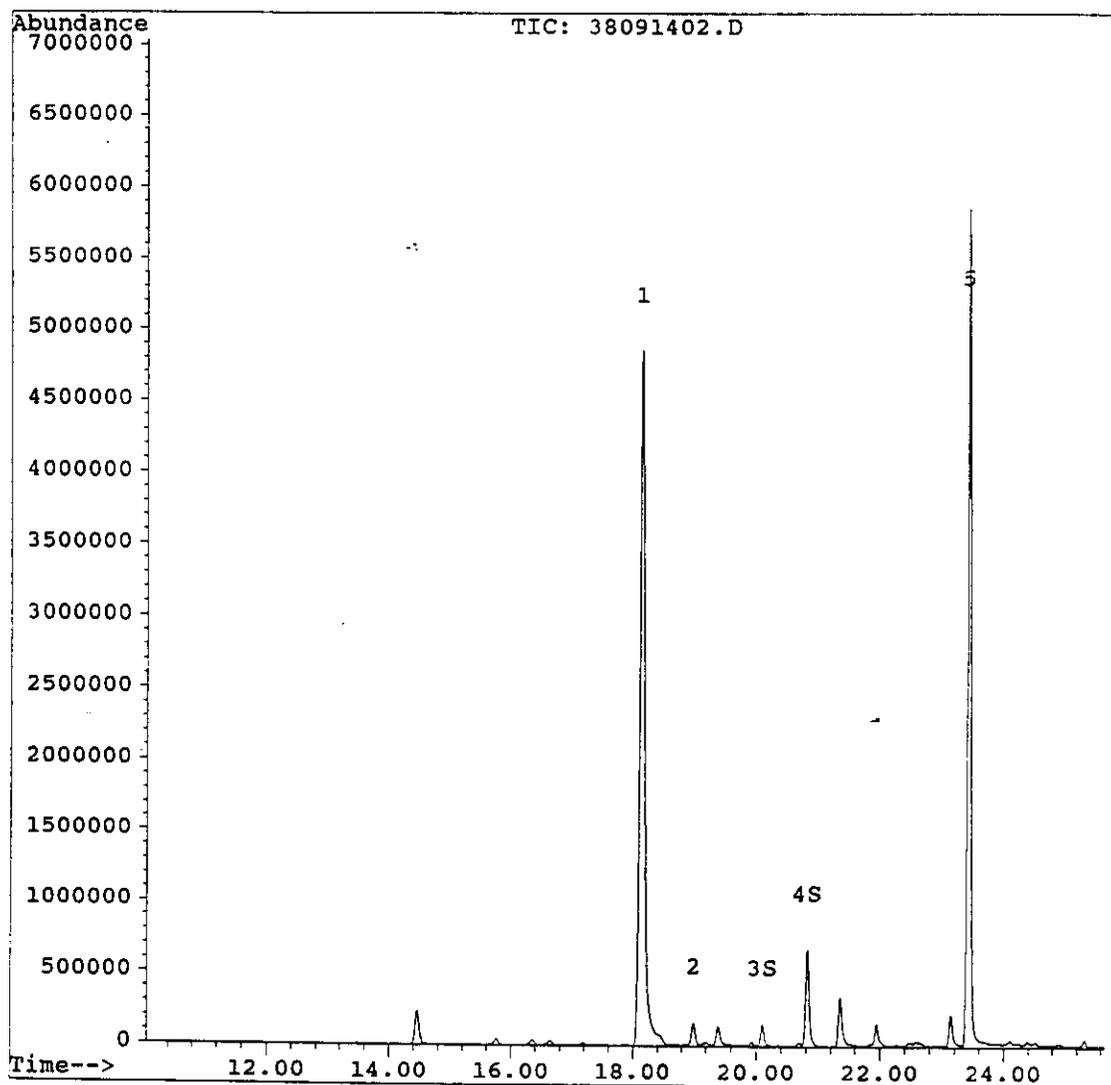
Page 1

## 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

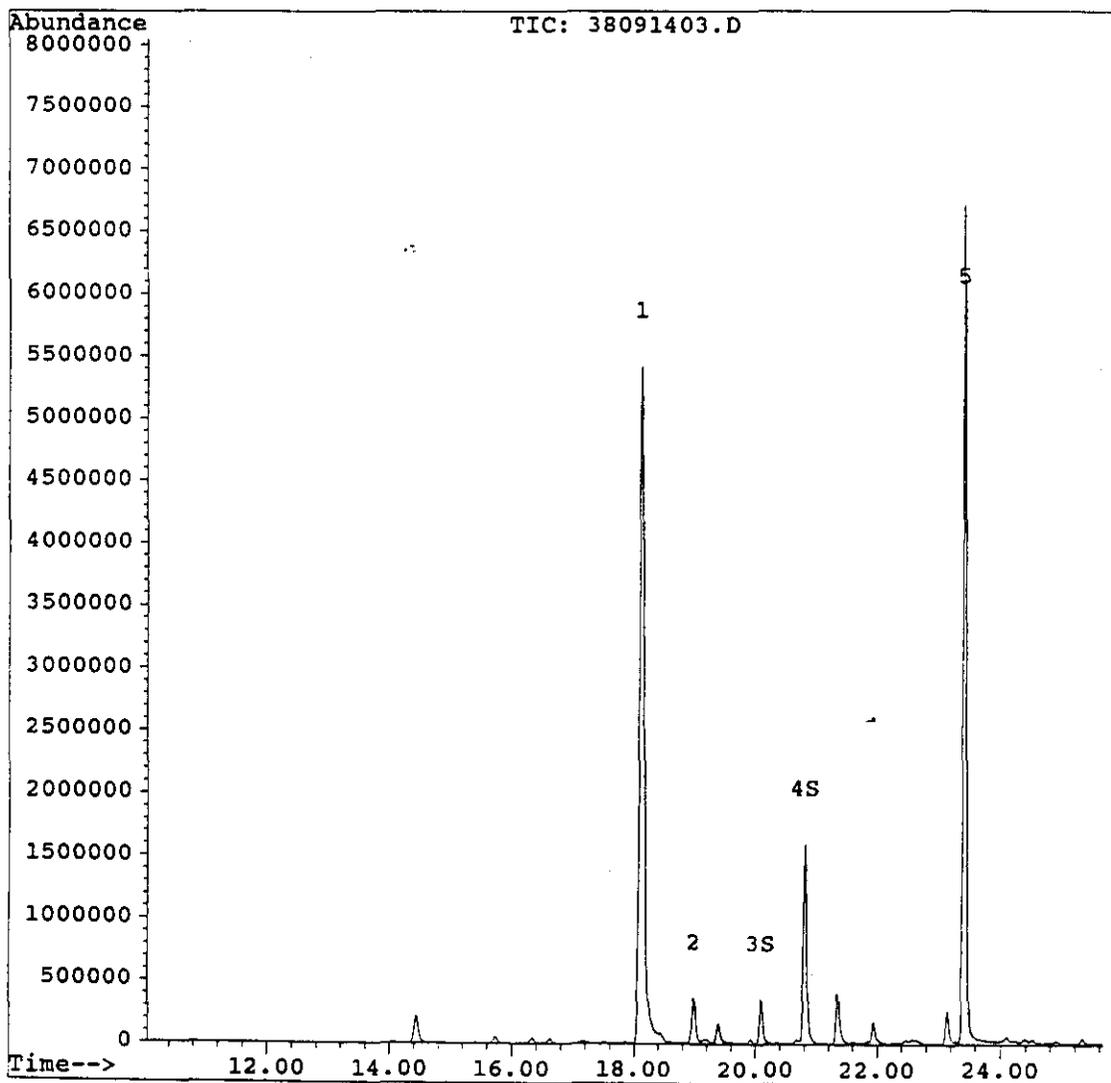
Page 1

## 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
						%Recovery
System Monitoring Compounds						
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%
						Qvalue
Target Compounds						
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

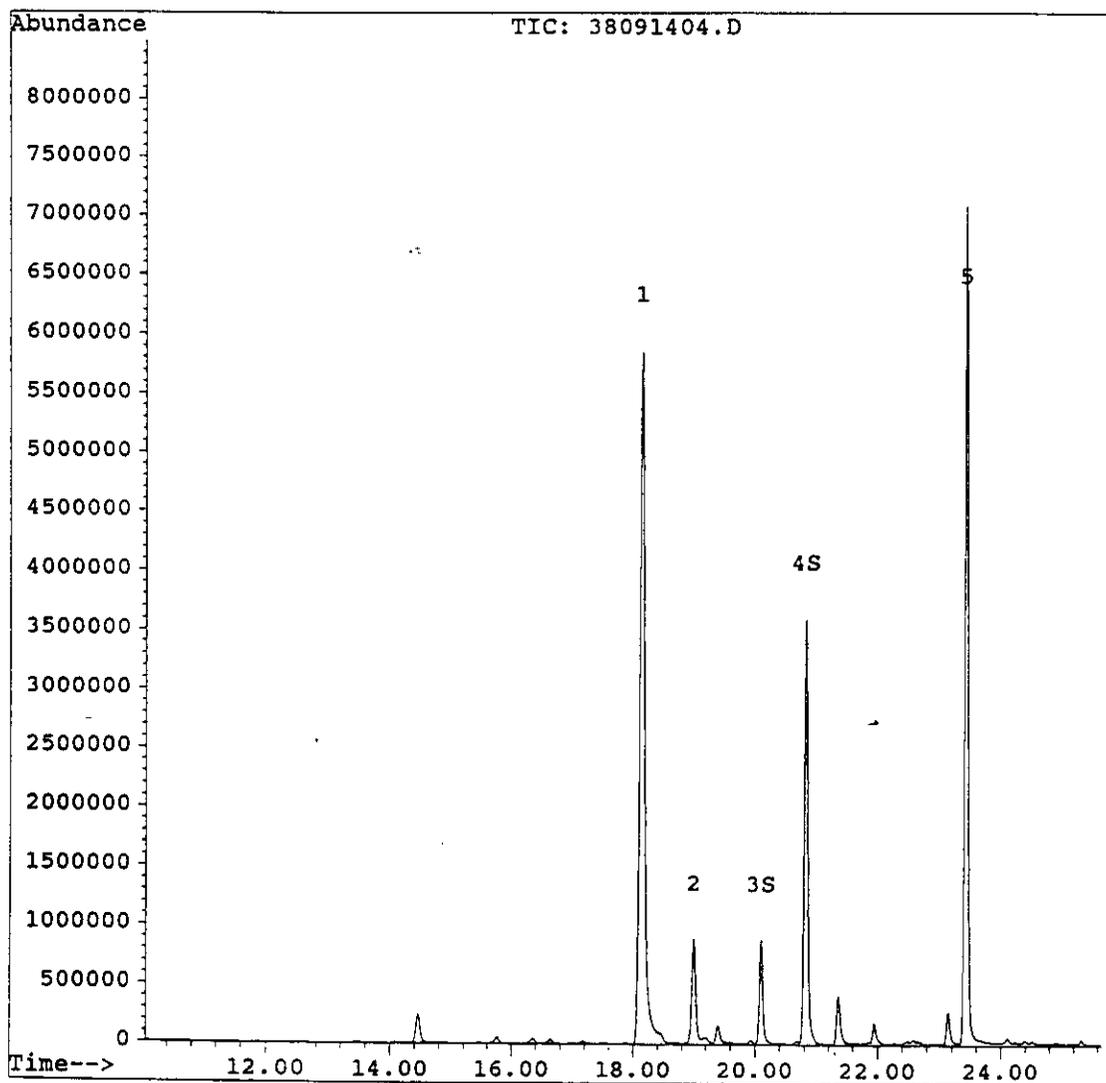
Page 1

## 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



## 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
						%Recovery
System Monitoring Compounds						
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%
						Qvalue
Target Compounds						
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

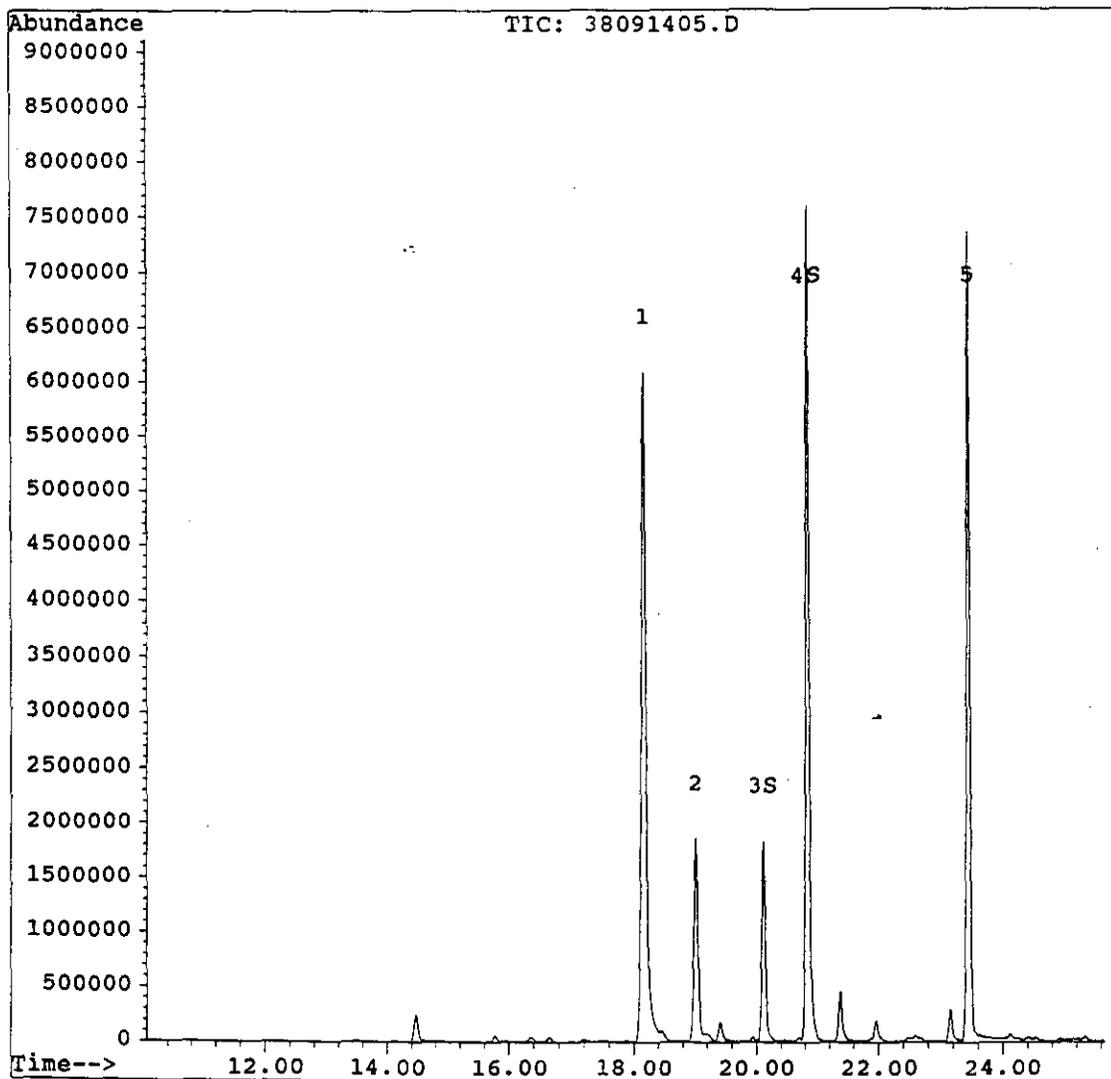
Page 1

## 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

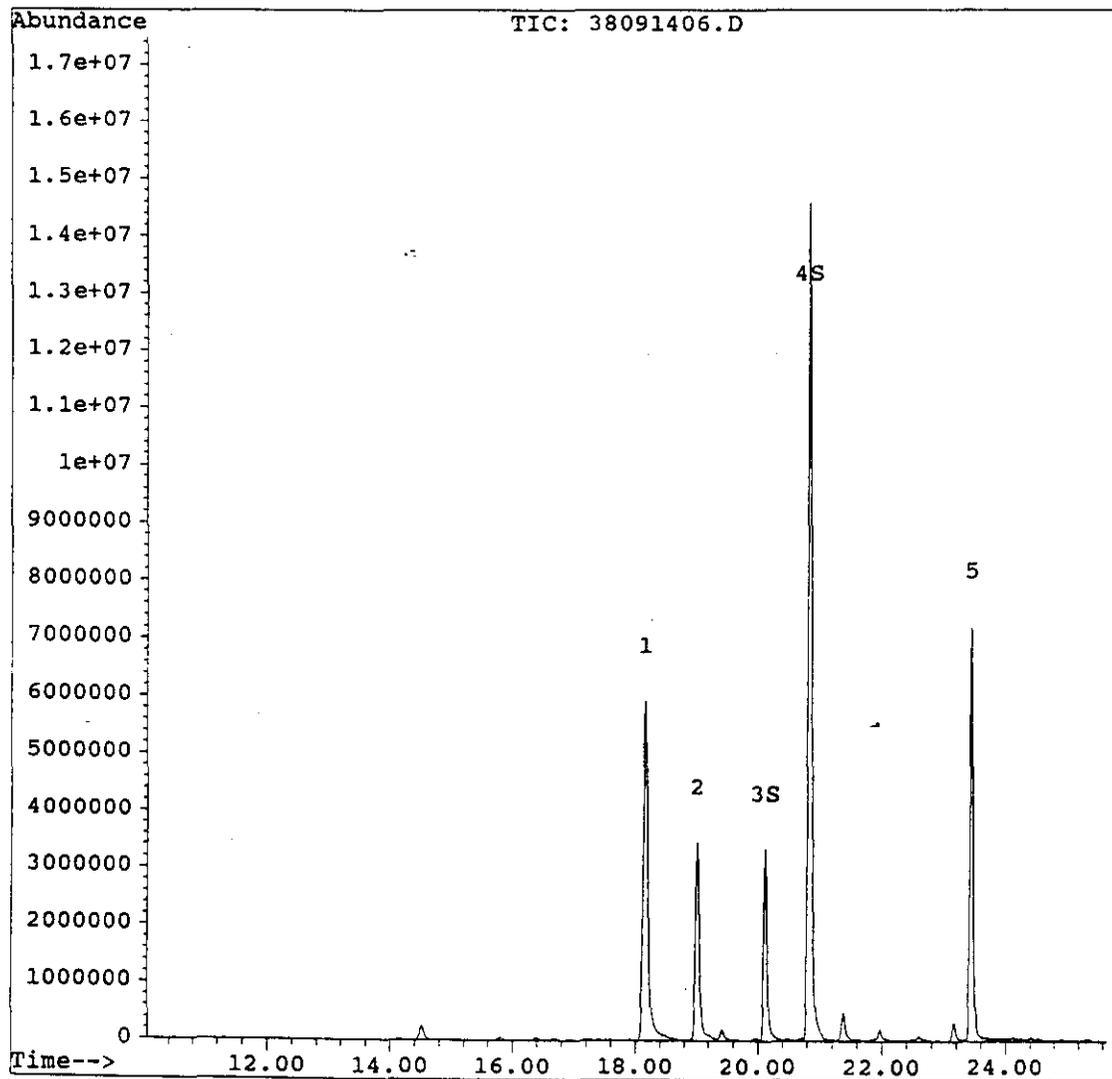
Page 1

## 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



## 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
						%Recovery
System Monitoring Compounds	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%
						Qvalue
Target Compounds	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

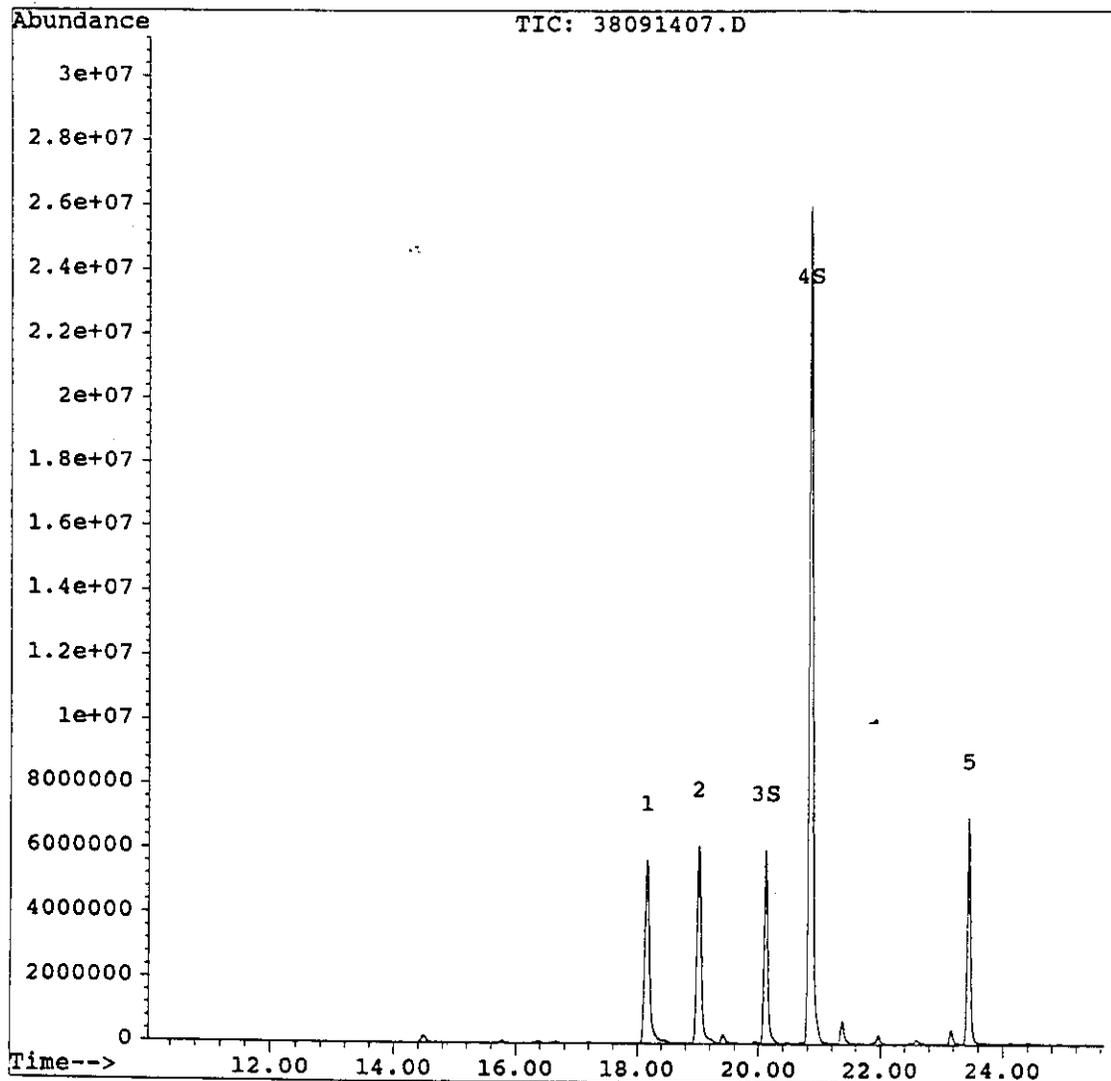
Page 1

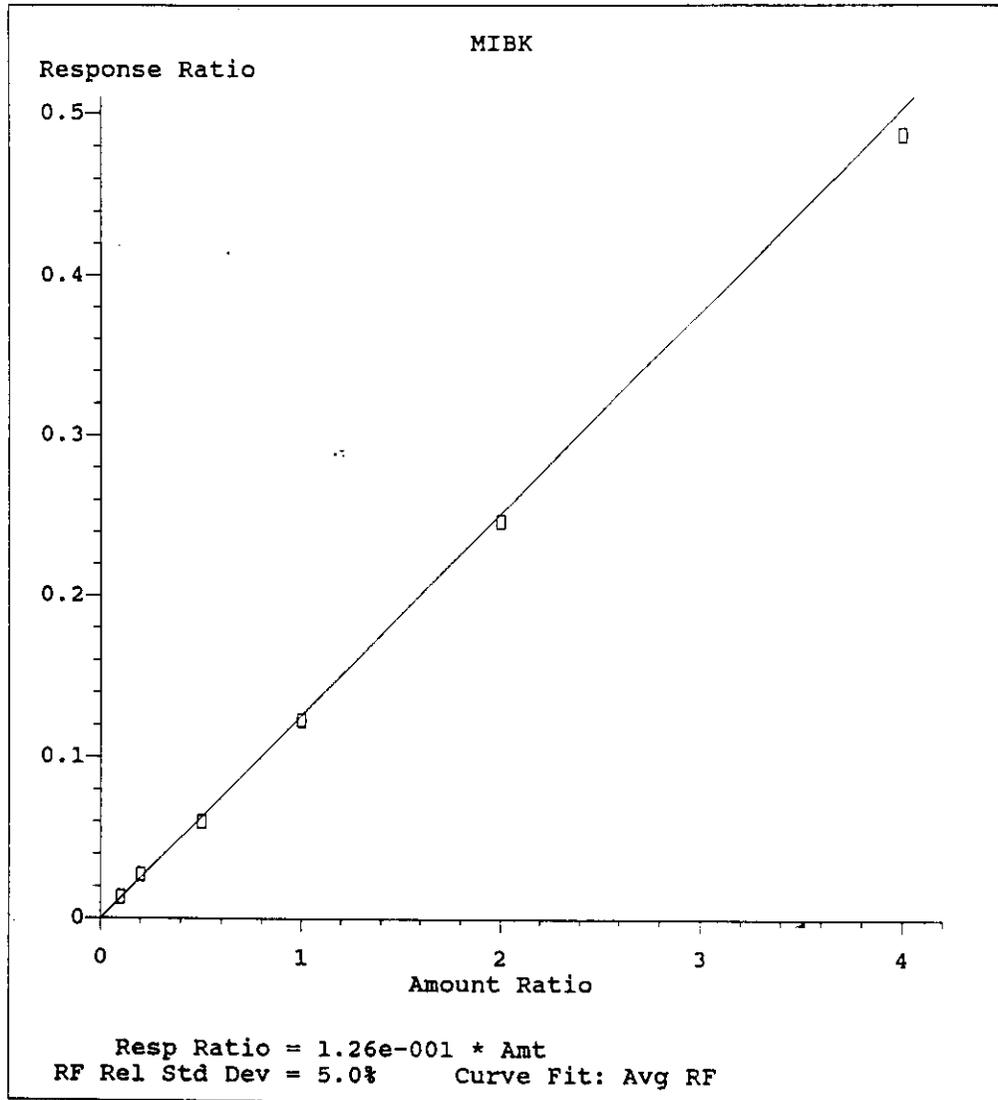
## Quantitation Report

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

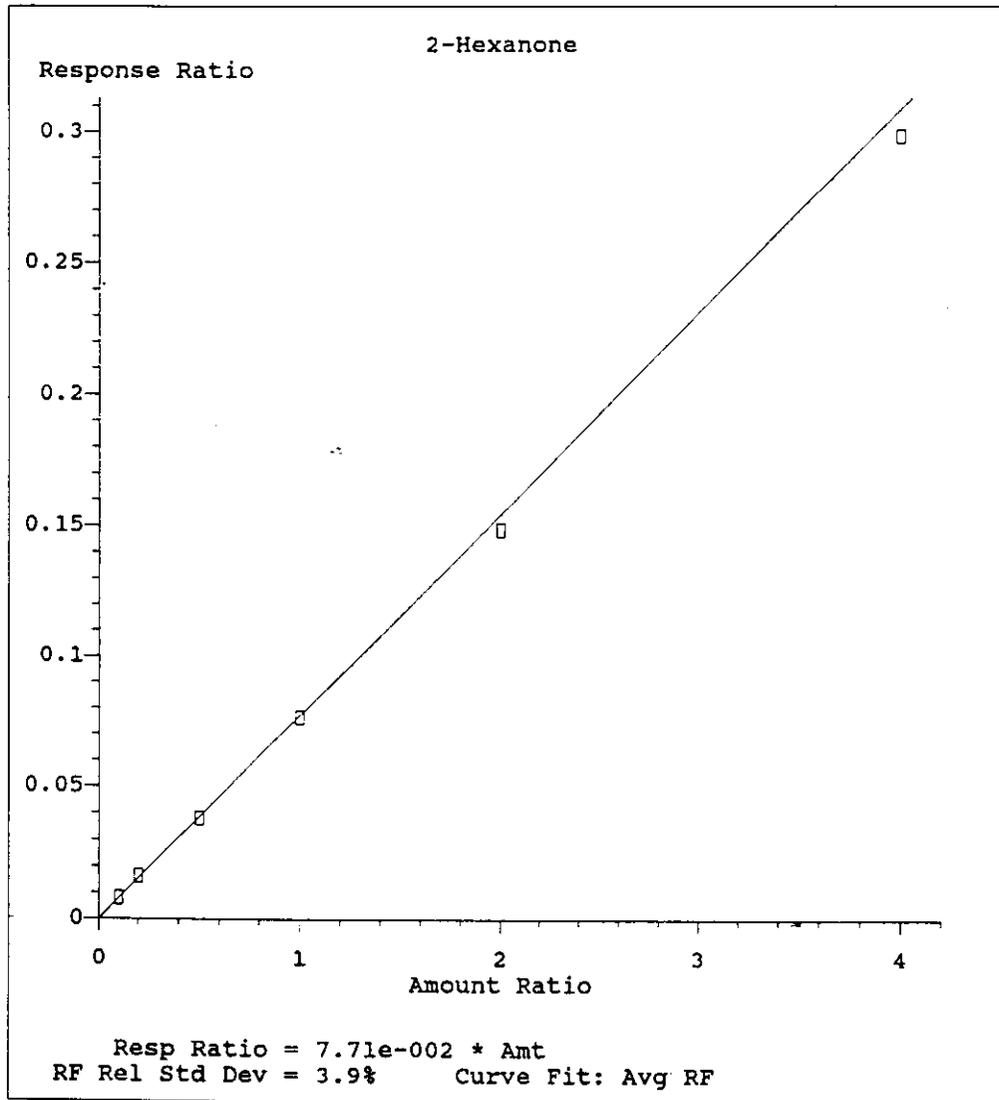
Vial: 7  
Operator: Bonfoey  
Inst : 5972 INST  
Multiplr: 1.00

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

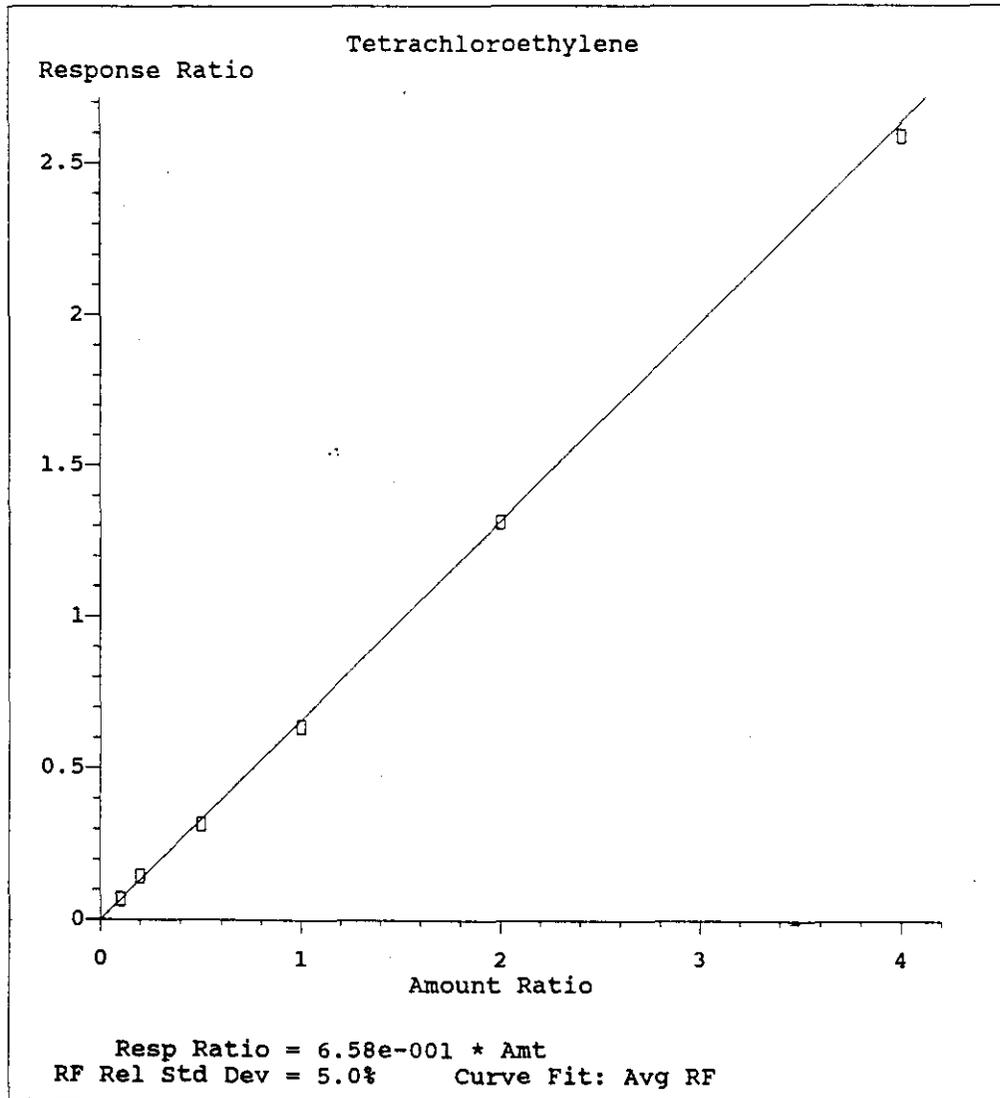




Method Name: C:\HPCHEM\2\METHODS\HEXONE.M  
Calibration Table Last Updated: Mon Sep 14 15:53:28 1998



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 Vial: 9  
 Acq On : 15 Sep 98 12:59 pm Operator: Bonfoey  
 Sample : 50 ug/L std N-91-1-21.04 Inst : 5972 INST  
 Misc : Multiplr: 1.00  
 Quant Time: Sep 15 13:28 1998

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 Vial: 9  
 Acq On : 15 Sep 98 12:59 pm Operator: Bonfoey  
 Sample : 50 ug/L std N-91-1-21.04 Inst : 5972 INST  
 Misc : 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  
 38091405.D HEXONE.M

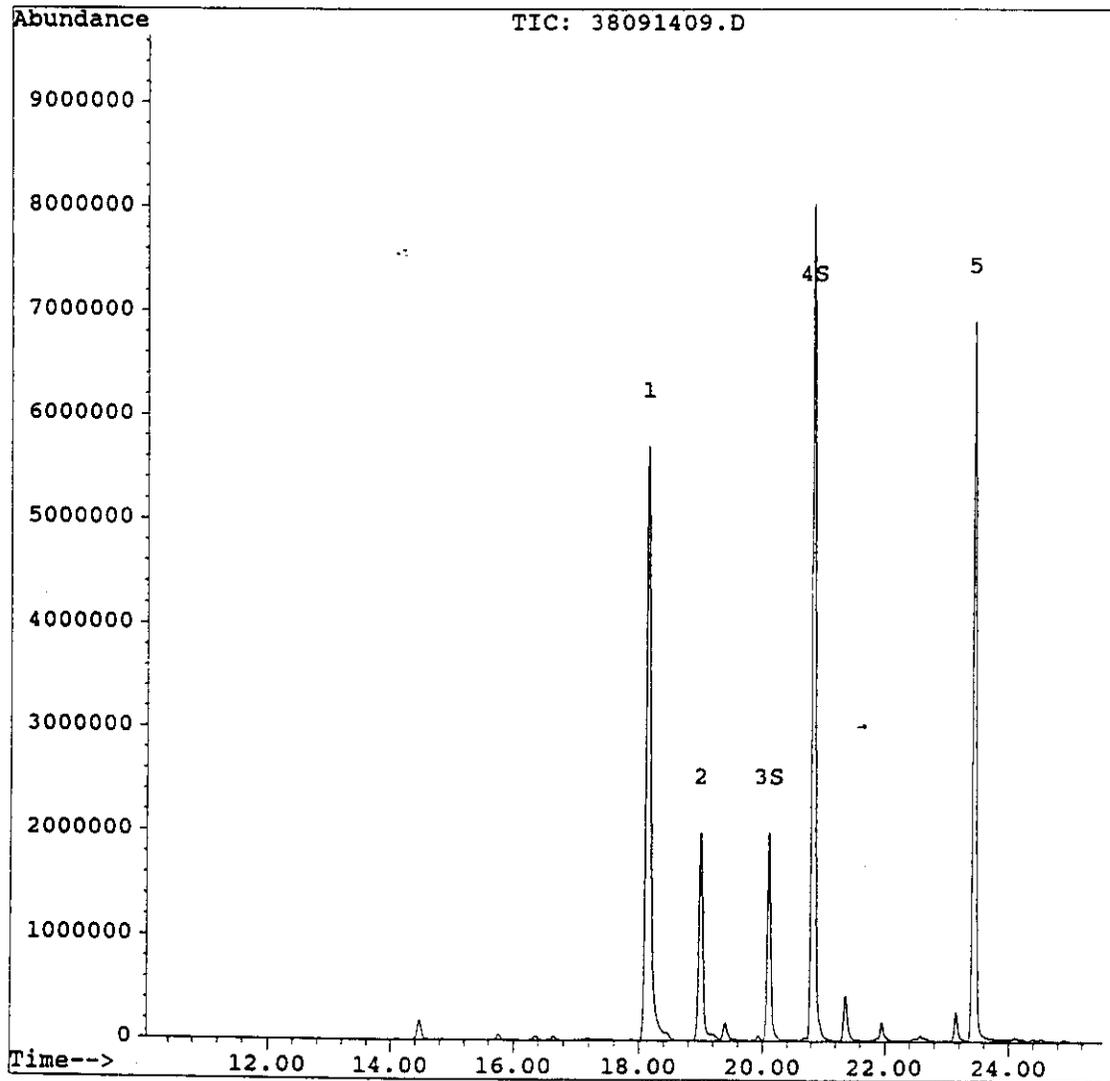
SPCC's out = 0 CCC's out = 0  
 Wed Sep 30 13:35:24 1998

## 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

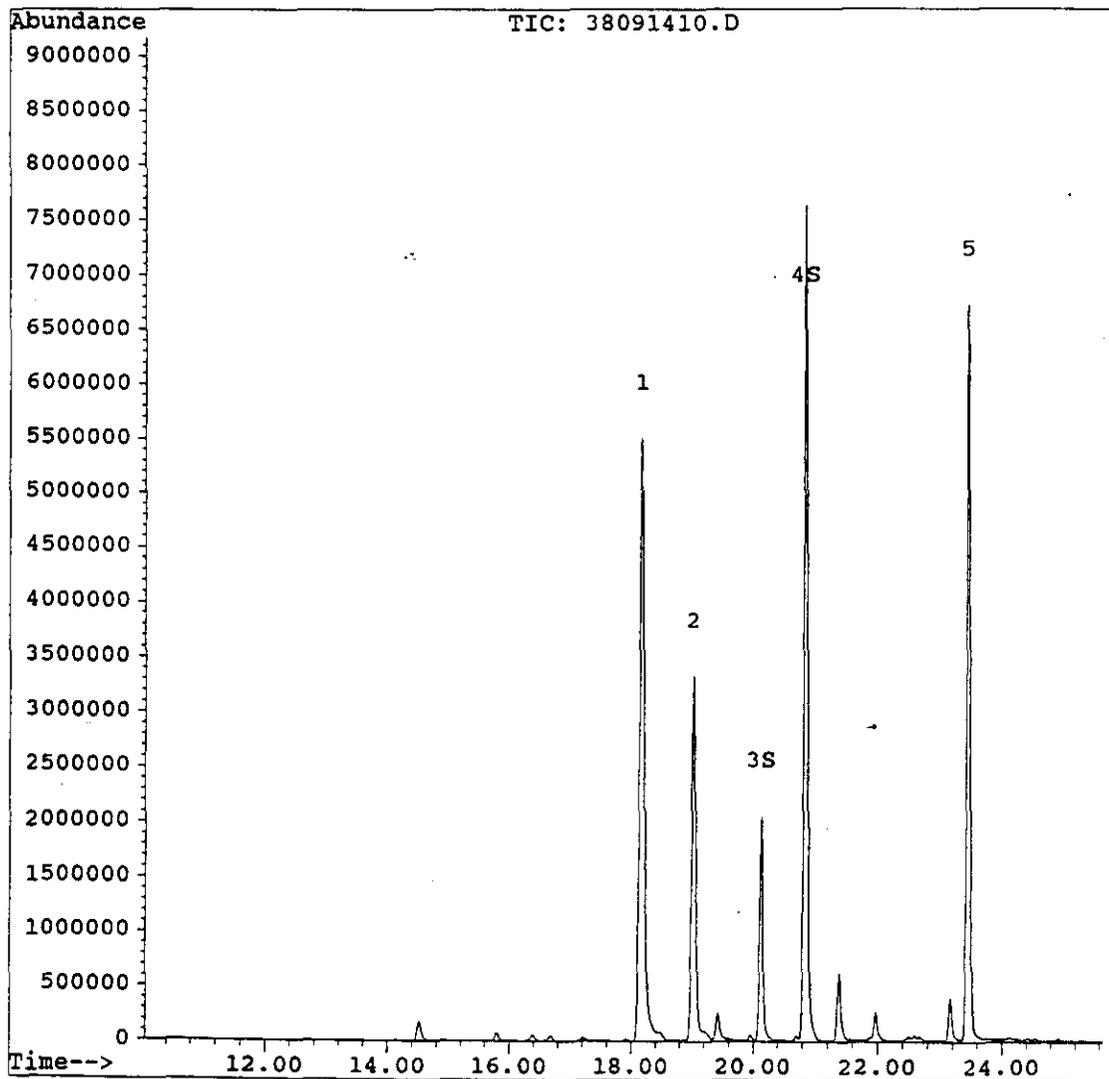
(#) = qualifier out of range (m) = manual integration  
 38091410.D HEXONE.M Wed Sep 30 13:40:15 1998

## 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 Vial: 10  
 Acq On : 18 Sep 98 10:34 am Operator: Bonfoey  
 Sample : 50 ug/L std n-91-1-21.09 Inst : 5972 INST  
 Misc : 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  
 38091405.D HEXONE.M

SPCC's out = 0 CCC's out = 0  
 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

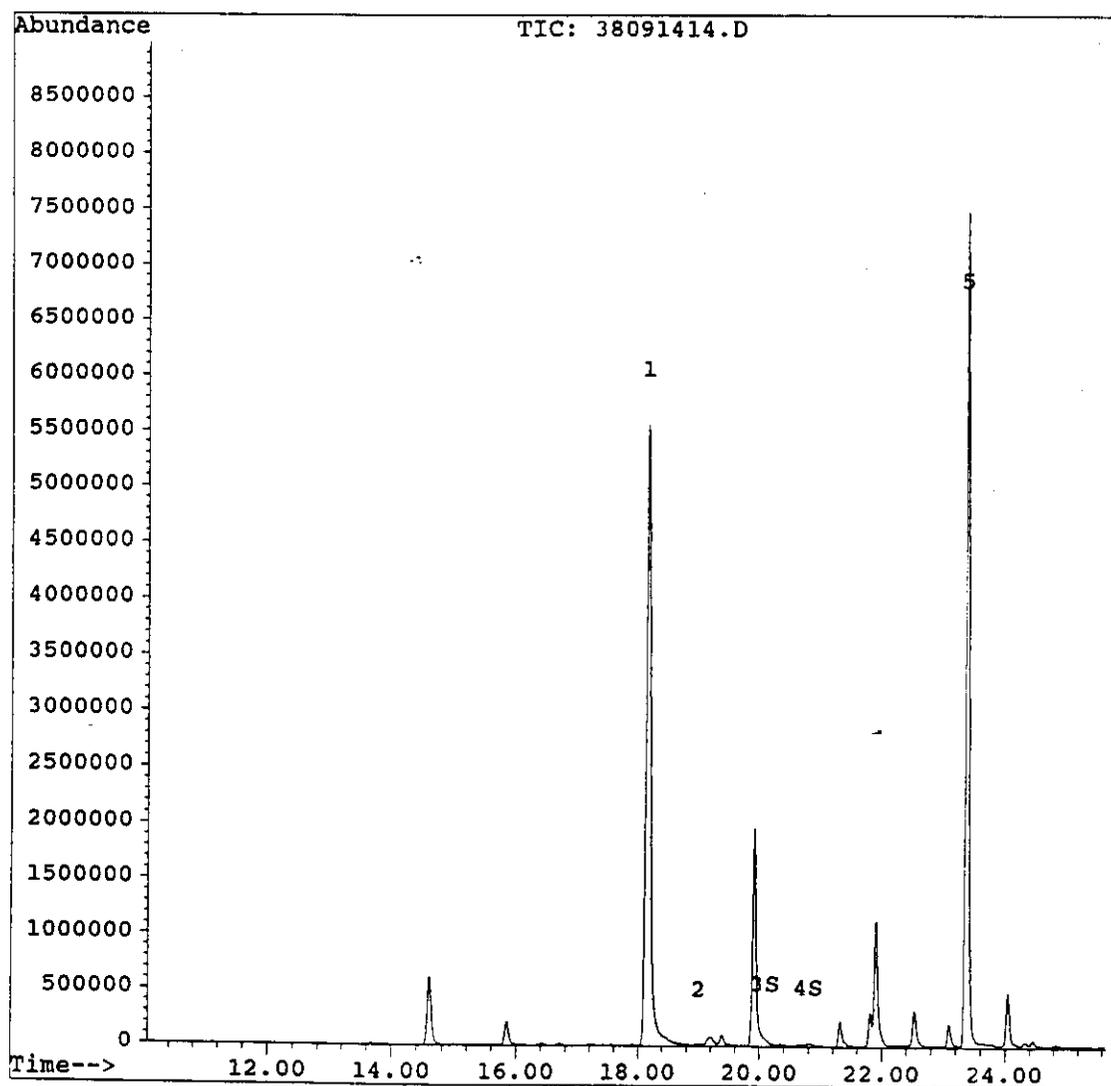
(#) = qualifier out of range (m) = manual integration  
 38091414.D HEXONE.M Wed Sep 30 13:25:00 1998

## 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



## 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

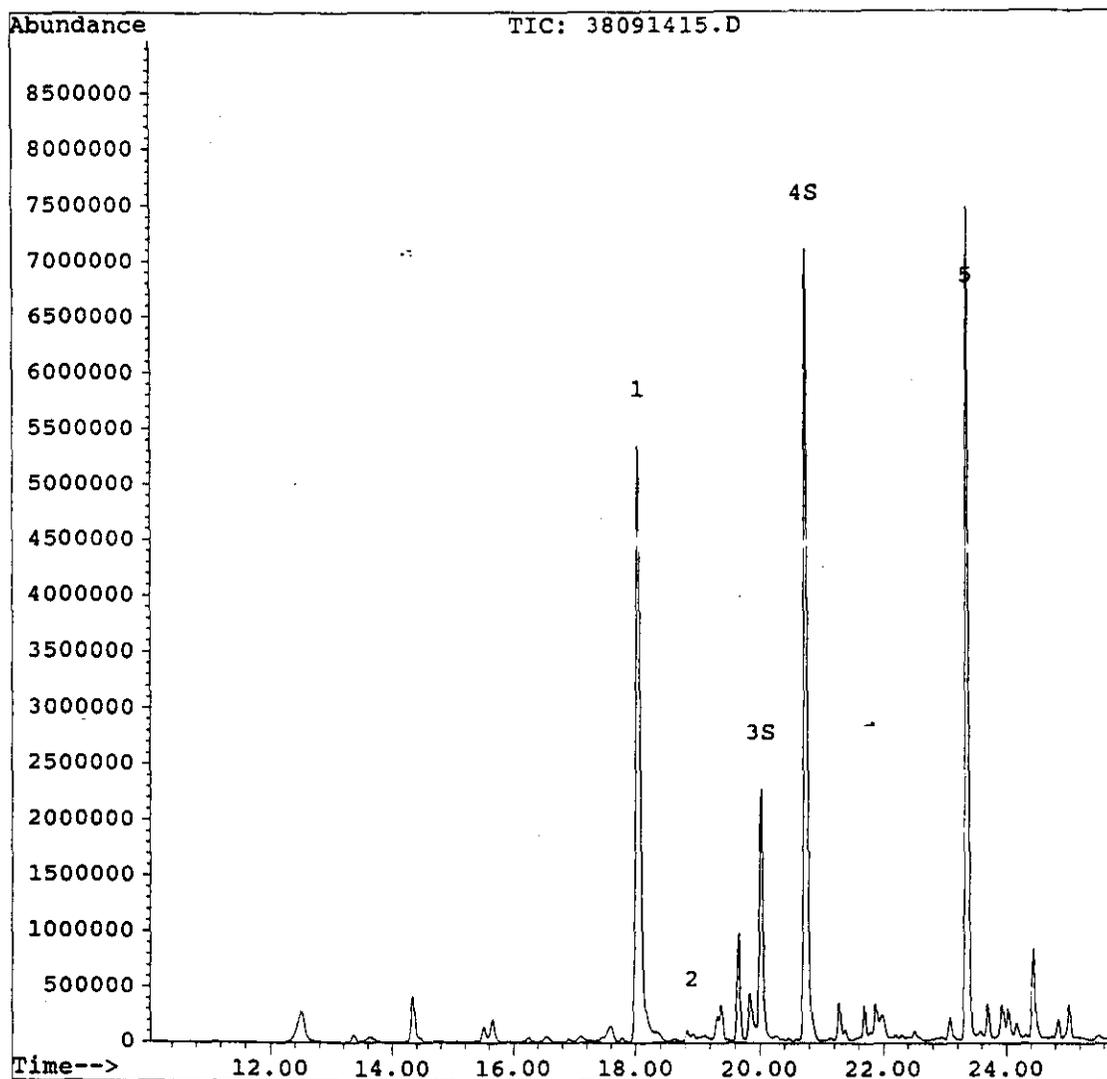
(#) = qualifier out of range (m) = manual integration  
 38091415.D HEXONE.M Wed Sep 30 13:44:53 1998

## 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 Vial: 10  
 Acq On : 23 Sep 98 2:38 pm Operator: Bonfoey  
 Sample : Method Blank N-91-1-22.02 Inst : 5972 INST  
 Misc : Multiplr: 1.00  
 Quant Time: Sep 29 10:58 1998

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

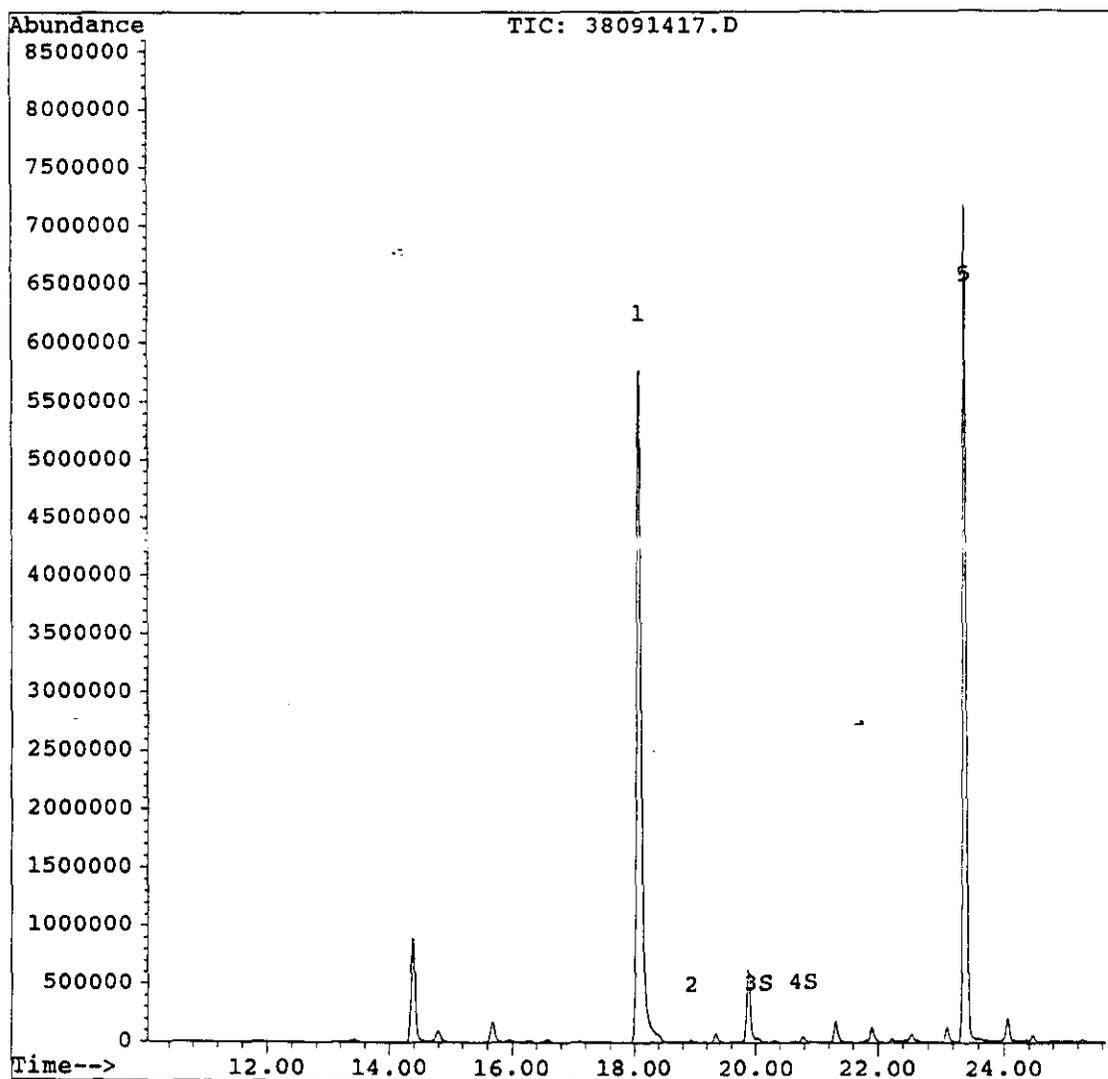
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 38091417.D HEXONE.M Wed Sep 30 14:45:27 1998

## 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 Vial: 10  
 Acq On : 23 Sep 98 3:15 pm Operator: Bonfoey  
 Sample : 50 ug/L std N-91-1-22.03 Inst : 5972 INST  
 Misc : 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  
 38091405.D HEXONE.M

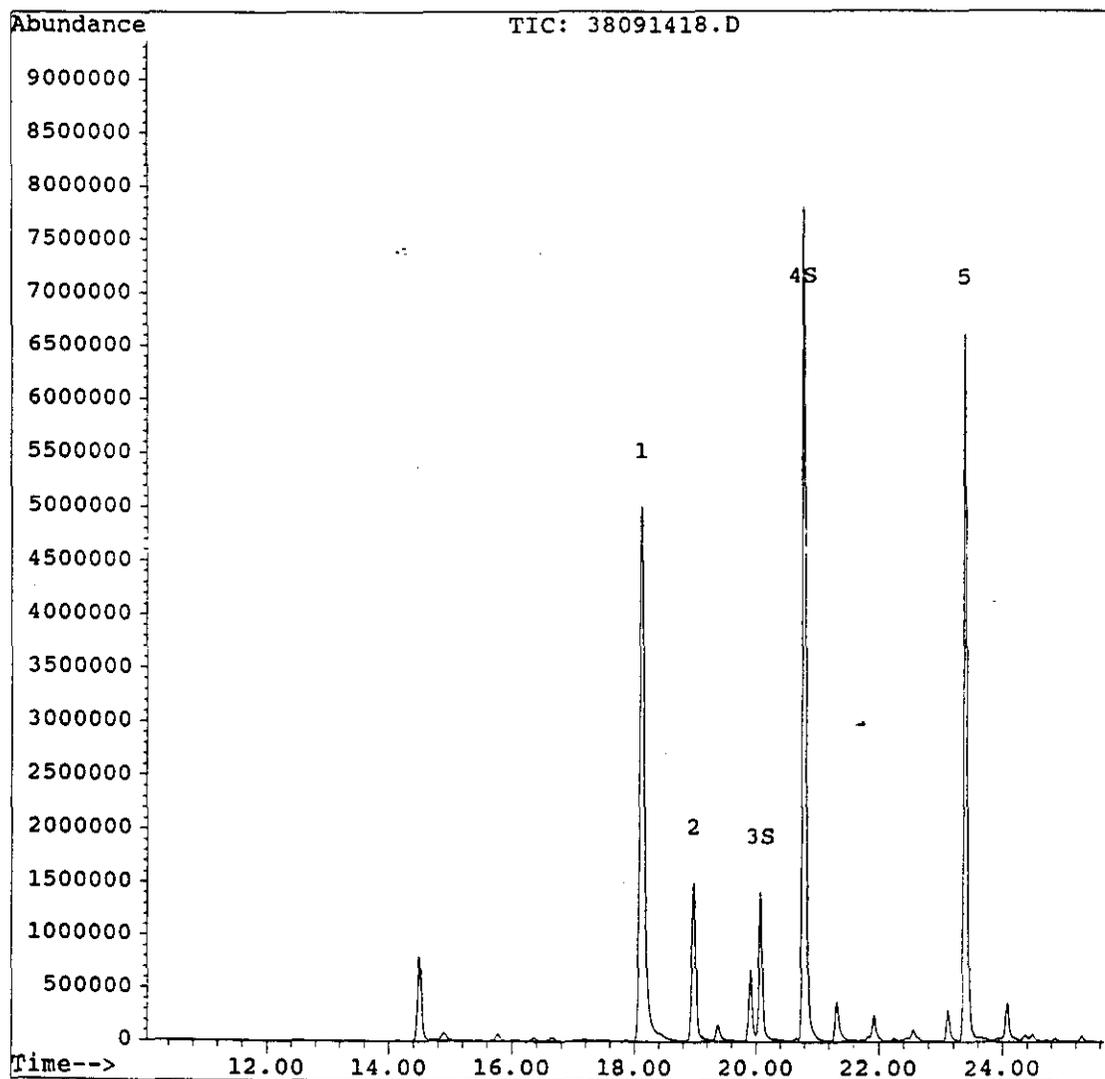
SPCC's out = 0 CCC's out = 0  
 Mon Oct 05 11:30:35 1998

## 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

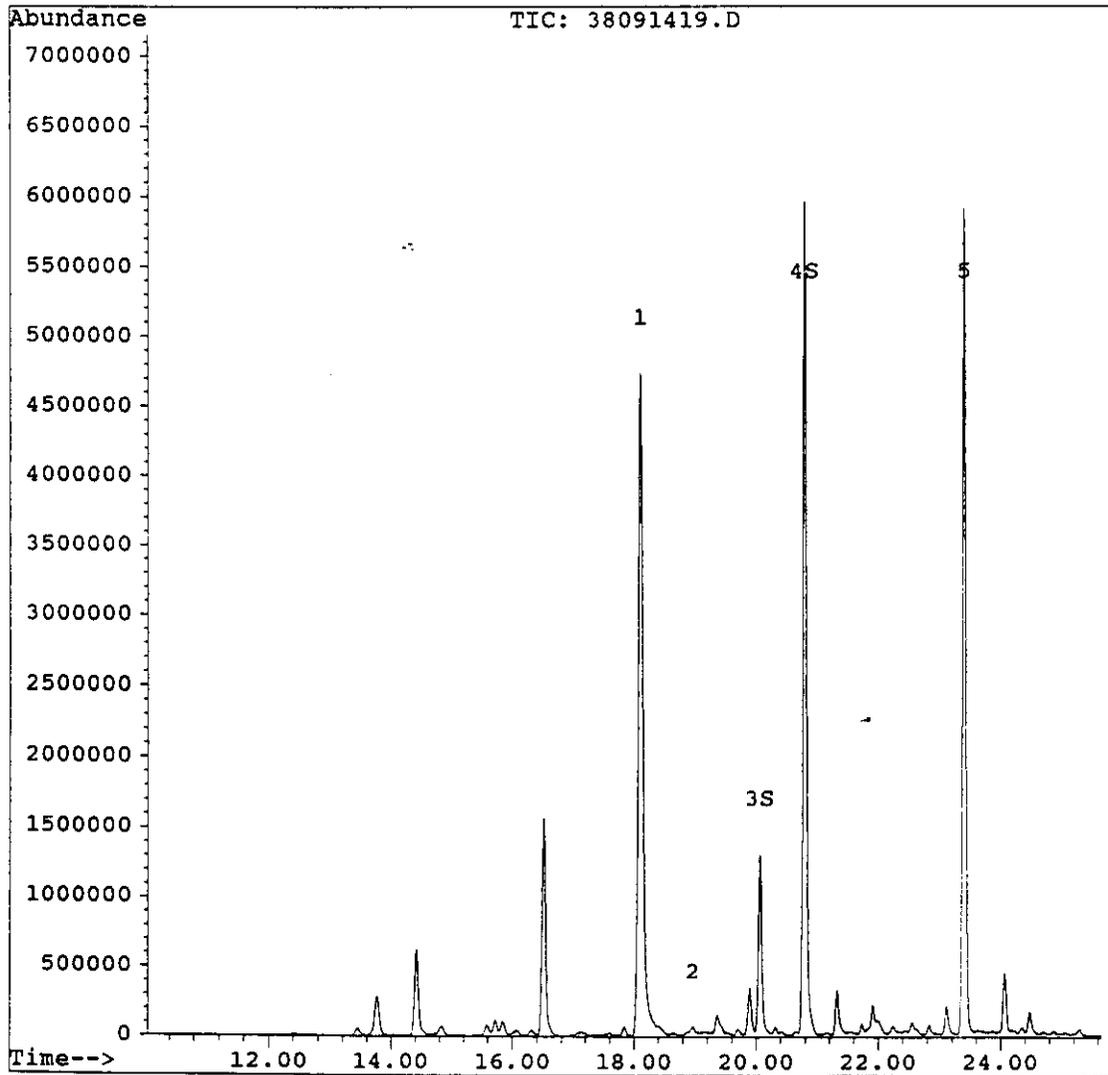
(#) = qualifier out of range (m) = manual integration  
 38091419.D HEXONE.M Wed Sep 30 14:47:27 1998

## 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**