Westinghouse
Hanford Company

P.O. Box 1970 Richland, WA 99352

222-S Analytical Laboratory

Project: 242-A EVAPORATOR FEED CHARACTERIZATION

Tank: 102AW

Customer Id. Number: 2291-1-1, 2291-2-1, 2291-3-1, 2291-4-1

Report Revision: 0

Date Printed: May 14, 1992

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S I G N A T U R E P A G E

I have reviewed the Inorganic and Radiochemistry results reported in this data package (when applicable). The results meet the requirements of "242-A Evaporator Feed Characterization Project - Statement of Work" - WHC-SOW-91-0002. This data is an accurate representation of the data generated for the requested laboratory analyses performed.

J. H. Tillman
242-A Evaporator Project Manager

7/29/92
Date

I have reviewed the compiled report and certify that this data package meets the document standards of the RCRA Data Packaging Procedure LO-150-151. This data package is complete and contains the data generated from the requested laboratory analysis performed on this sample.

L. R. Webb
Records Management Specialist
Data Coordinator

7/30/92
Date

I have reviewed this report and certify that this data package meets the requirements of "Quality Assurance Project Plan for the Chemical Analysis of Highly Radioactive Samples in Support of Environmental Activities on the Hanford Site" - WHC-SD-CP-QAPP-002, unless superseded by the Statement of Work or Waste Characterization Plan. This data package is a complete and accurate representation of the data generated from the requested laboratory analyses performed on this sample based on the QA Review Process.

L. P. Markel
Laboratory Q.A. Officer

9/12/92
Date

The data contained in this hardcopy data package has been approved and authorized for release by the Laboratory Manager or Manager's designee as verified by the following signature.

M. A. Bell
Manager
Processing and Analytical Laboratories

9-14-92
Date

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NARRATIVE

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Westinghouse
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242-EVAPORATOR FEED CHARACTERIZATION

INORGANIC CASE NARRATIVE

Introduction

The analysis of samples in support of the 242-A Evaporator Feed Characterization Project for Fiscal Year 1991, was performed by the 222-S Laboratory during the last quarter of 1991 and completed during the first quarter of 1992. Samples received and analyzed for the inorganic and conventional parameters were performed using methods specified in the Statement of Work (SOW), WHC-SOW-91-0002 Westinghouse Hanford Company, 242-A Evaporator Feed Characterization Project Fiscal Year 1991, September 1991.

Samples submitted to the laboratory were identified as:

1. TK-102-AW (referred to as 102AW in the remainder of this report) the feed tank prior to the evaporator.

2. TK-106-AW (referred to as 106AW in the remainder of this report) one of the candidate feed tanks into 102AW.

3. TK-103-AP (referred to as 103AP in the remainder of this report) the other candidate feed tank into 102AW.

The inorganic constituents requested for analysis on the three tanks were divided into the following categories; metals by Inductively Coupled Plasma (ICP), metals by Atomic Absorption Spectroscopy (AAS), and conventional parameters by specified methods. The results were obtained using approved methods as specified in Table I of the SOW. Quality analyses, including number and frequency, were performed in accordance to guidance found in Table 2 of the SOW. The parameters analyzed for from the three tanks are:

Metals by ICP

Silver	Ag
Aluminum	Al
Barium	Ba
Cadmium	Cd
Chromium	Cr
Iron	Fe
Magnesium	Mg
Manganese	Mn
Sodium	Na
Lead	Pb
Zinc	Zn

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Metals (AAS)

Arsenic	As
Selenium	Se
Mercury	Hg

Conventionals (IC)

Fluoride	F
Chloride	Cl
Nitrite	NO2
Nitrate	NO3
Phosphate	PO4
Sulfate	SO4

Conventional (Specified Methods)

Total Organic Carbon	TOC
Total Inorganic Carbon	TIC
Cyanide	CN
Hydroxide	OH
Ph	
Specific Gravity	SpG
Differential Scanning Calorimetry	DSC

The analysis of the samples for Cyanide, Total Ammonia, Total Inorganic Carbon (TIC), Specific Gravity, and Differential Scanning Calorimetry (DSC) were performed using methods traceable to ASTM or EPA. All other analytes were determined based on EPA SW-846 methods or current approved WHC golden rod procedures.

The Quality Objectives and requirements for this work effort were set to achieve the highest quality data. Factors relevant to sample matrix and the applicability of the methods to these complex matrices of samples from the evaporator candidate and feed tanks may have lead to biased results for some analytes of concern. The Quality Objectives were:

1. Matrix Spike and Matrix Spike Duplicate per batch or for no more than 20 samples which ever is less. The calculated Percent Recovery for these analyses to be within 75 to 125% and the Relative Percent Difference (RPD) must not exceed ± 20%.

2. One sample in twenty was to be analyzed in duplicate where specified. The duplicate results must agree with an RPD of ± 20%.

3. A blank must be run for each batch or for every 20 samples.

John H. Tillman 9/5/92

J. H. Tillman, Manager
Inorganic Chemistry PAL

P.O. Box 1970 Richland, WA 99352

242-EVAPORATOR FEED CHARACTERIZATION

INORGANICS CASE NARRATIVE

Problems encountered:

Samples from the two candidate and one feed tank into the evaporator were received into the 222-S laboratory during the laboratory's transition period from process to environmental analysis. This transition period signaled a change in the analytical protocols required to meet different, and in some cases, more stringent conditions. Most of the problems encountered during this work effort can be attributed to the response of the laboratory to these changing requirements. Nevertheless, the data generated for these samples was obtained using the best available laboratory practice at the time of sample analysis. The following problems were observed to have occurred throughout the samples submitted from tanks 102AW, 103AP, and 106AW:

(1) In a few cases, the analytical data cards are not corrected with one line, an initial and a date. Also, due to insufficient training, the chemists signed the analytical data card in the incorrect location. Though the analytical data cards were signed by the cognizant chemists, they were often signed in the inappropriate location on the card. This indicated the need for appropriate training to address this problem. This training effort has begun.

The Extension "1621" on the data cards represent an old extension which specifically denotes "TOC" analysis.

(2) Instrument Detection Limits (IDL). Detection limits for the parameters determined were obtained using the method prescribed by the US EPA. The instrument detection limits for the metals determined by Inductively Coupled Plasma (ICP), Atomic Absorption (AA), Ion Chromatograph (IC) and classical methods are obtained from an aqueous matrix. The instrument detection limits for the analytes on actual evaporator feed or candidate tanks would probably be higher due to matrix efforts. The standards used to prepare the solutions for the detection limit determinations were obtained from bonifide and reliable sources. The procedure basically requires the analysis of seven replicates of the analyte at a concentration two times the noise level for the instrument. Following this protocol, the instrument detection limits were met or exceeded when compared to the IDC's in the Request for Special Analyses (RSA). Typical instrument detection limits obtained during this work effort are listed below:

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Analyte	Detection Limit (ppm) Required	Actual
Arsenic (As)	5	.005
Cyanide (CN)	.10	.010
Mercury (Hg)	.20	.002
Ammonia (NH4)	500	.100
Hydroxide (OH-)	1700	17.000
Selenium (Se)	1	.005
Total Inorganic Carbon (TIC)	5000	5.000
Total Organic Carbon (TOC)	500	5.500
Fluoride (F)	6000	.090
Nitrate (NO3)	5000	.240
Chloride (Cl)	4000	.040
Nitrite (NO2)	5000	.180
Phosphate (PO4)	10000	.130
Sulfate (SO4)	10000	.130
Aluminum (Al)	50	.075
Barium (Ba)	2	.003
Cadmium (Cd)	1	.004
Chromium (Cr)	5	.004
Iron (Fe)	10	.007
Lead (Pb)	5	.030
Magnesium (Mg)	1	.0001
Manganese (Mn)	2	.001
Silver (Ag)	5	.018
Sodium (Na)	60	.048
Zinc (Zn)	2	.002

Detection limits for the analytes required in the Statement of Work are listed for each set of samples. These instrument detection limits vary according to the analyte and instrument and were generated in accordance with the Request for Special Analysis (RSA), the internal memo, "Recommendations for Tank Farm Waste Analysis" by T. D. Blankenship, dated November 26, 1990, and references the document, "Detection Limit Package, Appendix B" for the 241-U-110 Single Shell Tank Waste Characterization data package, dated August 9, 1991. The detection limit study performed for Core 5 followed recommended EPA protocol.

J. H. Tillman 9/5/92

J. H. Tillman, Manager
Inorganic Chemistry PAL

Westinghouse
Hanford Company

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242-EVAPORATOR FEED CHARACTERIZATION

INORGANICS CASE NARRATIVE

TANK: 102AW

Metals, anion, inorganic, and radionuclides data review for the 242-A Evaporator Feed Characterization Project Fiscal Year 1991.

Tank: 102AW (referred to as 102AW in the remainder of this report)

These samples appeared aqueous with no visible organic layer. All samples had a light yellow tint and 2291-4-3 (R9411) had solids present. Most check standards were within control limits except for some metals; i.e., aluminum, iron, and sodium. Also some of the radionuclides in the check standards were outside the control limits.

Ion Chromatography (IC) Anions and Conventional Parameters

Customer Sample #	Lab. I.D. #
2291-1-3	R9408
2291-2-3	R9409
2291-3-3	R9410
2291-4-3	R9411

Anions are determined on the undigested samples that are diluted if necessary. IC is used to determine fluoride, chloride, nitrate, nitrite, phosphate, and sulfate anions. All duplicates were within the control limits of 20% relative percent difference (RPD). The results were consistent over all samples analyzed for this batch of samples. The sulfate spike recovery data was biased high due to matrix interferences and the high ion content of the sample. The spike recovery data was bracketed by check standards that were within the limits. Some of the parameters for sample 2291-1-3 (R9408) were run in duplicate as a quality check of the method. The RPD for sulfate, phosphate, nitrate, and nitrite were within the defined control limits.

Duplicate cyanide analyses were run on sample 2291-1-3 (R9408). The RPD for this sample was within the control limit and the spike recovery value was about 95%. The results of the check standards run before and after the sample were 100.5 and 99.1% respectively. The check standards run before and after Total Inorganic Carbon (TIC) and Total Organic Carbon (TOC) indicate good accuracy for these analytes. No exotherm was detected for this batch of

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samples. The check standards run for this batch of samples for the Differential Scanning Calorimetry (DSC) indicate good reproducibility.

Radiochemical Analysis

Customer Sample#	Lab I.D.#
2291-1-4	R9415
2291-2-4	R9416
2291-3-4	R9417
2291-4-4	R9418

Radiochemical analysis was run on the above samples. Insufficient sample was found for the analysis of americium 241 for all of these samples. The americium 241 was analyzed on the riser sample submitted later during this work effort (see results for samples 2AW-BD-1 (R332) and 2AW-BD-2 (R333)). Duplicates were run on sample 2291-1-4 (R9415) and selected radionuclides were run in duplicate for samples 2291-2-4 (R416) and 2291-3-4 (R9417). The samplers, in an attempt to get the smallest sample possible, failed to get enough sample to perform all radiochemical analyses. Check standards results for cesium 137 on 2291-1-4 (R9415) were 101.1 and 102.5%. The RPD for the duplicates were within the limits. The spike recovery values for cesium 137 was 105.7%, Total Beta was 97.1% and Total Alpha was 94.8%. These values imply good precision and accuracy of the method.

Metals Analysis

Customer Sample #	Lab I.D. #
2291-1-1	R9394
2291-2-1	R9395
2291-3-1	R9396
2291-4-1	R3997

Inductively Coupled Plasma (ICP) was used to analyze for eleven metals in the above samples. Sample 2291-1-1 (R9394) was run in duplicate. The RPD for magnesium was 143%. The check standards were 110 and 111% respectively. This could imply matrix interference or contamination problems. The RPD for iron was 122% with check standard results at 150 and 162%. The high bias of the check standards imply contamination or spectral problems. Also, aluminum and sodium produced data showing extremely high check standard results, before and after sample analysis. These high values appear for all samples within this batch and imply contamination problems.

	Check Standard #1	Check Standard #2
aluminum	141.2%	139.8%
sodium	194.4%	196.5%

Riser #22A Radiochemical Analysis

Customer I.D. #	Lab I.D.#
2AW-BD-1 (R332)	R1626
2AW-BD-2 (R333)	R1627

These samples were used to determine americium 241 and several other radionuclides because of concern for criticality. Isotopic analysis for uranium was accomplished using Alpha Total/Alpha Energy Analysis.

The sample was run in duplicate except for the isotopic uranium. The precision and accuracy data were within the limits of control. An additive of the isotopic uranium data agrees well with the total uranium results.

For no apparent reason, the spikes were not run for Tritium with this batch of samples.

John H. Tillman 9/9/92

John H. Tillman, Manager
Inorganic Chemistry PAL

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Hanford Company

Internal
Memo

From: Office of Sample Management 16500-90-090
Phone: 3-3869 MO-346/200W T6-08
Date: November 26, 1990
Subject: RECOMMENDATIONS FOR TANK FARM WASTE ANALYSES

To: T. D. Blankenship R1-62

cc: J. D. Briggs T6-14
J. A. Eacker R1-51
D. L. Halgren R1-51
J. H. Kessner T6-08
E. J. Kosiancic SO-61
C. R. Stroup T6-07
RLW File/LB

Reference: Internal Memo, T. D. Blankenship to E. J. Kosiancic, "Tank Farm Waste Analysis Requirements," dated September 10, 1990.

The referenced Internal Memo requests information regarding laboratory analytical capacity for a variety of analytes to support Tank Farm and Evaporator operations. Specific comments and suggestions for each have been prepared along with information on suggested minimum quantitation limits (MQLs) for the needed analyses and recommended reporting formats. With the exception of Nb^{94}, all requested analyses are currently performed on-site. Laboratory capacity exists to support these programs if sufficient prescheduling of activities is done to coordinate with times of high sample throughput in the laboratory (e.g., single shell tank sampling).

The discussions that follow are based on the assumption that the laboratory will be performing "standard" regulatory type analysis. Analysis MQLs are based on proven laboratory experience, turnaround times are based on requirements in the Tri-Party agreement, and reporting/validation formats based on WHC-CM-5-3, Section 2.0, "Data Validation for RCRA Analyses." This information is summarized in the following attached tables:

Table 1	MQLs for Inorganic Analysis
Table 2	MQLs for Radionuclide Analysis
Table 3	MQLs for Organic Analysis (these are CLP requirements but will form the basis for all organic analysis)
Table 4	Sample Turnaround Times
Table 5	Result Reporting/Validation
Table 6	Validation Criteria - Generic Data Quality Objectives (DQOs)

If specific needs different from this standard are required for a given program, these needs must be defined in the program's Waste Analysis Plan (WAP) or equivalent documentation and negotiated with the laboratory to assure

compliance. While it is expected that in most cases specific needs will be more stringent, if less stringent requirements are appropriate, these should also be defined in the WAP. This could significantly reduce analytical costs and turnaround times.

Characterization of Waste Streams Discharged to Double Shell Tanks (DSTs):

These streams are from ongoing operations of the site and will need analysis for two requirements; verification of compliance to tank farm storage specifications (processing parameters), and determination of composition for regulatory based designation of the waste (hazardous waste designation). Processing parameter based analysis will be equivalent to current practice and should be predefined using laboratory "routine set" analysis. The analysis will be performed under the quality assurance requirements of NQA-1 with typical result turnarounds of 1 to 5 days. Results will be available via the laboratory reporting system (LCCS).

Analysis of the samples to meet the needs for hazardous waste designation will require more stringent quality assurance than for processing parameters. Those components that fall under both needs will likely be required to be analyzed by both protocols. Unfortunately, analysis turnaround times for designation will likely exceed needs for normal processing parameters. If processing parameter analysis results show a component to significantly exceed a hazardous waste designation limit (e.g., a sample is sufficiently caustic to qualify as a extremely hazardous waste based on corrosiveness) reanalysis of the sample under the more stringent protocols would not be necessary. In no case will analysis performed to processing parameter protocols be suitable for designation as an intermediate level or as nonhazardous waste.

DST Characterization Analysis:

All of these analyses will be required to be performed to hazardous waste designation protocols. Currently, no analytical capacity exists to perform Nb^{94} analysis. This long lived ($2x10^4$ y) beta emitter is not expected to be present in significant quantities and will require development efforts to analyze for. Addition of total beta (TB) analysis to the analysis request should allow for screening for significant levels of unaccounted for beta activity and assessment of the needs for additional specific beta emitting radionuclide component quantification.

Analysis for Pu^{238} at the 222-S Laboratory is complicated by the presence of this isotope in the spike (Pu^{236}) added to the analysis to allow correction for overall yield in the procedure. For most expected samples, Pu^{238} activity will be only a small fraction of the $Pu^{239/240}$ activity and may be approximated using isotopic ratios based on historical irradiated uranium processing

Samples having greater than normal Pu^{238} (e.g., associated with previous irradiated thorium processing) activity will be detectable using the current procedures. In these cases, Pu^{238} activity can be quantified either using a special analysis or through determination of isotopic ratios based on mass spectral analysis.

Analysis of Samples for the 242-A Evaporator:

All analyses identified in the Internal Memo appear to be for hazardous waste designation needs. It should be noted that analysis of the vent stack will require the installation of specialized gas sampling equipment.

General Comments:

Analysis of two major hazardous waste designation groups were not requested for any of the streams; semivolatile organics and Toxicity Characteristic Leaching Procedure (TCLP). If these analyses have not been assessed for inclusion in the requested analysis; it is recommended that they are reviewed for inclusion.

The current schedule for implementation of organic analysis capacity at 222-S Laboratory is for early in 1991, most probably after March 1, 1991. Until capacity becomes available at 222-S Laboratory, organic analyses (VOA and TOX) will be performed by the Pacific Northwest Laboratories (PNL). This will require transhipping of samples sent to 222-S Laboratory, but should not seriously affect result turnaround or quality.

Estimated cost information for the requested analyses is shown in Table 7. These costs are based on analysis of organic components at PNL. When organic capability is available at 222-S Laboratory, costs will be reduced slightly. Addition of semivolatile organic analysis to the lists would increase costs $2000 per analysis. Addition of TCLP to the list would increase analysis costs $1500 for those samples containing greater than 1% solids. For liquid only samples, no additional preparation is required for TCLP and the analytes of concern are already included in the analysis requests.

If you need any additional information or have any questions, please call me on 3-3869.

Richard L. Weiss

R. L. Weiss, Principal Scientist
Office of Sample Management

jmd

Attachments - 7

CONCURRENCE:

Curtis R. Stroup Date 11/28/90
C. R. Stroup, Manager
Analytical Laboratories

J. D. Briggs for Date 11/29/90
J. D. Briggs, Manager
222-S Analytical Laboratory Complex

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TABLE 1
RECOMMENDED ANALYSIS MINIMUM QUANTITATION LEVELS
for TANK FARM WASTE ANALYSES

Analyte	High Salt Liquid or Solid/Slurry	Low Salt Liquid	Analyte	High Salt Liquid or Solid/Slurry	Low Salt Liquid
Analyzed by Inductively Coupled Plasma Spectroscopy (ICP)					
Al	50	0.5	As	20	0.2
Ba	2	0.02	Bi	100	0.5
B	20	0.05	Cd	2	0.02
Ca	0.2	0.002	Ce	100	1
Cr	5	0.05	Co	20	0.2
Cu	20	0.2	Eu	2	0.02
Fe	10	0.01	La	20	0.2
Pb	30	0.3	Li	3	0.03
Mg	0.1	0.001	Mn	2	0.02
Hg	5	0.05	Mo	5	0.05
Nd	250	2.5	Ni	20	0.2
P	50	0.5	K	250	2.5
Sm	200	2	Se	100	1
Si	100	0.5	Ag	30	0.3
Na	60	0.6	Sr	2	0.02
S	60	0.6	Ta	50	0.5
Th	20	0.2	Sn	2	0.02
Ti	30	0.06	W	200	0.5
U	1500	15	Zn	2	0.02
Zr	80	0.1			
Analyzed by Specific Atomic Absorption Techniques					
As	5	0.05	Hg	3	0.03
Se	5	0.05			
Anion Analysis by DIONEX					
F	6000	10	Cl	4000	5
NO_3	20000	10	NO_2	20000	10
PO_4	10000	10	SO_4	10000	10
Specific Analysis					
CO_3	5000	50	TOC(carbon)	5000	50
CN	0.1	0.01	NH_4	5000	50
U	100	1	TOX(chlorine)	100	10
OH	0.2	0.002	DSC	*	*

Values for solids are as ug/g
Values for liquids are as ug/ml
*DSC will be used to screen for the presence of exothermic reactions. Specific quantitation limits are not required for this screening

TABLE 2
RECOMMENDED ANALYSIS MINIMUM QUANTITATION LEVELS
for TANK FARM WASTE ANALYSES

Analyte	Solid/Slurry	High Salt Liquid	Low Salt Liquid
Alpha Total	100	1	0.01
Beta Total	350	3.5	0.035
Radionuclides Analyzed by Gamma Energy Analysis			
Co^{60}	4	4	0.04
Cs^{137}	5	5	0.05
$RuRh^{106}$	50	50	0.5
Radionuclides Analyzed by Separation with Beta Counting			
H^{3}	75	1.5	1.5
C^{14}	50	0.5	0.25
Nb^{94}	*	*	*
Se^{79}	50	0.5	0.25
Sr^{90}	150	1.5	0.015
Tc^{99}	250	2.5	0.025
I^{129}	900	9	0.09
Radionuclides Analyzed by Separation with Alpha Counting/Alpha Energy Analysis			
Pu^{238}	200[1]	2[1]	0.02[1]
$Pu^{239/240}$	50	0.5	0.005
Am^{241}	100	1	0.01
Cm^{244}	100	1	0.01

Values for solids are as pCi/g
Values for liquids are as pCi/ml

* No current analysis capacity for Nb^{94}
[1]Potential interferrence on Pu^{238} analysis from contamination in Pu^{236} spike added to the analysis

TABLE 3

TARGET COMPOUND LIST (TCL) AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)

Pesticides/Aroclors	CAS Number	Quantitation Limits* Water ug/L	Soil ug/Kg	On Column (pg)
98. alpha-BHC	319-84-6	0.05	1.7	5
99. beta-BHC	319-85-7	0.05	1.7	5
100. delta-BHC	319-86-8	0.05	1.7	5
101. gamma-BHC (Lindane)	58-89-9	0.05	1.7	5
102. Heptachlor	76-44-8	0.05	1.7	5
103. Aldrin	309-00-2	0.05	1.7	5
104. Heptachlor epoxide	1024-57-3	0.05	1.7	5
105. Endosulfan I	959-98-8	0.05	1.7	5
106. Dieldrin	60-57-1	0.10	3.3	10
107. 4,4'-DDE	72-55-9	0.10	3.3	10
108. Endrin	72-20-8	0.10	3.3	10
109. Endosulfan II	33213-65-9	0.10	3.3	10
110. 4,4'-DDD	72-54-8	0.10	3.3	10
111. Endosulfan sulfate	1031-07-8	0.10	3.3	10
112. 4,4'-DDT	50-29-3	0.10	3.3	10
113. Methoxychlor	72-43-5	0.50	17.0	50
114. Endrin ketone	53494-70-5	0.10	3.3	10
115. Endrin aldehyde	7421-36-3	0.10	3.3	10
116. alpha-Chlordane	5103-71-9	0.05	1.7	5
117. gamma-Chlordane	5103-74-2	0.05	1.7	5
118. Toxaphene	8001-35-2	5.0	170.0	500
119. Aroclor-1016	12674-11-2	1.0	33.0	100
120. Aroclor-1221	11104-28-2	1.0	33.0	100
121. Aroclor-1232	11141-16-5	2.0	67.0	200
122. Aroclor-1242	53469-21-9	1.0	33.0	100
123. Aroclor-1248	12672-29-6	1.0	33.0	100
124. Aroclor-1254	11097-69-1	1.0	33.0	100
125. Aroclor-1260	11096-82-5	1.0	33.0	100

* Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.

There is no differentiation between the preparation of low and medium soil samples in this method for the analysis of Pesticides/Aroclors.

TABLE 3 (cont)

(continued)

Semivolatiles	CAS Number	Quantitation Limits* Water ug/L	Low Soil ug/Kg	Med. Soil ug/Kg	On Column (ng)
69. Dibenzofuran	132-64-9	10	330	10000	(20)
70. 2,4-Dinitrotoluene	121-14-2	10	330	10000	(20)
71. Diethylphthalate	84-66-2	10	330	10000	(20)
72. 4-Chlorophenyl-phenyl ether	7005-72-3	10	330	10000	(20)
73. Fluorene	86-73-7	10	330	10000	(20)
74. 4-Nitroaniline	100-01-6	50	1700	50000	(100)
75. 4,6-Dinitro-2-methylphenol	534-52-1	50	1700	50000	(100)
76. N-nitrosodiphenylamine	86-30-6	10	330	10000	(20)
77. 4-Bromophenyl-phenylether	101-55-3	10	330	10000	(20)
78. Hexachlorobenzene	118-74-1	10	330	10000	(20)
79. Pentachlorophenol	87-86-5	50	1700	50000	(100)
80. Phenanthrene	85-01-8	10	330	10000	(20)
81. Anthracene	120-12-7	10	330	10000	(20)
82. Carbazole	86-74-8	10	330	10000	(20)
83. Di-n-butylphthalate	84-74-2	10	330	10000	(20)
84. Fluoranthene	206-44-0	10	330	10000	(20)
85. Pyrene	129-00-0	10	330	10000	(20)
86. Butylbenzylphthalate	85-68-7	10	330	10000	(20)
87. 3,3'-Dichlorobenzidine	91-94-1	10	330	10000	(20)
88. Benzo(a)anthracene	56-55-3	10	330	10000	(20)
89. Chrysene	218-01-9	10	330	10000	(20)
90. bis(2-Ethylhexyl)phthalate	117-81-7	10	330	10000	(20)
91. Di-n-octylphthalate	117-84-0	10	330	10000	(20)
92. Benzo(b)fluoranthene	205-99-2	10	330	10000	(20)
93. Benzo(k)fluoranthene	207-08-9	10	330	10000	(20)
94. Benzo(a)pyrene	50-32-8	10	330	10000	(20)
95. Indeno(1,2,3-cd)pyrene	193-39-5	10	330	10000	(20)
96. Dibenz(a,h)anthracene	53-70-3	10	330	10000	(20)
97. Benzo(g,h,i)perylene	191-24-2	10	330	10000	(20)

* Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.

TABLE 3 (cont)

TARGET COMPOUND LIST (TCL) AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)

Semivolatiles	CAS Number	Quantitation Limits* Water ug/L	Low Soil ug/Kg	Med. Soil ug/Kg	On Column (ng)
34. Phenol	108-95-2	10	330	10000	(20)
35. bis(2-Chloroethyl) ether	111-44-4	10	330	10000	(20)
36. 2-Chlorophenol	95-57-8	10	330	10000	(20)
37. 1,3-Dichlorobenzene	541-73-1	10	330	10000	(20)
38. 1,4-Dichlorobenzene	106-46-7	10	330	10000	(20)
39. 1,2-Dichlorobenzene	95-50-1	10	330	10000	(20)
40. 2-Methylphenol	95-48-7	10	330	10000	(20)
41. 2,2'-oxybis (1-Chloropropane)#	108-60-1	10	330	10000	(20)
42. 4-Methylphenol	106-44-5	10	330	10000	(20)
43. N-Nitroso-di-n-dipropylamine	621-64-7	10	330	10000	(20)
44. Hexachloroethane	67-72-1	10	330	10000	(20)
45. Nitrobenzene	98-95-3	10	330	10000	(20)
46. Isophorone	78-59-1	10	330	10000	(20)
47. 2-Nitrophenol	88-75-5	10	330	10000	(20)
48. 2,4-Dimethylphenol	105-67-9	10	330	10000	(20)
49. bis(2-Chloroethoxy) methane	111-91-1	10	330	10000	(20)
50 2,4-Dichlorophenol	120-83-2	10	330	10000	(20)
51. 1,2,4-Trichlorobenzene	120-82-1	10	330	10000	(20)
52. Naphthalene	91-20-3	10	330	10000	(20)
53. 4-Chloroaniline	106-47-8	10	330	10000	(20)
54. Hexachlorobutadiene	87-68-3	10	330	10000	(20)
55. 4-Chloro-3-methylphenol	59-50-7	10	330	10000	(20)
56. 2-Methylnaphthalene	91-57-6	10	330	10000	(20)
57. Hexachlorocyclopentadiene	77-47-4	10	330	10000	(20)
58. 2,4,6-Trichlorophenol	88-06-2	10	330	10000	(20)
59. 2,4,5-Trichlorophenol	95-95-4	50	1700	50000	(100)
60. 2-Chloronaphthalene	91-58-7	10	330	10000	(20)
61. 2-Nitroaniline	88-74-4	50	1700	50000	(100)
62. Dimethylphthalate	131-11-3	10	330	10000	(20)
63. Acenaphthylene	208-96-8	10	330	10000	(20)
64. 2,6-Dinitrotoluene	606-20-2	10	330	10000	(20)
65. 3-Nitroaniline	99-09-2	50	1700	50000	(100)
66. Acenaphthene	83-32-9	10	330	10000	(20)
67. 2,4-Dinitrophenol	51-28-5	50	1700	50000	(100)
68. 4-Nitrophenol	100-02-7	50	1700	50000	(100)

Previously known by the name bis(2-Chloroisopropyl) ether

TABLE 3 (cont)

TARGET COMPOUND LIST (TCL) AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)

Volatiles	CAS Number	Quantitation Limits* Water ug/L	Low Soil ug/Kg	Med. Soil ug/Kg	On Column (ng)
1. Chloromethane	74-87-3	10	10	1200	(50)
2. Bromomethane	74-83-9	10	10	1200	(50)
3. Vinyl Chloride	75-01-4	10	10	1200	(50)
4. Chloroethane	75-00-3	10	10	1200	(50)
5. Methylene Chloride	75-09-2	10	10	1200	(50)
6. Acetone	67-64-1	10	10	1200	(50)
7. Carbon Disulfide	75-15-0	10	10	1200	(50)
8. 1,1-Dichloroethene	75-35-4	10	10	1200	(50)
9. 1,1-Dichloroethane	75-34-3	10	10	1200	(50)
10. 1,2-Dichloroethene (total)	540-59-0	10	10	1200	(50)
11. Chloroform	67-66-3	10	10	1200	(50)
12. 1,2-Dichloroethane	107-06-2	10	10	1200	(50)
13. 2-Butanone	78-93-3	10	10	1200	(50)
14. 1,1,1-Trichloroethane	71-55-6	10	10	1200	(50)
15. Carbon Tetrachloride	56-23-5	10	10	1200	(50)
16. Bromodichloromethane	75-27-4	10	10	1200	(50)
17. 1,2-Dichloropropane	78-87-5	10	10	1200	(50)
18. cis-1,3-Dichloropropene	10061-01-5	10	10	1200	(50)
19. Trichloroethene	79-01-6	10	10	1200	(50)
20. Dibromochloromethane	124-48-1	10	10	1200	(50)
21. 1,1,2-Trichloroethane	79-00-5	10	10	1200	(50)
22. Benzene	71-43-2	10	10	1200	(50)
23. trans-1,3-Dichloropropene	10061-02-6	10	10	1200	(50)
24. Bromoform	75-25-2	10	10	1200	(50)
25. 4-Methyl-2-pentanone	108-10-1	10	10	1200	(50)
26. 2-Hexanone	591-78-6	10	10	1200	(50)
27. Tetrachloroethene	127-18-4	10	10	1200	(50)
28. Toluene	108-88-3	10	10	1200	(50)
29. 1,1,2,2-Tetrachloroethane	79-34-5	10	10	1200	(50)
30. Chlorobenzene	108-90-7	10	10	1200	(50)
31. Ethyl Benzene	100-41-4	10	10	1200	(50)
32. Styrene	100-42-5	10	10	1200	(50)
33. Xylenes (Total)	1330-20-7	10	10	1200	(50)

* Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.

TABLE 4
SAMPLE RESULT TURNAROUND TIMES

Laboratory analysis and quality assurance documentation, excluding validation, shall be limited to the following schedule:

Transuranic and hot cell analyses - 100 days annual average, but not to exceed 140 days

Low-level and mixed waste (up to 100 mr/hr) analyses - 75 days annual average, but not to exceed 90 days

Nonradioactive waste analyses - 50 days

Validated data packages will be issued within 21 days of receipt of the results by the Office of Sample Management.

TABLE 5
RESULT REPORTING/VALIDATION

The RCRA validation documentation package consists of the Office of Sample Management Data Validation cover sheet (different sheets for Level A, B, or C validation), supplemental Quality Control (QC) attachment pages, a copy of the Chain of Custody, and all sample data. One documentation package is completed for each sample or delivery group.

Three levels of validation are offered:

Level A The minimum requirement for all RCRA data. The primary application is for data used in waste designation/disposal. The additional QC required by SW-846 will be assessed through laboratory audits and Performance Evaluation (PE) samples.

Review Requirements:

- o Requested Versus Reported Analyses
- o Analysis Holding Times

Level B Provides a more in-depth review for programs whose data are compiled for use in later reports.

Review Requirements in Addition to Those Listed for Level A:

- o Matrix Spike/Matrix Spike Duplicate Analysis
- o Surrogate Recoveries
- o Duplicate Analysis
- o Analytical Blank Analysis

Level C Requires that the data be reported in Sample Delivery Group (SDG) data packages and is applicable to RCRA governed programs requiring Contract Laboratory Program (CLP) quality data from analytical work done in non-CLP laboratories

Review Requirements in Addition to Those Above:

- o Initial and Continuing Instrument Calibrations
- o Gas Chromatography - Mass Spectrograph (GC/MS) Tune Criteria
- o Internal Standards for Gas Chromatograph Analysis
- o Laboratory Control Samples
- o Interference Check Samples (for ICP analysis)
- o Any Other QC Checks Performed or Required by the Methods of Analysis

TABLE 6
VALIDATION CRITERIA - GENERIC DATA QUALITY OBJECTIVES

1. REQUESTED VERSUS REPORTED ANALYSES

   All requested analyses shall be reported of accounted for.

2. HOLDING TIMES

   Holding times shall be equivalent to RCRA defined times. If no RCRA holding time exists, holding times will be 6 months unless specifically defined in project specific documentation.

3. SURROGATE RECOVERY

   Sample and blank surrogate recoveries must be between 80 and 120%.

4. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

   A matrix spike or matrix spike duplicate must be analyzed with every analytical batch of every 20 samples, whichever is more frequent. Control limits will be between 75 and 125% with ±20% relative percent differences.

5. DUPLICATE ANALYSIS

   Duplicate analysis must be performed with every analytical batch or every 20 samples, whichever is more frequent. Control limits will be ±20%. If both sample and duplicate results are below the method detection limit of sample quantitation limit, then no control limit applies.

6. ANALYTICAL BLANKS

   A minimum of one analytical blank must be analyzed for every batch or every 20 samples, whichever is more frequent. No contaminants should be detected in the blanks.

7. INITIAL AND CONTINUING CALIBRATION

   Analytical instrumentation shall be calibrated in accordance with requirements specific to the instrumentation and methods of procedures employed.

8. GC/MS TUNE

   Ion abundance results and tuning frequency requirements must be as specified in the method employed for analysis.

9. INTERNAL STANDARDS

   Internal Standard area counts and retention time differences from the associated calibration standard must be within the control limits specified by the methods or procedure used.

TABLE 6 (cont)

10. LABORATORY CONTROL SAMPLE

All Laboratory Control Sample recoveries must be within 80-120% for all sample matrices.

11. INTERFERENCE CHECK SAMPLE

Frequency of analysis and all Interference Check Sample solution results must meet the requirements specified in the procedure used.

12. OTHER QUALITY CONTROL CHECKS

As specified in project specific documentation.

TABLE 7
ESTIMATED COSTS

CHARACTERIZATION OF WASTE STREAMS DICHSRGED TO DOUBLE SHELL TANKS	
Analysis for processing parameters	$500/sample
Analysis for hazwaste designation	$5000/sample
DOUBLE SHELL TANK CHARACTERIZATION	
Analysis for hazewaste designation	$10000/sample
ANALYSIS OF SAMPLES FROM 242-A EVAPORTOR	
Analysis of feed tank	$5000/sample
Analysis of Process Condensate	$2500/sample
Analysis of Slurry Product	$5000/sample
Analysis of Steam Condensate	$4000/sample
Analysis of Cooling Water	$4000/sample
Analysis of Vent Gases	$2000/sample

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SINGLE SHELL TANK PROJECT
Analytical Detection Limits
October 12, 1990

The following detection limits are derived on ideal matrices. These values were derived by using either calibration standards or pure matrix standards. Detection limits on actual single shell tank samples are likely to be much higher. No information regarding procedure detection limits is available for procedures not listed in this report.

Procedure LA-355-131
Arsenic Analysis by Hydride Generation Atomic Absorption

Detection Limit = 0.005 ppm in solution
Typical sample dilution for the Fusion Dissolution was 0.0025g/mL.
Typical sample dilution for the Water Digestion was 0.010g/mL.
Typical sample dilution for the acid Digestion was 0.010g/mL.

Procedure LA-325-102
Mercury Analysis by Atomic Absorption Manual Cold Vapor Technique

Detection Limit = 0.002 ppm in solution
Typical sample dilution for the Fusion Dissolution was 0.0025g/mL.
Typical sample dilution for the Water Digestion was 0.010g/mL.
Typical sample dilution for the acid Digestion was 0.010g/mL.
Solids were analyzed directly.

Procedure LA-362-131
Selenium Analysis by Hydride Generation Atomic Absorption

Detection Limit = 0.005 ppm in solution
Typical sample dilution for the Fusion Dissolution was 0.0025g/mL.
Typical sample dilution for the Water Digestion was 0.010g/mL.
Typical sample dilution for the acid Digestion was 0.010g/mL.

Procedure LA-533-105
Anion Analysis on Dionex Model 40001

Typical sample dilution was 0.000099g/mL

Fluoride
Detection Limit in solution = 0.09 ppm.

Chloride
Detection Limit in solution = 0.04 ppm.

Nitrate
Detection Limit in solution = 0.24 ppm.

Phosphate
Detection Limit in solution = 0.13 ppm.

Sulfate
Detection Limit in solution = 0.13 ppm.

Procedure LA-622-102
Determination of Carbonate in Solutions by Coulometry

Detection Limit = 5 ppm in solution
Typical sample dilution was 0.01g/mL

Procedure LA-344-105
Total Organic Carbon
Determination of Carbon Insolation by Combustion and Coulometry

Detection Limit = 5.5 ppm in solution
Typical sample dilution was 0.01 g/mL

Procedure LA-695-101
Cyanide = 0.1 ppm CN in solution
Spectrophotometric Determination of Cyanide

Procedure LA-634-102
Ammonia = 0.1 ppm NH_4^+ in solution
Ammonia by Kjeldahl

Procedure LA-645-001
Nitrite = 0.184 ppm NO_2 in solution
Spectrophotometric Determination of Nitrite

Procedure LA-265-101
Chromium VI = 0.1004 ppm Cr^{6+} in solution
Spectrophotometric Determination of Hexavalent Chromium

Procedure: LA-505-151 (Nominal Detection Limits)

Inductively Coupled Plasma (ICP) Emission Spectrometer Operations and Analysis.

Typical sample dilution for the Fusion Dissolution was 0.00019 g/mL.

Typical sample dilution for the Water Digestion was 0.000476 g/mL.

Typical sample dilution for the Acid Digestion was 0.000476 g/mL

Instrument Detection Limit ppm.

Aluminum	0.0745	Antimony	0.1424
Arsenic	0.0223	Barium	0.0026
Beryllium	0.0006	Bismuth	0.0839
Boron	0.0083	Cadmium	0.0039
Calcium	0.0002	Cerium	0.1359
Chromium	0.0039	Cobalt	0.0246
Copper	0.0158	Europium	0.0024
Iron	0.0073	Lanthanum	0.0141
Lead	0.0273	Lithium	0.0032
Magnesium	0.0001	Manganese	0.0011
Mercury	0.0036	Molybdenum	0.0049
Neodymium	0.2130	Nickel	0.0147
Phosphorous	0.0308	Potassium	0.2122
Samarium	0.1525	Selenium	0.0631
Silicon	0.0314	Silver	0.0183
Sodium	0.0483	Strontium	0.0010
Sulfur	0.0163	Tantalum	0.0273
Thallium	0.0646	Thorium	0.0122
Tin	0.0144	Titanium	0.0035
Tungsten	0.0273	Uranium	1.1405
Vanadium	0.0186	Zinc	0.0017
Zirconium	0.0141		

SAMPLING AND CUSTODY DATA

TANK FARM PLANT OPERATING PROCEDURE

CHAIN OF CUSTODY

Company Contact	Paul Haigh	Telephone	373-4655
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	B-Plant Sample Truck		
Shipped to	222-S Lab		

SAMPLING INFORMATION

Sample Collected by	Rick Lemos	Date	11-13-91	Time	2140
Sample Locations	TK 102-AW, Riser #22A		Custody Seal #	4246	
Remarks	NA				
Ice Chest or Sample Pig No.	B-18	Field Logbook and Page No.	N/A		

SUPERVISION REVIEW: [signature] DATE: 11-13-91

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW-BD-1 R-332	242-A Statement of Work WHC-SOW-91-0002

CHAIN OF POSSESSION

Relinquished by: [signature]	Received by: [signature]	Date/Time: 11-16-91/0050
Relinquished by: [signature]	Received by: R. AKITA Raymond Akita	Date/Time: 11-16/91/0140
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

SAMPLE CHECK IN LIST

Date/Time Received 11-16-91 0140 Sample ID 2AW-BD-1

Project TK102AW Client TANK SAMS

Shipping Container ID# B-15 Shipping # R332

1. Condition of Shipping container? Good
2. Custody Seals on container intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [ ] No [ ]
4. Custody Seals ID # 4246
5. Condition of Samples: ✓ in good condition
   ____ broken
   ____ leaking
6. Samples have: ____ custody seals
   ✓ appropriate sample labels
7. The following paperwork should be accounted for (N/A if not applicable):
   Chain of Custody #(s) Yes
   Request for Special Analysis #(s) no
8. Have any anomalies been identified? Yes [ ] No [X]
9. Memos have been initiated for all anomalies identified? Yes [ ]

Printed Name Vida Johansen

Signature Vida Johansen

Date/Time 11-18-91 - 1050

Please send copy to Office of Sample Management Data Administrator, T6-08

TANK FARM PLANT OPERATING PROCEDURE

CHAIN OF CUSTODY

Company Contact	Paul Haigh	Telephone	373-4655
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	B-Plant Sample Truck		
Shipped to	222-S Lab		

SAMPLING INFORMATION

Sample Collected by	Rich Lemos	Date	11-13-91	Time	2120
Sample Locations	TK 102-AW, Riser #22A		Custody Seal #	4247	
Remarks	NA				
Ice Chest or Sample Pig No.	G-6	Field Logbook and Page No.	N/A		

SUPERVISION REVIEW: [signature] DATE: 11-13-91

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW-BD-2 R-333	242-A Statement of Work WHC-SOW-91-0002

CHAIN OF POSSESSION

Relinquished by: [signature]	Received by: [signature]	Date/Time: 11-16-91/0050
Relinquished by: [signature]	Received by: R. Akizuki Raymond Akizuki	Date/Time: 11-16-91/0140
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

SAMPLE CHECK IN LIST

Date/Time Received 11-16-91 0140 Sample ID 2AW-BD-2

Project TK 102AW Client Tank Farms

Shipping Container ID# G-16 Shipping # R 333

1. Condition of Shipping container? Good
2. Custody Seals on container intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Custody Seals ID # 4247
5. Condition of Samples: ✓ in good condition
   ____ broken
   ____ leaking
6. Samples have: ____ custody seals
   ✓ appropriate sample labels
7. The following paperwork should be accounted for (N/A if not applicable):
   Chain of Custody #(s) N/A
   Request for Special Analysis #(s) ____
8. Have any anomalies been identified? Yes [ ] No [X]
9. Memos have been initiated for all anomalies identified? Yes [ ]

Printed Name Vina Johansen

Signature Vina Johansen

Date/Time 11-15-91 1050

Please send copy to Office of Sample Management Data Administrator, T6-08

DON'T SAY IT --- *Write It!*

DATE 6/10/91

TO

FROM Vicki Johansen

Received 2 pig over packs @ 1500 hrs on 6/10/91. The paper work for sample # 2AW52291-2 was correct. The paper work for sample # 2AW52291 was correct, but the inside pig was labeled 2AW52291-3. I contacted Carol Pittkoff after putting the sample on a 24 hr holding time according to procedure 20-090-101. I notified Dan Thornton of the discrepancy and fax attached. This will invalidate the sample chain of custody. Because of the late time of day I could not locate QSR.

"TO MAKE LIFE LAST, PUT SAFETY FIRST"

DON'T SAY IT --- *Write It!*

DATE 6/11/91

TO

FROM Vicki Johansen

Contacted Carol Pittkoff at 0750 hrs to remind her of the problem. She is contacted the field personell to prevent a similar problem with the next sample.
Rich was informed of mishap

6/11/91 0900 Customer requested sample disposal. They will resample

"TO MAKE LIFE LAST, PUT SAFETY FIRST"

CHAIN OF CUSTODY

Company Contact	C. C. Pitkoff	Telephone	3-2408
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	Sample Truck		
Shipped to	222-S		

SAMPLING INFORMATION

Sample Collected by	CLearing	Date	6-5-91	Time	1615
Sample Locations	241-AW-TANK 102-AW, RISER # 22-A				
Remarks	N/A				
Ice Chest or Sample Pig No.	TF-5	Field Logbook and Page No.	N/A		

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW52291-4	FSS-T-630-00001, FD-A, Routine 2

* Sample in pig marked 2AW52291-3

CHAIN OF POSSESSION

Relinquished by:	Received by:	Date/Time:
[signature]	T.L. Bacon	6/10/91 / 1405
Troy L. Bacon	[signature]	6/10/91 / 15:05

Ship. # R9228

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 6/10/91 1445 Client Name 241-A Evaporator Tank Farm

Project/Client # 241-AW-102AW Batch or Case # 102-AW RISER 22-A

Cooler ID (if noted on outside of cooler) TF-5 Seal # 4212

1. Condition of shipping container? Good
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [ ] No [ ] NA
5. Vermiculite/packing material is: Wet [ ] Dry [ ] NA
6. Each sample is in a plastic bag? Yes [ ] No [ ] NA
7. Number of sample containers in cooler: 1
8. Samples have:
   - ____ clips (in cans)
   - ____ tape
   - X custody seals
   - NO appropriate sample labels
   - ____ hazard labels
   - Sample & paperwork do not agree
9. Samples are:
   - ____ in good condition
   - ____ leaking
   - ____ broken
   - ____ have air bubbles
   - ____ other
10. Samples received at N/A °C. Coolant type N/A
11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #(s) Yes
    Request for Analysis #(s) ____
    Airbill # N/A Carrier hand carried
12. Have any anomalies been identified above? Yes [X] No [ ]
13. Memos have been initiated for all anomalies identified above? Yes [X] attached

Printed Name/Signature VIDA JOHANSEN Date/Time 6/10/91 1530

Page 1 of 2

SAMPLE CHECK-IN LIST
SAMPLE NUMBER MATRIX

WHC ID NUMBER	SAMPLE LABEL NUMBER	C JC ~~PNL ID~~ NUMBER	AGREEMENT OF INFORMATION?
R 9228	2AW52291-3 WS	2AW52291-4	NO —

CHAIN OF CUSTODY

Company Contact	C. C. Pitkoff	Telephone	3-2408
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	Sample Truck		
Shipped to	222-S		

SAMPLING INFORMATION

Sample Collected by	B.C. Wyer	Date 6-12-91		Time	0930
Sample Locations	241-AW, Tank 102-AW, Riser # 22A				
Remarks	Seal #4215				
Ice Chest ~~or Sample Pig No.~~	TF-1	Field Logbook and Page No.	N/A		

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW61191-3	FSS-T-630-00001, FD-A, Routine 2

CHAIN OF POSSESSION

Relinquished by: B.C. Wyer	Received by: [illegible]	Date/Time: 6-12-91 / 1310
Relinquished by: [illegible]	Received by: Vida Johansen	Date/Time: 6-12-91 / 1410
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

9396, 9403, 9410, 9417
R9424, 9425 LABORATORY ID

Date Sampled	Time Sampled

Sample Site or Sampling ID	Date Received at 222-S	Time Received at 222-S
2AW52291-3 (R9371) 102AW	6/13/91	1315

Delivered by (Signature)	RPT Release (Signature)	Dose Rate
[illegible]	J. Yalley	200 mR/hr

Custodian (Signature)	Date Analysis Complete	Disposal Date
Vida Johnson		

Comments: Stored in Refs 1,2.

Payroll No.	Tech/Receiver (Signature)	Date	Entry Code	Comments
	INORGANIC 1	R9396		
	2	R9403		
	3	R9410		
	4	R9417		
	SVOA 1	R9424		
	2			
	VOA 1	R9425		
	2			

000595

BEST AVAILABLE COPY

BD-6000-347R (

Date/Time Received 6/12/91 1400 Client Name Hart Jann

Project/Client # 241-102-AW Batch or Case # 2AW61191-3 RISER 22A

Cooler ID (if noted on outside of cooler) TF-1

1. Condition of shipping container? Good
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [ ] No [✓] NA
5. Vermiculite/packing material is: Wet [ ] Dry [ ] NA
6. Each sample is in a plastic bag? Yes [ ] No [ ] NA
7. Number of sample containers in cooler: 1
8. Samples have:
   - ____ clips (in cans)
   - ____ tape
   - X custody seals
   - X appropriate sample labels
   - ____ hazard labels
9. Samples are:
   - ____ in good condition
   - ____ leaking
   - ____ broken
   - ____ have air bubbles
   - ____ other
10. Samples received at N/A °C. Coolant type ____
11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #(s) yes
    Request for Analysis #(s) yes
    Airbill # N/A Carrier hand carried
12. Have any anomalies been identified above? Yes [ ] No [X]
13. Memos have been initiated for all anomalies identified above? Yes [ ]

Printed Name/Signature Kim Johansen / Kim Johansen Date/Time 6/12/91 1445

Page 1 of 2

BEST AVAILABLE COPY

SAMPLE CHECK-IN LIST
SAMPLE NUMBER MATRIX

WHC ID NUMBER	SAMPLE LABEL NUMBER	PNL ID NUMBER	AGREEMENT OF INFORMATION?
R9371	2AW61191-3		yes
INORGANIC 1	R9396		
2	9403		
3	9410		
4	9417		
SEMI-VOA			
1 and 2	R9424		
VOA			
1 and 2	R9425		

CHAIN OF CUSTODY

Company Contact	C. C. Pitkoff	Telephone	3-2408
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	Sample Truck		
Shipped to	222-S		

SAMPLING INFORMATION

Sample Collected by	CLGeorney	Date 6-5-91		Time	1545
Sample Locations	241-AW - TANK 102-AW RISER # 22A				
Remarks	N/A				
Ice Chest or Sample Pig No.	B-18 ~~2AW5229-1~~ Rev 1	Field Logbook and Page No.	N/A		

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW5229-1	FSS-T-630-00001, FD-A, Routine 2

CHAIN OF POSSESSION

Relinquished by: Chris Winkler	Received by: John J. Throie	Date/Time: 6-7-91/0115
Relinquished by: John J. Throie	Received by: J. A. Throie	Date/Time: 6/7/91 0215
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Ship # R9227

9394, 9401, 9408 9415
9420, 9421 LABORATORY ID

Date Sampled	Time Sampled

Sample Site or Sampling ID	Date Received at 222-S	Time Received at 222-S
ORGANIC (R9227) INORGANIC (2AW52291-1 102AW)	6/13/91	1315

Delivered by (Signature)	RPT Release (Signature)	Dose Rate
[illegible]	[illegible]	200 mR/hr

Custodian (Signature)	Date Analysis Complete	Disposal Date
[illegible]		

Comments Stored in 2B Refr. #1, 2.

Payroll No.	Tech/Receiver (Signature)	Date	Entry Code	Comments
	INORGANIC 1 R9394			
	" 2 R9401			
	" 3 R9408			
	" 4 R9415			
	SEMI VOA OC 1 } R9420			
	2 }			
	VOA 1 } R942			
	2 }			

BD-6000-34

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(1 Per Shipping Container)

R 42

Date/Time Received 6-7-91 / 0210 hrs Client Name C.C. Pitkoff

Project/Client # 241-AW-TANK Batch or Case # 102-AW RISER #22A
Company Contact: C.C. Pitkoff Sample No. 2AW52291-1

Cooler ID (if noted on outside of cooler) PIG B-18

1. Condition of shipping container? good
2. Custody Seals on ~~cooler~~ Pig intact? Yes [ ] No [ ] none
3. Custody Seals dated and signed? Yes [ ] No [ ] none
4. Chain of Custody record is ~~taped on inside of cooler lid~~ hand carried? Yes [✓] No [ ]
5. Vermiculite/packing material is: Wet [ ] Dry [ ] NA
6. Each sample is in a plastic bag? Yes [ ] No [ ] NA
7. Number of sample containers in cooler: 1
8. Samples have:
   - NA clips (in cans)
   - NA tape
   - NO custody seals
   - ✓ appropriate sample labels
   - ✓ hazard labels
9. Samples are:
   - ✓ in good condition
   - NO leaking
   - NA broken
   - NA have air bubbles
   - NA other
10. Samples received at NA °C. Coolant type NA
11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #(s) C of C present
    Request for Analysis #(s) yes
    Airbill # NA Carrier Truck
12. Have any anomalies been identified above? Yes [ ] No [✓]
13. Memos have been initiated for all anomalies identified above? Yes [NA]

Printed Name/Signature ~~Honaker~~ DOT / Dot Honaker Date/Time 6-7-91
for J.A. Zuerin

Page 1 of 2

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SAMPLE CHECK-IN LIST
SAMPLE NUMBER MATRIX

WHC ID NUMBER	SAMPLE LABEL NUMBER	PNL ID NUMBER	AGREEMENT OF INFORMATION?
~~INORGANIC~~ 1	R9394		
2	R9401		
3	R9408		
4	R9415		
Semi VOA ORGANIC			
1, and 2	R9420		
VOA			
1 and 2	R9421		

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TANK FARM PLANT OPERATING PROCEDURE

CHAIN OF CUSTODY

Company Contact	C. C. Pitkoff	Telephone	3-2408
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	Sample Truck		
Shipped to	222-S		

SAMPLING INFORMATION

Sample Collected by	CLKenney	Date	6-5-91	Time	1545
Sample Locations	241-AW - TANK 102-AW RISER # 22A				
Remarks	N/A				
Ice Chest or Sample Pig No.	B-18 ~~2AW5229I-1~~ Rewire	Field Logbook and Page No.	N/A		

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW5229I-1	FSS-T-630-00001, FD-A, Routine 2

CHAIN OF POSSESSION

Relinquished by:	Received by:	Date/Time:
Chris Winkler	John J. Thoie	6-7-91/0115
John J. Thoie	J. A. Thoie	6/7/91 0215
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Ship# 9277
RyB 7/11/91

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 6-7-91 / 0210 hrs Client Name C.C. Pitkoff

Project/Client # 241-AW-TANK Batch or Case # 102-AW RISER #22A

Company Contact: C.C. Pitkoff Sample No. 2AW52291-1

~~Cooler~~ PIG ID (if noted on outside of cooler) B-18

1. Condition of shipping container? Good
2. Custody Seals on ~~cooler~~ Pig intact? Yes [ ] No [ ] none
3. Custody Seals dated and signed? Yes [ ] No [ ] none
4. Chain of Custody record is ~~taped on inside of cooler lid?~~ hand carried Yes [✓] No [ ]
5. Vermiculite/packing material is: Wet [ ] Dry [ ] NA
6. Each sample is in a plastic bag? Yes [ ] No [ ] NA
7. Number of sample containers in cooler: 1
8. Samples have:
   - NA clips (in cans)
   - NA tape
   - NO custody seals
   - ✓ appropriate sample labels
   - ✓ hazard labels
9. Samples are:
   - ✓ in good condition
   - NO leaking
   - NA broken
   - NA have air bubbles
   - NA other
10. Samples received at NA °C. Coolant type NA
11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #(s) C of C present
    Request for Analysis #(s) yes
    Airbill # NA Carrier Truck
12. Have any anomalies been identified above? Yes [ ] No [✓]
13. Memos have been initiated for all anomalies identified above? Yes [NA]

Printed Name/Signature DOT HONAKER / Dot Honaker Date/Time 6-7-91

for J.A. Zuerin

SAMPLE CHECK-IN LIST
SAMPLE NUMBER MATRIX

WHC ID NUMBER	SAMPLE LABEL NUMBER	PNL ID NUMBER	AGREEMENT OF INFORMATION?
R 92277 DLB 7/11/91	2AW 52291-1 DLB 7/11/91		

TANK FARM PLANT OPERATING PROCEDURE

CHAIN OF CUSTODY

Company Contact	C. C. Pitkoff	Telephone	3-2408
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	Sample Truck		
Shipped to	222-S		

SAMPLING INFORMATION

Sample Collected by	CCPitkoff	Date 6-5-91		Time	1555
Sample Locations	241-AW -TANK 102-AW Riser # 22A				
Remarks	N/A				
Ice Chest or Sample Pig No.	G	Field Logbook and Page No.	N/A		

SAMPLE IDENTIFICATION

Sample Number: 2AW5229I-2

Sample Schedule Number: FSS-T-630-00001, FD-A, Routine 2

CHAIN OF POSSESSION

Relinquished by: [signature]	Received by: T.L. Bacon	Date/Time: 6/10/91 / 1405
Relinquished by: Troy L. Bacon	Received by: [signature]	Date/Time: 6/10/91 15:05
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Wip #19229

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9402, 9409, 9416, 9422, 9423 LABORATORY ID		Date Sampled	Time Sampled
ple Site or Sampling ID 102-AW W52291-2 (R9229)		Date Received at 222-S 6/13/91	Time Received at 222-S 1315
d by (Signature)	RPT Release (Signature)		Dose Rate 200 mrad/hr
Kodian (Signature) Vida Johansen		Date Analysis Complete	Disposal Date
ments			

Stored in QB ref. #1,2,3

ll No.	Tech/Receiver (Signature)	Date	Entry Code	Comments
	INORGANIC 1	R9395		
	2	R9402		
	3	R9409		
	4	R9416		
	SVOA 1	R9423		
	2	R		
	VOA 1	~~R9423~~		
	2	R9422		

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R 40

(1 Per Shipping Container)

242-A Evaporator

Date/Time Received 6/10/91 Client Name Hard Jam

Project/Client # 241-AW -102AW Batch or Case # Rinse 22-A 102 -AW

Cooler ID (if noted on outside of cooler) G Seal 4210

1. Condition of shipping container? Good
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [ ] No [ ] N/A
5. Vermiculite/packing material is: Wet [ ] Dry [ ] NA
6. Each sample is in a plastic bag? Yes [ ] No [ ] NA
7. Number of sample containers in cooler: 1
8. Samples have:
   - ____ clips (in cans)
   - ____ tape
   - X custody seals
   - X appropriate sample labels
   - ____ hazard labels
9. Samples are:
   - ____ in good condition
   - ____ leaking
   - ____ broken
   - ____ have air bubbles
   - ____ other
10. Samples received at N/A °C. Coolant type ____
11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #(s) Ice Yes
    Request for Analysis #(s) —
    Airbill # N/A Carrier Hand carried
12. Have any anomalies been identified above? Yes [ ] No [X]
13. Memos have been initiated for all anomalies identified above? Yes [ ]

Printed Name/Signature Vida Johansen Date/Time 6/10/91 1530

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SAMPLE CHECK-IN LIST
SAMPLE NUMBER MATRIX

WHC ID NUMBER	SAMPLE LABEL NUMBER	PNL ID NUMBER	AGREEMENT OF INFORMATION?
R 9229	2AW52291-2		yes
INORGANIC 1	R9395		
2	9402		
3	9409		
4	9416		
SEMI VOA			
1 and 2	R 9423		
VOA			
1 and	R9422		

TANK FARM PLANT OPERATING PROCEDURE

CHAIN OF CUSTODY

Company Contact	C. C. Pitkoff	Telephone	3-2408
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	Sample Truck		
Shipped to	222-S		

SAMPLING INFORMATION

Sample Collected by	CCPitkoff	Date 6-5-91		Time	1555
Sample Locations	241-AW -TANK 102-AW RISER # 22A				
Remarks	N/A				
Ice Chest or Sample Pig No.	G	Field Logbook and Page No.	N/A		

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW52291-2	FSS-T-630-00001, FD-A, Routine 2

CHAIN OF POSSESSION

Relinquished by: [signature]	Received by: T.L. Bacon	Date/Time: 6/10/91 1405
Relinquished by: Troy L. Bacon	Received by: [signature]	Date/Time: 6/10/91 15:05
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Ship #R9229

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(1 Per Shipping Container)

Date/Time Received 6/10/91 Client Name 242-A Evaporator Hard Jam

Project/Client # 241-AW -102AW Batch or Case # Rinse 242-A 102-AW

Cooler ID (if noted on outside of cooler) G Seal 4210

1. Condition of shipping container? Good
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [ ] No [ ] N/A
5. Vermiculite/packing material is: Wet [ ] Dry [ ] NA
6. Each sample is in a plastic bag? Yes [ ] No [ ] NA
7. Number of sample containers in cooler: 1
8. Samples have:
   - ____ clips (in cans)
   - ____ tape
   - X custody seals
   - X appropriate sample labels
   - ____ hazard labels
9. Samples are:
   - ____ in good condition
   - ____ leaking
   - ____ broken
   - ____ have air bubbles
   - ____ other
10. Samples received at N/A °C. Coolant type ____
11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #(s) Yes —
    Request for Analysis #(s) —
    Airbill # N/A Carrier Hand Carried
12. Have any anomalies been identified above? Yes [ ] No [X]
13. Memos have been initiated for all anomalies identified above? Yes [ ]

Printed Name/Signature Vida Johansen Date/Time 6/10/91 1530

Page 1 of 2

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SAMPLE CHECK-IN LIST
SAMPLE NUMBER MATRIX

WHC ID NUMBER	SAMPLE LABEL NUMBER	PNL ID NUMBER	AGREEMENT OF INFORMATION?
A 9229	2AW52291-2		yes

TANK FARM PLANT OPERATING PROCEDURE

CHAIN OF CUSTODY

Company Contact	C. C. Pitkoff	Telephone	3-2408
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	Sample Truck		
Shipped to	222-S		

SAMPLING INFORMATION

Sample Collected by	CCPearing	Date 6-5-91		Time	1615
Sample Locations	241-AW-TANK 102-AW, RISER # 22-A				
Remarks	N/A				
Ice Chest or Sample Pig No.	TF-5	Field Logbook and Page No.	N/A		

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW52291-4	FSS-T-630-00001, FD-A, Routine 2

* Sample in pig marked 2AW52291-3

CHAIN OF POSSESSION

Relinquished by: [signature]	Received by: T.L. Bacon	Date/Time: 6/10/91 / 1405
Relinquished by: Troy L. Bacon	Received by: [signature]	Date/Time: 6/10/91 / 15:05
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Ship. # R9228

Per customer request:
Sample disposed of 6/11/91 1030

241-A Evaporator

Date/Time Received 6/10/91 1445 Client Name Steel Farm

Project/Client # 241-AW- 102AW Batch or Case # 102-AW RISER 22-A

Cooler ID (if noted on outside of cooler) TF-5 Seal # 4212

1. Condition of shipping container? Good
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [ ] No [ ] NA
5. Vermiculite/packing material is: Wet [ ] Dry [ ] NA
6. Each sample is in a plastic bag? Yes [ ] No [ ] NA
7. Number of sample containers in cooler: 1
8. Samples have:
   - ____ clips (in cans)
   - X custody seals
   - ____ hazard labels
   - ____ tape
   - NO appropriate sample labels
   - Sample & paperwork do not agree
9. Samples are:
   - ____ in good condition
   - ____ broken
   - ____ other
   - ____ leaking
   - ____ have air bubbles
10. Samples received at N/A °C. Coolant type N/A
11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #(s) Yes
    Request for Analysis #(s) ____
    Airbill # N/A Carrier hand carried
12. Have any anomalies been identified above? Yes [X] No [ ]
13. Memos have been initiated for all anomalies identified above? Yes [X] attached

Printed Name/Signature VIDA JOHANSEN Date/Time 6/10/91 1530

Page 1 of 2

SAMPLE CHECK-IN LIST
SAMPLE NUMBER MATRIX

WHC ID NUMBER	SAMPLE LABEL NUMBER	C SC ~~PNL ID~~ NUMBER	AGREEMENT OF INFORMATION?
R 9228	2AW52291-3 WS	2AW52291-4	NO —

Customer wants
Sample disposal —
Will resample
6/11/91
[illegible]

CHAIN OF CUSTODY

Company Contact	C. C. Pitkoff	Telephone	3-2408
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	Sample Truck		
Shipped to	222-S		

SAMPLING INFORMATION

Sample Collected by	BCWyn	Date 6-12-91		Time	0945
Sample Locations	241-AW, 102-AW, Rinse # 22A				
Remarks	seal #4214				
Ice Chest or Sample Pig No.	TF-11	Field Logbook and Page No.	N/A		

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW61191-4	FSS-T-630-00001, FD-A, Routine 2

CHAIN OF POSSESSION

Relinquished by: BCWyn	Received by: [signature]	Date/Time: 6-12-91 / 1310
Relinquished by: [signature]	Received by: [signature]	Date/Time: 6-12-91 / 1410
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

R9426, 9427, 9411, 9418 LABORATORY ID		Date Sampled	Time Sampled
Sample Site or Sampling ID (R 9372) 2AW52291-4 102AW		Date Received at 222-S 6/13/91	Time Received at 222-S 13:15
Delivered by (Signature)	RPT Release (Signature)		Dose Rate 200 mrem/hr
Custodian (Signature)		Date Analysis Complete	Disposal Date
Comments Stored in refg. 1,2,3			

Payroll No.	Tech/Receiver (Signature)		Date	Entry Code	Comments
	INORGANIC	1	R9397		
		2	R9464		
		3	R9411		
		4	R9418		
				R9427	
	SVOA	1		~~R9423~~	
	"	2			
	VOA	1		~~R9422~~	
	"	2		R9426	

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(1 Per Shipping Container)

Date/Time Received 6/12/91 1400 Client Name Hart James

2AW61191-4

Project/Client # 241-102 AW Batch or Case # RISER 22A

Cooler ID (if noted on outside of cooler) TF-11 seal 4214

1. Condition of shipping container? Good
2. Custody Seals on ~~cooler~~ intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [ ] No [ ] NA
5. Vermiculite/packing material is: Wet [ ] Dry [ ] N/A
6. Each sample is in a plastic bag? Yes [ ] No [ ] N/A
7. Number of sample containers in cooler: 1
8. Samples have:
   - ____ clips (in cans)
   - ____ tape
   - X custody seals
   - ____ appropriate sample labels
   - ____ hazard labels
9. Samples are:
   - ____ in good condition
   - ____ leaking
   - ____ broken
   - ____ have air bubbles
   - ____ other
10. Samples received at N/A °C. Coolant type ____
11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #(s) yes
    Request for Analysis #(s) yes
    Airbill # N/A Carrier hand carried
12. Have any anomalies been identified above? Yes [ ] No [X]
13. Memos have been initiated for all anomalies identified above? Yes [ ]

Printed Name/Signature Vida Johansen Vida Johansen Date/Time 6/12/91 1445

Page 1 of 2

SAMPLE CHECK-IN LIST
SAMPLE NUMBER MATRIX

WHC ID NUMBER	SAMPLE LABEL NUMBER	PNL ID NUMBER	AGREEMENT OF INFORMATION?
R9372	2AW 61191-4		yes
INORGANIC 1	R9397		
2	9404		
3	9411		
4	9418		
SEMI VOA			
1 and 2	R 9427		
3			
VOA			
1 and 2	R 9426		

102HW

COPY

SAMPLE CHECKOUT LIST

Sample ID	Tech. sign./pyrl	Sample out	Sample in	Date/Time	Custodian/ date time
R9415, 11, 18, 16, 09 R9410, 17, 08,	Mary 6C269 Franey	1100	1115	6-18-91	6/18/91 1115 Vida Johansen
9394 - 9401 9395 - 9402 9397 - 9404 9396 - 9403	M G Simon 6C559	1100	1115	6/18/91	6/18/91 1115 Vida Johansen
R9415, 16, 17, 18	6C269 Mary Franey	115	1350	6/18-91	6/18/91 1350 Vida Johansen
R9417	6C275 Dan R Jackson	14:10	14:30	6-18-91	6/19/91 0830 Vida Johansen
R-9408 - 11	80028 Ed Cohen	0830	1330	6-19-91	6/19/91 1045 Vida Johansen

SAMPLE DATA SUMMARY

SUMMARY DATA REPORT

Project: 242-A EVAPORATOR FEED CHARACTERIZATION
Tank: 102AW
Customer ID: 2291-1-1, 2291-2-1, 2291-3-1, 2291-4-1

Undigested Sample Results

	Sample	Sample Duplicate
Visual Check And Over The Top Reading Analysis	R9394 Aqueous Solution Light Tint Yellow, Clear, Some Solids Settled on Bottom of Vial.	NA
Visual Check And Over The Top Reading Analysis	R9395 Aqueous Solution Light Tint Yellow, Clear, Some Solids Settled on Bottom of Vial.	NA
Visual Check And Over The Top Reading Analysis	R9396 Aqueous Solution Light Tint Yellow, Clear, Some Solids Settled on Bottom of Vial.	NA
Visual Check And Over The Top Reading Analysis	R9397 Aqueous Solution Light Tint Yellow, Clear, Some Solids Settled on Bottom of Vial.	NA

SUMMARY DATA REPORT

Project: 242-A EVAPORATOR FEED CHARACTERIZATION
Tank: 102AW
Customer ID: 2291-1-1, 2291-2-1, 2291-3-1, 2291-4-1

Acid Digestion Sample Results

	Sample R9394-8705		Sample Duplicate R9394-8805	
Acid Digestion	Complete R9394-8750		Complete R9394-8850	
ICP				
Al	4.83E+5	ppb	4.69E+5	ppb
Ba	<1.30E+3	ppb	<1.30E+3	ppb
Cd	<4.00E+2	ppb	<4.00E+2	ppb
Cr	1.10E+4	ppb	1.05E+4	ppb
Fe	1.76E+4	ppb	7.37E+4	ppb
Pb	<8.00E+3	ppb	<8.00E+3	ppb
Mg	7.20E+3	ppb	1.19E+4	ppb
Mn	<3.00E+2	ppb	<3.00E+2	ppb
Ag	1.50E+3	ppb	<8.00E+2	ppb
Na	1.68E+7	ppb	1.63E+7	ppb
Zn	4.19E+3	ppb	2.30E+3	ppb

	Sample R9395-8705		Sample Duplicate NA	
Acid Digestion	Complete R9395-8750			
ICP				
Al	4.82E+5	ppb	NA	
Ba	<1.30E+3	ppb	NA	
Cd	<4.00E+2	ppb	NA	
Cr	1.04E+4	ppb	NA	
Fe	5.06E+4	ppb	NA	
Pb	<8.00E+3	ppb	NA	
Mg	1.37E+4	ppb	NA	
Mn	<3.00E+2	ppb	NA	
Ag	8.20E+2	ppb	NA	

	Sample R9395-8750		Sample Duplicate NA
Na	1.66E+7	ppb	NA
Zn	7.30E+3	ppb	NA

	Sample R9396-8705		Sample Duplicate NA
Acid Digestion	Complete R9396-8750		
ICP			
Al	4.91E+5	ppb	NA
Ba	<1.30E+3	ppb	NA
Cd	<4.00E+2	ppb	NA
Cr	1.09E+4	ppb	NA
Fe	2.39E+4	ppb	NA
Pb	<8.00E+3	ppb	NA
Mg	1.33E+4	ppb	NA
Mn	<3.00E+3	ppb	NA
Ag	<8.00E+2	ppb	NA
Na	1.70E+7	ppb	NA
Zn	5.10E+3	ppb	NA

	Sample R9397-8705		Sample Duplicate NA
Acid Digestion	Complete R9397-8750		
ICP			
Al	5.01E+5	ppb	NA
Ba	<1.30E+3	ppb	NA
Cd	<4.00E+2	ppb	NA
Cr	1.06E+4	ppb	NA
Fe	6.17E+3	ppb	NA
Pb	<8.00E+3	ppb	NA
Mg	1.72E+4	ppb	NA
Mn	<3.00E+2	ppb	NA
Ag	<8.00E+2	ppb	NA
Na	1.70E+7	ppb	NA
Zn	2.09E+4	ppb	NA

ACID DIGESTION ANALYSIS RESULTS

ACID DIGESTION
SAMPLE RESULTS

Tank: 102AW
Core: NA
Sample No: R9394
Customer ID: 2291-1-1

	Check Standard		Blank		Sample		Duplicate Sample		Spike of Sample		Check Standard	
Lab ID:	R9392		R9393		R9394-8705		R9394-8805		NA		R9398	
Acid Digestion (11-01-91)	Complete		Complete		Complete		Complete				Complete	
Lab ID:	R9392		R9393		R9394-8750		R9394-8850		NA		R9398	
ICP												
Aluminum	141.2	%	1.02E+2	ppb	4.83E+5	ppb	4.69E+5	ppb			139.8	%
Barium	100.4	%	<1.30E+1	ppb	<1.30E+3	ppb	<1.30E+3	ppb			101	%
Cadmium	99.1	%	<4.00E+0	ppb	<4.00E+2	ppb	<4.00E+2	ppb			99.1	%
Chromium	105	%	<8.00E+0	ppb	1.10E+4	ppb	1.05E+4	ppb			105.4	%
Iron	159	%	1.03E+2	ppb	1.76E+4	ppb	7.37E+4	ppb			162.2	%
Lead	105	%	<8.00E+1	ppb	<8.00E+3	ppb	<8.00E+3	ppb			107.6	%
Magnesium	110	%	<5.10E+1	ppb	7.20E+3	ppb	1.19E+4	ppb			111.4	%
Manganese	100	%	<3.00E+0	ppb	<3.00E+2	ppb	<3.00E+2	ppb			100.8	%
Silver	96.8	%	<8.00E+0	ppb	1.50E+3	ppb	<8.00E+2	ppb			87.6	%
Sodium	194.4	%	7.02E+2	ppb	1.68E+7	ppb	1.63E+7	ppb			196.5	%
Zinc	104.3	%	3.01E+1	ppb	4.19E+3	ppb	2.30E+3	ppb			106.7	%

ACID DIGESTION
SAMPLE RESULTS

Tank: 102AW
Core: NA
Sample No.: R9395
Customer ID: 2291-2-1

	Check Standard		Blank		Sample		Duplicate Sample		Spike of Sample		Check Standard	
Lab ID:	R9392		R9393		R9395-8705		NA		R9395-8905		R9398	
Acid Digestion (11-01-91)	Complete		Complete		Complete				Complete		Complete	
Lab ID:	R9392		R9393		R9395-8750		NA		R9395-8950		R9398	
ICP												
Aluminum	141.2	%	1.02E+2	ppb	4.82E+5	ppb			128.2	%	139.8	%
Barium	100.4	%	<1.30E+1	ppb	<1.30E+3	ppb			101	%	101	%
Cadmium	99.1	%	<4.00E+0	ppb	<4.00E+2	ppb			99.1	%	99.1	%
Chromium	105	%	<8.00E+0	ppb	1.04E+4	ppb			105.6	%	105.4	%
Iron	159	%	1.03E+2	ppb	5.06E+4	ppb			35.2	%	162.2	%
Lead	105	%	<8.00E+1	ppb	<8.00E+3	ppb			102.2	%	107.6	%
Magnesium	110	%	<5.10E+1	ppb	1.37E+4	ppb			84.4	%	111.4	%
Manganese	100	%	<3.00E+0	ppb	<3.00E+2	ppb			99	%	100.8	%
Silver	96.8	%	<8.00E+0	ppb	8.20E+2	ppb			95.8	%	87.6	%
Sodium	194.4	%	7.02E+2	ppb	1.66E+7	ppb			*636.6	%	196.5	%
Zinc	104.3	%	3.01E+1	ppb	7.30E+3	ppb			97	%	106.7	%

*As Per Result Card-Sample 4 x > Spike.

ACID DIGESTION
SAMPLE RESULTS

Tank: 102AW
Core: NA
Sample No.: R9396
Customer ID: 2291-3-1

	Check Standard		Blank		Sample		Duplicate Sample		Spike of Sample		Check Standard	
Lab ID:	R9392		R9393		R9396		NA		NA		R9398	
Acid Digestion (11-01-91)	Complete		Complete		Complete						Complete	
Lab ID:	R9392		R9393		R9396		NA		NA		R9398	
ICP												
Aluminum	141.2	%	1.02E+2	ppb	4.91E+5	ppb					139.8	%
Barium	100.4	%	<1.30E+1	ppb	<1.30E+3	ppb					101	%
Cadmium	99.1	%	<4.00E+0	ppb	<4.00E+2	ppb					99.1	%
Chromium	105	%	<8.00E+0	ppb	1.09E+4	ppb					105.4	%
Iron	159	%	1.03E+2	ppb	2.39E+4	ppb					162.2	%
Lead	105	%	<8.00E+1	ppb	<8.00E+3	ppb					107.6	%
Magnesium	110	%	<5.10E+1	ppb	1.33E+4	ppb					111.4	%
Manganese	100	%	<3.00E+0	ppb	<3.00E+3	ppb					100.8	%
Silver	96.8	%	<8.00E+0	ppb	<8.00E+2	ppb					87.6	%
Sodium	194.4	%	7.02E+2	ppb	1.70E+7	ppb					196.5	%
Zinc	104.3	%	3.01E+1	ppb	5.10E+3	ppb					106.7	%

ACID DIGESTION
SAMPLE RESULTS

Tank: 102AW
Core: NA
Sample No.: R9397
Customer ID: 2291-4-1

	Check Standard		Blank		Sample		Duplicate Sample		Spike of Sample		Check Standard	
Lab ID:	R9392		R9393		R9397		NA		NA		R9398	
Acid Digestion (11-01-91)	Complete		Complete		Complete						Complete	
Lab ID:	R9392		R9393		R9397		NA		NA		R9398	
ICP												
Aluminum	141.2	%	1.02E+2	ppb	5.01E+5	ppb					139.8	%
Barium	100.4	%	<1.30E+1	ppb	<1.30E+3	ppb					101	%
Cadmium	99.1	%	<4.00E+0	ppb	<4.00E+2	ppb					99.1	%
Chromium	105	%	<8.00E+0	ppb	1.06E+4	ppb					105.4	%
Iron	159	%	1.03E+2	ppb	6.17E+3	ppb					162.2	%
Lead	105	%	<8.00E+1	ppb	<8.00E+3	ppb					107.6	%
Magnesium	110	%	<5.10E+1	ppb	1.72E+4	ppb					111.4	%
Manganese	100	%	<3.00E+0	ppb	<3.00E+2	ppb					100.8	%
Silver	96.8	%	<8.00E+0	ppb	<8.00E+2	ppb					87.6	%
Sodium	194.4	%	7.02E+2	ppb	1.73E+7	ppb					196.5	%
Zinc	104.3	%	3.01E+1	ppb	2.09E+4	ppb					106.7	%

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9394	Customer ID: 2291-1-1
Analysis: VISUAL CHECK AND OVER-THE-TOP READING	Sample Prep: UNDIGESTED

Instrument: N/A	Procedure/Rev: LA-519-151/D-1
Technologist: M. BIERMAN	Date: 6-14-91
Starting Time: 13:30	Temperature: 25degC
Ending Time: 15:00	Chemist: N/A

	Description	Lab ID		Description	Lab ID
1	SAMPLE 1-1	R9394-5000	11		
2	SAMPLE 2-1	R9395-5000	12		
3	SAMPLE 3-1	R9396-5000	13		
4	SAMPLE 4-1	R9397-5000	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
N/A				N/A

A-6000-881 (03/92)

VISUAL CHECK AND OVER-THE-TOP READING ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
R 9394.-500C	102AW	6-14-91	10:41	26

Determination	Method/Reagent	Result Units	Charge Code	Remarks
APPEAR	LA-514-151		W1UEO	0

Sample Size	Customer ID
?	2291-1-1

Remarks, Calculations, Results

A. JAR IDN
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-DM
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
clarity - clear
some solids settled
on bottom of vial

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
LCSS9				
MB				

Date: 6/14/91

Serial No	Sample Point	Date	Time Issued	Priority
R 9395.-500C	102AW	6-14-91	10:44	26

Determination	Method/Reagent	Result Units	Charge Code	Remarks
APPEAR	LA-514-151		W7A12	0

Sample Size	Customer ID
?	2291-2-1

Remarks, Calculations, Results

A. JAR IDN
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-DM
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
clarity - clear
solids settled on
bottom of vial

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
LCSS9				
MB				

Date: 6/14/91

Serial No	Sample Point	Date	Time Issued	Priority
R 9396.-500C	102AW	6-14-91	10:47	26

Determination	Method/Reagent	Result Units	Charge Code	Remarks
APPEAR	LA-514-151		W1UEO	0

Sample Size	Customer ID
?	2291-3-1

Remarks, Calculations, Results

A. JAR IDN
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-DM
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
aqueous solution
light tint yellow
clarity clear
some solids have settled on
the bottom of vial

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
LCSS9				
MB				

Date: 6/14/91

Serial No	Sample Point	Date	Time Issued	Priority
R 9397.-500C	102AW	6-14-91	10:48	26

Determination	Method/Reagent	Result Units	Charge Code	Remarks
APPEAR	LA-514-151		W1UEO	0

Sample Size	Customer ID
?	2291-4-1

Remarks, Calculations, Results

6-14-91

A. JAR IDN
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-DM
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
clarity - clear
solids - present

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
LCSS9				
MB				

Date: 6/14/91

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9394	Customer ID: 2291-1-1
Analysis: ACID DIGESTION	Sample Prep: ACID DIGESTION

Instrument: SNF04495	Procedure/Rev: LA-505-158/A-2
Technologist: J. WORRELL	Date: 11-1-91
Starting Time: 08:00	Temperature: 20degC
Ending Time: N/A	Chemist: L. OTTMAR

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9392-8505	11		
2	REAGENT BLANK	R9393-8605	12		
3	SAMPLE 2291-1-1	R9394-8705	13		
4	SAM DUP OF 2291-1-1	R9394-8805	14		
5	SPIKE OF SAMPLE 2291-2-1	R9395-8905	15		
6	FINAL LMCS CHECK STD	R9398-8505	16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	1B48U/10 mL	2B48U/10 mL	3B48U/10 mL	N/A
SPIKE(SPEX)	LOT# 1-150AS/1 mL			N/A
THESE SAMPLES WERE RERUN.				

A-6000-881 (03/92)

ACID DIGESTION ANALYSIS

Sample No.	Sample Point	Date	Time Issued	Priority
R 9392.-8505	102AW	6-14-91	10:35	26

Determination	Method/Standard	Result Units	Charge Code	Results
ACD-DIG	LA-505-158	% RECOVERY	W1BEU	1

Sample Size: 1 ml of the 1848-U, 2848-U, 3848-U in 100 ml Q-H2O
Customer ID: STD

Remarks, Calculations, Results:
LHCS CHECK SAMPLE
LHCS ID_____

Complete

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
61483				

Date: 11-1-91

Sample No.	Sample Point	Date	Time Issued	Priority
R 9393.-8505	102AW	6-14-91	10:37	26

Determination	Method/Standard	Result Units	Charge Code	Results
ACD-DIG	LA-505-158	B/G	W1BEU	1

Customer ID: REAGENT

Remarks, Calculations, Results:
REAGENT BLANK
VOLUME ON COMPLETION 100 ml

Complete

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
61483				

Date: 11-1-91

Sample No.	Sample Point	Date	Time Issued	Priority
R 9394.-8505	102AW	6-14-91	10:40	26

Determination	Method/Standard	Result Units	Charge Code	Results
ACD-DIG	LA-505-158	B/G	W1BEU	1

Sample Size: 1 ml in 100 ml Q-H2O
Customer ID: 2291-1-1

Remarks, Calculations, Results:

Complete

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
61483				

Date: 11-1-91

Sample No.	Sample Point	Date	Time Issued	Priority
R 9394.-8805	102AW	6-14-91	10:40	26

Determination	Method/Standard	Result Units	Charge Code	Results
ACD-DIG	LA-505-158	B/G	W1BEU	1

Customer ID: 2291-1-1

Remarks, Calculations, Results: IN 100 ml Q-H2O
DUPLICATE SAMPLE

complete

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
61483				

Date: 11-1-91

Sample No.	Sample Point	Date	Time Issued	Priority
R 9398.-8505	102AW	6-14-91	10:50	26

Determination	Method/Standard	Result Units	Charge Code	Results
ACD-DIG	LA-505-158	% RECOVERY	W1BEU	1

Sample Size: 1 ml of the 1848-U, 2848-U, 3848-U in 100 ml Q-H2O
Customer ID: STD

Remarks, Calculations, Results:
LHCS CHECK SAMPLE
LHCS ID_____

complete

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
61483				

Date: 11-1-91

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9394	Customer ID: 2291-1-1
Analysis: ICP	Sample Prep: ACID DIGESTION

Instrument: WB39939	Procedure/Rev: LA-505-151/B-0
Technologist: T. FRAZIER	Date: 12-26-91
Starting Time: N/A	Temperature: N/A
Ending Time: N/A	Chemist: L. OTTMAR

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9392-8550	11		
2	REAGENT BLANK	R9393-8650	12		
3	SAMPLE 2291-1-1	R9394-8750	13		
4	SAM DUP 2291-1-1	R9394-8850	14		
5	FINAL LMCS CHECK STD	R9398-8550	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	ICP1-1B48R/10 mL	ICP2-2B48R/10 mL	ICP3-3B48R/10 mL	N/A
SAMPLES RERUN.				

A-6000-881 (03/92)

ICP ANALYSIS - ACID DIGESTION

DIGESTED

67768 82768

12/26/91 12/27/91

UNDIGESTED STDS
R4342 - 8550

Ag	4.75ppm	95.0%
Al	4.71ppm	94.2%
Ba	9.83	98.3%
Cd	9.65	96.5%
Cr	4.75	95.0%
Mg	4.85	97.0%
Mn	9.60	96.0%
Pb	5.06ppm	101.2%
Fe	4.89	97.8%
Zn	9.72	97.2%
Mo	4.87	97.4%

1892
2498AA
1848AA

D.EECT

RERUN

67768 82768

12/26/91 12/27/91

67768 82768

12/26/91 12/27/91

67768 82768

12/26/91 12/27/91

ICP ANALYSIS - ACID DIGESTION

Sample No	Sample Point	Date	Time Issued	Priority
R 9398-8550	102AW	6-14-91	10:50	20

Determination	Method/Standard	Report Units	Charge Code	Reruns
ICP	LA-505-151	% RECOVERY	WIRED	1

Sample Size	Customer ID
2 10-[illegible] 100mL DIGESTED	STD

Remarks, Calculations, Results

LMCS CHECK SAMPLE
LMCS ID_____

Ag .412ppm 82.4% Rec.
Al 4.99ppm 139.9% Rec.
Ba 10.10 101.0% Rec.
Cd 9.91 99.1% Rec.
Cr 5.27 105.4% Rec.
Mg 5.57 111.4% Rec.
Na 19.65 196.5% Rec.
Pb 5.28 107.6% Rec.
Fe .311±.10 [illegible] 94.4%
Zn 4.67 106.7%
Mn .5[illegible] ± 5.09 [illegible]%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
67768	82768			
Initials	Initials	Initials	Initials	Initials
Date 12/20/91	Date 12/27/91	Date	Date	Date

UNDIGESTED 5785
R4348-8550

Ag	4.52 ppm	96.4%
Al	4.72 ppm	94.4%
Ba	9.79 ppm	97.9%
Cd	9.62 ppm	96.2%
Cr	4.71 ppm	94.2%
Mg	4.82 ppm	96.4%
Na	9.55 ppm	95.5%
Pb	5.12 ppm	102.4%
Fe	4.87 ppm	97.4%
Zn	9.78 ppm	97.8%
Mn	4.86 ppm	97.2%

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WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9395	Customer ID: 2291-2-1
Analysis: VISUAL CHECK AND OVER-THE-TOP READING	Sample Prep: UNDIGESTED

Instrument: N/A	Procedure/Rev: LA-519-151/D-1
Technologist: M. BIERMAN	Date: 6-14-91
Starting Time: 13:30	Temperature: 25degC
Ending Time: 15:00	Chemist: N/A

	Description	Lab ID		Description	Lab ID
1	SAMPLE 1-1	R9394-5000	11		
2	SAMPLE 2-1	R9395-5000	12		
3	SAMPLE 3-1	R9396-5000	13		
4	SAMPLE 4-1	R9397-5000	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
N/A				N/A

A-6000-881 (03/92)

VISUAL CHECK AND OVER-THE-TOP READING ANALYSIS - UNDIGESTED SAMPLE

ADDENDUM 1 REV 0

Sample No	Sample Point	Date	Time Issued	Priority
R 9391.-5000	102AW	6-14-91	10:41	26

Determination: APMEAK | Method Reference: LA-519-151 | Result Units: | Charge Code: W1NED | Returns: 0
Sample Size: ? | Customer ID: 2291-1-1

Remarks, Calculations, Results:
A. JAR IDN
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-Um
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
clarity - clear
some solids settled
on bottom of vial

Analyst 1: LCS9 | Analyst 2: | Analyst 3: | Analyst 4: | Analyst 5:
Date: 6/14/91 | Time Completed:

Sample No	Sample Point	Date	Time Issued	Priority
R 9395.-5000	102AW	6-14-91	10:46	26

Determination: APMEAK | Method Reference: LA-519-151 | Result Units: | Charge Code: W1A1X | Returns: 0
Sample Size: ? | Customer ID: 2291-2-1

Remarks, Calculations, Results:
A. JAR IDN
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-Um
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
clarity - clear
solids settled on
bottom of vial

Analyst 1: LCS9 | Analyst 2: | Analyst 3: | Analyst 4: | Analyst 5:
Date: 6/14/91 | Time Completed:

Sample No	Sample Point	Date	Time Issued	Priority
R 9396.-5000	102AW	6-14-91	10:47	26

Determination: APMEAK | Method Reference: LA-519-151 | Result Units: | Charge Code: W1NED | Returns: 0
Sample Size: ? | Customer ID: 2291-3-1

Remarks, Calculations, Results:
A. JAR IDN
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-Um
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
aqueous solution
light tint yellow
clarity clear
some solids have settled on
the bottom of vial

Analyst 1: LCS9 | Analyst 2: | Analyst 3: | Analyst 4: | Analyst 5:
Date: 6/14/91 | Time Completed:

Sample No	Sample Point	Date	Time Issued	Priority
R 9397.-5000	102AW	6-14-91	10:48	26

Determination: APMEAK | Method Reference: LA-519-151 | Result Units: | Charge Code: W1NED | Returns: 0
Sample Size: ? | Customer ID: 2291-4-1

Remarks, Calculations, Results:
A. JAR IDN
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-Um
E. EST. VOL./LENGTH
F. VISUAL REMARKS

6-14-91
no visible organic
light tint yellow
aqueous solution
clarity - clear
solids - present

Analyst 1: LCS9 | Analyst 2: | Analyst 3: | Analyst 4: | Analyst 5:
Date: 6/14/91 | Time Completed:

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9395	Customer ID: 2291-2-1
Analysis: ACID DIGESTION	Sample Prep: ACID DIGESTION

Instrument: SNF04495	Procedure/Rev: LA-505-158/A-2
Technologist: J. WORRELL	Date: 11-1-91
Starting Time: 08:00	Temperature: 20degC
Ending Time: N/A	Chemist: L. OTTMAR

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9392-8505	11		
2	REAGENT BLANK	R9393-8605	12		
3	SAMPLE 2291-1-1	R9394-8705	13		
4	SAM DUP OF 2291-1-1	R9394-8805	14		
5	SAMPLE 2291-2-1	R9395-8705	15		
6	SPIKE OF SAMPLE 2291-2-1	R9395-8905	16		
7	FINAL LMCS CHECK STD	R9398-8505	17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	1B48U/10 mL	2B48U/10 mL	3B48U/10 mL	N/A
SPIKE(SPEX)	LOT# 1-150AS/1 mL			N/A
THESE SAMPLES WERE RERUN.				

A-6000-881 (03/92)

9 3 1 2 3 3 3 3 9

ACID DIGESTION ANALYSIS

Sample No.	Sample Point	Date	Time Issued	Priority
R 9392.-8505	102AW	6-14-91	10:35	26

Determination	Method/Standard	Result Units	Charge Code	Results
ACD-DIG	LA-505-158	% RECOVERY	W1BEU	1

Sample Size: 7 1ml of each {1048-0, 1049-0, 1050-0} in 100ml Q-H_2O — Customer ID: STD

Remarks, Contaminants, Results:
LMCS CHECK SAMPLE
LMCS ID_____

Complete

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
61483	[signature]			

Date: 11-1-91

Sample No.	Sample Point	Date	Time Issued	Priority
R 9393.-8505	102AW	6-14-91	10:[illegible]	[illegible]

Determination	Method/Standard	Result Units	Charge Code	Results
ACD-DIG	LA-505-158	U/G	W1BEU	1

Sample Size: ?

Customer ID: REG.BL

Remarks, Contaminants, Results:
REAGENT BLANK
VOLUME ON
COMPLETION 100ml

Complete

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
61483	[signature]			

Date: 11-1-91

Sample No.	Sample Point	Date	Time Issued	Priority
R 9394.-8805	102AW	6-14-91	10:40	26

Determination	Method/Standard	Result Units	Charge Code	Results
ACD-DIG	LA-505-158	U/G	W1BEU	1

Sample Size: 7 1ml in 100ml Q-H_2O

Customer ID: 2291-1-1

Remarks, Contaminants, Results:

Complete

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
61483	[signature]			

Date: 11-1-91

Sample No.	Sample Point	Date	Time Issued	Priority
R 9394.-8805	102AW	6-14-91	10:40	26

Determination	Method/Standard	Result Units	Charge Code	Results
ACD-DIG	LA-505-158	U/G	W1BEU	1

Sample Size: 7 1ml in 100ml Q-H_2O 5/9/91

Customer ID: 2291-1-1

Remarks, Contaminants, Results:
DUPLICATE SAMPLE

Complete

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
61483	[signature]			

Date: 11-1-91

Sample No.	Sample Point	Date	Time Issued	Priority
R 9395.-8805	102AW	6-14-91	10:46	26

Determination	Method/Standard	Result Units	Charge Code	Results
ACD-DIG	LA-505-158	U/G	W1BEU	1

Sample Size: 7 1ml in 100ml Q-H_2O

Customer ID: 2291-2-1

Remarks, Contaminants, Results:

complete

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
61483	[signature]			

Date: 11-1-91

Sample No.	Sample Point	Date	Time Issued	Priority
R 9395.-8905	102AW	6-14-91	10:46	26

Determination	Method/Standard	Result Units	Charge Code	Results
ACD-DIG	LA-505-158	U/G	W1BEU	1

Sample Size: 7 1ml in 100ml Q-H_2O

Customer ID: 2291-2-1

Remarks, Contaminants, Results:
SAMPLE SPIKED ID
SPIKE ID SPEX SPIKE-1, LOT No. 1-150AS
SPIKE VOLUME 1ml

complete

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
61483	[signature]			

Date: 11-1-91

ACID DIGESTION ANALYSIS

Sample No	Sample Point	Date	Time Issued	Priority
R 9398.-8505	102AW	6-14-91	10:50	26

Determination	Method/Standard	Result Units	Charge Code	Aliquots
ACD-DIG	LA-505-158	% RECOVERY	W1DEU	1

Sample Size	Container ID
7 10ml of [illegible] in 100ml Q-H2O	STD

Remarks, Comments, Results

LHCS CHECK SAMPLE
LHCS ID_____

complete

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
61483				
Date	Time Completed	Data Verified		
11-1-91				

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9395	Customer ID: 2291-2-1
Analysis: ICP	Sample Prep: ACID DIGESTION

Instrument: WB39939	Procedure/Rev: LA-505-151/B-0
Technologist: T. FRAZIER	Date: 12-26-91
Starting Time: N/A	Temperature: N/A
Ending Time: N/A	Chemist: L. OTTMAR

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9392-8550	11		
2	REAGENT BLANK	R9393-8650	12		
3	SAMPLE 2291-2-1	R9395-8750	13		
4	SPIKE OF SAMPLE 2291-2-1	R9395-8950	14		
5	FINAL LMCS CHECK STD	R9398-8550	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	ICP1-1B48R/10 mL	ICP2-2B48R/10 mL	ICP3-3B48R/10 mL	N/A
SPIKE	1B482	2B48AA	3B48AA	N/A
THESE SAMPLES WERE RERUN.				

A-6000-881 (03/92)

ICP ANALYSIS - ACID DIGESTION

Sample No.	Sample Point	Date	Time Issued	Priority
R 9392.-8550	102AW	6-14-91	10:35	26

Determination	Method/Standard	Result Units	Charge Code	Results
ICP	LA-505-151	% RECOVERY	WIBEU	1

Sample Size: 7 10mL to 100mL DIGESTED

Customer ID: SID

Remarks, Calculations, Results: 1.8498, 2.8498, 3.8498

LMCS CHECK SAMPLE Ag = .994 ppm 100 = 7.94 96.8% Rec.
LMCS ID _____
Fe .793 100 = 7.93 159%
Zn 1.0448 10.48 104.8%
Mn .500 100 5.00 100%
Al 7.00 196.3% Rec.
Ba 10.04 100.4% Rec.
Cd 9.9 99.1% Rec.
Cr 5.28 105% Rec.
Mg 5.50 110% Rec.
Na 9.44 194.9% Rec.
Pb 5.25 105% Rec.

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
67768	82768			
Teresa L. Fujii	Laurine J. Ottman		Teresa L. Fujii	

Date: 12/26/91 Time/Completed: 12/27/91

UNDIGESTED STDS R9392 - 8550

Ag	4.75 ppm	95.0%
Al	4.71 ppm	94.2%
Ba	9.83	98.3%
Cd	9.65	96.5%
Cr	4.75	95.0%
Mg	4.85	97.0%
Na	9.60	96.0%
Pb	5.06 ppm	101.2%
Fe	4.89	97.8%
Zn	9.72	97.2%
Mn	4.87	97.4%

1892
284AA
384AA

Sample No.	Sample Point	Date	Time Issued	Priority
R 9391.-8650	102AW	6-14-91	10:37	26

Determination	Method/Standard	Result Units	Charge Code	Results
ICP	LA-505-151	G/G	WIBEU	1

Sample Size: DIRECT

Customer ID: REG.BL

Remarks, Calculations, Results: Ag <5.0 ug/l
REAGENT BLANK Al 1.0262 ug/l
Ba < 1.381 ug/l
Cd < 4.0 ug/l
Cr < 2.0 ug/l
Mg < 5.141 ug/l
Na 7.0262 ug/l
Pb < 5.081 ug/l

RERUN
Fe 1.0268 ug/l
Zn 3.0181 ug/l
Mn < 2.0 ug/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
67768	82768			
Teresa L. Fujii	Laurine J. Ottman			

Date: 12/26/91 Time/Completed: 12/27/91

Sample No.	Sample Point	Date	Time Issued	Priority
R 9395.-8750	102AW	6-14-91	10:46	26

Determination	Method/Standard	Result Units	Charge Code	Results
ICP	LA-505-151	G/G	WIBEU	1

Sample Size: 7 100mL 5-5 5/23/92

Customer ID: 2291-2-1

Remarks, Calculations, Results:
Ag (8.2 ug/l)100) = 8.28 ug/l
Al (4.2265)100) = 4.2265 ug/l
Ba (<13)100) = <1.383 ug/l
Cd (<4)100) = <4.082 ug/l
Cr (1.0482)100) = 1.0482 ug/l
Mg (1.7724)100) = 1.7724 ug/l
Na (1.6667)100) = 1.6667 ug/l
Pb (<50)100) = <2.083 ug/l
Fe (50)100) = 5.0669 ug/l
Zn (72)100) = 7.2063 ug/l
Mn (<3)100) = <2.083 ug/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
67768	82768			
Teresa L. Fujii	Laurine J. Ottman			

Date: 12/26/91 Time/Completed: 12/27/91

R9395- 8750

Fe 677-176 / 500 = 100.2%
Zn 1043-42 / 1000 = 100.1
Mn 495-0 / 500 = 99%

R9395 Spike

Logged/Updated 5/27/92 Teresa L. Fujii

ICP ANALYSIS - ACID DIGESTION

Sample No	Sampling Point	Date	Time Issued	Priority
K 9395, 8550	102NW	6-14-91	10:46	20

Determination	Method Standard	Report Units	Charge Code	Versions
ICP	LA-505-151	% RECOVERY	WIRED	1

Sample Size: 5-5 (1 ml 100 ml, Bar to 10 ml)
Customer ID: 22491-2-1

Numerical Calculations Results

SPIKE SAMPLE
SPIKE ID 10492, 23492, 32492
SPIKE VOLUME 10 ml

Fe (677 - 501)/500 x 100 = 35.2%
Zn (1043 - 73)/1000 x 100 = 97.0%
Mn (495 - 0)/500 x 100 = 94.0%

JW 7-23-92

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
67768	82768			
Susan L Fitzgerald	Laurine	J. Ottmer		
12/26/91	12/27/91	Job Lead Step 82484 Brian Wells	Susan L Fitzgerald	

Ag (987) - 8 / 500 x100 = 95.8% Rec. K9345 - 8550

Al (5457) - 4816 / 500 x100 = 128.2% Rec.

Ba (1010) / 1000 x100 = 101% Rec.

Cd (991) / 1000 x100 = 99.1% Rec.

Cr (632) - 104 / 500 x100 = 105.6% Rec.

Mg (557) - 177 / 500 x100 = 89.4% Rec.

Na (178874) - 166506 / 1000 x100 = 136.6% Rec. Sam 42 Spk.

Pb (511) / 500 x100 = 102.2% Rec.

Sample No	Sampling Point	Date	Time Issued	Priority
K 9395, 8550	102NW	6-14-91	10:50	20

Determination	Method Standard	Report Units	Charge Code	Versions
ICP	LA-505-151	% RECOVERY	WIRED	1

Sample Size: 10-10 (10 ml 100 ml) DIGESTED
Customer ID: STD

Numerical Calculations Results

TIMES UNSPIKE SAMPLE
TIMES ID 10492, 23492, 32492

Ag 4.78 ppm x100 4.78 ppm = 87.6% Rec.
Al 6.99 ppm 139.9% Rec.
Ba 10.10 101.0% Rec.
Cd 9.91 99.1% Rec.
Cr 5.27 105.4% Rec.
Mg 5.57 111.4% Rec.
Na 19.65 196.5% Rec.
Pb 5.38 107.6% Rec.

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
67768	82768			
Susan L Fitzgerald	Laurine	J. Ottmer	Susan L Fitzgerald	
12/26/91	12/27/91		Susan L Fitzgerald	

UNDIGESTED 5785
K9348-8550

Ag	4.82 ppm	96.4%
Al	4.72 ppm	94.4%
Ba	9.79 ppm	97.9%
Cd	9.62 ppm	96.2%
Cr	4.71 ppm	94.2%
Mg	4.82 ppm	96.4%
Na	9.55 ppm	95.5%
Pb	5.12 ppm	102.4%
Fe	4.87 ppm	97.4%
Zn	9.73 ppm	97.3%
Mn	4.56 ppm	97.2%

19452
2846AA
3 846AA

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9396	Customer ID: 2291-3-1
Analysis: VISUAL CHECK AND OVER-THE-TOP READING	Sample Prep: UNDIGESTED

Instrument: N/A	Procedure/Rev: LA-519-151/D-1
Technologist: M. BIERMAN	Date: 6-14-91
Starting Time: 13:30	Temperature: 25degC
Ending Time: 15:00	Chemist: N/A

	Description	Lab ID		Description	Lab ID
1	SAMPLE 1-1	R9394-5000	11		
2	SAMPLE 2-1	R9395-5000	12		
3	SAMPLE 3-1	R9396-5000	13		
4	SAMPLE 4-1	R9397-5000	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
N/A				

A-6000-881 (03/92)

VISUAL CHECK AND OVER-THE-TOP READING ANALYSIS - UNDIGESTED SAMPLE

R 9394.-5000 | 102AW | 6-14-91 | 10:41 | 26
APPEAR | W1WED | 0
? | 2291-1-1
A. JAR IDN
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-Um
E. EST. VOL./LENGTH
F. VISUAL REMARKS
no visible organic
light tint yellow
aqueous solution
clarity - clear
some solids settled
on bottom of vial
6559
6/14/91

R 9395.-5000 | 102AW | 6-14-91 | 10:46 | 26
APPEAR | W/A1X | 0
? | 2291-2-1
A. JAR IDN
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-Um
E. EST. VOL./LENGTH
F. VISUAL REMARKS
no visible organic
light tint yellow
aqueous solution
clarity - clear
solids settled on
bottom of vial
6559
6/14/91

R 9396.-5000 | 102AW | 6-14-91 | 10:47 | 26
APPEAR | W1WED | 0
? | 2291-3-1
A. JAR IDN
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-Um
E. EST. VOL./LENGTH
F. VISUAL REMARKS
no visible organic
aqueous solution
light tint yellow
clarity clear
some solids have settled on
the bottom of vial
6559
6/14/91

R 9397.-5000 | 102AW | 6-14-91 | 10:48 | 26
APPEAR | W1WED | 0
? | 2291-4-1
A. JAR IDN
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-Um
E. EST. VOL./LENGTH
F. VISUAL REMARKS
6-14-91
no visible organic
light tint yellow
aqueous solution
clarity - clear
solids - present
6559
6/14/91

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9396	Customer ID: 2291-3-1
Analysis: ACID DIGESTION	Sample Prep: ACID DIGESTION

Instrument: SNF04495	Procedure/Rev: LA-505-158/A-2
Technologist: J. WORRELL	Date: 11-1-91
Starting Time: 08:00	Temperature: 20degC
Ending Time: N/A	Chemist: L. OTTMAR

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9392-8505	11		
2	REAGENT BLANK	R9393-8605	12		
3	SAMPLE 2291-1-1	R9394-8705	13		
4	SAM DUP OF 2291-1-1	R9394-8805	14		
5	SPIKE OF SAMPLE 2291-2-1	R9395-8905	15		
6	SAMPLE 2291-3-1	R9396-8705	16		
7	FINAL LMCS CHECK STD	R9398-8505	17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	1B48U/10 mL	2B48U/10 mL	3B48U/10 mL	N/A
SPIKE(SPEX)	LOT# 1-150AS/1 mL			N/A
THESE SAMPLES WERE RERUN.				

A-6000-881 (03/92)

9 3 1 2 8 3 0 3 1 7

ACID DIGESTION ANALYSIS

Sample No	Sample Point	Date	Time Issued	Priority
R 9392.-8505	102AW	6-14-91	10:35	26

Determination	Method/Standard	Result Units	Charge Code	Results
ACD-DIG	LA-505-158	% RECOVERY	W1DEU	1

Sample Size: ? 10ml of 1848-0, 2848-0, 7848-0 in 100ml Q-H2O
Customer ID: STD

Remarks, Calculations, Results:
LHCS CHECK SAMPLE
LHCS ID_____
Complete

Analyst 1: 61483 | Analyst 2 | Analyst 3 | Analyst 4 | Analyst 5
Date: 11-1-91 | Time Completed | Lab Unit Mgr

Sample No	Sample Point	Date	Time Issued	Priority
R 9393.-8505	102AW	6-14-91	10:47	26

Determination	Method/Standard	Result Units	Charge Code	Results
ACD-DIG	LA-505-158	G/G	W1DEU	1

Sample Size: ? 1ml in 100ml Q-H2O
Customer ID: 2291-3-1

Remarks, Calculations, Results:
complete

Analyst 1: 61483 | Analyst 2 | Analyst 3 | Analyst 4 | Analyst 5
Date: 11-1-91 | Time Completed | Lab Unit Mgr

Sample No	Sample Point	Date	Time Issued	Priority
R 9394.-8505	102AW	6-14-91	10:50	26

Determination	Method/Standard	Result Units	Charge Code	Results
ACD-DIG	LA-505-158	% RECOVERY	W1DEU	1

Sample Size: ? 10ml of 1848-0, 2848-0, 7848-0 in 100ml Q-H2O
Customer ID: STD

Remarks, Calculations, Results:
LHCS CHECK SAMPLE
LHCS ID_____
complete

Analyst 1: 61483 | Analyst 2 | Analyst 3 | Analyst 4 | Analyst 5
Date: 11-1-91 | Time Completed | Lab Unit Mgr

Sample No	Sample Point	Date	Time Issued	Priority
R 9395.-8505	102AW	6-14-91	10:55	26

Determination	Method/Standard	Result Units	Charge Code	Results
ACD-DIG	LA-505-158	G/G	W1DEU	1

Sample Size: ? 1ml in 100ml Q-H2O
Customer ID: REG.BL

Remarks, Calculations, Results:
REAGENT BLANK
VOLUME ON
COMPLETION 100ml
Complete

Analyst 1: 61483 | Analyst 2 | Analyst 3 | Analyst 4 | Analyst 5
Date: 11-1-91 | Time Completed | Lab Unit Mgr

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9396	Customer ID: 2291-3-1
Analysis: ICP	Sample Prep: ACID DIGESTION

Instrument: WB39939	Procedure/Rev: LA-505-151/B-0
Technologist: T. FRAZIER	Date: 12-26-91
Starting Time: N/A	Temperature: N/A
Ending Time: N/A	Chemist: L. OTTMAR

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9392-8550	11		
2	REAGENT BLANK	R9393-8650	12		
3	SAM DUP OF 2291-1-1	R9394-8850	13		
4	SAMPLE 2291-3-1	R9396-8750	14		
5	FINAL LMCS CHECK STD	R9398-8550	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	ICP1-1B48R/10 mL	ICP2-2B48R/10 mL	ICP3-3B48R/10 mL	N/A
THESE SAMPLES WERE RERUN.				

A-6000-881 (03/92)

ICP ANALYSIS - ACID DIGESTION

Sample No.	Sample Point	Date	Time Issued	Priority
R 9392.-8550	102AW	6-14-91	10:35	26

Instrument	Method/Standard	Result Units	Charge Code	Remarks
ICP	LA-505-151	% RECOVERY	W1BEU	1

Sample Size: ? 10 mL w 100 mL DIGESTED — Customer ID: STD

Remarks, Calculations, Results: 1B49R, 2B49R, 3B49R

LMCS CHECK SAMPLE
LMCS ID _____
Fe .791 x10 = 7.93 15.9%
Zn 1.0 x10 = 10.18 101.8%
mg .500 x10 = 5.00 100.0%
Al 7.06 141.2% Rec.
Ba 10.04 100.4% Rec.
Cd 9.4 94.0% Rec.
Cr 5.25 105% Rec.
Mg 5.50 110% Rec.
Mn 19.44 194.1% Rec.
Pb 5.25 105% Rec.

Analyte-1	Analyte-2	Analyte-3	Analyte-4	Analyte-5
67768	82768			
Teresa L. Fitzgerald	Lauriine J. Ottman		Teresa L. Fitzgerald	
12/26/91	12/27/91	?	Teresa L. Fitzgerald	

UNDIGESTED STDS R9392 - 8550

Ag	4.75 ppm	95.0%
Al	4.71 ppm	94.2%
Ba	9.83	98.3%
Cd	9.65	96.5%
Cr	4.75	95.0%
Mg	4.85	97.0%
Mn	9.60	96.0%
Pb	5.06 ppm	101.2%
Fe	4.89	97.8%
Zn	9.72	97.2%
mg	4.87	97.4%

1B49R
2B49AA
3B49AA

Sample No.	Sample Point	Date	Time Issued	Priority
R 9393.-8650	102AW	6-14-91	10:37	26

Instrument	Method/Standard	Result Units	Charge Code	Remarks
ICP	LA-505-151	U/G	W1BEU	1

Sample Size: DIRECT — Customer ID: REG.BL

Remarks, Calculations, Results: Ag <8.0 ug/l
REAGENT BLANK Al 1.0262 ug/l
Ba < 4.261 ug/l
Cd < 4.0 ug/l
Cr < 3.0 ug/l
Mg < 5.1 ug/l
Mn 7.0262 ug/l
Pb < 3.0 ug/l

RERUN
Fe 1.0762 ug/l
Zn 3.0181 ug/l
Mn < 2.0 ug/l

Analyte-1	Analyte-2	Analyte-3	Analyte-4	Analyte-5
67768	82768			
Teresa L. Fitzgerald	Lauriine J. Ottman			
12/26/91	12/27/91		Teresa L. Fitzgerald	

Sample No.	Sample Point	Date	Time Issued	Priority
R 9394.-8850	102AW	6-14-91	10:40	26

Instrument	Method/Standard	Result Units	Charge Code	Remarks
ICP	LA-505-151	U/G	W1BEU	1

Sample Size: ? 100 mL w 100 mL 5/28/92 — Customer ID: 2291-1-1

Remarks, Calculations, Results:
DUPLICATE SAMPLE
Ag (<8)(100) = <8.0 ug/l
Al (9.0082)(100) = 9.0185 ug/l
Ba (<4.3)(100) = <4.3 ug/l
Cd (<4)(100) = <4.0 ug/l
Cr (1.0524)(100) = 1.0524 ug/l
Mg (19)(100) = 1.1969 ug/l
Mn (1.6385)(100) = 1.6387 ug/l
Pb (<30)(100) = <3.0 ug/l
Fe (787)(100) = 7.3769 ug/l
Zn (23)(100) = 2.3068 ug/l
Mn (<2)(100) = <2.0 ug/l

Analyte-1	Analyte-2	Analyte-3	Analyte-4	Analyte-5
67768	82768			
Teresa L. Fitzgerald	Lauriine J. Ottman			
12/26/91	12/27/91		Teresa L. Fitzgerald	

Sample No.	Sample Point	Date	Time Issued	Priority
R 9396.-8750	102AW	6-14-91	10:47	26

Instrument	Method/Standard	Result Units	Charge Code	Remarks
ICP	LA-505-151	U/G	W1BEU	1

Sample Size: ? 100 mL w 100 mL 5/28/92 — Customer ID: 2291-3-1

Remarks, Calculations, Results:
Ag (<8)(100) = <8.0 ug/l
Al (9.9182)(100) = 9.9185 ug/l
Ba (<4.3)(100) = <4.3 ug/l
Cd (<4)(100) = <4.0 ug/l
Cr (109)(100) = 1.0984 ug/l
Mg (133)(100) = 1.3384 ug/l
Mn (1.7067)(100) = 1.7067 ug/l
Pb (<30)(100) = <3.0 ug/l
Fe (57)(100) = 2.3969 ug/l
Zn (5)(100) = 5.0063 ug/l
Mn (<2)(100) = <2.0 ug/l

Analyte-1	Analyte-2	Analyte-3	Analyte-4	Analyte-5
67768	82768			
Teresa L. Fitzgerald	Lauriine J. Ottman			
12/26/91	12/27/91		Teresa L. Fitzgerald	

ICP ANALYSIS - ACID DIGESTION

Sample No	Sample Point	Date	Time Issued	Priority
R 9398-8550	102AW	6-14-91	10:50	26

Determination	Method/Standard	Result Units	Charge Code	Remarks
ICP	LA-505-151	% RECOVERY	WIBEU	1

Sample Size	Customer ID
? 10 to 10 in 100 mL DIGESTED	STD

Remarks, Calculations, Results

LHCS CHECK SAMPLE
LHCS ID _____

Ag .488 ppm 97.6% Rec.
Al 6.99 ppm 139.9% Rec.
Ba 10.10 101.0% Rec.
Cd 9.91 99.1% Rec.
Cr 5.27 105.4% Rec.
Mg 5.57 111.4% Rec.
Na 19.65 196.8% Rec.
Pb 5.38 107.6% Rec.
Fe .311 x 10 = 3.11 62.2%
Mn .5040 x 5.09 101.8%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
67768	82768			
Initials	Initials	Initials	Initials	Initials
Date 12/26/91	Time/Temperature 12/27/91	Cal/Use Log		

UNDIGESTED 5795
R9398-8550

Ag	4.52 ppm	96.4%
Al	9.72 ppm	94.4%
Ba	9.79 ppm	97.9%
Cd	9.62 ppm	96.2%
Cr	4.71 ppm	94.2%
Mg	4.82 ppm	96.4%
Na	9.55 ppm	95.5%
Pb	5.13 ppm	102.4%
Fe	4.87 ppm	97.4%
Zn	9.73 ppm	97.3%
Mn	4.86 ppm	97.2%

7495E
LEMEAA
3 BMBAA

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9397	Customer ID: 2291-4-1
Analysis: VISUAL CHECK AND OVER-THE-TOP READING	Sample Prep: UNDIGESTED

Instrument: N/A	Procedure/Rev: LA-519-151/D-1
Technologist: M. BIERMAN	Date: 6-14-91
Starting Time: 13:30	Temperature: 25degC
Ending Time: 15:00	Chemist: N/A

	Description	Lab ID		Description	Lab ID
1	SAMPLE 1-1	R9394-5000	11		
2	SAMPLE 2-1	R9395-5000	12		
3	SAMPLE 3-1	R9396-5000	13		
4	SAMPLE 4-1	R9397-5000	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
N/A				

A-6000-881 (03/92)

VISUAL CHECK AND OVER-THE-TOP READING ANALYSIS - UNDIGESTED SAMPLE

Sample No	Sample Point	Date	Time Issued	Priority
R 9394.-5000	102AW	6-14-91	10:41	26

Department: AMMEAK
Requisition Number: DA-519-151
Result Units:
Charge Code: W1HFO
Results: 0
Sample Size: 7
Customer ID: 2291-1-1

Remarks, Comments, Results:
A. JAR IDN
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-um
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
cloudy - clear
some solids settled
on bottom of vial

Analyte-1	Analyte-2	Analyte-3	Analyte-4	Analyte-5
6559				
MB	Res	Res	Res	Res

Date: 6/14/91
Time Completed:

Sample No	Sample Point	Date	Time Issued	Priority
R 9395.-5000	102AW	6-14-91	10:46	26

Department: AMMEAK
Requisition Number: DA-519-151
Result Units:
Charge Code: W2A12
Results: 0
Sample Size: 7
Customer ID: 2291-2-1

Remarks, Comments, Results:
A. JAR IDN
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-um
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
cloudy - clear
solids settled on
bottom of vial

Analyte-1	Analyte-2	Analyte-3	Analyte-4	Analyte-5
6559				
MB	Res	Res	Res	Res

Date: 6/14/91
Time Completed:

Sample No	Sample Point	Date	Time Issued	Priority
R 9396.-5000	102AW	6-14-91	10:47	26

Department: AMMEAK
Requisition Number: DA-519-151
Result Units:
Charge Code: W1HEO
Results: 0
Sample Size: 7
Customer ID: 2291-3-1

Remarks, Comments, Results:
A. JAR IDN
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-um
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
aqueous solution
light tint yellow
cloudy clear
some solids have settled on
the bottom of vial

Analyte-1	Analyte-2	Analyte-3	Analyte-4	Analyte-5
6559				
MB	Res	Res	Res	Res

Date: 6/14/91
Time Completed:

Sample No	Sample Point	Date	Time Issued	Priority
R 9397.-5000	102AW	6-14-91	10:48	26

Department: AMMEAK
Requisition Number: DA-519-151
Result Units:
Charge Code: W1HEO
Results: 0
Sample Size: 7
Customer ID: 2291-4-1

Remarks, Comments, Results:
A. JAR IDN
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-um
E. EST. VOL./LENGTH
F. VISUAL REMARKS

6-14-91
no visible organic
light tint yellow
aqueous solution
cloudy - clear
solids - present

Analyte-1	Analyte-2	Analyte-3	Analyte-4	Analyte-5
6559				
MB	Res	Res	Res	Res

Date: 6/14/91
Time Completed:

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9397	Customer ID: 2291-4-1
Analysis: ACID DIGESTION	Sample Prep: ACID DIGESTION

Instrument: SNF04495	Procedure/Rev: LA-505-158/A-2
Technologist: J. WORRELL	Date: 11-1-91
Starting Time: 08:00	Temperature: 20degC
Ending Time: N/A	Chemist: L. OTTMAR

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9392-8505	11		
2	REAGENT BLANK	R9393-8605	12		
3	SAMPLE 2291-1-1	R9394-8705	13		
4	SAM DUP OF 2291-1-1	R9394-8805	14		
5	SPIKE OF SAMPLE 2291-2-1	R9395-8905	15		
6	SAMPLE 2291-4-1	R9397-8705	16		
7	FINAL LMCS CHECK STD	R9398-8505	17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	1B48U/10 mL	2B48U/10 mL	3B48U/10 mL	N/A
SPIKE(SPEX)	LOT# 1-150AS/1 mL			N/A
THESE SAMPLES WERE RERUN.				

A-6000-881 (03/92)

ACID DIGESTION ANALYSIS

Sample No	Sample Point	Date	Time Issued	Priority
K 9342-B505	102AW	6-14-91	10:35	26

Determination	Method Standard	Result Units	Charge Code	Persons
ACD-DIG	LA-505-158	% RECOVERY	WIDEU	1

Sample Size: 1848-U, 2848-U, 2848-U } in 100 ml Q-H2O — Container ID: STD

Remarks, Calculations, Results:
LHCS CHECK SAMPLE
LHCS ID _____
Complete

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
61483				

Date: 11-1-91

Sample No	Sample Point	Date	Time Issued	Priority
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Determination	Method Standard	Result Units	Charge Code	Persons
ACD-DIG	LA-505-158	[illegible]	WIDEU	1

Sample Size: [illegible] — Container ID: REG.IR

Remarks, Calculations, Results:
REAGENT BLANK
VOLUME ON
COMPLETION 100 ml
Complete

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
61483				

Date: 11-1-91

Sample No	Sample Point	Date	Time Issued	Priority
K 9342-B505	102AW	6-14-91	10:37	26

Determination	Method Standard	Result Units	Charge Code	Persons
ACD-DIG	LA-505-158	[illegible]	WIDEU	1

Sample Size: 1 ml in 100 ml Q-H2O — Container ID: 2291-4-1

Remarks, Calculations, Results:
complete

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
61483				

Date: 11-1-91

Sample No	Sample Point	Date	Time Issued	Priority
K 9342-B505	102AW	6-14-91	10:30	26

Determination	Method Standard	Result Units	Charge Code	Persons
ACD-DIG	LA-505-158	% RECOVERY	WIDEU	1

Sample Size: 1848-U, 2848-U, 2848-U } in 100 ml Q-H2O — Container ID: STD

Remarks, Calculations, Results:
LHCS CHECK SAMPLE
LHCS ID _____
complete

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
61483				

Date: 11-1-91

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9397	Customer ID: 2291-4-1
Analysis: ICP	Sample Prep: ACID DIGESTION

Instrument: WB39939	Procedure/Rev: LA-505-151/B-0
Technologist: T. FRAZIER	Date: 12-26-91
Starting Time: N/A	Temperature: N/A
Ending Time: N/A	Chemist: L. OTTMAR

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9392-8550	11		
2	REAGENT BLANK	R9393-8650	12		
3	SAM DUP OF 2291-1-1	R9394-8850	13		
4	SPIKE OF 2291-2-1	R9395-8950	14		
5	SAMPLE 2291-4-1	R9397-8750	15		
6	FINAL LMCS CHECK STD	R9398-8550	16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	ICP1-1B48R/10 mL	ICP2-2B48R/10 mL	ICP3-3B48R/10 mL	N/A
THESE SAMPLES WERE RERUN.				

A-6000-881 (03/92)

ICP ANALYSIS - ACID DIGESTION

Batch No.	Sample Point	Date	Time Issued	Priority
R 9392.-8550	102AW	6-14-91	10:35	26
Instrument	Method/Standard	Report Units	Charge Code	Rerun
ICP	LA-505-151	% RECOVERY	W1BEU	1
Sample Size			Customer ID	
? 10mL to 100mL DIGESTED			BID	

Remarks, Calculations, Results: 1.5195, 2.5195, 3.5195

LHCS CHECK SAMPLE
LHCS ID _____
Ag .784ppm 0.84 96.8% Rec.
Al 7.06 94.2% Rec.
Ba 10.04 100.4% Rec.
Cd 9.9 99.0% Rec.
Cr 5.28 105% Rec.
Mg 5.50 110% Rec.
Mn 19.44 194.4% Rec.
Pb 5.25 105% Rec.
Fe .791x10=7.91 159%
Zn 1.045x10=10.45 104.5%
Mn .500x10=5.00 100%

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
67768	82768			
Initials	Initials	Initials	Initials	Initials
Teresa L Fagin	Laurine J. Ottmar		Teresa L Fagin	
Date	Temp Completed	Lab Unit Mgr		
12/26/91	12/27/91		Teresa L Fagin	

DIGESTED STDS R9392-8550

Ag	4.75ppm	95.0%
Al	4.71ppm	94.2%
Ba	9.83	98.3%
Cd	9.65	96.5%
Cr	4.75	95.0%
Mg	4.85	97.0%
Mn	9.60	96.0%
Pb	5.06ppm	101.2%
Fe	4.89	97.8%
Zn	9.72	97.2%
Mn	4.87	97.4%

1892
2492AA
3492AA

Batch No.	Sample Point	Date	Time Issued	Priority
R 9393.-8650	102AW	6-14-91	10:37	26
Instrument	Method/Standard	Report Units	Charge Code	Rerun
ICP	LA-505-151	U/G	W1BEU	1
Sample Size			Customer ID	
.. D.EGOT			REG.BL	

Remarks, Calculations, Results: Ag <2.0 ug/l
REAGENT BLANK: Al 1.0262 ug/l
Ba <.6261 ug/l
Cd <4.0 ug/l
Cr <2.0 ug/l
Mg <5.14 ug/l
Mn 7.0262 ug/l
Pb <5.05 ug/l

RERUN
Fe 1.0362 ug/l
Zn 3.0181 ug/l
Mn <2.0 ug/l

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
67768	82768			
Initials	Initials	Initials	Initials	Initials
Teresa L Fagin	Laurine J. Ottmar			
Date	Temp Completed	Lab Unit Mgr		
12/26/91	12/27/91		Teresa L Fagin	

Batch No.	Sample Point	Date	Time Issued	Priority
R 9397.-8760	102AW	6-14-91	10:47	26
Instrument	Method/Standard	Report Units	Charge Code	Rerun
ICP	LA-505-151	U/G	W1BEU	1
Sample Size			Customer ID	
? 1mL to 100mL 5/25/92			2291-4-1	

Remarks, Calculations, Results:
Ag (<5)(100) = <5.00 ug/l
Al (5.0142)(100) = 5.0142 ug/l
Ba (<1)(100) = <1.00 ug/l
Cd (<4)(100) = <4.00 ug/l
Cr (106)(100) = 1.06E4 ug/l
Mg (172)(100) = 1.72E4 ug/l
Mn (0.7362)(100) = 4.73E2 ug/l
Pb (<50)(100) = <5.00 ug/l
Fe (459)(100) = 4.59E4 ug/l
Zn (981)(100) = 9.81E4 ug/l
~~Mn (478)(100) = 4.78E4 ug/l~~

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
67768	82768			
Initials	Initials	Initials	Initials	Initials
Teresa L Fagin	Laurine J. Ottmar			
Date	Temp Completed	Lab Unit Mgr		
12/26/91	12/27/91	Brian Wiebe 6-11-92	Teresa L Fagin	

R 9397-8760
Fe (61.7)(100) = 6.17 E3 ug/L
Zn (209)(100) = 2.09 E4 ug/L
Mn (<3)(100) = <3.00 E2 ug/L

ICP ANALYSIS - ACID DIGESTION

R 9398-8550	102AW	6-14-91	10:50	2A
ICP	LA-505-151	% RECOVERY	W1DEW	1
7 10mL to 100mL	0.0410	1160750		STD

LINE CHECK SAMPLE
LINE ID _____

Ag 4.52ppm	92.6% Rec	Mg 5.57	111.4% Rec
Al 4.93ppm	139.1% Rec	Mn 11.65	146.8% Rec
Ba 10.10	101.0% Rec	Pb 5.33	102.6% Rec
Cd 9.81	99.1% Rec		
Cr 5.37	105.4% Rec		

67768	82768			
12/26/91	12/27/91			

UNDIGESTED STDS
R9398-8550

Ag	4.52ppm	96.4%
Al	4.72ppm	94.4%
Ba	9.79ppm	97.9%
Cd	9.62ppm	96.2%
Cr	4.71ppm	94.2%
Mg	4.82ppm	96.4%
Mn	9.55ppm	95.5%
Pb	5.13ppm	102.6%
Fe	4.87ppm	97.4%
Zn	9.78ppm	97.8%
Mn	4.8ppm	97.2%