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Station #12

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

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1	WHC-SD-EN-TI-234		0	100 Area Excavation Treatability Study Data Validation Report	Q	1	1	

16. KEY

Impact Level (F)	Reason for Transmittal (G)	Disposition (H) & (I)
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17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)

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2	1	Cog.Eng. J.M. Frain	JMF	5/10/94	H6-04	IRA (2)			H4-17	3	
2	1	Cog. Mgr. J.G. Woolard	JGW	5/10/94		Central Files (2)			L8-04	3	
2	1	EQA G.C. Corrigan	D.G. Farwick	5/10/94		EPIC (2)			H6-08	3	
		Safety N/A				L. Hermann			H6-07	3	
		Env. N/A									
2	1	HASM ~~J.M. Duncan~~	K.N. Pool	c.o. sumiel for KNP	5/10/94						

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J.M. Frain JMF 5/10/94 Signature of EDT Originator Date	J.G. Woolard JGW 5/10/94 Authorized Representative for Receiving Organization Date	J.G. Woolard JGW 5/10/94 Cognizant/Project Engineer's Manager Date	[ ] Approved [ ] Approved w/comments [ ] Disapproved w/comments

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7. Abstract

Frain, J. M., 1994, *100 Area Excavation Treatability Study Data Validation Report*, WHC-SD-EN-TI-234, Rev. 0, prepared by A.T. Kearney, Inc. for Westinghouse Hanford Company, Richland, Washington.

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10. RELEASE STAMP

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9. Impact Level Q

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DISCLAIMER

This report is designated as Revision 0. The report covers a specific site for a specific sampling time frame. The report addresses only those samples that have been provided for data validation review.

At the request of Westinghouse Hanford Company (Westinghouse-Hanford), one hundred percent of the total number of Sample Delivery Groups received by A.T. Kearney, Inc. from the 100 Area Excavation Treatability Study Data and their related quality assurance samples were reviewed and validated to verify that reported sample results were of sufficient quality to meet quality control objectives.

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ACRONYMS

%D	Percent difference
AA	Atomic absorption
BFB	Bromofluorobenzene
BNA	Base/neutral and acid (equivalent to semivolatiles)
CCB	Continuing calibration blank
CCV	Continuing calibration verification
CLP	Contract Laboratory Program
CRA	CRDL standard for AA
CRDL	Contract required detection limit
CRI	CRDL standard for ICP
CRII	CRDL standard for ICP initial
CRIF	CRDL standard for ICP final
CRQL	Contract required quantitation limit
DBC	Dibutylchlorendate
DFTPP	Decafluorotriphenylphosphine
DQO	Data quality objectives
EPA	U.S. Environmental Protection Agency
GC/MS	Gas chromatography/mass spectrometry
GC	Gas chromatography
GFAA	Graphite furnace atomic absorption
ICB	Initial Calibration Blank
ICP	Inductively coupled plasma emission spectrometry
ICS	ICP interference check sample
ICV	Initial calibration verification
IDL	Instrument detection limit
LCS	Laboratory control sample
LCSS	Laboratory control sample soil
LCSW	Laboratory control sample water
MSA	Method of standard addition
MS/MSD	Matrix spike/matrix spike duplicate
NV	Not Validated
PBS	Preparation blank soil
PBW	Preparation blank water
PCB	Polychlorinated biphenyl
PEM	Performance evaluation mixture
QA	Quality assurance
QC	Quality control
RF	Response factor
RIC	Reconstructed ion chromatogram
RPD	Relative percent difference
RRF	Relative response factor
RRT	Relative retention time
RSD	Relative standard deviation
RT	Retention time
SDG	Sample delivery group
SOW	Statement of work
TAL	Target analyte list
TCL	Target compound list
TIC	Tentatively identified compounds
TOC	Total organic carbon
TOX	Total organic halides
V	Validated
VOC	Volatile organic compounds

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1.0 INTRODUCTION

The following samples were obtained from the 100 Area Excavation Treatability Study sampling event:

B09F20	B09F29	B09769
B09F21	B09F30	B09770
B09F22	B09LD4	B09771
B09F23	B09LD5	B09772
B09F24	B09LD6	B09773
B09F25	B09LD7	B09774
B09F28	B09LD8	B097C7

Westinghouse-Hanford has requested that all of the Sample Delivery Groups be validated for the 100 Area Excavation Treatability Study. Therefore, the data from the chemical analysis of fifteen samples from this sampling event and their related quality assurance samples were reviewed and validated to verify that reported sample results were of sufficient quality to support decisions regarding remedial actions performed at this site. Sample numbers B09LD4, B09LD5, B09LD6, B09LD7 and B09LD8 were included in SDG No. B09F20, but were not listed on the original Westinghouse-Hanford validation services request form dated 1/3/94. Westinghouse-Hanford has requested that A.T. Kearney include these samples as not validated samples in the report. Sample results can be found on the lotus tables provided in each section. The samples were analyzed by Thermo-Analytic Laboratories (TMA) and Roy F. Weston Laboratories (WESTON) using U.S. Environmental Protection Agency (EPA) CLP protocols.

Sample analyses included:

- Volatile organics
- Semivolatile organics
- Inorganics
- General chemical parameters.

The table below lists the Sample Delivery Groups (SDGs) that were validated for this sampling event. The validated data are included in this report.

SDG No.	Matrix	No. of Samples Analyzed	Parameters
B09F20	S	12	Inorganics, Wet Chemistry
B09F25	S	9	Volatiles
B09F25	S	7	Semivolatiles
B09769	S	4	Volatiles
B09769	S	2	Semivolatiles, Inorganics, Wet Chemistry
B09771	S	2	Volatiles
B09771	S	1	Semivolatiles, Inorganics, Wet Chemistry
B097C7	S	1	Inorganics, Wet Chemistry

Eleven samples were validated for radiochemical parameters by TMA and Teledyne. Analytical protocols specified in the *Westinghouse Hanford Company Statement of Work for Nonradioactive Inorganic/Organic and Radiochemical Analytical Services* were used. Sample analyses included the following:

- Alpha spectroscopy
- Gamma spectroscopy
- Strontium-90
- Technetium-99

SDG No.	Matrix	No. of Samples Analyzed	Parameters
B09F20	S	7	Radiochemistry
B09769	S	2	Radiochemistry
B09771	S	1	Radiochemistry
B097C7	S	1	Radiochemistry

The radiochemical data summary tables can be found following Section 9.8.

Data quality was reviewed and analytical results validated using Westinghouse-Hanford procedures and related EPA CLP protocols and guidelines. Data were qualified based upon their quality and the guidance provided by these sources. In instances where the two protocols differed, the Westinghouse-Hanford guidance was followed.

One split sample was submitted to WESTON Laboratories as shown below:

Set 1:

Sample No.	Split Sample No.	Location
B09769	B09771	Lift 1-Clean Spoils

The split sample results for this location were included in the validated data. The results were compared using the sample guidelines for determining the RPD between a sample and its duplicate. The results fell within the required control limit. All results for the two samples appear in the summary tables within the report.

One field duplicate sample was submitted to TMA as shown below:

Set 1:

Sample No.	Duplicate Sample No.	Location
B09769	B09770	Lift 1-Clean Spoils

The field duplicate sample results for this location were included in the validated data. The results were compared using the sample guidelines for determining the RPD between a sample and its duplicate. The results fell within the required control limit. All results for the two samples appear in the summary tables within this report.

One equipment blank was submitted to TMA. The equipment blank is identified as follows: B09F28 collected on 11/11/93, and designated as EB-1.

Under EPA protocol, equipment blanks are used to indicate whether or not decontamination procedures were adequate or that contamination was not inherent in the equipment used. The equipment blank matrix used for this sampling event was silica sand, however the information provided was inadequate to determine what contamination, if any, was a result of the equipment used. Equipment blanks require well number locations and associated sample numbers in order to make such a determination.

Five trip blanks were submitted for volatiles analysis. The trip blanks are identified as follows: B09F29, B09F30, B09772, B09773 and B09774.

A laboratory duplicate and spike were performed on sample number B09F28 in SDG No. B09F20. This sample had been designated as the equipment blank according to the Westinghouse-Hanford sample list. Both the EPA CLP SOW 3/90 and the Westinghouse-Hanford data validation guidelines state that a laboratory

duplicate and spike should not be performed on an equipment blank, however, as per the Westinghouse-Hanford guidelines no qualification of the blank sample or its associated samples is required.

The report is broken down into sections for each chemical analysis and radiochemical analysis type. Each section addresses the data package completeness, holding time adherence, instrument calibration and tuning acceptability, blank results, accuracy, precision, system performance, as well as the compound identification and quantitation. In addition, each section has an overall assessment and summary for the data packages reviewed for the particular chemical/radiochemical analyses. Detailed backup information is provided to the reader by SDG No. and sample number. For each data package, a matrix of chemical analyses per sample number is presented. Data qualification summaries are provided for chemical analyses only.

Laboratory and data validation personnel added qualifiers to the reported data based on specified data quality objectives. The data reporting qualifiers are summarized as follows:

U - Indicates the analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for dilutions and moisture content. It should be noted that the sample quantitation limit may be higher or lower than the contract or method required detection limit, depending on instrumentation, matrix and concentration factors.

J - Indicates the analyte was analyzed for and detected. However, the associated value is considered to be an estimate due to identified QC deficiencies. Data flagged with a "J" may be usable for decision making purposes, depending upon the DQOs of the project. Laboratories qualify all reported organic detects below CRQL with a "J" per the CLP procedures.

UJ - Indicates the analyte was analyzed for and not detected. However, the associated detection limit is considered to be an estimate due to identified QC deficiencies. Detection limits flagged with a "UJ" may be usable for decision making purposes, depending upon the DQOs of the project.

JN - Indicates the analyte was analyzed for and that there is presumptive evidence of the presence of the compound. The concentration reported is considered an estimate which should be used for informational purposes only.

R - Indicates the analyte was analyzed for and due to a significant QC deficiency, the data are deemed unusable. Analytic results flagged "R" are invalid and

provide no information as to whether or not the analyte is present.

It should be noted that, frequently, results will bear two qualifiers - one given by the laboratory and one given during the validation process. For example, a "U" qualifier is given by the laboratory when the compound has not been detected during the analysis, and a "J" qualifier may be added during the validation to qualify the result due to minor quality problems. Therefore, the resulting qualification is "UJ", where the "U" qualifier has been given by the laboratory and the "J" qualifier given by the validator.

The results of data validation performed for the 100 Area Excavation Treatability Study are contained in the tables following each of the chapters in this report.

Several general quality trends which resulted in data qualification were observed. These included:

- Minor laboratory blank contamination was noted in the volatile results for a few samples and one semivolatile sample. The contaminants were compounds commonly found in the analytical laboratories and the corresponding sample results were flagged accordingly.

- The extraction holding time was slightly exceeded for one semivolatile sample. All associated sample results were qualified as estimates.

- One semivolatile sample exhibited a single internal standard area count above QC limits. The assocatied data were qualified as estimates.

- Minor laboratory blank contamination was noted in the inorganics analysis. Associated results were flagged accordingly.

- The metals analysis showed minor matrix spike accuracy problems, analytical spike recoveries below the QC limits; laboratory duplicate RPD results outside of QC limits; and ICP serial dilution results outside of QC limits. Therefore, several metals results were flagged "J" due to these factors.

- The analysis holding times for nitrite, nitrate and pH in one data package and for phosphate in three data packages were exceeded. All associated sample results were qualified as estimates.

- Insufficient instrument calibration was performed for chloride, fluoride, phosphate and sulfate in two data packages. Associated results were qualified as estimates.

- Continuing calibration verifications were not analyzed at the proper frequency for chloride, fluoride, phosphate and sulfate analyses in one data package. All associated results were qualified as estimates.

- The CCV percent recovery fell below the 90% acceptance limit for nitrate-nitrite analysis in one data package. All associated sample results were qualified as estimates.

- The matrix spike percent recovery fell outside of the QC limits for fluoride in one data package. All associated results were flagged accordingly.

- Due to accuracy results outside of QC limits, several alpha spectroscopy and technetium-99 results were qualified as estimates.

- Due to calibration problems, several alpha spectroscopy, gamma spectroscopy and strontium-90 results were qualified as estimates and flagged "J".

- The MDA values for a few gamma spectroscopy compounds and technetium-99 results were above the RDL for a few samples.

In general, the protocol-specific QA/QC requirements were met for the samples analyzed in this investigation with the exceptions noted above and discussed in detail in the chapters to follow. All requested analyses were performed.

With the exceptions noted above, the protocol-specific data quality objectives in terms of precision, accuracy, completeness, representativeness, and comparability have been met.

WELL AND SAMPLE INFORMATION					SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	NV/V	VOLATILES
CS LIFT 1	B09769	S	09/22/93	V	2-10
	B09770	S	09/22/93	V	2-10
	B09771	S	09/22/93	V	2-13
S2	B09F25	S	11/10/93	V	2-6
EB	B09F28	S	11/11/93	V	2-6
TB	B09772	S	09/22/93	V	2-10
	B09773	S	09/22/93	V	2-10
	B09774	S	09/22/93	V	2-13
	B09F29	S	11/10/93	V	2-6
	B09F30	S	11/10/93	V	2-6
	B09LD4	S	11/11/93	NV	2-6
	B09LD5	S	11/11/93	NV	2-6
	B09LD6	S	11/11/93	NV	2-6
	B09LD7	S	11/11/93	NV	2-6
	B09LD8	S	11/11/93	NV	2-7

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2.0 VOLATILE ORGANIC DATA VALIDATION

2.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and found to be complete:

B09F25 B09769 B09771

2.2 HOLDING TIMES

Analytical holding times were assessed to ascertain whether the Westinghouse-Hanford holding time requirements for volatile organic analyses were met by the laboratory. The Westinghouse-Hanford holding time requirements for volatile organic analyses are as follows: soil samples must be analyzed within 14 days of the date of sample collection; aqueous samples must be analyzed within seven days of the date of sample collection (if unpreserved); and all samples must be shipped on ice to the laboratory and stored at 4°C until analysis.

Holding times were met for all samples.

2.3 INSTRUMENT CALIBRATION AND TUNING

Instrument calibration is performed to establish that the GC/MS instrument is capable of producing acceptable and reliable analytical data over a range of concentrations. The initial and continuing calibrations are to be performed according to CLP protocols. An initial multipoint calibration is performed prior to sample analysis to establish the linear range of the GC/MS instrument. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

All initial and continuing calibration results were acceptable.

2.3.1 GC/MS Tuning/Instrument Performance Check

Tuning is performed to ensure that mass resolution, identification, and, to some degree, sensitivity of the GC/MS instrument have been established. When analyzing for volatile organics, instrument tuning is performed with BFB. Instrument tuning must be performed prior to the analysis of either standards or samples and must meet the criteria for acceptable

GC/MS instrument tuning using BFB as outlined in Westinghouse-Hanford (WHC 1992) and in EPA (EPA 1988b and 1991) guidelines.

The original data were checked for transcription and calculation errors to verify that tuning criteria were met. Prior to calibration and sample analysis, all tuning criteria were met.

All GC/MS tuning data were acceptable.

2.4 BLANKS

Method blank, field blank and trip blank analyses are performed to determine the extent of laboratory or field contamination of samples. No contaminants should be present in the blanks. Analytical results for analytes present in any sample at less than 5 times the concentration of that analyte found in associated blanks should be qualified as non-detects; common laboratory contaminants present in samples at less than 10 times the concentration of that analyte in the associated blank are qualified as non-detects.

Due to the presence of laboratory blank contamination, the following samples were flagged "U" for methylene chloride:

- Sample numbers B09F25, B09F28 and B09F29 in SDG No. B09F25.
- Sample numbers B09769, B09770, B09772 and B09773 in SDG No. B09769.
- Sample numbers B09771 and B09774 in SDG No. B09771.

Due to the presence of laboratory blank contamination, the following samples were flagged "U" for acetone:

- Sample numbers B09F25, B09F28, B09F29 and B09F30 in SDG No. B09F25.
- Sample number B09769 in SDG No. B09769.
- Sample numbers B09771 and B09774 in SDG No. B09771.

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for toluene:

- Sample number B09F30 in SDG No. B09F25.

All other laboratory blank results were acceptable.

2.5 ACCURACY

Accuracy was assessed by evaluating the recoveries of stable isotopically labeled surrogate compounds added to all samples and

blanks, and by the analysis of a representative sample which was spiked with a variety of volatile organic compounds.

2.5.1 Matrix Spike Recovery

Matrix spike compounds are added to a sample which is representative of the sample delivery group. Matrix spike analyses are performed in duplicate using five compounds and should be within the established quality control limits (EPA 1988b). The matrix spike analyses estimate how much the target compounds are interfered with, either positively or negatively, by the sample matrix.

All matrix spike/matrix spike duplicate recovery results were acceptable.

2.5.2 Surrogate Recovery

Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP protocol. When a surrogate compound recovery is out of the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Undetected compounds are qualified as having an estimated detection limit and flagged "UJ".

All surrogate recovery results were acceptable.

2.6 PRECISION

Precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses.

Field precision is measured by analyzing duplicate samples taken in the field. No standards have been established for qualifying data based on RPD for duplicate field samples by CLP protocols. Westinghouse-Hanford procedures establish the following criteria for duplicate field sample analyses for organic compounds, based on criteria established for inorganic analyses for laboratory duplicates:

1. For compounds whose concentrations are greater than 5 times CRQL, RPDs must be ±20 percent for aqueous samples and ±35 percent for soil samples.

2. When one or more compounds are present at concentrations less than 5 times CRQL, the concentration difference must be ± CRQL for aqueous samples and ± 2xCRQL for soil samples.

All matrix spike/matrix spike duplicate RPD results were acceptable.

2.7 INTERNAL STANDARDS PERFORMANCE

Internal standard performance was assessed to determine whether abrupt changes in instrument response and sensitivity occurred that may have affected the reliability of the analytical data. The response (area or height) of the internal standards must not vary by more than 100 percent or -50 percent from the response of the internal standard that was used to calculate the upper and lower bounds. The upper and lower bounds define the range for acceptable internal standard response (area/height) for the sample analyses.

All internal standard recovery results were acceptable.

2.8 COMPOUND IDENTIFICATION AND QUANTITATION

The identity of detected compounds are confirmed to investigate the possibility of false positives. The confirmation of compound identification during the quality assurance review focuses on false positives because only mass spectra for positive identifications are submitted. However, target compounds that are reported as undetected are also evaluated to investigate the possibility of false negatives. Confirmation of possible false negatives is addressed by reviewing other factors relating to analytical sensitivity (e.g., relative response factors, detection limits, linearity, analytical recovery).

Compound quantitations and reported detection limits were recalculated for a minimum of 20 percent of the samples in each case to verify that they are accurate and are consistent with CLP requirements.

Below the CRQL, instrument precision becomes more variable as the instrument detection limit is approached. Therefore, the concentration of any compound that was detected below the CRQL was qualified as an estimate and flagged "J".

All reported results and quantitation limits were verified as correct.

2.9 OVERALL ASSESSMENT AND SUMMARY

A thorough review of ongoing data acquisition and instrument performance criteria was made to assess overall GC/MS instrument performance. No changes in instrument performance were noted that would result in the degradation of data quality. No indications of unacceptable instrument performance (i.e., shifts in baseline stability, retention time shifts, extraneous peaks, or sensitivity) were found during the quality assurance review.

In general, the volatile data presented in this report met the protocol-specified QA/QC requirements. Minor blank contamination was detected in several samples, all from laboratory blank contamination. All other validated data are considered valid and usable within the standard error associated with the method.

Project: WESTINGHOUSE-HANFORD																					
Laboratory: TMA																					
Case	SDG: B09F25																				
Sample Number		B09F25		B09F28		B09F29		B09F30		B09LD4		B09LD5		B09LD5		B09LD6		B09LD7		B09LD7	
Location		S2		EB		TB		TB		*NA		*NA		*NA		*NA		*NA		*NA	
Remarks		*26 FT		Equip Blk		Trip Blk		Trip Blk		NV		NV		NV,DIL		NV		NV		NV,DIL	
Sample Date		11/10/93		11/11/93		11/10/93		11/11/93		11/11/93		11/11/93		11/11/93		11/11/93		11/11/93		11/11/93	
Analysis Date		11/18/93		11/18/93		11/18/93		11/19/93		11/19/93		11/19/93		11/23/93		11/23/93		11/19/93		11/22/93	
Volatile Organic Compound	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chloromethane	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
Bromomethane	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
Vinyl Chloride	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
Chloroethane	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
Methylene Chloride	10	10	U	10	U	10	U	10	U	2	J	18	J	500	J	3	J	13	J	550	J
Acetone	10	10	U	10	U	32	U	10	U	26		640		1800		11	U	14000		9100	
Carbon Disulfide	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
1,1-Dichloroethene	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
1,1-Dichloroethane	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
1,2-Dichloroethene (total)	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
Chloroform	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
1,2-Dichloroethane	10	10	U	10	U	10	U	10	U	10	U	7	J	1300	U	11	U	55	U	1300	U
2-Butanone	10	10	U	10	U	10	U	10	U	10	U	270		1300	U	11	U	55	U	1300	U
1,1,1-Trichloroethane	10	10	U	10	U	10	U	10	U	10	U	290		190	J	11	U	6	J	1300	U
Carbon Tetrachloride	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
Bromodichloromethane	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
1,2-Dichloropropane	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
cis-1,3-Dichloropropene	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
Trichloroethene	10	10	U	10	U	10	U	10	U	10	U	200		150	J	11	U	55	U	1300	U
Dibromochloromethane	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
1,1,2-Trichloroethane	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
Benzene	10	10	U	10	U	10	U	10	U	10	U	440		290	J	11	U	55	U	1300	U
trans-1,3-Dichloropropene	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
Bromoform	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
4-Methyl-2-Pentanone	10	10	U	10	U	10	U	2	J	10	U	590		710	J	11	U	55	U	1300	U
2-Hexanone	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
Tetrachloroethene	10	10	U	10	U	10	U	10	U	10	U	1500		1200	J	11	U	55	U	1300	U
1,1,2,2-Tetrachloroethane	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
Toluene	10	1	J	1	J	1	J	10	U	10	U	7300		5200		11	U	55	U	1300	U
Chlorobenzene	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
Ethylbenzene	10	10	U	10	U	10	U	10	U	10	U	2700		2400		11	U	55	U	1300	U
Styrene	10	10	U	10	U	10	U	10	U	10	U	54	U	1300	U	11	U	55	U	1300	U
Xylene (total)	10	10	U	10	U	10	U	10	U	10	U	15000		14000		11	U	55	U	1300	U

* = Depth, *NA = Not Available, NV = Not Validated, DIL = Dilution, EB=Equipment Blank, TB=Trip Blank

Project: WESTINGHOUSE-HANFORD																			
Laboratory: TMA																			
Case	SDG: B09F25																		
Sample Number		B09LD8																	
Location		*NA																	
Remarks		NV																	
Sample Date		11/11/93																	
Analysis Date		11/23/93																	
Volatile Organic Compound	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chloromethane	10	11	U																
Bromomethane	10	11	U																
Vinyl Chloride	10	11	U																
Chloroethane	10	11	U																
Methylene Chloride	10	4	J																
Acetone	10	32																	
Carbon Disulfide	10	11	U																
1,1-Dichloroethene	10	11	U																
1,1-Dichloroethane	10	11	U																
1,2-Dichloroethene (total)	10	11	U																
Chloroform	10	11	U																
1,2-Dichloroethane	10	11	U																
2-Butanone	10	11	U																
1,1,1-Trichloroethane	10	11	U																
Carbon Tetrachloride	10	11	U																
Bromodichloromethane	10	11	U																
1,2-Dichloropropane	10	11	U																
cis-1,3-Dichloropropene	10	11	U																
Trichloroethene	10	11	U																
Dibromochloromethane	10	11	U																
1,1,2-Trichloroethane	10	11	U																
Benzene	10	11	U																
trans-1,3-Dichloropropene	10	11	U																
Bromoform	10	11	U																
4-Methyl-2-Pentanone	10	11	U																
2-Hexanone	10	11	U																
Tetrachloroethene	10	11	U																
1,1,2,2-Tetrachloroethane	10	11	U																
Toluene	10	11	U																
Chlorobenzene	10	11	U																
Ethylbenzene	10	11	U																
Styrene	10	11	U																
Xylene (total)	10	11	U																

* = Depth, *NA = Not Available, NV = Not Validated, DIL = Dilution, EB=Equipment Blank, TB=Trip Blank

BLANK AND SAMPLE DATA SUMMARY

SDG: B09F25	REVIEWER: SC			DATE: 2/8/94				PAGE 1 OF 1	
COMMENTS:									
SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
VBLK118R2	Methylene Chloride	2	J		ug/Kg	10	20	B09F25, B09F28, B09F29	U
VBLK118R2	Acetone	6	J		ug/Kg	30	60	B09F25, B09F28, B09F29	U
VBLK119R	Acetone	4	J		ug/Kg	20	40	B09F30	U
VBLK119R	Toluene	2	J		ug/Kg	10	20	B09F30	U

DATA QUALIFICATION SUMMARY

SDG: B09F25	REVIEWER: SC	DATE: 2/8/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Methylene Chloride	U	B09F25, B09F28, B09F29	Lab Blank Contamination
Acetone	U	B09F25, B09F28, B09F29, B09F30	Lab Blank Contamination
Toluene	U	B09F30	Lab Blank Contamination

Project: WESTINGHOUSE-HANFORD																			
Laboratory: TMA																			
Case	SDG: B09769																		
Sample Number		B09769		B09770		B09772		B09773											
Location		CS LIFT 1		CS LIFT 1		*NA		TB											
Remarks				DUP		Trip Blk		Trip Blk											
Sample Date		09/22/93		09/22/93		09/22/93		09/22/93											
Analysis Date		09/30/93		09/30/93		09/30/93		09/30/93											
Volatile Organic Compound	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chloromethane	10	11	U	11	U	10	U	10	U										
Bromomethane	10	11	U	11	U	10	U	10	U										
Vinyl Chloride	10	11	U	11	U	10	U	10	U										
Chloroethane	10	11	U	11	U	10	U	10	U										
Methylene Chloride	10	11	U	11	U	10	U	10	U										
Acetone	10	12	U	11	U	10	U	10	U										
Carbon Disulfide	10	11	U	11	U	10	U	10	U										
1,1-Dichloroethene	10	11	U	11	U	10	U	10	U										
1,1-Dichloroethane	10	11	U	11	U	10	U	10	U										
1,2-Dichloroethene (total)	10	11	U	11	U	10	U	10	U										
Chloroform	10	11	U	11	U	10	U	10	U										
1,2-Dichloroethane	10	11	U	11	U	10	U	10	U										
2-Butanone	10	11	U	11	U	10	U	10	U										
1,1,1-Trichloroethane	10	11	U	11	U	10	U	10	U										
Carbon Tetrachloride	10	11	U	11	U	10	U	10	U										
Bromodichloromethane	10	11	U	11	U	10	U	10	U										
1,2-Dichloropropane	10	11	U	11	U	10	U	10	U										
cis-1,3-Dichloropropene	10	11	U	11	U	10	U	10	U										
Trichloroethene	10	11	U	11	U	10	U	10	U										
Dibromochloromethane	10	11	U	11	U	10	U	10	U										
1,1,2-Trichloroethane	10	11	U	11	U	10	U	10	U										
Benzene	10	11	U	11	U	10	U	10	U										
trans-1,3-Dichloropropene	10	11	U	11	U	10	U	10	U										
Bromoform	10	11	U	11	U	10	U	10	U										
4-Methyl-2-Pentanone	10	11	U	11	U	10	U	10	U										
2-Hexanone	10	11	U	11	U	10	U	10	U										
Tetrachloroethene	10	11	U	11	U	10	U	10	U										
1,1,2,2-Tetrachloroethane	10	11	U	11	U	10	U	10	U										
Toluene	10	1	J	11	U	10	U	10	U										
Chlorobenzene	10	11	U	11	U	10	U	10	U										
Ethylbenzene	10	11	U	11	U	10	U	10	U										
Styrene	10	11	U	11	U	10	U	10	U										
Xylene (total)	10	11	U	11	U	10	U	10	U										

CS = Clean Spoils, DUP = Duplicate, *NA = Not Available, TB=Trip Blank

BLANK AND SAMPLE DATA SUMMARY

SDG: B09769	REVIEWER: CENH			DATE: 2/7/94				PAGE 1 OF 1	
COMMENTS:									
SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
VBLK0930R	Acetone	3	J		ug/Kg	15	30	B09769	U
VBLK0930R	Methylene Chloride	1	J		ug/Kg	5	10	B09769	U
VBLK0930R1	Methylene Chloride	2	J		ug/Kg	10	20	B09770, B09772, B09773	U

DATA QUALIFICATION SUMMARY

SDG: B09769	REVIEWER: CENH	DATE: 2/7/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Acetone	U	B09769	Lab Blank Contamination
Methylene Chloride	U	B09769, B09770, B09772, B09773	Lab Blank Contamination

Project: WESTINGHOUSE-HANFORD																					
Laboratory: Roy F. Weston																					
Case	SDG: B09771																				
Sample Number		B09771		B09774																	
Location		CS LIFT 1		TB																	
Remarks		Split		Trip Blk																	
Sample Date		09/22/93		09/22/93																	
Analysis Date		09/28/93		09/30/93																	
Volatile Organic Compound	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chloromethane	10	11	U	10	U																
Bromomethane	10	11	U	10	U																
Vinyl Chloride	10	11	U	10	U																
Chloroethane	10	11	U	10	U																
Methylene Chloride	10	11	U	10	U																
Acetone	10	11	U	10	U																
Carbon Disulfide	10	11	U	10	U																
1,1-Dichloroethene	10	11	U	10	U																
1,1-Dichloroethane	10	11	U	10	U																
1,2-Dichloroethene (total)	10	11	U	10	U																
Chloroform	10	11	U	10	U																
1,2-Dichloroethane	10	11	U	10	U																
2-Butanone	10	11	U	10	U																
1,1,1-Trichloroethane	10	11	U	10	U																
Carbon Tetrachloride	10	11	U	10	U																
Bromodichloromethane	10	11	U	10	U																
1,2-Dichloropropane	10	11	U	10	U																
cis-1,3-Dichloropropene	10	11	U	10	U																
Trichloroethene	10	11	U	10	U																
Dibromochloromethane	10	11	U	10	U																
1,1,2-Trichloroethane	10	11	U	10	U																
Benzene	10	11	U	10	U																
trans-1,3-Dichloropropene	10	11	U	10	U																
Bromoform	10	11	U	10	U																
4-Methyl-2-Pentanone	10	11	U	10	U																
2-Hexanone	10	11	U	10	U																
Tetrachloroethene	10	11	U	10	U																
1,1,2,2-Tetrachloroethane	10	11	U	10	U																
Toluene	10	11	U	10	U																
Chlorobenzene	10	11	U	10	U																
Ethylbenzene	10	11	U	10	U																
Styrene	10	11	U	10	U																
Xylene (total)	10	11	U	10	U																

CS = Clean Spoils, TB=Trip Blank

BLANK AND SAMPLE DATA SUMMARY

SDG: B09771	REVIEWER: CENH			DATE: 2/7/94				PAGE 1 OF 1	
COMMENTS:									
SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
93LVW203-MB1	Acetone	14			ug/Kg	70	140	B09771	U
93LVW203-MB1	Methylene Chloride	6	J		ug/Kg	30	60	B09771	U
93LVK170-MB1	Acetone	25			ug/Kg	125	250	B09774	U
93LVK170-MB1	Methylene Chloride	4	J		ug/Kg	20	40	B09774	U

DATA QUALIFICATION SUMMARY

SDG: B09771	REVIEWER: CENH	DATE: 2/7/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Acetone	U	B09771, B09774	Method Blank Contamination
Methylene Chloride	U	B09771, B09774	Method Blank Contamination

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WELL AND SAMPLE INFORMATION					SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	NV/V	SEMIVOLATILES
CS LIFT 1	B09769	S	09/22/93	V	3-10, 3-11
	B09770	S	09/22/93	V	3-10, 3-11
	B09771	S	09/22/93	V	3-14, 3-15
S2	B09F25	S	11/10/93	V	3-6, 3-7
EB	B09F28	S	11/11/93	V	3-6, 3-7
	B09LD4	S	11/11/93	NV	3-6, 3-7
	B09LD5	S	11/11/93	NV	3-6, 3-7
	B09LD6	S	11/11/93	NV	3-6, 3-7
	B09LD7	S	11/11/93	NV	3-6, 3-7
	B09LD8	S	11/11/93	NV	3-6, 3-7

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3.0 SEMIVOLATILE DATA VALIDATION

3.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and found to be complete:

B09F25 B09769 B09771

3.2 HOLDING TIMES

Analytical holding times were assessed to ascertain whether the holding time requirements for semivolatile analyses were met by the laboratory. Westinghouse Hanford protocols require that samples be extracted within seven days of collection and be analyzed within 40 days of extraction (WHC 1992a).

The 7-day extraction holding requirement was exceeded by one day for sample number B09F25 in SDG No. B09F25. All associated sample results were qualified as estimates and flagged "J".

All other holding time requirements were met for all samples.

3.3 INSTRUMENT CALIBRATION AND TUNING

3.3.1 GC/MS Tuning/Instrument Performance Check

Tuning is performed to ensure that mass resolution, and to some degree, sensitivity, of the GC/MS instrument has been established. When analyzing for semivolatile organic compounds, the GC/MS is tuned using DFTPP. The GC/MS must be tuned prior to the analysis of either standards or samples, and tuning must meet the criteria established by the analytical protocol. The specific criteria for acceptable GC/MS tuning using DFTPP are outlined in Westinghouse Hanford procedures (WHC 1992a) and in CLP protocols (EPA 1988b and 1991).

As part of data validation, the original tuning data were checked for transcription and calculation errors to verify that tuning and performance criteria were met.

All tuning and performance criteria were met.

3.3.2 Initial Calibration

The GC/MS instrument is calibrated to ensure that it is capable of producing acceptable and reliable analytical data over a range of concentrations. The initial and continuing calibrations are to be performed according to CLP protocols. An initial multipoint calibration is performed prior to sample analysis to establish the linearity range of the GC/MS instrument. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

Instrument response is established by the initial calibration when the RRFs for all target compounds are greater than or equal to 0.05 units. Linearity is established when the RSDs of the RRFs are less than or equal to 30 percent.

All initial calibration results were acceptable.

3.3.3 Continuing Calibration

The criteria for accepting the continuing calibration require that a standard be analyzed at least once per 12 hour period and that the RRFs of all target compounds be greater than or equal to 0.05 units. In addition, the percent difference of these RRFs must be less than or equal to 25 percent of the average RRFs calculated for the associated initial calibration.

All continuing calibration results were acceptable.

3.4 BLANKS

Method blank and field blank analyses are performed to determine the extent of laboratory or field contamination of samples. No contaminants should be present in the blanks. Analytical results for analytes present in any sample at less than 5 times the concentration of that analyte found in associated blanks should be qualified as non-detects; in the case of certain common laboratory contaminants, results less than 10 times the concentrations of that analyte in the associated blanks are qualified as non-detects.

Due to the presence of laboratory blank contamination, the following samples were flagged "U" for di-n-butylphthalate:

- Sample numbers B09769 and B09770 in SDG No. B09769.

All other blank results were acceptable.

3.5 ACCURACY

Accuracy was assessed by evaluating the recoveries of stable isotopically labeled surrogate compounds added to all samples and blanks, and by the analysis of a representative sample which was spiked with a variety of organic compounds.

3.5.1 Matrix Spike Recovery

Matrix spike compounds are added to a sample which is representative of the sample delivery group. Matrix spike analyses are performed in duplicate using the six compounds specified by CLP protocols. All recoveries for the compounds should be within the established QC limits (EPA 1988b). The matrix spike analyses estimate how much the analyses for the target compounds are interfered with, either positively or negatively, by the sample matrix. Because the matrix spike is performed using only one of the samples extracted within the SDG, these data alone cannot be used to evaluate the precision and accuracy of individual samples.

All matrix spike/matrix spike duplicate recovery results were acceptable.

3.5.2 Surrogate Recovery

Surrogate compound recoveries are calculated using analytical results from six stable, isotopically labeled surrogate compounds added to the sample prior to sample preparation and analysis. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP protocol. When recoveries for any two surrogate compounds are out of the control window, all positively identified target compound concentrations in samples associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J" and undetected compounds are qualified estimated below the detection limit and flagged "UJ".

All surrogate recovery results were acceptable.

3.6 PRECISION

The precision is expressed by the RPD between the recoveries of the matrix spike and the matrix spike duplicate analyses performed on a sample, and through a comparison of the results for field duplicate samples. Acceptable RPD control windows for matrix spike/matrix spike duplicate analyses have been established by the EPA CLP protocol.

Field precision is measured by analyzing duplicate samples taken in the field. No standards have been established for qualifying data based on RPD for duplicate field samples by CLP

protocols. Westinghouse-Hanford procedures establish the following criteria for duplicate field sample analyses for organic compounds, based on criteria established for inorganic analyses for laboratory duplicates:

1. For compounds whose concentrations are greater than 5 times CRQL, RPDs must be ±20 percent for aqueous samples and ±35 percent for soil samples.

2. When one or more compounds are present at concentrations less than 5 times CRQL, the concentration difference must be ± CRQL for aqueous samples and ± 2xCRQL for soil samples.

All matrix spike/matrix spike duplicate RPD results were acceptable.

3.7 INTERNAL STANDARDS PERFORMANCE

Internal standard performance was assessed to determine whether abrupt changes in instrument response and sensitivity occurred that may have affected the reliability of the analytical data. The response (area or height) of the internal standards must not vary by more than -50 percent or +100 percent from the response of the calibration standard that was used to calculate the upper and lower bounds. The upper and lower bounds define the range for acceptable internal standard response (area/height) for the sample analyses. In addition, retention times for the internal standard must not vary more than ±30 seconds from that of the associated calibration standard.

The internal standard recovery result did not meet QC limits for internal standard compound perylene-d12. All associated results for sample number B09771 in SDG No. B09771 were qualified as estimates and flagged "J".

All other internal standard results were acceptable.

3.8 COMPOUND IDENTIFICATION AND QUANTITATION

The identities of detected compounds were confirmed to investigate the possibility of false positives. The confirmation of compound identification during the QA review focuses on false positives because only mass spectra for positive identifications are submitted. However, target compounds that are reported as undetected are also evaluated to investigate the possibility of false negatives. Confirmation of possible false negatives is addressed by reviewing other factors relating to analytical sensitivity (e.g., detection limits, linearity, analytical recovery). Compound retention times and mass spectra must match those for the standard within set to tolerance limits (EPA 1988b).

3.8.1 Reported Results and Quantitation Limits

Compound quantitations and reported detection limits were recalculated and verified to ensure that they are accurate and are consistent with the internal standards and relative retention times specified by the CLP scope of work.

At concentrations below the CRQL, instrument precision becomes more variable as the IDL is approached. Therefore, the concentrations of any compound detected below the CRQL are qualified as estimates.

All compound identifications and quantitations have been verified as correct in the validated data.

3.8.2 Tentatively Identified Compounds

Chromatographic peaks may be present in an analysis that are not TCL analytes, surrogates, or internal standards and are considered TIC.

The validator verified that spectral library searches were conducted for at least 20 or less candidate TIC. All compounds, including common laboratory contaminants present in the blanks using Westinghouse-Hanford blank review criteria, were qualified as non-detects and flagged "U".

3.9 OVERALL ASSESSMENT AND SUMMARY

A thorough review of ongoing data acquisition and instrument performance criteria was made to assess overall GC/MS instrument performance. No changes in instrument performance were noted that would result in the degradation of data quality. No indications of unacceptable instrument performance (i.e., shifts in baseline stability, retention time shifts, extraneous peaks, sensitivity) were found during the quality assurance review.

In general, the semivolatile data presented in this report met the protocol-specified QA/QC requirements. Minor blank contamination was noted in one sample. The internal standard results for one standard in one sample did not meet QC limits. All associated results were qualified as estimates. The 7-day extraction holding period was exceeded by one day for one sample. All associated results were qualified as estimates. Data qualified as estimates are considered to be usable for limited purposes only. All other validated data are considered valid and usable within the standard error associated with the method.

Project: WESTINGHOUSE-HANFORD																			
Laboratory: TMA																			
Case	SDG: B09F25																		
Sample Number		B09F25		B09F28		B09LD4		B09LD5		B09LD6		B09LD7		B09LD8					
Location		S2		EB		*NA		*NA		*NA		*NA		*NA					
Remarks		*26 FT		Equip Blk		NV		NV		NV		NV		NV					
Sample Date		11/10/93		11/11/93		11/11/93		11/11/93		11/11/93		11/11/93		11/11/93					
Extraction Date		11/18/93		11/18/93		11/18/93		11/18/93		11/18/93		11/18/93		11/18/93					
Analysis Date		11/22/93		11/22/93		11/22/93		11/24/93		11/22/93		11/22/93		11/22/93					
Semivolatile Compound	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Phenol	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
bis(2-Chloroethyl)ether	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
2-Chlorophenol	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
1,3-Dichlorobenzene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
1,4-Dichlorobenzene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
1,2-Dichlorobenzene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
2-Methylphenol	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
2,2'-oxybis(1-Chloropropane)	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
4-Methylphenol	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
N-Nitroso-Di-n-Propylamine	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Hexachloroethane	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Nitrobenzene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Isophorone	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
2-Nitrophenol	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
2,4-Dimethylphenol	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
bis(2-Chloroethoxy)methane	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
2,4-Dichlorophenol	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
1,2,4-Trichlorobenzene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Naphthalene	330	330	UJ	330	U	340	U	5800	J	360	U	360	U	350	U						
4-Chloroaniline	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Hexachlorobutadiene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
4-Chloro-3-Methylphenol	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
2-Methylnaphthalene	330	330	UJ	330	U	340	U	22000		360	U	360	U	350	U						
Hexachlorocyclopentadiene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
2,4,6-Trichlorophenol	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
2,4,5-Trichlorophenol	1700	810	UJ	800	U	830	U	34000	U	870	U	880	U	840	U						
2-Chloronaphthalene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
2-Nitroaniline	1700	810	UJ	800	U	830	U	34000	U	870	U	880	U	840	U						
Dimethylphthalate	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Acenaphthylene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
3-Nitroaniline	1700	810	UJ	800	U	830	U	34000	U	870	U	880	U	840	U						
Acenaphthene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
2,4-Dinitrophenol	1700	810	UJ	800	U	830	U	34000	U	870	U	880	U	840	U						

* = Depth, *NA = Not Available, NV = Not Validated, EB=Equipment Blank

Project: WESTINGHOUSE-HANFORD																					
Laboratory: TMA																					
Case	SDG: B09F25																				
Sample Number		B09F25		B09F28		B09LD4		B09LD5		B09LD6		B09LD7		B09LD8							
Location		S2		EB		*NA		*NA		*NA		*NA		*NA							
Remarks		*26 FT		Equip Blk		NV		NV		NV		NV		NV							
Sample Date		11/10/93		11/11/93		11/11/93		11/11/93		11/11/93		11/11/93		11/11/93							
Extraction Date		11/18/93		11/18/93		11/18/93		11/18/93		11/18/93		11/18/93		11/18/93							
Analysis Date		11/22/93		11/22/93		11/22/93		11/24/93		11/22/93		11/22/93		11/22/93							
Semivolatile Compound	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
4-Nitrophenol	1700	810	UJ	800	U	830	U	34000	U	870	U	880	U	840	U						
Dibenzofuran	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
2,4-Dinitrotoluene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
2,6-Dinitrotoluene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Diethylphthalate	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
4-Chlorophenyl-phenylether	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Fluorene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
4-Nitroaniline	1700	810	UJ	800	U	830	U	34000	U	870	U	880	U	840	U						
4,6-Dinitro-2-methylphenol	1700	810	UJ	800	U	830	U	34000	U	870	U	880	U	840	U						
N-Nitrosodiphenylamine	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
4-Bromophenyl-phenylether	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Hexachlorobenzene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Pentachlorophenol	1700	810	UJ	800	U	830	U	34000	U	870	U	880	U	840	U						
Phenanthrene	330	330	UJ	330	U	340	U	2800	U	360	U	360	U	350	U						
Anthracene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Carbazole	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Di-n-Butylphthalate	330	330	UJ	34	J	340	U	14000	U	81	J	110	J	45	J						
Fluoranthene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Pyrene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Butylbenzylphthalate	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
3,3'-Dichlorobenzidine	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Benzo(a)Anthracene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
bis(2-Ethylhexyl)Phthalate	330	330	UJ	330	U	340	U	2300	J	360	U	360	U	49	J						
Chrysene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Di-n-Octyl Phthalate	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Benzo(b)Fluoranthene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Benzo(k)Fluoranthene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Benzo(a)Pyrene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Indeno(1,2,3-cd)Pyrene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Dibenz(a,h)Anthracene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						
Benzo(g,h,i)Perylene	330	330	UJ	330	U	340	U	14000	U	360	U	360	U	350	U						

* = Depth, *NA = Not Available, NV = Not Validated, EB=Equipment Blank

HOLDING TIME SUMMARY

SDG: B09F25	REVIEWER: SC			DATE: 2/8/94		PAGE 1 OF 1	
COMMENTS:							
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09F25	BNA	11/10/93	11/18/93	11/22/93	7	40	J

DATA QUALIFICATION SUMMARY

SDG: B09F25	REVIEWER: SC	DATE: 2/8/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All BNA compounds	J	B09F25	Holding Times Exceeded

Project: WESTINGHOUSE-HANFORD																					
Laboratory: TMA																					
Case	SDG: B09769																				
Sample Number		B09769		B09770																	
Location		CS LIFT 1		CS LIFT 1																	
Remarks				DUP																	
Sample Date		09/22/93		09/22/93																	
Extraction Date		09/29/93		09/29/93																	
Analysis Date		09/30/93		09/30/93																	
Semivolatile Compound	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Phenol	330	360	U	350	U																
bis(2-Chloroethyl)ether	330	360	U	350	U																
2-Chlorophenol	330	360	U	350	U																
1,3-Dichlorobenzene	330	360	U	350	U																
1,4-Dichlorobenzene	330	360	U	350	U																
1,2-Dichlorobenzene	330	360	U	350	U																
2-Methylphenol	330	360	U	350	U																
2,2'-oxybis(1-Chloropropane)	330	360	U	350	U																
4-Methylphenol	330	360	U	350	U																
N-Nitroso-Di-n-Propylamine	330	360	U	350	U																
Hexachloroethane	330	360	U	350	U																
Nitrobenzene	330	360	U	350	U																
Isophorone	330	360	U	350	U																
2-Nitrophenol	330	360	U	350	U																
2,4-Dimethylphenol	330	360	U	350	U																
bis(2-Chloroethoxy)methane	330	360	U	350	U																
2,4-Dichlorophenol	330	360	U	350	U																
1,2,4-Trichlorobenzene	330	360	U	350	U																
Naphthalene	330	360	U	350	U																
4-Chloroaniline	330	360	U	350	U																
Hexachlorobutadiene	330	360	U	350	U																
4-Chloro-3-Methylphenol	330	360	U	350	U																
2-Methylnaphthalene	330	360	U	350	U																
Hexachlorocyclopentadiene	330	360	U	350	U																
2,4,6-Trichlorophenol	330	360	U	350	U																
2,4,5-Trichlorophenol	1700	870	U	850	U																
2-Chloronaphthalene	330	360	U	350	U																
2-Nitroaniline	1700	870	U	850	U																
Dimethylphthalate	330	360	U	350	U																
Acenaphthylene	330	360	U	350	U																
3-Nitroaniline	330	870	U	850	U																
Acenaphthene	330	360	U	350	U																
2,4-Dinitrophenol	1700	870	U	850	U																

CS = Clean Spoils, DUP = Duplicate

Project: WESTINGHOUSE-HANFORD																			
Laboratory: TMA																			
Case	SDG: B09769																		
Sample Number		B09769		B09770															
Location		CS LIFT 1		CS LIFT 1															
Remarks				DUP															
Sample Date		09/22/93		09/22/93															
Extraction Date		09/29/93		09/29/93															
Analysis Date		09/30/93		09/30/93															
Semivolatile Compound	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
4-Nitrophenol	1700	870	U	850	U														
Dibenzofuran	330	360	U	350	U														
2,4-Dinitrotoluene	330	360	U	350	U														
2,6-Dinitrotoluene	330	360	U	350	U														
Diethylphthalate	330	360	U	350	U														
4-Chlorophenyl-phenylether	330	360	U	350	U														
Fluorene	330	360	U	350	U														
4-Nitroaniline	1700	870	U	850	U														
4,6-Dinitro-2-methylphenol	1700	870	U	850	U														
N-Nitrosodiphenylamine	330	360	U	350	U														
4-Bromophenyl-phenylether	330	360	U	350	U														
Hexachlorobenzene	330	360	U	350	U														
Pentachlorophenol	1700	870	U	850	U														
Phenanthrene	330	360	U	350	U														
Anthracene	330	360	U	350	U														
Carbazole	330	360	U	350	U														
Di-n-Butylphthalate	330	360	U	350	U														
Fluoranthene	330	360	U	350	U														
Pyrene	330	360	U	350	U														
Butylbenzylphthalate	330	360	U	350	U														
3,3'-Dichlorobenzidine	330	360	U	350	U														
Benzo(a)Anthracene	330	360	U	350	U														
bis(2-Ethylhexyl)Phthalate	330	360	U	350	U														
Chrysene	330	360	U	350	U														
Di-n-Octyl Phthalate	330	360	U	350	U														
Benzo(b)Fluoranthene	330	360	U	350	U														
Benzo(k)Fluoranthene	330	360	U	350	U														
Benzo(a)Pyrene	330	360	U	350	U														
Indeno(1,2,3-cd)Pyrene	330	360	U	350	U														
Dibenz(a,h)Anthracene	330	360	U	350	U														
Benzo(g,h,i)Perylene	330	360	U	350	U														

CS = Clean Spoils, DUP = Duplicate

BLANK AND SAMPLE DATA SUMMARY

SDG: B09769	REVIEWER: CENH			DATE: 2/7/94				PAGE 1 OF 1	
COMMENTS:									
SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
SBLK0929S2	di-n-butylphthalate	220	J		ug/Kg	1100	2200	B09769, B09770	U

DATA QUALIFICATION SUMMARY

SDG: B09769	REVIEWER: CENH	DATE: 2/7/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
di-n-butylphthalate	U	B09769, B09770	Lab Blank Contamination

Project: WESTINGHOUSE-HANFORD																			
Laboratory: Roy F. Weston																			
Case	SDG: B09771																		
Sample Number		B09771																	
Location		CS LIFT 1																	
Remarks		Split																	
Sample Date		09/22/93																	
Extraction Date		09/28/93																	
Analysis Date		10/01/93																	
Semivolatile Compound	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Phenol	330	360	U																
bis(2-Chloroethyl)ether	330	360	U																
2-Chlorophenol	330	360	U																
1,3-Dichlorobenzene	330	360	U																
1,4-Dichlorobenzene	330	360	U																
1,2-Dichlorobenzene	330	360	U																
2-Methylphenol	330	360	U																
2,2'-oxybis(1-Chloropropane)	330	360	U																
4-Methylphenol	330	360	U																
N-Nitroso-Di-n-Propylamine	330	360	U																
Hexachloroethane	330	360	U																
Nitrobenzene	330	360	U																
Isophorone	330	360	U																
2-Nitrophenol	330	360	U																
2,4-Dimethylphenol	330	360	U																
bis(2-Chloroethoxy)methane	330	360	U																
2,4-Dichlorophenol	330	360	U																
1,2,4-Trichlorobenzene	330	360	U																
Naphthalene	330	360	U																
4-Chloroaniline	330	360	U																
Hexachlorobutadiene	330	360	U																
4-Chloro-3-Methylphenol	330	360	U																
2-Methylnaphthalene	330	360	U																
Hexachlorocyclopentadiene	330	360	U																
2,4,6-Trichlorophenol	330	360	U																
2,4,5-Trichlorophenol	1700	890	U																
2-Chloronaphthalene	330	360	U																
2-Nitroaniline	1700	890	U																
Dimethylphthalate	330	360	U																
Acenaphthylene	330	360	U																
2,6-Dinitrotoluene	330	360	U																
3-Nitroaniline	1700	890	U																
Acenaphthene	330	360	U																

CS = Clean Spoils

Project: WESTINGHOUSE-HANFORD																			
Laboratory: Roy F. Weston																			
Case	SDG: B09771																		
Sample Number		B09771																	
Location		CS LIFT 1																	
Remarks		Split																	
Sample Date		09/22/93																	
Extraction Date		09/28/93																	
Analysis Date		10/01/93																	
Semivolatile Compound	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
2,4-Dinitrophenol	1700	890	U																
4-Nitrophenol	1700	890	U																
Dibenzofuran	330	360	U																
2,4-Dinitrotoluene	330	360	U																
Diethylphthalate	330	360	U																
4-Chlorophenyl-phenylether	330	360	U																
Fluorene	330	360	U																
4-Nitroaniline	1700	890	U																
4,6-Dinitro-2-methylphenol	1700	890	U																
N-Nitrosodiphenylamine	330	360	U																
4-Bromophenyl-phenylether	330	360	U																
Hexachlorobenzene	330	360	U																
Pentachlorophenol	1700	890	U																
Phenanthrene	330	360	U																
Anthracene	330	360	U																
Carbazole	330	360	U																
Di-n-Butylphthalate	330	46	J																
Fluoranthene	330	360	U																
Pyrene	330	360	U																
Butylbenzylphthalate	330	360	U																
3,3'-Dichlorobenzidine	330	360	U																
Benzo(a)Anthracene	330	360	U																
Chrysene	330	360	U																
bis(2-Ethylhexyl)Phthalate	330	32	J																
Di-n-Octyl Phthalate	330	360	UJ																
Benzo(b)Fluoranthene	330	360	UJ																
Benzo(k)Fluoranthene	330	360	UJ																
Benzo(a)Pyrene	330	360	UJ																
Indeno(1,2,3-cd)Pyrene	330	360	UJ																
Dibenz(a,h)Anthracene	330	360	UJ																
Benzo(g,h,i)Perylene	330	360	UJ																

CS = Clean Spoils

DATA QUALIFICATION SUMMARY

SDG: B09771	REVIEWER: CENH	DATE: 2/7/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
di-n-octylphthalate	J	B09771	Internal Standard Outside Limits
benzo(b)fluoranthene	J	B09771	Internal Standard Outside Limits
benzo(k)fluoranthene	J	B09771	Internal Standard Outside Limits
benzo(a)pyrene	J	B09771	Internal Standard Outside Limits
indeno(1,2,3-cd)pyrene	J	B09771	Internal Standard Outside Limits
dibenz(a,h)anthracene	J	B09771	Internal Standard Outside Limits
benzo(g,h,i)perylene	J	B09771	Internal Standard Outside Limits

WELL AND SAMPLE INFORMATION					SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	NV/V	INORGANICS
00	B09F21	S	11/10/93	V	4-10
CS LIFT 1	B09769	S	09/22/93	V	4-14
	B09770	S	09/22/93	V	4-14
	B09771	S	09/22/93	V	4-19
CS LIFT 6	B097C7	S	10/21/93	V	4-23
N3	B09F22	S	11/10/93	V	4-10
N3+5'N	B09F23	S	11/10/93	V	4-10
S2	B09F25	S	11/10/93	V	4-10
W2/S2	B09F20	S	11/10/93	V	4-10
W2/S2+10'W	B09F24	S	11/10/93	V	4-10
EB	B09F28	S	11/11/93	V	4-10
	B09LD4	S	11/11/93	NV	4-10
	B09LD5	S	11/11/93	NV	4-10
	B09LD6	S	11/11/93	NV	4-10
	B09LD7	S	11/11/93	NV	4-11
	B09LD8	S	11/11/93	NV	4-11

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4.0 INORGANIC DATA VALIDATION

4.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and checked for completeness:

B09F20	B09769	B09771	B097C7

4.2 HOLDING TIMES

Analytical holding times for ICP metals, GFAA metals, and CVAA mercury analyses were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: samples must be analyzed within six months for all ICP and GFAA metals, and twenty-eight days for mercury.

All holding time requirements for all analytes in all data packages reviewed were met.

4.3 INSTRUMENT PERFORMANCE AND CALIBRATIONS

Performance of specific instrument quality assurance and quality control procedures, including deficiencies noted during the quality assurance review, are outlined below.

Three calibration standards and a blank were analyzed for arsenic, lead, selenium and thallium by GFAA. The correlation coefficient of a least squares linear regression met the requirements for calibration.

Up to five calibration standards and a blank were analyzed for mercury by CVAA. The correlation coefficient of a least squares linear regression met the requirements for calibration.

At least one standard and a blank were analyzed by ICP for all other elements.

The above calibrations were each immediately verified with an ICV standard and a calibration blank. The ICV was prepared from a source independent of the calibration standards, at a mid-calibration range concentration. The ICV percent recovery must fall within the control limits of 90 to 110 percent for metals analyzed by ICP and GFAA, and 80 to 120 percent for mercury. Calibration linearity near the detection limit was verified with a standard prepared at a concentration near the CRDL.

The ICVs met the recommended control limits in all cases.

The calibrations were subsequently verified at regular intervals using a CCV standard. The control windows for percent recovery of CCV standards are the same as the ICV windows described above.

The CCVs met the recommended control limits in all cases.

4.3.1 ICP Calibration

An ICS was analyzed at the beginning and end of each ICP sample run to verify the laboratory interelement and background correction factors. Results for the ICS solution must fall within the control limit of ±20 percent of the true value.

The ICS has been analyzed at the proper frequency and all ICSAB solution percent recovery values fell within the control limit.

4.3.2 Atomic Absorption Calibrations

Duplicate injections are required for all GFAA analyses. The duplicate injections establish the precision of the individual analytical determinations. For sample concentrations greater than the CRDL, duplicate injections must agree within ±20 percent RSD or CV. The post-digestion analytical spike is analyzed to determine the extent of interference in the digestate matrix. When the results of the analytical spike analyses exceeds the control window of 85 to 115 percent recovery and the absorbance of the sample is greater than fifty percent of the analytical spike absorbance, then the sample must be reanalyzed using the MSA. The duplicate injections and the analytical spike recoveries establish the precision and accuracy of the individual GFAA determinations. The AA precision and accuracy results are discussed further in Section 4.7 of this report.

4.4 BLANKS

4.4.1 Positive Blank Results

Samples with digestate concentrations (in ug/L) of less than five times (<5x) the highest amount found in any of the associated blanks have had their associated values qualified as non-detects and flagged "U". Samples with concentrations of greater than five times (>5x) the highest amount found in any of the associated blanks do not require qualification.

Due to the presence of laboratory blank contamination, the following samples were flagged "U" for arsenic:

- Sample numbers B09F20, B09F21, B09F22, B09F23, B09F24 and B09F25 in SDG No. B09F20.

- Sample number B09769 in SDG No. B09769.

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for barium:

- Sample number B09F28 in SDG No. B09F20.

Due to the presence of laboratory blank contamination, the following samples were flagged "U" for beryllium:

- Sample numbers B09F20, B09F21, B09F22, B09F23, B09F24 and B09F25 in SDG No. B09F20.

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for cadmium:

- Sample number B09F20 in SDG No. B09F20.

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for calcium:

- Sample number B09F28 in SDG No. B09F20.

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for chromium:

- Sample number B09F28 in SDG No. B09F20.

Due to the presence of laboratory blank contamination, the following samples were flagged "U" for copper:

- Sample numbers B09F20, B09F21, B09F22, B09F23, B09F24, B09F25 and B09F28 in SDG No. B09F20.

- Sample numbers B09769 and B09770 in SDG No. B09769.

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for magnesium:

- Sample number B09F28 in SDG No. B09F20.

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for manganese:

- Sample number B09F28 in SDG No. B09F20.

Due to the presence of laboratory blank contamination, the following sample was flagged "U" for potassium:

- Sample number B09F28 in SDG No. B09F20.

- Sample numbers B09F21, B09F22, B09F23, B09F24, B09F25 and B09F28 in SDG No. B09F20.

- Sample numbers B09769 and B09770 in SDG No. B09769.

All other laboratory blank results were acceptable.

4.4.2 Negative Blank Results

In the case of negative blank results, if the absolute value of any calibration blank exceeds the IDL, all non-detects are qualified as estimates and flagged "J", and all positive results within two times the absolute value of the blank result are qualified as estimates and flagged "J". In the case of preparation blanks, if the absolute value exceeds the CRDL, all non-detects are rejected and flagged "R" and all detected values that are less than ten times the absolute value of the preparation blank result are qualified as estimates and flagged "J".

Due to the presence of negative calibration blank results, the following sample was flagged "J" for mercury:

- Sample number B097C7 in SDG No. B097C7.

Due to the presence of negative preparation blank results, the following sample was flagged "J" for arsenic:

- Sample number B097C7 in SDG No. B097C7.

No other negative blank results were detected.

4.5 ACCURACY

4.5.1 Matrix Spike Recovery

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must generally fall within the range of 75 to 125 percent. Samples with a spike recovery of less than 30% and a sample value below the IDL were rejected and flagged "R". All other samples with a spike recovery outside the QC limits are qualified as estimates and flagged "J".

The matrix spike recovery fell outside the QC limits and the associated results were flagged "J" for antimony in the following samples:

- Sample numbers B09769 and B09770 in SDG No. B09769.

- Sample number B097C7 in SDG No. B097C7.

The matrix spike recovery fell outside the QC limits and the associated results were flagged "J" for arsenic in the following samples:

- Sample numbers B09769 and B09770 in SDG No. B09769.

The matrix spike recovery fell outside the QC limits and the associated results were flagged "J" for lead in the following sample:

- Sample number B09771 in SDG No. B09771.

The matrix spike recovery fell outside the QC limits and the associated results were flagged "J" for manganese in the following samples:

- Sample numbers B09769 and B09770 in SDG No. B09769.

The matrix spike recovery fell outside the QC limits and the associated results were flagged "J" for selenium in the following sample:

- Sample number B09771 in SDG No. B09771.

All other matrix spike recovery results were acceptable.

4.5.2 Laboratory Control Sample Recovery

The LCS monitors the overall performance of the analysis, including the sample preparation. An LCS should be digested or distilled and analyzed with every group of samples which have been prepared together. Sample recoveries less than 50% were rejected and flagged "R". All other samples with LCS recovery outside of QC limits are qualified as estimates and flagged "J".

One solid LCS was digested and analyzed for each of the cases in this report that contained soil samples. The results were compared against the established performance criteria and found to be acceptable.

LCS solid samples for soil samples digested and analyzed by WESTON could not be verified as actual solid samples. According to the WESTON digestion logbooks, two milliliters of ICV were used for the LCS. However, according to Exhibit E, Section V, Item 8 (pg. E-19) of the USEPA Statement of Work for Inorganics Analysis, Document Number ILM01.0, the ICV can only be used as the LCS for the digestion and analysis of aqueous samples. A solid LCS provided by the EPA or a certified agent is required for soil samples.

All LCS results were found to be acceptable.

4.6 PRECISION

4.6.1 Laboratory Duplicate Samples

The laboratory duplicate results measures the precision of the method by measuring a second aliquot of the sample that is treated the same way as the original. Samples whose precision fell outside the quality control requirements were flagged as estimates "J".

The laboratory duplicate result fell outside the QC limits and the associated result was flagged "J" for lead in the following sample:

- Sample number B09771 in SDG No. B09771.

All other laboratory duplicate recovery results were acceptable.

4.6.2 ICP Serial Dilution

The ICP serial dilution is used to determine whether significant physical or chemical interferences exist due to sample matrix. If sample concentration is $\geq$50 times the IDL for an analyte and the %D is outside the control limits the associated data must be qualified as estimates and flagged "J".

The ICP serial dilution result fell outside the QC limits and the associated result was flagged "J" for sodium in the following samples:

- Sample numbers B09769 and B09770 in SDG No. B09769.

All other ICP serial dilution results were acceptable.

4.7 FURNACE AA QUALITY CONTROL

4.7.1 Duplicate Injections

Each furnace analysis requires a minimum of two injections (burns), except for full MSA. For concentrations greater than CRDL, the duplicate injection readings must agree within 20% RSD or CV. If these requirements are not met, the analytical sample must be rerun once (i.e., two additional burns). If the readings are then still outside the QC limits, the result is qualified as an estimate and flagged "J".

All duplicate injection quality control requirements were met.

4.7.2 Analytical Spike Recoveries

For all samples whose analytical spike results are outside the 85 to 115 percent control limit, but whose absorbances are less than 50 percent of the analytical spike absorbance, the samples were flagged as estimates "J". In cases where the analytical spike recovery was 0.0 percent, the results were rejected and flagged "R".

The analytical spike recovery fell outside the established QC limits and the associated result was flagged "J" for selenium in the following sample:

- Sample number B09771 in SDG No. B09771.

The analytical spike recovery fell outside the established QC limits and the associated result was flagged "J" for thallium in the following sample:

- Sample number B09771 in SDG No. B09771.

All other analytical spike recovery results were acceptable.

4.7.3 Method of Standard Addition Results

For all samples whose analytical spike results are outside the 85 to 115 percent control limit and whose absorbances are greater than 50 percent of the analytical spike absorbance an MSA is required. In cases where the MSA correlation coefficient was less than 0.995 the MSA analysis was repeated once. If the correlation coefficient was still less than 0.995, samples were flagged as estimates "J".

The correlation coefficient of the MSA was below 0.995 and the associated result was flagged "J" for selenium in the following samples:

- Sample numbers B09769 and B09770 in SDG No. B09769.

All other MSA results were acceptable.

4.8 ANALYTE QUANTITATION AND DETECTION LIMITS

Twenty percent of sample results and reported detection limits were recalculated to ensure that the reported results were accurate. Raw data were examined for anomalies, transcription errors, and reduction errors.

The reviewer verified that the results and detection limits fell within the linear range of the instrument.

4.9 OVERALL ASSESSMENT AND SUMMARY

All samples were analyzed and reported under the 1990 CLP protocol (EPA 1990). Several inconsistencies and deviations from the protocol were observed. They are as follows:

A CCV and CCB must be analyzed immediately after the ICV and ICB. ICAP analysis does not follow this protocol. For ICAP analysis a CCV and CCB were run after the initial interference checks and CRI. This is incorrect because the ICSA/AB and CRII are considered analytical samples and according to the CLP protocol a CCV and CCB must be run prior to any analytical samples.

Internal Chains of Custody lacked sufficient information such as interdepartmental transfers, i.e., from the sample custodian to the technician responsible for sample preparation and the dates these transfers took place plus the EPA sample ID number. Without this information Internal Chains of Custody can not be verified as those belonging to samples in this report. Refer to Sections F-5, paragraph 1.5 and F-3, paragraph 1.4 of the EPA CLP SOW 3/90 protocol.

For samples analyzed by WESTON, incorrect ICP instrument detection limits (IDL's) are being used to report results down to the IDL. Two sets of IDL's (Form 10) are included in the data package for ICAP analysis, one for instrument IC1 and one for instrument IC3. According to the case narrative addendum, WESTON states that the highest IDL of the two instruments is used, as per Exhibit E, Section V, Item 10 (pg. E-53) of the EPA Statement of Work for Inorganics Analysis, Document Number ILM01.0. This is correct only when two instruments are being used to determine sample results within a data package. However, in this data package, WESTON used only one ICP instrument to determine the sample results and therefore it is this instrument's IDL's which should be used to calculate results. According to the raw data and the Form XIV information IC3 is the instrument being used for analysis while some of the IDL's of IC1 are the ones reported on Forms 1-9. This can effect results flagged "U" or results which may be flagged "U" because of laboratory blank contamination. Results have been changed, where necessary, to reflect results based on IDLs from instrument IC3.

LCS solid samples for soil samples digested and analyzed by WESTON could not be verified as actual solid samples. According to the WESTON digestion logbooks, two milliliters of ICV were used for the LCS. However, according to Exhibit E, Section V, Item 8 (pg. E-19) of the USEPA Statement of Work for Inorganics Analysis, Document Number ILM01.0, the ICV can only be used as the LCS for the digestion and analysis of aqueous samples. A solid LCS provided by the EPA or a certified agent is required for soil samples.

All raw data associated with WESTON has not been labeled with the client (EPA) ID number. Results labeled with only the

laboratory sample ID number is insufficient. Refer to Section B-10 of the EPA CLP SOW 3/90.

Except as noted in the preceding sections, all other validated data are usable for all purposes.

INORGANIC ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																			
Laboratory: TMA																			
Case	B09F20																		
Sample Number		B09F20		B09F21		B09F22		B09F23		B09F24		B09F25		B09F28		B09LD4		B09LD5		B09LD6	
Location		W2/S2		00		N3		N3+5'N		W2/S2+10'		S2		EB		*NA		*NA		*NA	
Remarks		*18 FT		*18 FT		*18 FT		*14 FT		*14 FT		*26 FT		Equip.Blk		NV		NV		NV	
Sample Date		11/10/93		11/10/93		11/10/93		11/10/93		11/10/93		11/10/93		11/11/93		11/11/93		11/11/93		11/11/93	
Inorganic Analytes	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	200	4200		4050		4120		4520		5000		4340		69.2		6300		6290		5760	
Antimony	60	2.6	U	2.6	U	2.6	U	2.6	U	2.5	U	2.6	U	2.5	U	2.6	U	2.7	U	2.7	U
Arsenic	10	2.1	U	1.9	U	2.4	U	2.0	U	2.0	U	1.9	U	0.41	U	2.5		2.6		2.6	
Barium	200	27.8		34.3		28.1		41.8		32.5		33.2		0.43	U	81.7		77.9		189	
Beryllium	5	0.20	U	0.20	U	0.22	U	0.20	U	0.25	U	0.15	U	0.04	U	0.32		0.31		0.25	
Cadmium	5	0.35	U	0.26		0.26	U	0.26	U	0.31	U	0.26	U	0.26	U	0.28		0.33		0.27	U
Calcium	5000	6210		6110		6670		6490		6520		5590		29.2	U	4730		4770		4880	
Chromium	10	7.6		7.3		8.1		9.9		8.5		7.6		0.53	U	9.9		8.8		8.7	
Cobalt	50	4.4		4.3		4.4		4.9		5.4		4.8		0.51	U	7.3		7.2		7.1	
Copper	25	14.1	U	11.6	U	12.1	U	11.1	U	12.3	U	11.1	U	0.90	U	14.9		17.1		14.2	
Iron	100	9030		8550		8700		9570		10600		9240		140		13400		13200		12600	
Lead	3	12.3		2.6		2.6		3.0		2.6		2.3		0.57	U	4.6		8.7		4.3	
Magnesium	5000	3330		3130		3330		3560		3710		3300		11.2	U	4020		4040		3830	
Manganese	15	188		197		195		212		210		194		0.70	U	268		261		256	
Mercury	0.2	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Nickel	40	7.6		7.8		9.0		8.5		8.5		7.9		0.67	U	10.1		9.0		9.4	
Potassium	5000	625		659		603		672		681		605		30.9	U	1140		1750		1040	
Selenium	5	0.57	U	0.56	U	0.57	U	0.57	U	0.54	U	0.56	U	0.55	U	0.57	U	0.58	U	0.58	U
Silver	10	0.53	U	0.62		0.53	U	0.53	U	0.52		0.65		0.51	U	0.72		0.54	U	0.54	U
Sodium	5000	261		244	U	226	U	204	U	215	U	173	U	68.6	U	240		594		225	
Thallium	10	0.32	U	0.32	U	0.32	U	0.44		0.31	U	0.32	U	0.31	U	0.35		0.46		0.50	
Vanadium	50	21.2		20.2		19.4		22.7		27.3		22.6		1.1	U	31.4		31.1		29.7	
Zinc	20	23.8		21.8		22.9		24.2		28.8		22.9		0.86	U	30.6		36.1		29.8	
Cyanide	10	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	

*=Depth, EB=Equipment Blank, *NA=Not Available, NV=Not Validated, N/A=Not Applicable

INORGANIC ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																					
Laboratory: TMA																					
Case	B09F20																				
Sample Number		B09LD7		B09LD8																	
Location		*NA		*NA																	
Remarks		NV		NV																	
Sample Date		11/11/93		11/11/93																	
Inorganic Analytes	CRDL	Result	Q	Result																	
Aluminum	200	6150		6150																	
Antimony	60	2.8	U	2.7	U																
Arsenic	10	2.4		2.4																	
Barium	200	79.8		64.1																	
Beryllium	5	0.27		0.34																	
Cadmium	5	0.41		0.27	U																
Calcium	5000	6250		4980																	
Chromium	10	9.9		9.0																	
Cobalt	50	6.9		6.4																	
Copper	25	15.4		14.6																	
Iron	100	13000		12800																	
Lead	3	3.9		3.8																	
Magnesium	5000	4130		3850																	
Manganese	15	253		260																	
Mercury	0.2	0.06	U	0.05	U																
Nickel	40	10.0		9.1																	
Potassium	5000	1010		960																	
Selenium	5	0.60	U	0.58	U																
Silver	10	1.0		0.76																	
Sodium	5000	299		298																	
Thallium	10	0.57		0.71																	
Vanadium	50	30.5		31.3																	
Zinc	20	28.8		30.4																	
Cyanide	10	N/A		N/A																	

*=Depth, EB=Equipment Blank, *NA=Not Available, NV=Not Validated, N/A=Not Applicable

BLANK AND SAMPLE DATA SUMMARY

SDG: B09F20	REVIEWER: HS			DATE: 2/2/94				PAGE 1 OF 1	
COMMENTS:									
SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
CCB	Arsenic	2.5			ug/L	12.5	25.0	B09F20, B09F21, B09F22, B09F23, B09F24, B09F25	U
CCB	Barium	1.8			ug/L	9.0	18.0	B09F28	U
CCB	Beryllium	0.4			ug/L	2.0	4.0	B09F20, B09F21, B09F22, B09F23, B09F24, B09F25	U
CCB	Cadmium	2.1			ug/L	10.5	21.0	B09F20	U
PB	Calcium	76.8			ug/L	384	768	B09F28	U
PB	Chromium	2.95			ug/L	14.8	29.5	B09F28	U
ICB	Copper	20.2			ug/L	101	202	B09F20, B09F21, B09F22, B09F23, B09F24, B09F25, B09F28	U
CCB	Magnesium	29.1			ug/L	146	291	B09F28	U
CCB	Manganese	1.7			ug/L	8.5	17.0	B09F28	U
PB	Potassium	87.9			ug/L	440	879	B09F28	U
PB	Sodium	251			ug/L	1260	2510	B09F21, B09F22, B09F23, B09F24, B09F25, B09F28	U

DATA QUALIFICATION SUMMARY

SDG: B09F20	REVIEWER: HS	DATE: 2/2/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Arsenic	U	B09F20, B09F21, B09F22, B09F23, B09F24, B09F25	Lab Blank Contamination
Barium	U	B09F28	Lab Blank Contamination
Beryllium	U	B09F20, B09F21, B09F22, B09F23, B09F24, B09F25	Lab Blank Contamination
Cadmium	U	B09F20	Lab Blank Contamination
Calcium	U	B09F28	Lab Blank Contamination
Chromium	U	B09F28	Lab Blank Contamination
Copper	U	B09F20, B09F21, B09F22, B09F23, B09F24, B09F25, B09F28	Lab Blank Contamination
Magnesium	U	B09F28	Lab Blank Contamination
Manganese	U	B09F28	Lab Blank Contamination
Potassium	U	B09F28	Lab Blank Contamination
Sodium	U	B09F21, B09F22, B09F23, B09F24, B09F25, B09F28	Lab Blank Contamination

INORGANIC ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																			
Laboratory: TMA																			
Case	SDG: B09769																		
Sample Number		B09769		B09770															
Location		LIFT 1		LIFT 1															
Remarks		CS		Duplicate															
Sample Date		9/22/93		9/22/93															
Inorganic Analytes	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	200	7610		7340															
Antimony	60	4.0	UJ	3.7	UJ														
Arsenic	10	2.3	UJ	3.4	J														
Barium	200	116		125															
Beryllium	5	0.44		0.36															
Cadmium	5	0.33	U	0.31	U														
Calcium	5000	4800		4590															
Chromium	10	10.8		10.5															
Cobalt	50	9.5		8.6															
Copper	25	17.3	U	15.6	U														
Iron	100	16600		15700															
Lead	3	6.2		5.6															
Magnesium	5000	4590		4200															
Manganese	15	339	J	298	J														
Mercury	0.2	0.06	U	0.05	U														
Nickel	40	11.2		9.7															
Potassium	5000	1450		1330															
Selenium	5	2.4	J	1.1	J														
Silver	10	1.1		0.99															
Sodium	5000	581	UJ	532	UJ														
Thallium	10	0.46	U	0.40	U														
Vanadium	50	41.1		38.2															
Zinc	20	43.7		39.7															
Cyanide	10	N/A		N/A															

CS=Clean Spoils, N/A=Not Applicable

BLANK AND SAMPLE DATA SUMMARY

SDG: B09769	REVIEWER: HS			DATE: 2/3/94				PAGE 1 OF 1	
COMMENTS:									
SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
CCB	Arsenic	2.9			ug/L	14.5	29.0	B09769	U
ICB	Copper	17.3			ug/L	86.5	173	B09769, B09770	U
PB	Sodium	1782			ug/L	8910	17820	B09769, B09770	U

ACCURACY DATA SUMMARY

SDG: B09769	REVIEWER: HS	DATE: 2/3/94	PAGE 1 OF 1	
COMMENTS:				
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B09770S	Antimony	54.0	B09769, B09770	J
B09770S	Aresenic	62.7	B09769, B09770	J
B09770S	Manganese	126.7	B09769, B09770	J

PRECISION DATA SUMMARY

SDG: B09769	REVIEWER: HS	DATE: 2/3/94		PAGE 1 OF 1	
COMMENTS:					
COMPOUND	SAMPLE ID:	SAMPLE ID:	RPD	SAMPLES AFFECTED	QUALIFIER
Sodium	B09770	B09770L	13.5	B09769, B09770	J

DATA QUALIFICATION SUMMARY

SDG: B09769	REVIEWER: HS	DATE: 2/3/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Arsenic	U	B09769	Lab Blank Contamination
Copper	U	B09769, B09770	Lab Blank Contamination
Sodium	U	B09769, B09770	Lab Blank Contamination
Antimony	J	B09769, B09770	Matrix Spike
Arsenic	J	B09769, B09770	Matrix Spike
Manganese	J	B09769, B09770	Matrix Spike
Sodium	J	B09769, B09770	ICP Serial Dilution
Selenium	J	B09769, B09770	MSA corr. coeff. <0.995

INORGANIC ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																			
Laboratory: Roy F. Weston																			
Case	SDG: B09771																		
Sample Number		B09771																	
Location		LIFT 1																	
Remarks		Split																	
Sample Date		9/22/93																	
Inorganic Analytes	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	200	5880																	
Antimony	60	10.1	U																
Arsenic	10	2.2																	
Barium	200	96.3																	
Beryllium	5	0.21	U																
Cadmium	5	1.07	U																
Calcium	5000	3960																	
Chromium	10	8.4																	
Cobalt	50	9.1																	
Copper	25	13.4																	
Iron	100	15600																	
Lead	3	5.1	J																
Magnesium	5000	3720																	
Manganese	15	288																	
Mercury	0.2	0.05	U																
Nickel	40	13.5																	
Potassium	5000	1250																	
Selenium	5	0.43	UJ																
Silver	10	1.29	U																
Sodium	5000	161																	
Thallium	10	0.86	UJ																
Vanadium	50	36.1																	
Zinc	20	51.9																	
Cyanide	10	107	U																

ACCURACY DATA SUMMARY

SDG: B09771	REVIEWER: HS	DATE: 1/31/94	PAGE 1 OF 1	
COMMENTS:				
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B09771S	Lead	65.1	B09771	J
B09771S	Selenium	71.4	B09771	J
B09771A	Selenium	78.5	B09771	J
B09771A	Thallium	73.1	B09771	J

PRECISION DATA SUMMARY

SDG: B09771	REVIEWER: HS	DATE: 1/31/94		PAGE 1 OF 1	
COMMENTS:					
COMPOUND	SAMPLE ID:	SAMPLE ID:	RPD	SAMPLES AFFECTED	QUALIFIER
Lead	B09771	B09771D	200	B09771	J

DATA QUALIFICATION SUMMARY

SDG: B09771	REVIEWER: HS	DATE: 1/31/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Lead	J	B09771	Matrix Spike
Selenium	J	B09771	Matrix Spike
Selenium	J	B09771	GFAA Analytical Spike
Thallium	J	B09771	GFAA Analytical Spike
Lead	J	B09771	Duplicate RPD

INORGANIC ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																			
Laboratory: TMA																			
Case	SDG: B097C7																		
Sample Number		B097C7																	
Location		CS LIFT 6																	
Remarks																			
Sample Date		10/21/93																	
Inorganic Analytes	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	200	4880																	
Antimony	60	1.8	UJ																
Arsenic	10	1.9	J																
Barium	200	31.8																	
Beryllium	5	0.07																	
Cadmium	5	0.20	U																
Calcium	5000	6790																	
Chromium	10	9.7																	
Cobalt	50	5.5																	
Copper	25	9.9																	
Iron	100	10200																	
Lead	3	2.5																	
Magnesium	5000	3640																	
Manganese	15	210																	
Mercury	0.2	0.05	UJ																
Nickel	40	8.5																	
Potassium	5000	709																	
Selenium	5	0.55	U																
Silver	10	0.73	U																
Sodium	5000	186																	
Thallium	10	0.31	U																
Vanadium	50	26.9																	
Zinc	20	26.9																	
Cyanide	10	NA																	

CS = Clean Spoils, NA = Not Analyzed

BLANK AND SAMPLE DATA SUMMARY

SDG: B097C7	REVIEWER: LM			DATE: 2/15/94				PAGE 1 OF 1	
COMMENTS: Negative Blanks									
SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	2X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
CCB1	Mercury	-0.2			ug/L	-0.4		B097C7	J
PBS	Arsenic	-2.36			ug/L		-23.6	B097C7	J

ACCURACY DATA SUMMARY

SDG: B097C7	REVIEWER: LM	DATE: 2/15/94	PAGE 1 OF 1	
COMMENTS:				
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B097C7S	Antimony	74.3	B097C7	J

DATA QUALIFICATION SUMMARY

SDG: B097C7	REVIEWER: LM	DATE: 2/15/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Mercury	J	B097C7	Negative Laboratory Blank
Arsenic	J	B097C7	Negative Prep. Blank
Antimony	J	B097C7	Matrix Spike

WELL AND SAMPLE INFORMATION					SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	NV/V	WET CHEMISTRY
00	B09F21	S	11/10/93	V	5-6, 5-11
CS LIFT 1	B09769	S	09/22/93	V	5-15, 5-19
	B09770	S	09/22/93	V	5-15, 5-19
	B09771	S	09/22/93	V	5-20
CS LIFT 6	B097C7	S	10/21/93	V	5-23, 5-27
N3	B09F22	S	11/10/93	V	5-6, 5-11
N3+5'N	B09F23	S	11/10/93	V	5-6, 5-11
S2	B09F25	S	11/10/93	V	5-6, 5-11
W2/S2	B09F20	S	11/10/93	V	5-6, 5-11
W2/S2+10'W	B09F24	S	11/10/93	V	5-6, 5-11
EB	B09F28	S	11/11/93	V	5-6, 5-11
	B09LD4	S	11/11/93	NV	5-6, 5-11
	B09LD5	S	11/11/93	NV	5-6, 5-11
	B09LD6	S	11/11/93	NV	5-6, 5-11
	B09LD7	S	11/11/93	NV	5-7, 5-12
	B09LD8	S	11/11/93	NV	5-7, 5-12

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WELL AND SAMPLE INFORMATION					SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	NV/V	SEMIVOLATILES
CS LIFT 1	B09769	S	09/22/93	V	3-10, 3-11
	B09770	S	09/22/93	V	3-10, 3-11
	B09771	S	09/22/93	V	3-14, 3-15
S2	B09F25	S	11/10/93	V	3-6, 3-7
EB	B09F28	S	11/11/93	V	3-6, 3-7
	B09LD4	S	11/11/93	NV	3-6, 3-7
	B09LD5	S	11/11/93	NV	3-6, 3-7
	B09LD6	S	11/11/93	NV	3-6, 3-7
	B09LD7	S	11/11/93	NV	3-6, 3-7
	B09LD8	S	11/11/93	NV	3-6, 3-7

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3.0 SEMIVOLATILE DATA VALIDATION

3.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and found to be complete:

B09F25 B09769 B09771

3.2 HOLDING TIMES

Analytical holding times were assessed to ascertain whether the holding time requirements for semivolatile analyses were met by the laboratory. Westinghouse Hanford protocols require that samples be extracted within seven days of collection and be analyzed within 40 days of extraction (WHC 1992a).

The 7-day extraction holding requirement was exceeded by one day for sample number B09F25 in SDG No. B09F25. All associated sample results were qualified as estimates and flagged "J".

All other holding time requirements were met for all samples.

3.3 INSTRUMENT CALIBRATION AND TUNING

3.3.1 GC/MS Tuning/Instrument Performance Check

Tuning is performed to ensure that mass resolution, and to some degree, sensitivity, of the GC/MS instrument has been established. When analyzing for semivolatile organic compounds, the GC/MS is tuned using DFTPP. The GC/MS must be tuned prior to the analysis of either standards or samples, and tuning must meet the criteria established by the analytical protocol. The specific criteria for acceptable GC/MS tuning using DFTPP are outlined in Westinghouse Hanford procedures (WHC 1992a) and in CLP protocols (EPA 1988b and 1991).

As part of data validation, the original tuning data were checked for transcription and calculation errors to verify that tuning and performance criteria were met.

All tuning and performance criteria were met.

3.3.2 Initial Calibration

The GC/MS instrument is calibrated to ensure that it is capable of producing acceptable and reliable analytical data over a range of concentrations. The initial and continuing calibrations are to be performed according to CLP protocols. An initial multipoint calibration is performed prior to sample analysis to establish the linearity range of the GC/MS instrument. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

Instrument response is established by the initial calibration when the RRFs for all target compounds are greater than or equal to 0.05 units. Linearity is established when the RSDs of the RRFs are less than or equal to 30 percent.

All initial calibration results were acceptable.

3.3.3 Continuing Calibration

The criteria for accepting the continuing calibration require that a standard be analyzed at least once per 12 hour period and that the RRFs of all target compounds be greater than or equal to 0.05 units. In addition, the percent difference of these RRFs must be less than or equal to 25 percent of the average RRFs calculated for the associated initial calibration.

All continuing calibration results were acceptable.

3.4 BLANKS

Method blank and field blank analyses are performed to determine the extent of laboratory or field contamination of samples. No contaminants should be present in the blanks. Analytical results for analytes present in any sample at less than 5 times the concentration of that analyte found in associated blanks should be qualified as non-detects; in the case of certain common laboratory contaminants, results less than 10 times the concentrations of that analyte in the associated blanks are qualified as non-detects.

Due to the presence of laboratory blank contamination, the following samples were flagged "U" for di-n-butylphthalate:

- Sample numbers B09769 and B09770 in SDG No. B09769.

All other blank results were acceptable.

3.5 ACCURACY

Accuracy was assessed by evaluating the recoveries of stable isotopically labeled surrogate compounds added to all samples and blanks, and by the analysis of a representative sample which was spiked with a variety of organic compounds.

3.5.1 Matrix Spike Recovery

Matrix spike compounds are added to a sample which is representative of the sample delivery group. Matrix spike analyses are performed in duplicate using the six compounds specified by CLP protocols. All recoveries for the compounds should be within the established QC limits (EPA 1988b). The matrix spike analyses estimate how much the analyses for the target compounds are interfered with, either positively or negatively, by the sample matrix. Because the matrix spike is performed using only one of the samples extracted within the SDG, these data alone cannot be used to evaluate the precision and accuracy of individual samples.

All matrix spike/matrix spike duplicate recovery results were acceptable.

3.5.2 Surrogate Recovery

Surrogate compound recoveries are calculated using analytical results from six stable, isotopically labeled surrogate compounds added to the sample prior to sample preparation and analysis. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP protocol. When recoveries for any two surrogate compounds are out of the control window, all positively identified target compound concentrations in samples associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J" and undetected compounds are qualified estimated below the detection limit and flagged "UJ".

All surrogate recovery results were acceptable.

3.6 PRECISION

The precision is expressed by the RPD between the recoveries of the matrix spike and the matrix spike duplicate analyses performed on a sample, and through a comparison of the results for field duplicate samples. Acceptable RPD control windows for matrix spike/matrix spike duplicate analyses have been established by the EPA CLP protocol.

Field precision is measured by analyzing duplicate samples taken in the field. No standards have been established for qualifying data based on RPD for duplicate field samples by CLP

protocols. Westinghouse-Hanford procedures establish the following criteria for duplicate field sample analyses for organic compounds, based on criteria established for inorganic analyses for laboratory duplicates:

1. For compounds whose concentrations are greater than 5 times CRQL, RPDs must be ±20 percent for aqueous samples and ±35 percent for soil samples.

2. When one or more compounds are present at concentrations less than 5 times CRQL, the concentration difference must be ± CRQL for aqueous samples and ± 2xCRQL for soil samples.

All matrix spike/matrix spike duplicate RPD results were acceptable.

3.7 INTERNAL STANDARDS PERFORMANCE

Internal standard performance was assessed to determine whether abrupt changes in instrument response and sensitivity occurred that may have affected the reliability of the analytical data. The response (area or height) of the internal standards must not vary by more than -50 percent or +100 percent from the response of the calibration standard that was used to calculate the upper and lower bounds. The upper and lower bounds define the range for acceptable internal standard response (area/height) for the sample analyses. In addition, retention times for the internal standard must not vary more than ±30 seconds from that of the associated calibration standard.

The internal standard recovery result did not meet QC limits for internal standard compound perylene-d12. All associated results for sample number B09771 in SDG No. B09771 were qualified as estimates and flagged "J".

All other internal standard results were acceptable.

3.8 COMPOUND IDENTIFICATION AND QUANTITATION

The identities of detected compounds were confirmed to investigate the possibility of false positives. The confirmation of compound identification during the QA review focuses on false positives because only mass spectra for positive identifications are submitted. However, target compounds that are reported as undetected are also evaluated to investigate the possibility of false negatives. Confirmation of possible false negatives is addressed by reviewing other factors relating to analytical sensitivity (e.g., detection limits, linearity, analytical recovery). Compound retention times and mass spectra must match those for the standard within set to tolerance limits (EPA 1988b).

3.8.1 Reported Results and Quantitation Limits

Compound quantitations and reported detection limits were recalculated and verified to ensure that they are accurate and are consistent with the internal standards and relative retention times specified by the CLP scope of work.

At concentrations below the CRQL, instrument precision becomes more variable as the IDL is approached. Therefore, the concentrations of any compound detected below the CRQL are qualified as estimates.

All compound identifications and quantitations have been verified as correct in the validated data.

3.8.2 Tentatively Identified Compounds

Chromatographic peaks may be present in an analysis that are not TCL analytes, surrogates, or internal standards and are considered TIC.

The validator verified that spectral library searches were conducted for at least 20 or less candidate TIC. All compounds, including common laboratory contaminants present in the blanks using Westinghouse-Hanford blank review criteria, were qualified as non-detects and flagged "U".

3.9 OVERALL ASSESSMENT AND SUMMARY

A thorough review of ongoing data acquisition and instrument performance criteria was made to assess overall GC/MS instrument performance. No changes in instrument performance were noted that would result in the degradation of data quality. No indications of unacceptable instrument performance (i.e., shifts in baseline stability, retention time shifts, extraneous peaks, sensitivity) were found during the quality assurance review.

In general, the semivolatile data presented in this report met the protocol-specified QA/QC requirements. Minor blank contamination was noted in one sample. The internal standard results for one standard in one sample did not meet QC limits. All associated results were qualified as estimates. The 7-day extraction holding period was exceeded by one day for one sample. All associated results were qualified as estimates. Data qualified as estimates are considered to be usable for limited purposes only. All other validated data are considered valid and usable within the standard error associated with the method.

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5.0 WET CHEMISTRY DATA VALIDATION

5.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and checked for completeness.

B09F20 B09769 B09771 B097C7

The incorrect analysis method was used for the nitrate-nitrite analysis of one sample in SDG No. B09771. The chain of custody requested analysis of nitrate-nitrite by EPA method 353.1. The laboratory performed the analysis of nitrite and nitrate, separately by IC, using EPA method 300.0. The sample results were validated according to method 300.0.

5.2 HOLDING TIMES

Analytical holding times for chloride, fluoride, nitrite, nitrate, nitrate-nitrite, phosphate, sulfate and pH were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: twenty-eight days for chloride, fluoride, nitrate-nitrite and sulfate, seventy-two hours for pH and forty-eight hours for nitrite, nitrate and phosphate.

The holding time was exceeded and the associated result was flagged "J" for nitrite in the following sample.

- Sample number B09771 in SDG No. B09771.

The holding time was exceeded and the associated result was flagged "J" for nitrate in the following sample.

- Sample number B09771 in SDG No. B09771.

The holding time was exceeded and the associated results were flagged "J" for phosphate in the following samples.

- Sample numbers B09F20, B09F21, B09F22, B09F23, B09F24, B09F25 and B09F28 in SDG No. B09F20.
- Sample numbers B09769 and B09770 in SDG No. B09769.
- Sample number B09771 in SDG No. B09771.
- Sample number B097C7 in SDG No. B097C7.

The holding time was exceeded and the associated results were flagged "J" for pH in the following samples.

- Sample numbers B09769 and B09770 in SDG No. B09769.

Holding times for all other results reviewed met QC requirements.

5.3 CALIBRATIONS

5.3.1 Initial Calibration

The following calibration procedures must be conducted:

- At least a blank and three standards were used to establish the ion chromatography, ion selective electrode, spectrophotometer, calibrations prior to sample analysis and the correlation was $\geq$0.995.

Instrument calibration was not performed on the day of analysis for chloride, fluoride, phosphate and sulfate analytes in two data packages. For samples in SDG No. B09F20 instrument calibration was performed on 11/16/93 and analysis on 11/23/93, for samples in SDG No. B09769 instrument calibration was performed on 8/28/93 and analysis on 10/5/93. A standard was, however, analyzed at the beginning of the analysis run to verify that the instrument was still within the calibration range. A discrepancy exists between the Westinghouse-Hanford data validation guidelines and the data validation checklist as to what actions should be taken by the data validator. The guidelines (pg. 61, section 9.3) state that the data validator is required to "... ensure that the laboratory has calibrated the instruments and other ancillary equipment as required by the approved laboratory SOP." The instructions given on the checklist (pg. A7-2 #3) however, require that all data be qualified as unusable (R) if instruments were not calibrated daily. Not all instruments require daily calibration provided that they can be verified as calibrated (i.e., analysis of a standard). Review of the laboratory SOPs for each instrument would be required to determine whether daily calibration was required. Therefore, in cases where instruments were not calibrated on the day of analysis but were verified as calibrated, associated results have been qualified as estimates and flagged "J".

Insufficient instrument calibrations were performed for chloride, fluoride, phosphate and sulfate analyses and the associated results were flagged "J" in the following samples.

- Sample numbers B09F20, B09F21, B09F22, B09F23, B09F24, B09F25 and B09F28 in SDG No. B09F20.

- Sample numbers B09769 and B09770 in SDG No. B09769.

All initial calibration verification results were acceptable.

5.3.2 Continuing Calibration Verification

All CCV standards must be analyzed with the required frequency or every 20 samples. The percent recoveries must fall within the 90-110% acceptance windows.

Continuing calibration verifications were not analyzed at the proper frequency for chloride, fluoride, phosphate and sulfate analyses in SDG No. B09769. Only final CCVs were provided in this data package, associated results have been qualified as estimates and flagged "J" in the following samples.

- Sample numbers B09769 and B09770 in SDG No. B09769.

CCVs whose results fell outside the 90-110% QC criteria had their associated results qualified as estimates and flagged "J".

The CCV percent recovery fell below the 90% acceptance limit and the associated results were flagged "J" for nitrate-nitrite in the following samples.

- Sample numbers B09F20, B09F21, B09F22, B09F23 and B09F24 in SDG No. B09F20.

All other continuing calibration results were acceptable.

5.4 BLANKS

One laboratory preparation blank is analyzed at a frequency of one every 20 samples. All blank results must fall below the CRQL and if not, all associated data <5 times the amount found in the blank is qualified as non-detected and flagged "U".

All laboratory blank results were acceptable.

5.5 ACCURACY

5.5.1 Matrix Spike Recovery

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must generally fall within the range of 75 to 125 percent. Samples with a spike recovery of less tha 30% and a sample value below the IDL were rejected and flagged "R". All other samples with a spike recovery outside the QC limits are qualified as estimates and flagged "J".

The matrix spike recovery fell outside the QC limits and the associated results were flagged "J" for fluoride in the following samples:

- Sample numbers B09769 and B09770 in SDG No. B09769.
- Sample number B097C7 in SDG No. B097C7.

All other matrix spike results were acceptable.

5.5.2 Laboratory Control Sample Recovery

The LCS monitors the overall performance of the analysis, including the sample preparation. An LCS should be prepared (e.g., digested or distilled) and analyzed with every group of samples which have been prepared together. The performance criteria for solid LCS samples are established through interlaboratory studies coordinated by a certifying agency (e.g., EPA or an independent commercial supplier).

All LCS results were found to be acceptable.

5.6 PRECISION

Analytical duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Field duplicate analyses are used to measure both the laboratory and the field sampling procedure precision.

All duplicate analyses results were acceptable for this data.

5.7 ANALYTE QUANTITATION AND DETECTION LIMITS

Sample results and reported detection limits were recalculated to ensure that the reported results were accurate. Raw data were examined for anomalies, transcription errors, and reduction errors. In addition, the reviewer verified that the results fell within the linear range of the instrument.

5.8 OVERALL ASSESSMENT AND SUMMARY

A review of instrument continuing calibration information and QC data indicate that instrument performance was adequate for all analyses. The holding times for nitrite, nitrate and pH for all samples in one data package and for phosphate for all samples in all data packages were exceeded and all associated results were qualified as estimates and flagged "J". Insufficient instrument calibration data was provided for chloride, fluoride, phosphate and sulfate analyses in two data packages and all associated results were qualified as estimates and flagged "J".

Continuing calibration verifications were not analyzed at the proper frequency for chloride, fluoride, phosphate and sulfate analyses in one data package and all associated results were qualified as estimates and flagged "J". The CCV percent recovery fell below the 90% acceptance limit for nitrate-nitrite and phosphate analyses in one data package and all associated results were qualified as estimates and flagged "J". The matrix spike percent recovery was exceeded for fluoride for all samples in one data package and all associated results were qualified as estimates and flagged "J". The incorrect method was used for nitrate-nitrite analysis in one data package. Roy F. Weston analyzed for nitrite and nitrate, separately by IC, using EPA method 300.0. The chain of custody requested nitrate-nitrite (N03N02) analysis using EPA method 353.1. Associated sample results could only be validated for nitrite and nitrate under EPA method 300.0.

Results that are qualified as estimates are usable for limited purposes. All other results are considered accurate within the standard error associated with the methods.

WET CHEMISTRY/ANIONS ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																			
Laboratory: TMA																			
Case	SDG: B09F20																		
Sample Number		B09F20		B09F21		B09F22		B09F23		B09F24		B09F25		B09F28		B09LD4		B09LD5		B09LD6	
Location		W2/S2		00		N3		N3+5'N		W2/S2+10'		S2		EB		*NA		*NA		*NA	
Remarks		*18 FT		*18 FT		*18 FT		*14 FT		*14 FT		*26 FT		Equip.Blk		NV		NV		NV	
Sample Date		11/10/93		11/10/93		11/10/93		11/10/93		11/10/93		11/10/93		11/11/93		11/11/93		11/11/93		11/11/93	
Analytes	Method	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chloride	300.0	13.6	J	13.8	J	14.3	J	14.1	J	18.3	J	6.8	J	7.2	J	37.7		505		38.8	
Fluoride	300.0	71.0	J	47.5	J	43.5	J	5.7	J	6.5	J	0.9	J	0.5	J	1.1		125		1.2	
Phosphate	300.0	2.6	J	2.0	UJ	2.0	J	2.0	UJ	2.0	UJ	2.0	UJ	2.0	UJ	2.0	U	2.0	U	2.0	U
Sulfate	300.0	120	J	76	J	78	J	29	J	49	J	9	J	5	J	74		137		72	

*=Depth, EB=Equipment Blank, NV=Not Validated, *NA=Not Available

WET CHEMISTRY/ANIONS ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD					
Laboratory: TMA					
Case	SDG: B09F20				
Sample Number		B09LD7		B09LD8	
Location		*NA		*NA	
Remarks		NV		NV	
Sample Date		11/11/93		11/11/93	
Analytes	Method	Result	Q	Result	
Chloride	300.0	36.7		38.7	
Fluoride	300.0	2.7		27.0	
Phosphate	300.0	2.0	U	2.0	U
Sulfate	300.0	65		119	

*=Depth, EB=Equipment Blank, NV=Not Validated, *NA=Not Available

HOLDING TIME SUMMARY

SDG: B09F20	REVIEWER: LM			DATE: 2/8/94		PAGE 1 OF 1	
COMMENTS:							
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09F20	Phosphate	11/10/93		11/23/93		2 Days	J
B09F21	Phosphate	11/10/93		11/23/93		2 Days	J
B09F22	Phosphate	11/10/93		11/23/93		2 Days	J
B09F23	Phosphate	11/10/93		11/23/93		2 Days	J
B09F24	Phosphate	11/10/93		11/23/93		2 Days	J
B09F25	Phosphate	11/10/93		11/23/93		2 Days	J
B09F28	Phosphate	11/11/93		11/23/93		2 Days	J

CALIBRATION DATA SUMMARY

SDG: B09F20	REVIEWER: LM		DATE: 2/8/94		PAGE 1 OF 1
COMMENTS:					
CALIB. TYPE:	INITIAL CONTINUING		INSTRUMENT:		
CALIB. DATE	COMPOUND	RF	RSD/%D/%R	SAMPLES AFFECTED	QUALIFIER
11/23/93	Phosphate		89.0	B09F20, B09F21, B09F22, B09F23, B09F24, B09F25, B09F28	J
11/23/93	Phosphate		86.4	B09F20, B09F21, B09F22, B09F23, B09F24, B09F25, B09F28	J
11/23/93	Phosphate		86.6	B09F20, B09F21, B09F22, B09F23, B09F24, B09F25, B09F28	J

DATA QUALIFICATION SUMMARY

SDG: B09F20	REVIEWER: LM	DATE: 2/8/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Phosphate	J	B09F20, B09F21, B09F22, B09F23, B09F24, B09F25, B09F28	Holding Time Exceeded
Phosphate	J	B09F20, B09F21, B09F22, B09F23, B09F24, B09F25, B09F28	CCV <90% R
Chloride	J	B09F20, B09F21, B09F22, B09F23, B09F24, B09F25, B09F28	Different Calibration and Analysis Dates
Fluoride	J	B09F20, B09F21, B09F22, B09F23, B09F24, B09F25, B09F28	Different Calibration and Analysis Dates
Phosphate	J	B09F20, B09F21, B09F22, B09F23, B09F24, B09F25, B09F28	Different Calibration and Analysis Dates
Sulfate	J	B09F20, B09F21, B09F22, B09F23, B09F24, B09F25, B09F28	Different Calibration and Analysis Dates

WET CHEMISTRY/ANIONS ANALYSIS, SOIL MATRIX, (mg N/kg)

Project: WESTINGHOUSE-HANFORD																					
Laboratory: TMA																					
Case	SDG: B09F20																				
Sample Number		B09F20		B09F21		B09F22		B09F23		B09F24		B09F25		B09F28		B09LD4		B09LD5		B09LD6	
Location		W2/S2		00		N3		N3+5'N		W2/S2+10'		S2		EB		*NA		*NA		*NA	
Remarks		*18 FT		*18 FT		*18 FT		*14 FT		*14 FT		*26 FT		Equip.Blk		NV		NV		NV	
Sample Date		11/10/93		11/10/93		11/10/93		11/10/93		11/10/93		11/10/93		11/11/93		11/11/93		11/11/93		11/11/93	
Analytes	Method	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
N03N02	353.2	2.60	UJ	2.56	UJ	2.56	UJ	2.57	UJ	2.72	UJ	2.57	UJ	2.45	UJ	2.50	U	2.44	U	7.63	

*=Depth, EB=Equipment Blank, NV=Not Validated, *NA=Not Available

WET CHEMISTRY/ANIONS ANALYSIS, SOIL MATRIX, (mg N/kg)

Project: WESTINGHOUSE-HANFORD					
Laboratory: TMA					
Case	SDG: B09F20				
Sample Number		B09LD7		B09LD8	
Location		*NA		*NA	
Remarks		NV		NV	
Sample Date		11/11/93		11/11/93	
Analytes	Method	Result	Q	Result	
N03N02	353.2	10.3		9.44	

*=Depth, EB=Equipment Blank, NV=Not Validated, *NA=Not Available

CALIBRATION DATA SUMMARY

SDG: B09F20	REVIEWER: LM		DATE: 2/9/94		PAGE 1 OF 1
COMMENTS:					
CALIB. TYPE:	INITIAL	CONTINUING	INSTRUMENT:		
CALIB. DATE	COMPOUND	RF	RSD/%D/%R	SAMPLES AFFECTED	QUALIFIER
12/2/93	N03N02		89.4	B09F20, B09F21, B09F22, B09F23, B09F24	J

DATA QUALIFICATION SUMMARY

SDG: B09F20	REVIEWER: LM	DATE: 2/8/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
N03N02	J	B09F20, B09F21, B09F22, B09F23, B09F24	CCV <90% R

WET CHEMISTRY/ANIONS ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																			
Laboratory: TMA																			
Case	SDG: B09769																		
Sample Number		B09769		B09770															
Location		LIFT 1		LIFT 1															
Remarks		CS		Duplicate															
Sample Date		9/22/93		9/22/93															
Analytes	Method	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chloride	300.0	7.1	J	6.6	J														
Fluoride	300.0	2.8	J	2.7	J														
Phosphate	300.0	3.3	J	3.3	J														
Sulfate	300.0	21	J	21	J														
pH (pH units)	9045	8.9	J	9.0	J														

CS=Clean Spoils

HOLDING TIME SUMMARY

SDG: B09769	REVIEWER: LM			DATE: 2/8/94		PAGE 1 OF 1	
COMMENTS:							
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09769	Phosphate	9/22/93		10/5/93		2	J
B09770	Phosphate	9/22/93		10/5/93		2	J
B09769	pH	9/22/93		9/28/93		3	J
B09770	pH	9/22/93		9/28/93		3	J

ACCURACY DATA SUMMARY

SDG: B09769	REVIEWER: LM	DATE: 2/8/94	PAGE 1 OF 1	
COMMENTS:				
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B09769MS	Fluoride	50.0	B09769, B09770	J

DATA QUALIFICATION SUMMARY

SDG: B09769	REVIEWER: LM	DATE: 2/8/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Phosphate	J	B09769, B09770	Holding Time Exceeded
pH	J	B09769, B09770	Holding Time Exceeded
Chloride	J	B09769, B09770	Different Calibration and Analysis Dates
Fluoride	J	B09769, B09770	Different Calibration and Analysis Dates
Phosphate	J	B09769, B09770	Different Calibration and Analysis Dates
Sulfate	J	B09769, B09770	Different Calibration and Analysis Dates
Chloride	J	B09769, B09770	Incomplete CCV Information
Fluoride	J	B09769, B09770	Incomplete CCV Information
Phosphate	J	B09769, B09770	Incomplete CCV Information
Sulfate	J	B09769, B09770	Incomplete CCV Information
Fluoride	J	B09769, B09770	Matrix Spike

WET CHEMISTRY/ANIONS ANALYSIS, SOIL MATRIX, (mg N/Kg)

Project: WESTINGHOUSE-HANFORD																			
Laboratory: TMA																			
Case	SDG: B09769																		
Sample Number		B09769		B09770															
Location		LIFT 1		LIFT 1															
Remarks		CS		Duplicate															
Sample Date		9/22/93		9/22/93															
Analytes	Method	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
N03N02	353.2	11.7		11.2															

CS=Clean Spoils

WET CHEMISTRY/ANIONS ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																			
Laboratory: Roy F. Weston																			
Case	SDG: B09771																		
Sample Number		B09771																	
Location		LIFT 1																	
Remarks		Split																	
Sample Date		9/22/93																	
Analytes	Method	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chloride	300.0	12.3																	
Fluoride	300.0	3.1																	
Nitrite	300.0	1.3	UJ																
Nitrate	300.0	29.8	J																
Phosphate	300.0	7.7	J																
Sulfate	300.0	21.0																	

HOLDING TIME SUMMARY

SDG: B09771	REVIEWER: LM			DATE: 2/9/94		PAGE 1 OF 1	
COMMENTS:							
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09771	Nitrite	9/22/93		9/30/93		2	J
B09771	Nitrate	9/22/93		9/30/93		2	J
B09771	Phosphate	9/22/93		9/30/93		2	J

DATA QUALIFICATION SUMMARY

SDG: B09771	REVIEWER: LM	DATE: 2/9/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Nitrite	J	B09771	Holding Time Exceeded
Nitrate	J	B09771	Holding Time Exceeded
Phosphate	J	B09771	Holding Time Exceeded

WET CHEMISTRY/ANIONS ANALYSIS, SOIL MATRIX, (mg/Kg)

Project: WESTINGHOUSE-HANFORD																			
Laboratory: TMA																			
Case	SDG: B097C7																		
Sample Number		B097C7																	
Location		CS LIFT 6																	
Remarks																			
Sample Date		10/21/93																	
Analytes	Method	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chloride	300.0	55.8																	
Fluoride	300.0	1.5	J																
Phosphate	300.0	2.0	UJ																
Sulfate	300.0	17																	

CS = Clean Spoils

HOLDING TIME SUMMARY

SDG: B097C7	REVIEWER: SC			DATE: 2/10/94		PAGE 1 OF 1	
COMMENTS:							
FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B097C7	Phosphate	10/21/93		11/02/93		2	J

ACCURACY DATA SUMMARY

SDG: B097C7	REVIEWER: SC	DATE: 2/10/94	PAGE 1 OF 1	
COMMENTS:				
SAMPLE ID	COMPOUND	% RECOVERY	SAMPLE(S) AFFECTED	QUALIFIER REQUIRED
B097C7MS	Fluoride	46	B097C7	J

DATA QUALIFICATION SUMMARY

SDG: B097C7	REVIEWER: SC	DATE: 2/10/94	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Phosphate	J	B097C7	Holding Times Exceeded
Fluoride	J	B097C7	Matrix Spike

WET CHEMISTRY/ANIONS ANALYSIS, SOIL MATRIX, (mg N/Kg)

Project: WESTINGHOUSE-HANFORD																			
Laboratory: TMA																			
Case	SDG: B097C7																		
Sample Number		B097C7																	
Location		CS LIFT 6																	
Remarks																			
Sample Date		10/21/93																	
Analytes	Method	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
N03N02	353.2	3.08																	

CS = Clean Spoils

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WELL AND SAMPLE INFORMATION					SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	NV/V	RADIOCHEMISTRY
00	B09F21	S	11/10/93	V	9-4
CS LIFT 1	B09769	S	09/22/93	V	9-5
	B09770	S	09/22/93	V	9-5
	B09771	S	09/22/93	V	9-6
CS LIFT 6	B097C7	S	10/21/93	V	9-7
N3	B09F22	S	11/10/93	V	9-4
N3+5'N	B09F23	S	11/10/93	V	9-4
S2	B09F25	S	11/10/93	V	9-4
W2/S2	B09F20	S	11/10/93	V	9-4
W2/S2+10'W	B09F24	S	11/10/93	V	9-4
EB	B09F28	S	11/11/93	V	9-4

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6.0 ALPHA SPECTROSCOPY DATA VALIDATION

6.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and found to be complete:

B09F20 B09769 B09771 B097C7

6.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

6.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the alpha spectroscopy system used is capable of producing acceptable and reliable analytical data. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible. The calibration consists of an instrument efficiency determination for each alpha radionuclide region of interest, and a system resolution assessment as measured by the full-width at half maximum for each peak.

Due to the lack of information regarding the date of the reported continuing calibration efficiency checks, all isotopic uranium, plutonium and americium results in SDG No. B09769 were qualified as estimates and flagged "J"

All missing data were requested but were not available.

All other calibration results, including efficiency checks and background counts, were acceptable.

6.4 ACCURACY

Accuracy was evaluated by analyzing soil or distilled water samples spiked with known amounts of alpha emitting radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample recovery range is 70 to 130 percent, while that for a matrix spike is 60 to 140 percent.

Spike sample results outside the above ranges resulted in associated sample results being qualified as estimated, rejected, or left unchanged, depending on the activity of the individual sample. A chemical tracer is used to determine the efficiency of the analytical method, with tracer yield limits of 20 to 105 percent. Sample results with chemical yields outside the above stated limits were qualified as estimated or rejected depending on sample activity.

Due to a low LCS percent recovery (58%), the uranium-235 result in sample number B09771 in SDG No. B09771 was qualified as an estimate and flagged "J".

Due to the lack of an LCS analysis, all plutonium-238 results in SDG Nos. B09F20, B09769, and B097C7 were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

6.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate samples. Duplicates with activities greater than five times the RDL and with an RPD less than 35 percent for soil samples and 20 percent for water samples are acceptable. If duplicate activities are both <5xRDL, a control limit of <2xRDL is used for soil samples and <RDL for water samples. If duplicate values are both below the RDL, no control limit is applicable.

All precision results were acceptable.

6.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicated the presence of an analyte above the MDA, the following qualifiers were applied: All positive sample results less than five times the blank concentration were qualified as estimates and flagged "J"; sample results below the MDA were elevated to the MDA and qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the blank concentration were not qualified.

All blank results were acceptable.

6.7 ANALYTE QUANTITATION AND REPORTED DETECTION LIMITS

Analyte quantitations and detection limits were recalculated for all samples in each data delivery package to verify their accuracy.

All analyte quantitation and reported detection limits were acceptable.

6.8 OVERALL ASSESSMENT AND SUMMARY

A complete review of all QC and calibration data indicates that overall system performance was adequate. All isotopic uranium, plutonium and americium results in SDG No. B09769 were qualified as estimates and flagged "J" due to a lack of information about the date of the reported continuing calibration efficiency checks. Due to a low LCS percent recovery, the uranium-235 result in sample number B09771 in SDG No. B09771 was qualified as an estimate and flagged "J". Due to the lack of an LCS analysis, all plutonium-238 results in SDG Nos. B09F20, B09769 and B097C7 were qualified as estimates and flagged "J". Data qualified as estimates are valid and usable for limited purposes only. All other QC data are valid and usable for all purposes.

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7.0 GAMMA SPECTROSCOPY DATA VALIDATION

7.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and found to be complete:

B09F20 B09769 B09771 B097C7

7.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

7.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the gamma spectroscopy system used is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturer's recommendations and consists of an instrument efficiency determination for each gamma radionuclide region of interest, and a system resolution assessment as measured by the full-width at half maximum for each peak. Initial calibration was performed for each counting geometry used during the analysis of Westinghouse-Hanford samples. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible.

The continuing calibration check standards were not counted on the same geometries used for sample analysis; therefore, all gamma spectroscopy results in SDG No. B09771 were qualified as estimates and flagged "J".

Due to a lack of annual calibration data for Gamma Spectroscopy Liquid Marinelli Detector #3, results for sample numbers B09F21 and B09F25 in SDG No. B09F20 were rejected and flagged "R".

All missing data were requested but were not available.

All other calibration, including efficiency checks and background counts results were acceptable.

7.4 ACCURACY

Accuracy was evaluated by analyzing soil or distilled water samples spiked with known amounts of gamma emitting radionuclides. The sample activity as determined by sample analysis is compared to the known activity to assess accuracy. The acceptable spiked recovery range is 70 to 130 percent. If spiked sample results were outside this range, the associated sample results were qualified as estimated, rejected or left unchanged, depending on the sample activity.

All accuracy results were acceptable.

7.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Duplicates with activities greater than five times the RDL and with an RPD less than 35 percent for soil samples and 20 percent for water samples are acceptable. If duplicate activities are both <5xRDL, a control limit of <2xRDL is used for soil samples and <RDL for water samples. If duplicate values are both below the RDL, no control limit is applicable.

All precision results were acceptable.

7.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results may be due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicated the presence of an analyte above the MDA, the following qualifiers were applied: All positive sample results less than five times the blank concentration were qualified as estimates and flagged "J"; sample results below the MDA were elevated to the MDA and qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the blank concentration were not qualified.

All blank results were acceptable.

7.7 ANALYTE QUANTITATION AND REPORTED DETECTION LIMITS

Analyte quantitations and detection limits were recalculated for all samples in each data delivery package to verify their accuracy.

The reported MDA values for the following samples were above the RDL:

- Cobalt-60 and cesium-137 results in SDG No. B09769.
- All iron-59 results in SDG Nos. B09F20, B09769, B09771 and B097C7.

All other analyte quantitation and reported detection limits were acceptable.

7.8 OVERALL ASSESSMENT AND SUMMARY

A review of instrument continuing calibration information and QC data indicates that instrument performance was adequate for these analyses. The continuing calibration check standards were not counted on the same geometries used for sample analysis; therefore, all gamma spectroscopy results in SDG No. B09771 were qualified as estimates and flagged "J". The reported MDA values for cobalt-60 and cesium-137 in SDG No. B09769 and all iron-59 results in SDG Nos. B09F20, B09769, B09771 and B097C7 were above the RDL. Data qualified as estimates are valid and usable for limited purposes only. Due to a lack of annual calibration data for Gamma Spectroscopy Liquid Marinelli Detector #3, results for sample numbers B09F21 and B09F25 in SDG No. B09F20 were rejected and flagged "R". Rejected data are invalid and unusable for any purpose and should not be reported. All other QC data are usable and valid for all purposes.

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8.0 STRONTIUM-90 DATA VALIDATION

8.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and found to be complete:

B09F20	B09769	B09771	B097C7

8.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

8.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the low background counting system used for strontium-90 determination is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturer's recommendations and consists of an instrument counting system efficiency determination. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible.

The reported background counts were taken more than one week prior to sample analysis; therefore, all strontium-90 results in SDG No. B09769 were rejected and flagged "R".

All other calibration results, including efficiency checks and background counts, were acceptable.

8.4 ACCURACY

Accuracy was evaluated by analyzing soil or distilled water samples spiked with known amounts of beta emitting radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample recovery range is 70 to 130 percent, while that for a matrix spike is 60 to 140%. Spike sample results outside the above ranges resulted in associated sample results being qualified as estimated, rejected, or left unchanged, depending on the activity of the individual sample. A chemical tracer is used

to determine the efficiency of the analytical method, with tracer yield limits of 30 to 105%. Sample results above the MDA with chemical yields outside the above stated limits were qualified as estimated or rejected.

All accuracy results were acceptable.

8.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Duplicates with activities greater than five times the RDL and with an RPD less than 35 percent for soil samples and 20 percent for water samples are acceptable. If duplicate activities are both <5xRDL, a control limit of <2xRDL is used for soil samples and <RDL for water samples. If duplicate values are both below the RDL, no control limit is applicable.

All precision results were acceptable.

8.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results may be due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicated the presence of an analyte above the MDA, the following qualifiers were applied: All positive sample results less than five times the blank concentration were qualified as estimates and flagged "J"; sample results below the MDA were elevated to the MDA and qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the blank concentration were not qualified.

All blank results were acceptable.

8.7 ANALYTE QUANTITATION AND REPORTED DETECTION LIMITS

Analyte quantitation and detection limits were recalculated for all samples in each data delivery package to verify their accuracy.

All analyte quantitation and reported detection limits were acceptable.

8.8 OVERALL ASSESSMENT AND SUMMARY

A review of instrument continuing calibration information and QC data indicates that instrument performance was adequate

for these analyses. All strontium-90 results in SDG No. B09769 were rejected and flagged "R" due to the reported background counts being taken more than one week prior to sample analysis. Rejected data are invalid and unusable for any purpose and should not be reported. All other QC data are valid and usable for all purposes.

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9.0 TECHNETIUM-99 DATA VALIDATION

9.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted for validation and found to be complete:

B09F20 B09769 B09771 B097C7

9.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

9.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the low background counting system used for technetium-99 determination is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturer's recommendations and consists of an instrument counting system efficiency determination. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible.

All calibration results, including efficiency checks and background counts, were acceptable.

9.4 ACCURACY

Accuracy was evaluated by analyzing soil or distilled water samples spiked with known amounts of beta emitting radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample recovery range is 70 to 130 percent, while that for a matrix spike is 60 to 140%. Spike sample results outside the above ranges resulted in associated sample results being qualified as estimated, rejected, or remaining unchanged, depending on the activity of the individual sample. A chemical tracer is used to determine the efficiency of the analytical method, with tracer yield limits of 30 to 105%. Sample results with chemical yields outside the above stated limits were qualified as estimated or rejected depending on sample activity.

Due to low chemical yields (<30%), technetium-99 results for samples numbers B09F22, B09F24 and B09F25 in SDG No. B09F20 were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

9.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Duplicates with activities greater than five times the RDL and with an RPD less than 35 percent for soil samples and 20 percent for water samples are acceptable. If duplicate activities are both <5xRDL, a control limit of <2xRDL is used for soil samples and <RDL for water samples. If duplicate values are both below the RDL, no control limit is applicable.

All precision results were acceptable.

9.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results may be due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicated the presence of an analyte above the MDA, the following qualifiers were applied: All positive sample results less than five times the blank concentration were qualified as estimates and flagged "J"; sample results below the MDA were elevated to the MDA and qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the blank concentration were not qualified.

All blank results were acceptable.

9.7 ANALYTE QUANTITATION AND REPORTED DETECTION LIMITS

Analyte quantitation and detection limits were recalculated for all samples in each data delivery package to verify their accuracy.

The MDA value for technetium-99 was above the RDL for sample number B09F24 in SDG No. B09F20 and for sample number B09771 in SDG No. B09771.

All other analyte quantitation and reported detection limits were acceptable.

9.8 OVERALL ASSESSMENT AND SUMMARY

A review of instrument continuing calibration information and QC data indicates that instrument performance was adequate for these analyses. Due to low chemical yields (<30%), technetium-99 results for samples numbers B09F22, B09F24 and B09F25 in SDG No. B09F20 were qualified as estimates and flagged "J". The MDA value for technetium-99 for two samples were above the RDL. Data qualified as estimates are considered usable for limited purposes only. All other QC data are valid and usable for all purposes.

Project: WESTINGHOUSE-HANFORD																					
Laboratory: TMA																					
Case	SDG: B09F20																				
Sample Number	B09F20		B09F21		B09F22		B09F23		B09F24		B09F25		B09F28								
Location	W2/S2		00		N3		N3+5'N		W2/S2+10'W		S2		EB								
Remarks	*18 FT		*18 FT		*18 FT		*14 FT		*14 FT		*26 FT		Equip Blk								
Sample Date	11/10/93		11/10/93		11/10/93		11/10/93		11/10/93		11/10/93		11/11/93								
Radiochemistry Analytes	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	
Strontium-90	0.077	U	0.70	U	0.063	U	-0.051	U	0.19	U	0.016	U	0	U							
Technetium-99	0.043	U	0.18	U	0.20	UJ	0.11	U	0.14	UJ	0.32	UJ	0.089	U							
Uranium-233/234	0.50		0.65		0.45		0.36		0.45		0.37		0.095	U							
Uranium-235	0.010	U	0.066	J	0.042	J	0.013	U	0.024	U	0.072	U	0.058	U							
Uranium-238	0.42		0.56		0.44		0.44		0.54		0.43		0.048	U							
Plutonium-238	-0.006	UJ	0	UJ	-0.003	UJ	0.003	UJ	0.009	UJ	-0.014	UJ	0.003	UJ							
Plutonium-239/240	0.009	U	0.074		0.013	U	0.003	U	0.003	U	0	U	-0.003	U							
Americium-241	-0.004	U	0.027	U	-0.004	U	0.009	U	0.008	U	0.007	U	0.004	U							
Sodium-22	N/D	U	N/D	R	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U							
Potassium-40	15		14	R	16		16		16		14	R	0.56								
Manganese-54	N/D	U	N/D	R	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U							
Iron-59	N/D	U	N/D	R	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U							
Cobalt-58	N/D	U	N/D	R	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U							
Cobalt-60	N/D	U	N/D	R	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U							
Niobium-94	N/D	U	N/D	R	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U							
Ruthenium-103	N/D	U	N/D	R	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U							
Ruthenium-106	N/D	U	N/D	R	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U							
Tin-113	N/D	U	N/D	R	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U							
Cesium-134	N/D	U	N/D	R	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U							
Cesium-137	0.34		1.8	R	0.38		N/D	U	N/D	U	N/D	R	N/D	U							
Cerium-144	N/D	U	N/D	R	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U							
Europium-152	N/D	U	N/D	R	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U							
Europium-154	N/D	U	N/D	R	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U							
Europium-155	N/D	U	N/D	R	N/D	U	N/D	U	N/D	U	N/D	R	N/D	U							
Radium-226	0.43		0.42	R	0.49		0.46		0.45		0.31	R	0.12								
Radium-228	0.62		0.58	R	0.71		0.51		0.54		0.51	R	0.21								
Thorium-228	0.93		0.59	R	0.75		0.48		0.54		0.62	R	0.16								
Thorium-232	0.62		0.58	R	0.71		0.51		0.54		0.51	R	0.21								

* = Depth, N/D = Not Detected, EB=Equipment Blank

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (pCi/g+-2 standard deviations)

Project: WESTINGHOUSE-HANFORD																			
Laboratory: TMA																			
Case	SDG: B09769																		
Sample Number	B09769		B09770																
Location	CS LIFT 1		CS LIFT 1																
Remarks			DUP																
Sample Date	09/22/93		09/22/93																
Radiochemistry Analytes	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Strontium-90	0.097	R	-0.11	R															
Technetium-99	0.13	U	0.11	U															
Uranium-233/234	0.44	J	0.58	J															
Uranium-235	0.063	UJ	0	UJ															
Uranium-238	0.53	J	0.41	J															
Plutonium-238	0.003	UJ	0	UJ															
Plutonium-239/240	0.003	UJ	0.003	UJ															
Americium-241	0.007	UJ	-0.004	UJ															
Sodium-22	N/D	U	N/D	U															
Potassium-40	13		13																
Manganese-54	N/D	U	N/D	U															
Iron-59	N/D	U	N/D	U															
Cobalt-58	N/D	U	N/D	U															
Cobalt-60	N/D	U	N/D	U															
Niobium-94	N/D	U	N/D	U															
Ruthenium-103	N/D	U	N/D	U															
Ruthenium-106	N/D	U	N/D	U															
Tin-113	N/D	U	N/D	U															
Cesium-134	N/D	U	N/D	U															
Cesium-137	N/D	U	N/D	U															
Cerium-144	N/D	U	N/D	U															
Europium-152	N/D	U	N/D	U															
Europium-154	N/D	U	N/D	U															
Europium-155	N/D	U	N/D	U															
Radium-226	0.63		0.59																
Radium-228	0.87		0.76																
Thorium-228	0.85		1.0																
Thorium-232	0.87		0.76																

CS = Clean Spoils, DUP = Duplicate, N/D = Not Detected

Project: WESTINGHOUSE-HANFORD																					
Laboratory: TELDYNE																					
Case	SDG: B09771																				
Sample Number	B09771																				
Location	CS LIFT 1																				
Remarks	Split																				
Sample Date	09/22/93																				
Radiochemistry Analytes	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	
Strontium-90	0.049																				
Technetium-99	0.18																				
Beryllium-7	0.010	J																			
Potassium-40	12.9	J																			
Manganese-54	0.0071	J																			
Cobalt-58	0.016	J																			
Iron-59	0.0040	J																			
Cobalt-60	0.039	J																			
Zinc-65	0.0019	J																			
Zirconium-95	0.024	J																			
Ruthenium-103	0.0054	J																			
Ruthenium-106	0.0090	J																			
Iodine-131	0.19	J																			
Cesium-134	0.036	J																			
Cesium-137	0.031	J																			
Barium-140	0.10	J																			
Cerium-141	0.0037	J																			
Cerium-144	0.16	J																			
Europium-152	0.44	J																			
Europium-154	0.0043	J																			
Europium-155	0.048	J																			
Radium-226	0.791	J																			
Thorium-228	0.543	J																			
Thorium-234	0.21	J																			
Uranium-238	0.14																				
Americium-241	0.010																				
Plutonium-239	0.00065																				
Uranium-235	0.0063	J																			

CS = Clean Spoils

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (pCi/g+-2 standard deviations)

Project: WESTINGHOUSE-HANFORD																					
Laboratory: TMA																					
Case	SDG: B097C7																				
Sample Number	B097C7																				
Location	CS LIFT 6																				
Remarks																					
Sample Date	10/21/93																				
Radiochemistry Analytes	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	
Strontium-90	-0.054	U																			
Technetium-99	-0.010	U																			
Uranium-233/234	0.34																				
Uranium-235	0.017	U																			
Uranium-238	0.42																				
Plutonium-238	0.003	UJ																			
Plutonium-239/240	0	U																			
Americium-241	-0.005	U																			
Sodium-22	N/D	U																			
Potassium-40	15																				
Manganese-54	N/D	U																			
Iron-59	N/D	U																			
Cobalt-58	N/D	U																			
Cobalt-60	N/D	U																			
Niobium-94	N/D	U																			
Ruthenium-103	N/D	U																			
Ruthenium-106	N/D	U																			
Tin-113	N/D	U																			
Cesium-134	N/D	U																			
Cesium-137	N/D	U																			
Cerium-144	N/D	U																			
Europium-152	N/D	U																			
Europium-154	N/D	U																			
Europium-155	N/D	U																			
Radium-226	0.37																				
Radium-228	0.67																				
Thorium-228	0.56																				
Thorium-232	0.67																				

CS = Clean Spoils, N/D = Not Detected

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