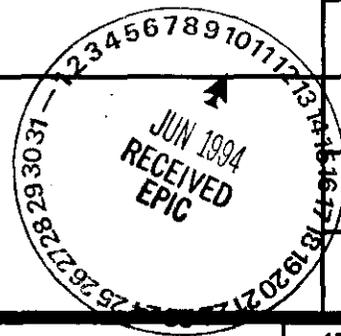


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*Station # 12*

**ENGINEERING DATA TRANSMITTAL**

2. To: (Receiving Organization) <b>Distribution</b>	3. From: (Originating Organization) <b>ER</b>	4. Related EDT No.: <b>N/A</b>
5. Proj./Prog./Dept./Div.:	6. Cog. Engr.: <b>P. J. Valcich</b>	7. Purchase Order No.: <b>N/A</b>
8. Originator Remarks: <b>Release to record file</b>		9. Equip./Component No.: <b>N/A</b>
11. Receiver Remarks:		10. System/Bldg./Facility: <b>N/A</b>
		12. Major Assm. Dwg. No.: <b>N/A</b>
		13. Permit/Permit Application No.: <b>N/A</b>
		14. Required Response Date:



2001/06/16

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Impact Level	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-EN-TI-236		0	Data Validation Report for the 100-IU-1 Operable Unit Riverland ERA Sampling Investigation	N/A	1/2	1	
2	WHC-SD-EN-TI-235		0	Data Validation Report for the 100-IU-4 Operable Unit Sodium Dichromate Barrel ERA Investigation	N/A	1/2	1	

16. KEY		
Impact Level (F)	Reason for Transmittal (G)	Disposition (H) & (I)
1, 2, 3, or 4 (see MRP 5.43)	1. Approval 2. Release 3. Information 6. Dist. (Receipt Acknow. Required)	4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)
		1. Approved 2. Approved w/comment 3. Disapproved w/comment
		4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

(G)	(H)	17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)				(G)	(H)			
Reason	Disp.	(J) Name	(K) Signature (M) MSIN	(L) Date	(J) Name	Date	(K) Signature (M) MSIN	(L)	Reason	Disp.
1/2	1	Cog. Eng. P. J. Valcich	<i>P. J. Valcich</i>	6/1/94	ERC			H6-07	3	
1/2	1	Cog. Mgr. M. J. Lauterbach	<i>M. J. Lauterbach</i>	H6-01	EPIC (2)			H6-08	3	
		QA			Central Files (2)			L8-04	3	
		Safety								
		Env.								

18. <i>P. J. Valcich</i> P. J. Valcich Signature of EDT Originator	6/1/94 Date	19. _____ Authorized Representative Date for Receiving Organization	20. <i>M. J. Lauterbach</i> M. J. Lauterbach Cognizant/Project Engineer's Manager	5/31/94 Date	21. DOE APPROVAL (if required) Ltr. No. <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments
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SUPPORTING DOCUMENT

1. Total Pages <sup>476</sup> 34

2. Title

Data Validation Report for the 100-IU-1 Operable Unit Riverland ERA Sampling Investigation

3. Number

WHC-SD-EN-TI-236<sup>6</sup>

4. Rev No.

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5. Key Words

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6. Author

Name: P. J. Valcich

*P. J. Valcich* 5/20/91  
Signature

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APPROVED FOR  
PUBLIC RELEASE

7. Abstract

5/31/91/D. J. J. J.

WHC, 1994, Data Validation Report for the 100-IU-1 Operable Unit Riverland ERA Sampling Investigation, WHC-SD-EN-TI-236, Rev. 0, prepared by A. T. Kearney, Inc. for Westinghouse Hanford Company, Richland, Washington.

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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), 100% of the total number of Sample Delivery Groups received by A.T. Kearney, Inc. from the 100-IU-1 Operable Unit Riverland ERA Sampling Investigation and their related quality assurance samples, including all field quality control samples, were reviewed and validated to verify that reported sample results were of sufficient quality to meet quality control objectives. However, results from ten additional samples in two data packages, also associated with this unit, were delivered to A.T. Kearney, Inc. by Westinghouse-Hanford. These results, per instructions from Westinghouse-Hanford, have been included in this report as unvalidated data. A.T. Kearney has performed no validation or review of these results, therefore, any extrapolation of the validated results to the unvalidated samples would not be technically sound and is not implied in any way by inclusion of the unvalidated results in this report.

The data reviewed for this report was validated according to Westinghouse-Hanford protocols, Rev. 1, in effect at the initiation of this task.

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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	Dibutylchloroendate
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
GPC	Gel permeation chromatography
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
PBW	Preparation blank water
PCB	Polychlorinated biphenyl
PEM	Performance evaluation mixture
QA	Quality assurance
QC	Quality control
RDL	Required Detection Limit
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
TPH/DRO	Total petroleum hydrocarbons/diesel range organics
V	Validated
VOC	Volatile organic compounds

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1.0 INTRODUCTION

The following samples were obtained from the 100-IU-1 Operable Unit Riverland ERA Sampling event:

B08NP7	B08NR2	B08NR9	B08NT1	B08NT8
B08NQ6	B08NR3	B08NS0	B08NT2	B08NT9
B08NQ7	B08NR4	B08NS6	B08NT3	B08NV0
B08NQ8	B08NR5	B08NS7	B08NT4	B08NV3
B08NQ9	B08NR6	B08NS8	B08NT5	B08NV4
B08NR0	B08NR7	B08NS9	B08NT6	B08NV5
B08NR1	B08NR8	B08NT0	B08NT7	B08NV7

Westinghouse-Hanford originally requested that 100% of the data associated with the 100-IU-1 Operable Unit Riverland ERA Sampling Event be validated. However, the final ten samples (B08NT5, B08NT6, B08NT7, B08NT8, B08NT9, B08NV0, B08NV3, B08NV4, B08NV5 AND B08NV7) were not included in the original request. Per Westinghouse-Hanford instructions, these samples are included in this project as unvalidated samples only. Due to field errors the analysis of sample number B08NS0 was canceled, therefore, there are no results for this sample.

Sample numbers B08NR8 and B08NT4 are field split samples which were erroneously submitted to the same laboratory as the original field samples. Westinghouse-Hanford requested analysis of the samples for "informational purposes only". Therefore, the data from the chemical analysis of twenty-four 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. The samples were analyzed by Thermo-Analytic Laboratories (TMA) and Roy F. Weston Laboratories (WESTON) using U.S. Environmental Protection Agency (EPA) CLP and SW-846 protocols.

Sample analyses included:

- Pesticide/PCB organics
- Herbicides
- Total petroleum hydrocarbons/diesel range organics

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

SDG No.	Matrix	No. of Samples Validated	Parameters
B08NP7	S	4	Pest/PCB, Herbicides
B08NQ8	S	1	Pest/PCB, Herbicides
B08NR0	S	9	TPH/DRO
B08NR3	S	8	TPH/DRO
B08NS8	S	1	TPH/DRO

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.

Two sets of split samples were submitted to TMA and Roy F. Weston Laboratories as shown below:

Set 1:

<u>Sample No.</u>	<u>Split Sample No.</u>	<u>Location</u>
B08NQ6	B08NQ8	139315/554285

Set 2:

<u>Sample No.</u>	<u>Split Sample No.</u>	<u>Location</u>
B08NS6	B08NS8	Drain Ditch

The samples and split samples for both locations were included in the validated data. However, in all cases except for the Pesticide/PCB analyses of sample numbers B08NQ6 and B08NQ8, one or the other set of results were rejected and therefore no comparisons could be made. The pesticide/PCB analyses were compared using the sample guidelines for determining the RPD between a sample and its duplicate. The results were within QC limits and appear in the summary tables within this report.

Two additional sets of split samples were also collected. However, due to field errors, these samples were all sent to TMA for analysis. Therefore, the sample numbers B08NR6 and B08NR8, and B08NT2 and B08NT4 have been included in the discussion of field duplicates below.

Four sets of field duplicate samples were submitted to TMA as shown below.

Set 1:

<u>Sample No.</u>	<u>Duplicate Sample No.</u>	<u>Location</u>
B08NQ6	B08NQ7	139315/554285

Set 2:

<u>Sample No.</u>	<u>Duplicate Sample No.</u>	<u>Location</u>
B08NR6	B08NR7, B08NR8	Drain Ditch

Set 3:

<u>Sample No.</u>	<u>Duplicate Sample No.</u>	<u>Location</u>
B08NS6	B08NS7	Drain Ditch

Set 4:

<u>Sample No.</u>	<u>Duplicate Sample No.</u>	<u>Location</u>
B08NT2	B08NT3, B08NT4	Pad Soil

The duplicate sample results for all locations were included in the validated data. The results were compared using the sample guidelines for determining the RPD between a sample and its duplicate. However, in all cases except for the Pesticide/PCB analyses of sample numbers B08NQ6 and B08NQ8, one or the other set of results were rejected and therefore no comparisons could be made. The pesticide/PCB results were within QC limits and appear in the summary tables within this report.

Two equipment blanks, soil sample numbers B08NP7 and B08NR4, were submitted to TMA for analysis. Under EPA protocol, equipment blanks are water samples used to indicate whether or not decontamination procedures were adequate or that contamination was not inherent in the equipment used. The equipment blank information provided was inadequate to determine what contamination, if any, was a result of the equipment used. Equipment blanks require locations and associated sample numbers in order to make such a determination.

The report is broken down into sections for each chemical 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 compound identification and quantitation. In addition, each section has an overall assessment and summary for the data packages reviewed for the particular 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, as well as data qualification summaries.

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 results will frequently 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-IU-1 Operable Unit Sampling Investigation 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 include:

- The herbicides results from one SDG and all TPH/DRO results in two SDGs were rejected due to incomplete supporting documentation and significant deviations from the corresponding methods. In all cases method non-compliance was sufficiently severe to warrant complete rejection of the data.
- The holding times were exceeded for the pesticide/PCB and herbicide analyses of one sample in one SDG. All associated results were qualified accordingly.
- The pesticide/PCB results for the two samples in one SDG and for one sample in one SDG were qualified as estimates due to the low surrogate recovery of tetrachloro-m-xylene.
- The herbicide initial and continuing calibration verification percent recovery results were below the QC limit for four compounds in one SDG. All associated results were qualified as estimates.

In general, the protocol-specific QA/QC requirements were met for all other samples analyzed in this investigation with a few minor exceptions as discussed 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.

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WELL AND SAMPLE INFORMATION					SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	NV/V	PESTICIDES/PCBs
139315/554285	B08NQ6	S	08/04/93	V	2-5
	B08NQ7	S	08/04/93	V	2-5
	B08NQ8	S	08/04/93	V	2-8
	B08NQ9	S	08/04/93	V	2-5
EB	B08NP7	S	08/04/93	V	2-5

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## 2.0 PESTICIDE AND PCB DATA VALIDATION

### 2.1 DATA PACKAGE COMPLETENESS

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

B08NP7

B08NQ8

### 2.2 HOLDING TIMES

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

The extraction holding time for sample number B08NQ8 in SDG No. B08NQ8 was exceeded, though not grossly exceeded. All associated data for this sample were qualified as estimates and flagged "J".

Holding time requirements were met for all other samples.

### 2.3 INSTRUMENT PERFORMANCE AND CALIBRATIONS

Instrument performance was assessed to ensure that adequate chromatographic resolution and instrument sensitivity were achieved by the gas chromatographic system.

The specific criteria for acceptable instrument performance are outlined in EPA guidelines (EPA 1988b and 1991), including the evaluation and qualification procedures that may be performed on the analytical results.

Instrument calibration is performed to ensure that the chromatographic system is capable of producing acceptable and reliable analytical data. The initial and continuing calibrations are to be performed according to procedures established by CLP protocols. An initial calibration is performed prior to sample analysis to establish the linear range of the system, including a demonstration that all target compounds can be detected. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

During the quality assurance review, all indicators for acceptable instrument performance were verified. The criteria established by CLP protocols were met and the results are acceptable.

### 2.3.1 Initial Calibrations

The laboratory performed an initial multipoint calibration for all target compounds at the concentrations required by CLP protocols. The linearity of the initial calibration is established when the percent RSD or the calibration factors are less than or equal to 10 percent (or 15% for certain analytes).

All initial calibration results were acceptable.

### 2.3.2 Calibration Verification

The criteria for acceptable continuing calibrations require that the calibration factors for all target compounds have a percent difference of less than or equal to 15 percent of the average calibration factor calculated for the associated initial calibration standard. The 15 percent difference value is required for results calculated using the chromatographic column which is used for quantitative purposes. In addition, the percent difference of the calibration factors calculated for the chromatographic column that is used for confirmation must be less than or equal to 20 percent.

All calibration verification results were acceptable.

### 2.4 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 the associated blanks should be qualified as non-detects.

There were no compounds of concern detected in the method or field blanks.

### 2.5 ACCURACY

Accuracy was assessed by evaluating the recoveries of the surrogate compounds and the matrix spike recoveries calculated for the sample analyses.

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### 2.5.1 Matrix Spike Recovery

Matrix spike analyses are performed in duplicate using six compounds specified by CLP protocols. The recoveries for the six compounds must be within the acceptable quality control limits established by CLP protocols.

All matrix spike/matrix spike duplicate results were acceptable.

### 2.5.2 Surrogate Recovery

Surrogate compound recoveries are calculated using analytical results from two stable 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 program. When recoveries for either surrogate compound 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".

The tetrachloro-m-xylene surrogate recoveries were slightly below the QC limits and all associated results were qualified as estimates and flagged "J" for the following samples:

- Sample numbers B08NP7 and B08NQ9 in SDG No. B08NP7.
- Sample number B08NQ8 in SDG No. B08NQ8.

All other surrogate recovery results were acceptable.

### 2.6 PRECISION

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

All matrix spike/matrix spike duplicate RPDs were acceptable.

### 2.7 COMPOUND IDENTIFICATION AND QUANTITATION

The data were evaluated to confirm the positive concentrations and to investigate the possibility of false negatives in all other data. Confirmation of possible false negatives is addressed by reviewing other factors relating to analytical sensitivity (e.g., detection limits, instrument

linearity, analytical recovery). These factors were found to be in control, and the data are acceptable.

Compound quantitations and reported detection limits were recalculated and verified for a minimum of 20 percent of the samples in each case to ensure that they were accurate and are consistent with CLP requirements (EPA 1991). The reported detection limits must be in accordance with the CRQLs specified in the applicable CLP statement of work.

All validated compound identifications, CRQLs, and quantitation results were acceptable.

## **2.8 OVERALL ASSESSMENT AND SUMMARY**

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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 pesticide/PCB data presented in this report met the protocol-specified QA/QC requirements. The extraction holding time was exceeded for one sample resulting in the qualification of all results for that sample as estimates. The surrogate recovery results for one surrogate were slightly below QC limits for three samples. The associated results were qualified as estimates. Estimated data are 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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PESTICIDE/PCB ORGANIC ANALYSIS, SOIL MATRIX, (ug/Kg)

Project: WESTINGHOUSE-HANFORD																						
Laboratory: TMA																						
Case	SDG: B08NP7																					
Sample Number	B08NP7	B08NQ6	B08NQ7	B08NQ9																		
Location	EB																					
Remarks	Equip. Blank																					
Sample Date	8/04/93	8/04/93	8/04/93	8/04/93																		
Extraction Date	8/11/93	8/11/93	8/11/93	8/11/93																		
Analysis Date	8/14/93	8/14/93	8/14/93	8/14/93																		
Pesticide/PCB	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	
alpha-BHC	1.7	1.7	UJ	1.7	U	1.7	U	1.7	UJ													
beta-BHC	1.7	1.7	UJ	1.7	U	1.7	U	1.7	UJ													
delta-BHC	1.7	1.7	UJ	1.7	U	1.7	U	1.7	UJ													
gamma-BHC (Lindane)	1.7	1.7	UJ	1.7	U	1.7	U	1.7	UJ													
Heptachlor	1.7	1.7	UJ	1.7	U	1.7	U	1.7	UJ													
Aldrin	1.7	1.7	UJ	0.45	J	0.32	J	1.7	UJ													
Heptachlor epoxide	1.7	1.7	UJ	1.7	U	1.7	U	1.7	UJ													
Endosulfan I	1.7	1.7	UJ	1.7	U	1.7	U	1.7	UJ													
Dieldrin	3.3	3.3	UJ	2.0	J	1.5	J	1.2	J													
4,4'-DDE	3.3	3.3	UJ	0.70	J	3.3	U	6.7	J													
Endrin	3.3	3.3	UJ	3.3	U	3.3	U	3.4	UJ													
Endosulfan II	3.3	3.3	UJ	3.3	U	3.3	U	3.4	UJ													
4,4'-DDD	3.3	3.3	UJ	3.3	U	3.3	U	3.4	UJ													
Endosulfan sulfate	3.3	3.3	UJ	3.3	U	3.3	U	3.4	UJ													
4,4'-DDT	3.3	3.3	UJ	3.3	U	3.3	U	0.57	J													
Methoxychlor	17.0	17	UJ	17	U	17	U	17	UJ													
Endrin Ketone	3.3	3.3	UJ	3.3	U	3.3	U	3.4	UJ													
Endrin Aldehyde	3.3	3.3	UJ	3.3	U	3.3	U	3.4	UJ													
alpha-Chlordane	1.7	1.7	UJ	1.7	U	1.7	U	1.7	UJ													
gamma-Chlordane	1.7	1.7	UJ	1.7	U	1.7	U	1.7	UJ													
Toxaphene	170.0	170	UJ	170	U	170	U	170	UJ													
Aroclor-1016	33.0	33	UJ	33	U	33	U	34	UJ													
Aroclor-1221	67.0	67	UJ	67	U	67	U	69	UJ													
Aroclor-1232	33.0	33	UJ	33	U	33	U	34	UJ													
Aroclor-1242	33.0	33	UJ	33	U	33	U	34	UJ													
Aroclor-1248	33.0	33	UJ	33	U	33	U	34	UJ													
Aroclor-1254	33.0	33	UJ	33	U	33	U	34	UJ													
Aroclor-1260	33.0	33	UJ	33	U	33	U	34	UJ													

2-5

WHC-SD-EN-TI-236, Rev. 0

EB=Equipment Blank, \*-139315/554285





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PESTICIDE/PCB ORGANIC ANALYSIS, SOIL MATRIX, (ug/Kg)

Project: WESTINGHOUSE-HANFORD																						
Laboratory: Roy F. Weston																						
Case	SDG: B08NQ8																					
Sample Number	B08NQ8																					
Location	.																					
Remarks	Split																					
Sample Date	8/04/93																					
Extraction Date	8/13/93																					
Analysis Date	8/21/93																					
Pesticide/PCB	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	
alpha-BHC	1.7	1.7	UJ																			
beta-BHC	1.7	1.7	UJ																			
delta-BHC	1.7	1.7	UJ																			
gamma-BHC (Lindane)	1.7	1.7	UJ																			
Heptachlor	1.7	1.7	UJ																			
Aldrin	1.7	1.7	UJ																			
Heptachlor epoxide	1.7	1.7	UJ																			
Endosulfan I	1.7	1.7	UJ																			
Dieldrin	3.3	3.6	J																			
4,4'-DDE	3.3	3.3	UJ																			
Endrin	3.3	3.3	UJ																			
Endosulfan II	3.3	3.3	UJ																			
4,4'-DDD	3.3	3.3	UJ																			
Endosulfan sulfate	3.3	3.3	UJ																			
4,4'-DDT	3.3	3.3	UJ																			
Methoxychlor	17.0	17	UJ																			
Endrin Ketone	3.3	3.3	UJ																			
Endrin Aldehyde	3.3	3.3	UJ																			
alpha-Chlordane	1.7	1.7	UJ																			
gamma-Chlordane	1.7	1.7	UJ																			
Toxaphene	170.0	170	UJ																			
Aroclor-1016	33.0	33	UJ																			
Aroclor-1221	33.0	66	UJ																			
Aroclor-1232	67.0	33	UJ																			
Aroclor-1242	33.0	33	UJ																			
Aroclor-1248	33.0	33	UJ																			
Aroclor-1254	33.0	33	UJ																			
Aroclor-1260	33.0	33	UJ																			

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WELL AND SAMPLE INFORMATION					SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	NV/V	HERBICIDE
139315/554285	B08NQ6	S	08/04/93	V	3-6
	B08NQ7	S	08/04/93	V	3-6
	B08NQ8	S	08/04/93	V	3-9
	B08NQ9	S	08/04/93	V	3-6
EB	B08NP7	S	08/04/93	V	3-6

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### 3.0 HERBICIDE DATA VALIDATION

#### 3.1 DATA PACKAGE COMPLETENESS

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

B08NP7

B08NQ8

SDG No. B08NP7 was reviewed and found to be complete. SDG No. B08NQ8 did not contain sufficient evidence of proper calibration procedures nor complete supporting raw data. The data were rejected for a combination of reasons, including the incomplete data package. Please see section 3.8 for additional information.

#### 3.2 HOLDING TIMES

Analytical holding times were assessed to ascertain whether the holding time requirements for herbicides analyses were met by the laboratory. Westinghouse-Hanford procedures require that samples be extracted within seven days of collection and analyzed within 40 days of extraction.

The extraction holding time for sample number B08NQ8 in SDG No. B08NQ8 was exceeded, though not grossly exceeded. All associated data for this sample were qualified as estimates and flagged "J".

Holding time requirements were met for all other samples.

#### 3.3 INSTRUMENT PERFORMANCE AND CALIBRATIONS

Instrument performance was assessed to ensure that adequate chromatographic resolution and instrument sensitivity were achieved by the gas chromatographic system.

Instrument calibration is performed to ensure that the chromatographic system is capable of producing acceptable and reliable analytical data. The initial and continuing calibrations are to be performed according to procedures established by SW-846 protocols. An initial calibration is performed prior to sample analysis to establish the linear range of the system, including a demonstration that all target compounds can be detected. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

### 3.3.1 Initial Calibrations

The laboratory performs an initial multipoint calibration for all target compounds at the concentrations required by SW-846 protocols. The linearity of the initial calibration is established when the percent RSD or the calibration factors are less than or equal to 15 percent.

The initial calibration results could not be verified due to incomplete information provided for SDG No. B08NQ8. The necessary calculations could not be verified nor could it be confirmed that the appropriate method had been followed. The initial calibration was performed for only eight of the ten compounds included in the requested method. All data associated with this SDG have been rejected for a combination of reasons, including this deficiency. Please see section 3.8 of this report for additional information.

The initial calibration results exceeded the QC limits for MCPA and all associated results were qualified as estimates and flagged "J" in the following samples:

- Sample numbers B08NP7, B08NQ6, B08NQ7 and B08NQ9 in SDG No. B08NP7.

All other initial calibration results were acceptable.

### 3.3.2 Calibration Verification

The criteria for acceptable continuing calibrations require that the calibration factors for all target compounds have a percent difference of less than or equal to 15 percent of the average calibration factor calculated for the associated initial calibration standard. The 15 percent difference value is required for results calculated using the chromatographic column which is used for quantitative purposes.

The continuing calibration results could not be verified due to incomplete information for SDG No. B08NQ8. The necessary calculations could not be verified nor could it be confirmed that the appropriate method had been followed. The continuing calibration included only eight of the ten method-required compounds. All data associated with this SDG have been rejected for a combination of reasons, including this deficiency. Please see section 3.8 of this report for additional information.

The continuing calibration results exceeded the QC limits for MCPA, MCPP, 2,4,5-T and 2,4-DB and all associated results were qualified as estimates and flagged "J" in the following samples:

- Sample numbers B08NP7, B08NQ6, B08NQ7 and B08NQ9 in SDG No. B08NP7.

The continuing calibration results grossly exceeded the QC limits for 2,4,5-TP (Silvex) and all associated results were rejected and flagged "R" in the following samples:

- Sample numbers B08NP7, B08NQ6, B08NQ7 and B08NQ9 in SDG No. B08NP7.

All other calibration verification 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 the associated blanks should be qualified as non-detects.

There were no compounds of concern detected in the method or field blanks.

### 3.5 ACCURACY

Accuracy was assessed by evaluating the recoveries of the surrogate compounds and the matrix spike recoveries calculated for the sample analyses.

#### 3.5.1 Matrix Spike Recovery

Matrix spike analyses are performed in duplicate using compounds specified in the method. The recoveries for the compounds must be within the acceptable quality control limits established in SW-846 protocols.

The matrix spike recovery results could not be verified due to incomplete information for SDG No. B08NQ8. The necessary calculations could not be verified. All data associated with this SDG have been rejected for a combination of reasons, including this deficiency. Please see section 3.8 of this report for additional information.

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

#### 3.5.2 Surrogate Recovery

Surrogate compound recoveries are calculated using analytical results from stable surrogate compounds added to the sample prior to sample preparation and analysis. When recoveries for a surrogate compound 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".

The surrogate recovery results could not be verified due to incomplete information for SDG No. B08NQ8. The necessary calculations could not be verified. All data associated with this SDG have been rejected for a combination of reasons, including this deficiency. Please see section 3.8 of this report for additional information.

All other surrogate recovery results were acceptable.

### 3.6 PRECISION

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

The matrix spike/matrix spike duplicate RPDs could not be verified due to incomplete information for SDG No. B08NQ8. The necessary calculations could not be verified. All data associated with this SDG have been rejected for a combination of reasons, including this deficiency. Please see section 3.8 of this report for additional information.

All other matrix spike/matrix spike duplicate RPDs were acceptable.

### 3.7 COMPOUND IDENTIFICATION AND QUANTITATION

The data were evaluated to confirm the positive concentrations and to investigate the possibility of false negatives in all other data. Confirmation of possible false negatives is addressed by reviewing other factors relating to analytical sensitivity (e.g., detection limits, instrument linearity, analytical recovery).

Compound quantitations and reported detection limits were recalculated and verified for a minimum of 20 percent of the samples in each case to ensure that they were accurate and are consistent with SW-846 requirements (EPA 1987). The reported detection limits must be in accordance with those specified in the applicable method.

All validated compound identifications, detection limits, and quantitation results were acceptable for SDG No. B08NP7. Results could not be verified for SDG No. B08NQ8 due to incomplete information. The necessary calculations could not be verified nor could it be confirmed that the appropriate method

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had been followed. Furthermore, only three of the ten compounds in the method were included in the field sample data. All data associated with this SDG have been rejected for a combination of reasons, including this deficiency. Please see section 3.8 of this report for additional information.

### 3.8 OVERALL ASSESSMENT AND SUMMARY

A thorough review of ongoing data acquisition and instrument performance criteria was made to assess overall GC 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.

The herbicides data presented for SDG No. B08NQ8 were found to be incomplete. It was not possible to duplicate any of the required calculations due to insufficient information and/or conflicting information within the data package. It could not be confirmed that the appropriate method had been performed due to the manner in which the data was generated and reported by the laboratory. Eight of the ten compounds required in the method were included in the calibration, while only three of the compounds were addressed in the sample reports. Due to the combined effect of these errors, the reliability of this data package could not be ascertained. Therefore, all data from this package have been rejected and flagged with an "R". Rejected data are unusable for any purpose and should not be reported.

In general, the remaining herbicide data presented in this report met the protocol-specified QA/QC requirements. Initial and/or continuing calibration results exceeded QC limits for MCPA, MCPP and 2,4,5-T for all samples in SDG No. B08NP7. All associated results were qualified as estimates and flagged "J". Estimated data are usable for limited purposes only. The continuing calibration results for 2,4,5-TP (Silvex) grossly exceeded the QC limits for all samples in SDG No. B08NP7. All associated results were rejected and flagged "R". Rejected data are not usable for any purpose and should not be reported. All other validated data are considered valid and usable within the standard error associated with the method.













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WELL AND SAMPLE INFORMATION					SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	NV/V	DIESEL RANGE ORGANICS
DRAIN DITCH	B08NR0	S	09/27/93	V	4-6
	B08NR1	S	09/28/93	V	4-6
	B08NR2	S	09/28/93	V	4-6
	B08NR3	S	10/15/93	V	4-8
	B08NR5	S	09/29/93	V	4-6
	B08NR6	S	09/29/93	V	4-6
	B08NR7	S	09/29/93	V	4-6
	B08NR8	S	09/29/93	V	4-6
	B08NR9	S	09/29/93	V	4-6
	B08NS6	S	10/13/93	V	4-8
	B08NS7	S	10/13/93	V	4-8
	B08NS8	S	10/13/93	V	4-10
	B08NS9	S	10/13/93	V	4-8
PAD SOIL	B08NT0	S	10/15/93	V	4-8
	B08NT1	S	10/18/93	V	4-8
	B08NT2	S	10/18/93	V	4-8
	B08NT3	S	10/18/93	V	4-8
	B08NT4	S	10/18/93	V	4-8
EB	B08NR4	S	9/29/93	V	4-6
	B08NT5	S	10/26/93	NV	4-11
	B08NT6	S	10/26/93	NV	4-11
	B08NT7	S	10/26/93	NV	4-11
	B08NT8	S	10/26/93	NV	4-11
	B08NT9	W	12/18/93	NV	4-12
	B08NV0	W	12/18/93	NV	4-12
	B08NV3	W	12/18/93	NV	4-12
	B08NV4	W	12/20/93	NV	4-12
	B08NV5	W	12/20/93	NV	4-12
B08NV7	W	12/20/93	NV	4-12	

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#### 4.0 TOTAL PETROLEUM HYDROCARBONS/DIESEL RANGE ORGANICS

##### 4.1 DATA PACKAGE COMPLETENESS

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

B08NR0

B08NR3

B08NS8

SDG No. B08NS8 was reviewed and found to be complete. SDG Nos. B08NR0 and B08NR3 did not contain quantitation reports or percent moisture determinations for any of the field samples. Therefore, no calculations associated with these packages could be confirmed. Surrogate compounds were also not included in any of the samples. The data were rejected for a combination of reasons, including the incomplete data package. Please see section 4.8 for additional information.

##### 4.2 HOLDING TIMES

Analytical holding times were assessed to ascertain whether the holding time requirements for TPH/DRO analyses were met by the laboratory. Westinghouse-Hanford procedures require that samples be extracted within 14 days of collection and analyzed within 14 days of extraction.

Holding time requirements were met for all samples.

##### 4.3 INSTRUMENT PERFORMANCE AND CALIBRATIONS

Instrument performance was assessed to ensure that adequate chromatographic resolution and instrument sensitivity were achieved by the gas chromatographic system.

Instrument calibration is performed to ensure that the chromatographic system is capable of producing acceptable and reliable analytical data. The initial and continuing calibrations are to be performed according to procedures established by SW-846 protocols. An initial calibration is performed prior to sample analysis to establish the linear range of the system, including a demonstration that the target compound can be detected. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

#### 4.3.1 Initial Calibrations

The laboratory performs an initial multipoint calibration for the target mixture at the concentrations required by SW-846 protocols. The linearity of the initial calibration is established when the percent RSD or the calibration factors are less than or equal to 10 percent (or 15% for certain analytes).

The initial calibration results could not be verified due to incomplete information for SDG Nos. B08NR0 and B08NR3. The necessary calculations could not be verified. All data associated with these SDGs have been rejected for a combination of reasons, including this deficiency. Please see section 4.8 of this report for additional information.

All other initial calibration results were acceptable.

#### 4.3.2 Calibration Verification

The criteria for acceptable continuing calibrations require that the calibration factors for the target mixture have a percent difference of less than or equal to 15 percent of the average calibration factor calculated for the associated initial calibration standard. The 15 percent difference value is required for results calculated using the chromatographic column which is used for quantitative purposes.

The continuing calibration results could not be verified due to incomplete information for SDG Nos. B08NR0 and B08NR3. The necessary calculations could not be verified. All data associated with these SDGs have been rejected for a combination of reasons, including this deficiency. Please see section 4.8 of this report for additional information.

All other calibration verification results were acceptable.

#### 4.4 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 the associated blanks should be qualified as non-detects.

There were no compounds of concern detected in the method or field blanks.

#### 4.5 ACCURACY

Accuracy was assessed by evaluating the recoveries of the surrogate compounds and the matrix spike recoveries calculated for the sample analyses.

##### 4.5.1 Matrix Spike Recovery

Matrix spike analyses are performed in duplicate using compounds specified in the method. The recoveries for the compounds must be within the acceptable quality control limits established in SW-846.

The matrix spike recovery results could not be verified due to incomplete information for SDG Nos. B08NR0 and B08NR3. The necessary calculations could not be verified. All data associated with these SDGs have been rejected for a combination of reasons, including this deficiency. Please see section 4.8 of this report for additional information.

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

##### 4.5.2 Surrogate Recovery

Surrogate compound recoveries are calculated using analytical results from stable surrogate compounds added to the sample prior to sample preparation and analysis. When recoveries for a surrogate compound 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".

No surrogate compounds were included in any of the samples associated with SDG Nos. B08NR0 and B08NR3. The method specifically requires that such surrogates be run to confirm the reliability of the analytical system and to assess the effectiveness of the sample preparation method. All data associated with these SDGs have been rejected and flagged "R". Please see section 4.8 of this report for additional information.

All other surrogate recovery results were acceptable.

#### 4.6 PRECISION

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

The matrix spike/matrix spike duplicate RPDs could not be verified due to incomplete information for SDG Nos. B08NR0 and B08NR3. The necessary calculations could not be verified. All data associated with these SDGs have been rejected for a combination of reasons, including this deficiency. Please see section 4.8 of this report for additional information.

All other matrix spike/matrix spike duplicate RPDs were acceptable.

#### 4.7 COMPOUND IDENTIFICATION AND QUANTITATION

The data were evaluated to confirm the positive concentrations and to investigate the possibility of false negatives in all other data. Confirmation of possible false negatives is addressed by reviewing other factors relating to analytical sensitivity (e.g., detection limits, instrument linearity, analytical recovery).

Compound quantitations and reported detection limits were recalculated and verified for a minimum of 20 percent of the samples in each case to ensure that they were accurate and are consistent with SW-846 requirements (EPA 1987). The reported detection limits must be in accordance with the applicable method.

All validated compound identifications, detection limits, and quantitation results were acceptable for SDG No. B08NS8. Results could not be verified for SDG Nos. B08NR0 and B08NR3 due to incomplete information. The necessary calculations could not be verified. All data associated with these SDGs have been rejected for a combination of reasons, including this deficiency. Please see section 4.8 of this report for additional information.

#### 4.8 OVERALL ASSESSMENT AND SUMMARY

A thorough review of ongoing data acquisition and instrument performance criteria was made to assess overall GC 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.

The TPH/DRO data presented for SDG Nos. B08NR0 and B08NR3 were found to be incomplete. It was not possible to duplicate any of the required calculations due to insufficient information. Furthermore, no surrogate compounds were included in any of the field or QC samples or any of the calibration standards. This is a gross deviation from the requested method resulting in the rejection of all data associated with these two SDGs. All rejected data has been flagged "R" and are unusable for any purpose and should not be reported.

The remaining TPH/DRP data presented in this report met the protocol-specified QA/QC requirements. All other validated data are considered valid and usable within the standard error associated with the method.















## 5.0 REFERENCES

- 9432741302
- EPA, 1987, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition, Environmental Protection Agency, Washington, D.C.
- EPA, 1988a, *EPA Contract Laboratory Program Statement of Work for Organics Analyses, Multi-Media, Multi-Concentration*, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1988b, *Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses*, U.S. Environmental Protection Agency, Washington, D.C.
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- WHC, December 1993, *Data Validation Procedure for Radiological Analyses*, WHC-SD-EN-SPP-001, Revision 1, Westinghouse Hanford Company, 1993.

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