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**200-BP-1
GROUNDWATER ANALYSIS PROJECT**

TOTAL ORGANIC CARBON DATA PACKAGE No. 3

Revision 0



December 10, 1990



Prepared by: B.M. Gillespie

**Pacific Northwest Laboratory
(PNL Project #16772)**

i Kdb 5/30/96

INTRODUCTION

This data package contains the results obtained by Pacific Northwest Laboratory (PNL) staff in the characterization of samples for the 200-BP-1 Groundwater Analysis Project. The samples were submitted for analysis by Westinghouse Hanford Company (WHC) under the PNL Technical Project Plan (TPP) 16772 and the Quality Assurance Project Plan (QAPjP) ALO-001. The analytical procedures required for analysis were defined in the Test Instructions (TI) prepared by the PNL 200-BP-1 Project Management Office in accordance with the TPP and the QAPjP ALO-001.

The samples (Table 1) were submitted with the appropriate WHC Chain of Custody (COC) and Sample Analysis Request Forms. The samples were delivered at refrigerated temperature to the 300 Area, 325 Building 200-BP-1 Sample Custodian.

The requested analysis for these samples was Total Organic Carbon. The quality control (QC) requirements for each sample are defined in the test instructions for each sample. The QC requirements outlined in the procedures and requested in the WHC SOW were followed. Sample duplicates and methods blanks were analyzed. All QC data that exist are include in this Data Package/Report.

The data in this package are reported in separate tables for soil samples (Table 2) and water samples (Table 3). The chemical analysis data are reported on a per received basis. That is, no corrections were made for the weight percent water in the samples. Three appendices are provided; one for Test Instruction, one for Chain of Custody, Sample Analysis Request Forms and Sample Receipt Forms and one that contains the primary total organic carbon analytical data.

CERTIFICATION STATEMENT

I certify that this data package is in compliance with the terms and conditions of the TPP 16772 and QAPJP ALO-001, for completeness. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Project Manager or the Project Manager's designee, as verified by the following signature.

B. M. Gillespie
B. M. Gillespie
200-BP-1 Project Manager

12-10-90
Date

Quality Control

I certify that I have reviewed all data in this report/package for completeness of the QC data and for compliance with project QC requirements as defined in the TPP 16772 and the QAPJP ALO-001.

J. L. Daniel
J. L. Daniel
PNL ACL Quality Representative

12/10/90
Date

TABLE 1: 200-BP-1 Sample Numbers

<u>WHC Sample Number</u>	<u>PNL ALO Sample Number</u>	<u>Sample Type</u>
699-55-55-160	90-6716	Soil
699-55-55-160A	90-6717	Soil
699-55-55-162	90-6718	Soil
699-55-57-160	90-6719	Soil
699-52-57-157A	90-6720	Water
699-52-57-157B	90-6721	Water
699-52-57-160A	90-6722	Water
699-52-57-160B	90-6723	Soil
699-55-55-166	90-6724	Soil
699-55-55-190	90-6725	Soil
699-52-57-162	90-6726	Soil

TOTAL ORGANIC CARBON ANALYSIS RESULTS

The soil samples and their accompanying QC samples were prepared by procedure PNL-7-40.37, Determination of Carbon in Solids Using the Coulometrics Carbon Dioxide Coulometer. The methodology is consistent with SW 846 Method 9060. Procedure PNL-7-40.37 defines the operation of the instrument used as well as the analysis of the sample. SW 846 Method 9060 leaves the option for the analyst to follow the manufacturer's instrument instructions for calibration, analysis procedure and calculations. The water samples and their accompanying QC samples were prepared by procedure PNL-7-40.7, Solutions Analysis: Carbon. Analysis for both soil and water samples was performed in building 325 in the 300 area.

Soil Samples

With the Coulometrics TOC analyzer, an average (daily) blank must be determined prior to calibration check of the instrument and analysis of samples. The major source of carbon in the blank is adsorbed CO₂ on the boat and ladle. The blank is obtained by removing the quartz ladle and platinum boat from the furnace tube, then these parts are placed in the furnace and carbon analysis is performed on this blank. As there is no sample preparation prior to analysis, this instrument blank is also considered to be the methods blank when determining TOC by this method.

The blank thus obtained has a direct effect on the quantification limit for each sample as this value must be subtracted from each sample value determined. However, this blank value is not an indicator of instrument sensitivity, and should not be considered as an indication of the true instrument detection limit. If the instrument were operated in a carbon-free atmosphere, a lower blank value could be observed. It is not possible to

determine the absolute instrument detection limit (i.e., a measure of instrument sensitivity) under current laboratory operating conditions. Therefore, as the daily blank represents the background carbon level in this analysis, it sets the lower method quantification limit for that day. For purposes of this report, the daily blank value is used as the lower quantification limit for the analysis. Reported results indicate that the results are above this method quantification limit (instrument background carbon levels).

An average "method detection limit" for this analytical method may be estimated from the standard deviation around the blank values reported for this project. The blank data may be found in data reports titled Total Organic Carbon Data Package No. 1, Total Organic Carbon Data Package No. 2 and in this data package. This "method detection limit," defined as three times the standard deviation of the blank values, is $\approx 3.4 \mu\text{g}$ of total organic carbon in the analytical sample. The method detection limit expressed in concentration terms would be dependent on the sample size analyzed. This average "method detection limit" value is useful in evaluating future applicability of this analytical method.

Samples were analyzed in duplicate. Duplicate results differed significantly. The percent standard deviations (as defined in the QAPJP ALO-001) ranged from 2% to 24%. This variability of difference is mostly attributed to the heterogeneity of the soil samples received and their moisture content. Due to the large amount of sample inhomogeneity observed in the samples, WHC was consulted on this issue in order to determine an acceptable method for obtaining a representative sub-sample. The analyst followed the accepted protocol of mixing the sample but heterogeneity still

remained as demonstrated by the duplicate results. However, it should be noted that the possibility, however remote, of analytical error cannot be completely eliminated based on the existing data.

At least one standard is analyzed each day as a one point calibration of the instrument. The manufacturer's manual states to use a single point calibration of the instrument as the instrument exhibits a linear response. Upon review of the standard results (of the same Kodak α -D Glucose standard) for this set of data, the recoveries ranged from 99% to 102%. The average recovery was 100.0% with a standard deviation of 1.4%. The conclusion is that the precision from this set of data is $\pm 1\%$ relative, and a bias of 0% on the average.

The general Environmental Protection Agency (EPA) hold time for Total Organic Carbon Analysis in soils is defined at 14 days from the date of sampling. The hold time was met for all but one (90-6726) of the soil sample analyses in this data report. This one hold time was inadvertently missed as the analyst did not realize that this sample was sampled three days prior to the other sample (90-6725) it was analyzed with and took the sampling date (10-29-90) as the same for both samples. The late analysis has no known impact the final results of the data.

Water Samples

With the Dohrman DC80 total organic carbon, a check standard is injected into the instrument repetitively until two successive results are within 1% relative. This standard value is taken as the one point calibration of the instrument. The manufacturer's manual states to use a single point calibration of the instrument as the instrument exhibits a linear response. An average "method detection limit" for this analytical method is estimated

from past analyses at 0.7 $\mu\text{g}/\text{ml}$.

Samples were analyzed in duplicate. Duplicate results differed significantly. The percent standard deviations ranged from less than 1% to 20%. This variability of difference is mostly attributed to the small amounts of total organic carbon in the water samples. The sample results are near detection limits.

At least one standard is analyzed daily (in at least duplicate) as a one point calibration of the instrument. Upon review of the standard results for this set of data, the recoveries ranged from 77% to 123%. The average recovery for the 10ppm standard was 101% with a standard deviation of 5%. The conclusion is that the precision from this set of data is $\pm 5\%$ relative, and a bias of +1% on the average. The spike recoveries, however, were not as good. The average recovery was 105% with a standard deviation of 25%. The poor recoveries are attributed to spiking at 2 times the detection limit (detection limit of about 0.7 to 0.8 ppm). The standard deviation of the spike recoveries that are so near the detection limit is expected to be larger than if samples were spiked at five to ten times the detection limit. The spike sample and spike blank analysis was not requested in the TPP or the client SOW for TOC analysis.

The general Environmental Protection Agency (EPA) hold time for Total Organic Carbon Analysis in soils is defined at 14 days from the date of sampling. The hold time was met for the water sample analyses in this data report.

Table 2: 200-BP-1 Total Organic Carbon Analysis Data
Soil Samples

WHC Sample #	PNL ALO #	Sample Type	Sample wt. g	ug C Results	ug C in Sample	mg/Kg Sample	RSD (%) Dups	% rec. spike	Date Sampled	Date Analyzed
699-55-55-160	90-6716-1	Sample	0.28326	28.84	26.13	92.3	8		10-23-90	10-26-90
"	90-6716-2	Duplicate	0.25249	28.81	26.1	103			10-23-90	10-26-90
"	90-6716-3	Standard						99.25		10-26-90
"	90-6716-4	Blank		2.71						10-26-90
699-55-55-160-A	90-6717-1	Sample	0.28147	37.81	35.1	125	8		10-23-90	10-26-90
"	90-6717-2	Duplicate	0.3173	37.97	35.26	111			10-23-90	10-26-90
"	90-6717-3	Standard						99.25		10-26-90
"	90-6717-4	Blank		2.71						10-26-90
699-55-55-162	90-6718-1	Sample	0.55697	14.71	12	21.5	24		10-23-90	10-26-90
"	90-6718-2	Duplicate	0.60811	21.29	18.58	30.6			10-23-90	10-26-90
"	90-6718-3	Standard						99.25		10-26-90
"	90-6718-4	Blank		2.71						10-26-90
699-52-57-160	90-6719-1	Sample	0.33163	22.93	20.22	61.0	3		10-23-90	10-26-90
"	90-6719-2	Duplicate	0.39409	25.6	22.89	58.1			10-23-90	10-26-90
"	90-6719-3	Standard						99.25		10-26-90
"	90-6719-4	Blank		2.71						10-26-90
699-52-57-160-B	90-6723-1	Sample	0.3902	34.54	32.83	84.1	3		10-23-90	10-26-90
"	90-6723-2	Duplicate	0.2981	28.93	26.22	88.0			10-23-90	10-26-90
"	90-6723-3	Standard		"				99.12		10-26-90
"	90-6723-4	Blank		2.71						10-26-90
699-55-55-166	90-6724-1	Sample	0.36091	24.92	22.21	61.5	14		10-24-90	10-26-90
"	90-6724-2	Duplicate	0.40881	33.39	30.68	75.1			10-24-90	10-26-90
"	90-6724-3	Standard						99.12		10-26-90
"	90-6724-4	Blank		2.71						10-26-90
699-55-55-190	90-6725-1	Sample	0.4421	17.1	10.5	23.8	7		10-29-90	11-13-90
"	90-6725-2	Duplicate	0.4401	16.09	9.49	21.6			10-29-90	11-13-90
"	90-6725-3	Standard						101.7		11-13-90
"	90-6725-4	Blank		6.6						11-13-90
699-52-57-162.0	90-6726-1	Sample	0.31368	21.63	15.03	47.9	2		10-26-90	11-13-90
"	90-6726-2	Duplicate	0.27817	19.48	12.88	46.3			10-26-90	11-13-90
"	90-6726-3	Standard						101.7		11-13-90
"	90-6726-4	Blank		6.6						11-13-90

Total Organic Carbon by PNL Procedure 7-40.37, on Instrument WA92040,
325 Bldg., rm 313. Data reported from LRB 52996, pp 53-57.

9613771.0139

Table 3: 200-BP-1 Total Organic Carbon Analysis Data
Water Samples

WMC Sample #	PNL Sample #	Sample Type	ug/mL Sample	Ave. ug/mL Sample	RSD of Dups (%)	Spike %Rec	C4 Cntrl %Rec	Lab Cntrl %Rec	Date Sampled	Analyzed
		10ppm Lab Cntrl	10.0 9.4 10.1	9.8				98		
		Water Blank	0.08 0.13	0.11						
699-52-57-157-A	90-6720-1	Sample	0.41	0.36	19.6				10-23-90	10-26-90
	90-6720-2	Duplicate	0.31							
	90-6720-3	Sample+Spike	2.06	2.08	1.4	115				
	"	"	2.10							
699-52-57-157-B	90-6721-1	Sample	0.99	0.90	14.1				10-23-90	10-26-90
	90-6721-2	Duplicate	0.81							
	90-6721-3	Sample+Spike	2.04	2.06	1.4	77				
	"	"	2.08							
699-52-57-160-A	90-6722-1	Sample	0.65	0.62	8.0				10-23-90	10-26-90
	90-6722-2	Duplicate	0.58							
	90-6722-3	Sample+Spike	2.65	2.46	10.9	123				
	"	"	2.27							
	90-6722-5	Blank	0.06	0.12						
	"	"	0.17							
	90-6722-4	Blank+Spike	1.89	1.87	1.5		117			
	"	"	1.85							
		10ppm Lab Cntrl	10.6 10.4	10.5	1.4			105		

Total Organic Carbon by PNL Procedure 7-40.7, on Instrument WA64102, 325 Bldg., rm 400. Data reported from LRB 53093, pp 55.

Samples and Controls spiked at 1.5 ppm. The 1.5 ppm spike level is about 2xDL and therefore spikes exhibit somewhat poor recovery

SAMPLE RECEIPT FORM

Delivered by: Steffen Date/Time: 10/24/20 10/24

Received by: MW Thi

Customer Sample Number(s): See Back

ALO Sample Number(s): See Back

1. Customer Chain-of-Custody Form: Present Absent

2. Additional Shipping Forms (list):

RSR

Request for Analysis

3. Custody Seals on Shipping and/or Sample Containers and their Conditions.

Present Absent

If Present, Condition: GOOD

4. Sample Tag(s) ID Numbers if not Recorded on the Chain-of-Custody Record or on Sample Vial.

Notes:

N/A

5. Condition of Shipping Container (Verify that ice still exists such that samples are at refrigerated temperature).

ICED

6. Condition of Sample Vials.

GOOD

7. Verification of Agreement or Nonagreement of Information on Receiving Documents.

Agree

8. Resolution of Problems or Discrepancies.

N/A

RETURN COMPLETED FORM TO PROJECT MANAGER

9613474.0142

Westinghouse Hanford Company

CHAIN OF CUSTODY

Company Contact: Wendy S. Thompson (Envir. Field Services) Telephone (509) 373-3818
 Sample Collected by: W.S. Thompson/R. Z. Steffler Date 10/23/90 Time 1310; 1310; 1445
 Sample Locations: 699-55-55 wellsite, 600 AREA, NORTH of 200 EAST
 Ice Chest No.: "Sleepy" polycorder Field Logbook and Page No. WMC-N-287-2 pp 77-79
 Remarks: All samples to be analyzed for TOTAL ORGANIC CARBON (TOC). Samples support 200-BP-1 Remedial Investigation/Ferriability Study.
 Bill of Lading No. NA Offsite Property No. NA
 Method of Shipment: hand carry to 325 PNL LAB for analysis
 Shipped to: 325 PNL LABORATORY (300 AREA)
 Possible Sample Hazards: No hazards indicated with field instruments

Sample Identification

- 1) 699-55-55-160
1, 120ml., amber glass; soil; analysis of Total organic carbon (TOC)
(PNL 7-40.37)
- 2) 699-55-55-160A
1, 120ml., amber glass; soil; analysis of TOTAL ORGANIC CARBON (TOC)
PNL 7-40.37
- 3) 699-55-55-162
1, 120ml., amber glass; soil; analysis of Total organic carbon (TOC) PNL 7-40.37

Chain of Possession

Relinquished by: <u>W.S. Thompson</u> <u>Wendy S. Thompson</u>	Received by: <u>R. Z. Steffler</u> <u>R. Z. Steffler</u>	Date/Time: <u>10/23/90 1515 hrs</u>
Relinquished by: <u>R. Z. Steffler</u> <u>R. Z. Steffler</u>	Received by: <u>M. W. [Signature]</u>	Date/Time: <u>10/24/90 1210</u>
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

9613474 0144

Westinghouse Hanford Company

CHAIN OF CUSTODY

Company Contact: Wendy S. Thompson Telephone (509) 373-3818

Sample Collected by: W.S. Thompson / R.Z. Steffler Date 10/23/90 Time 0935; 0645; 0845

Sample Locations: 699-52-57 well site, North of 200-AST 0945; 0935

Ice Chest No.: _____ Field Logbook and Page No. WHC-N-287-2 pg.

Remarks: All samples to be analyzed for total organic carbon (T.O.C.) supporting 200-BP-1 Remedial Investigation/Feasibility Study

Bill of Lading No. NA Offsite Property No. NA

Method of Shipment: hand carry to 325 PNL LAB; keep chilled on wet ice

Shipped to: 325 PNL LAB (300 Area)

Possible Sample Hazards: None indicated with field instruments.

Sample Identification

- 1) 699-52-57-160
1,120 ml. amber glass; soil; analysis of Total Organic Carbon (PNL 7-40.37)
- 2) 699-52-57-157A
1,250ml, amber glass; water; total organic carbon (PNL 7-40.7) (1/2 ml HCL)
- 3) 699-52-57-157B
1,250ml, amber glass; water; 1/2 ml. HCL; TOTAL ORGANIC CARBON (PNL 7-40.7)
- 4) 699-52-57-160A
1,250ml, amber glass; water; 1/2 ml. HCL; TOTAL ORGANIC CARBON (PNL 7-40.7)
- 5) 699-52-57-160B
1,120ml, amber glass; soil; TOTAL ORGANIC CARBON; (PNL 7-40.37)

Chain of Possession

Relinquished by: <u>Wendy S. Thompson</u> <u>Wendy S. Thompson</u>	Received by: <u>R.Z. Steffler</u> <u>R.Z. Steffler</u>	Date/Time: <u>10/23/90 15:15 hrs.</u>
Relinquished by: <u>R.Z. Steffler</u> <u>R.Z. Steffler</u>	Received by: <u>M. W. [Signature]</u>	Date/Time: <u>10/24/90 12:10</u>
Relinquished by: _____	Received by: _____	Date/Time: _____
Relinquished by: _____	Received by: _____	Date/Time: _____



SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector W.S. Thompson/R.Z. Staffler Date Sampled 10/23/90 Time 0935 hours
 Company Contact W.S. Thompson Telephone (509) 373-3818 ^{0645;}_{0845;}
0945; 0935

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
699-52-57-160	1, 120 ml, amber glass;	soil;	TOTAL ORGANIC CARBON (PNL 7-40.37)
699-52-57-157A	1, 250ml, AMBER GLASS;	WATER (1/2 ml. HCL);	TOTAL ORGANIC CARBON (PNL 7-40.7)
699-52-57-157B	1, 250ml, AMBER GLASS;	WATER (1/2 ml. HCL);	TOTAL ORGANIC CARBON (PNL 7-40.7)
699-52-57-160A	1, 250ml, AMBER GLASS;	WATER (1/2 ml. HCL);	TOTAL ORGANIC CARBON (PNL 7-40.7)
699-52-57-160B	1, 120ml, AMBER GLASS;	SOIL;	TOTAL ORGANIC CARBON (PNL 7-40.37)

Field Information** Samples to be analyzed for Total organic carbon, supporting the 200-AP1 RI FS. (see statement of work)

Special Handling and/or Storage keep samples chilled on wet ice until receipt at 325 PNL lab. No hazards indicated with field instruments.

PART II: LABORATORY SECTION

Received by MWU Title Group Leader Date 10/24/90
 Analysis Required _____

*Indicate whether sample is soil, sludge, water, etc.
 **Use back of page for additional information relative to sample location.

SAMPLE RECEIPT FORM

Delivered by: Steppler Date/Time: 10/30/90 11:10

Received by: Ure

Customer Sample Number(s): 699-55-55-190 699-52-57-162

ALO Sample Number(s): 90-6725 90-6726

1. Customer Chain-of-Custody Form: Present Absent

2. Additional Shipping Forms (list):
Request for Analysis

3. Custody Seals on Shipping and/or Sample Containers and their Conditions.
Present Absent

If Present, Condition: _____

4. Sample Tag(s) ID Numbers if not Recorded on the Chain-of-Custody Record or on Sample Vial.

Notes: N/A

5. Condition of Shipping Container (Verify that ice still exists such that samples are at refrigerated temperature).
GOOD - OKAY

6. Condition of Sample Vials.
GOOD

7. Verification of Agreement or Nonagreement of Information on Receiving Documents.
Agree

8. Resolution of Problems or Discrepancies.
N/A

RETURN COMPLETED FORM TO PROJECT MANAGER

Westinghouse Hanford Company

CHAIN OF CUSTODY

Company Contact Wendy S. Thompson Telephone (509) 373-3818

Sample Collected by J.W. Roberts / R. Z. Steffler Date 10/29/90 Time 1153

Sample Locations 699-55-55 Wellsite (600 Area; 1/2 mile N. of Four Corners)

Ice Chest No. Alpha #4 Field Logbook and Page No. WHC-N-287-2

Remarks All samples to be analyzed for TOTAL ORGANIC CARBON

Bill of Lading No. - N/A - Offsite Property No. - N/A -

Method of Shipment Hand carry by ASL Sample Van to 325 PNL Lab.

Shipped to 325 PNL Lab (300 Area)

Possible Sample Hazards None indicated with Field Instruments

Sample Identification

1) 699-55-55-190
1, 120 ml; amber glass; soil; TOTAL ORGANIC CARBON (PNLT-40.37)

~~Empty sample identification lines~~

~~Empty sample identification lines~~

Chain of Possession

Relinquished by: <u>J.W. Roberts</u>	Received by: <u>R. Z. Steffler</u>	Date/Time: <u>10-29-90 / 12:20</u>
Relinquished by: <u>R. Z. Steffler</u>	Received by: <u>Steven E. Kow</u>	Date/Time: <u>10/29/90 12:29</u>
Relinquished by: <u>Steven E. Kow</u>	Received by: <u>R. Z. Steffler</u>	Date/Time: <u>10/30/90 10:12</u>
Relinquished by: <u>R. Z. Steffler</u>	Received by: <u>W. W. [Signature]</u>	Date/Time: <u>10/30/90 11:10</u>

2613474, 0150

Westinghouse Hanford Company
10/26/90

CHAIN OF CUSTODY

Company Contact: W Wendy S. Thompson Telephone: (509) 373-3818
 Sample Collected by: S.E. Kos / R.Z. Steffler Date: 10/26/90 Time: 1403
 Sample Locations: 699-52-57 wellsite, North of 200 EAST
 Ice Chest No.: Alpha # 4 Field Logbook and Page No.: WHC-N-287-2
 Remarks: All samples to be analyzed for total organic carbon
 Bill of Lading No.: NA Offsite Property No.: NA
 Method of Shipment: Hand carry by ASL Sample van to 325 PNL LAB
 Shipped to: 325 PNL LAB (300 Area)
 Possible Sample Hazards: None indicated with field instruments

Sample Identification

1) 699-52-57-162.0 FT
1, 120ml, amber glass; soil; TOTAL ORGANIC CARBON (PNL 7-40.37)

(The remaining rows of the table are crossed out with large X's)

Chain of Possession

Relinquished by: <u>STEVEN E. KOS</u> <u>Steven E. Kos</u>	Received by: <u>R.Z. Steffler</u> <u>R.Z. Steffler</u>	Date/Time: <u>10/26/90 1435</u>
Relinquished by: <u>R.Z. Steffler</u> <u>R.Z. Steffler</u>	Received by: <u>Steven E. Kos</u> <u>Steven E. Kos</u>	Date/Time: <u>10/29/90 1229</u>
Relinquished by: <u>Steven E. Kos</u> <u>Steven E. Kos</u>	Received by: <u>R.Z. Steffler</u> <u>R.Z. Steffler</u>	Date/Time: <u>10/30/90 10:12</u>
Relinquished by: <u>R.Z. Steffler</u> <u>R.Z. Steffler</u>	Received by: <u>M.W. [Signature]</u> <u>M.W. [Signature]</u>	Date/Time: <u>10/31/90 11:10</u>

ALO CHAIN OF CUSTODY

<u>90-6716</u> ALO SAMPLE NUMBER	<u>TOC (soil)</u> ANALYSIS REQUESTED	<u>699-55-55-160</u> SAMPLE DESCRIPTION
SENDER <u>MW Ulin</u>		<u>10/24/90</u> DATE
RECEIVER <u>D. Ross</u>		<u>10-24-90</u> DATE

<u>90-6717</u> ALO SAMPLE NUMBER	<u>TOC (soil)</u> ANALYSIS REQUESTED	<u>699-55-55-160A</u> SAMPLE DESCRIPTION
SENDER <u>MW Ulin</u>		<u>10/24/90</u> DATE
RECEIVER <u>D. Ross</u>		<u>10-24-90</u> DATE

<u>90-6718</u> ALO SAMPLE NUMBER	<u>TOC (soil)</u> ANALYSIS REQUESTED	<u>699-55-55-162</u> SAMPLE DESCRIPTION
SENDER <u>MW Ulin</u>		<u>10/24/90</u> DATE
RECEIVER <u>D. Ross</u>		<u>10-24-90</u> DATE

<u>90-6719</u> ALO SAMPLE NUMBER	<u>TOC (soil)</u> ANALYSIS REQUESTED	<u>699-52-57-160</u> SAMPLE DESCRIPTION
SENDER <u>MW Ulin</u>		<u>10/24/90</u> DATE
RECEIVER <u>D. Ross</u>		<u>10-24-90</u> DATE

Original - Project Management Office
 Copy - Sender
 Copy - Receiver

Applicable Test Instruction

TI-200BP-1-23

ALO CHAIN OF CUSTODY

<u>90-6723</u> ALO SAMPLE NUMBER	<u>TOC (soil)</u> ANALYSIS REQUESTED	<u>699-52-57-160B</u> SAMPLE DESCRIPTION
SENDER <u>MW Thus</u>		<u>10/24/90</u> DATE
RECEIVER <u>DA Ross</u>		<u>10-24-90</u> DATE

<u>90-6724</u> ALO SAMPLE NUMBER	<u>TOC (soil)</u> ANALYSIS REQUESTED	<u>699-55-55-166</u> SAMPLE DESCRIPTION
SENDER <u>MW Thus</u>		<u>10/24/90</u> DATE
RECEIVER <u>DA Ross</u>		<u>10-24-90</u> DATE

<u>ALO SAMPLE NUMBER</u>	<u>ANALYSIS REQUESTED</u>	<u>SAMPLE DESCRIPTION</u>
SENDER _____		DATE _____
RECEIVER _____		DATE _____

<u>ALO SAMPLE NUMBER</u>	<u>ANALYSIS REQUESTED</u>	<u>SAMPLE DESCRIPTION</u>
SENDER _____		DATE _____
RECEIVER _____		DATE _____

Original - Project Management Office
 Copy - Sender
 Copy - Receiver

Applicable Test Instruction
TI-200BP-1-23

ALO CHAIN OF CUSTODY

<u>90-6725</u> ALO SAMPLE NUMBER	<u>TOC</u> ANALYSIS REQUESTED	<u>699-55-55-190</u> SAMPLE DESCRIPTION
SENDER <u>MW Chen</u>		<u>11/6/90</u> DATE
RECEIVER <u>Dennis Ross</u>		<u>11-6-90</u> DATE

<u>90-6726</u> ALO SAMPLE NUMBER	<u>TOC</u> ANALYSIS REQUESTED	<u>699-52-57-162</u> SAMPLE DESCRIPTION
SENDER <u>MW Chen</u>		<u>11/6/90</u> DATE
RECEIVER <u>Dennis Ross</u>		<u>11-6-90</u> DATE

<u>ALO SAMPLE NUMBER</u>	<u>ANALYSIS REQUESTED</u>	<u>SAMPLE DESCRIPTION</u>
SENDER _____		DATE _____
RECEIVER _____		DATE _____

<u>ALO SAMPLE NUMBER</u>	<u>ANALYSIS REQUESTED</u>	<u>SAMPLE DESCRIPTION</u>
SENDER _____		DATE _____
RECEIVER _____		DATE _____

Original - Project Management Office
 Copy - Sender
 Copy - Receiver

Applicable Test Instruction
TI-200BP-1-24



Westinghouse
Hanford Company

OSM RCRA LEVEL C DATA ASSESSMENT

DATE 02/08/91 SAMPLES/MATRIX 49-578-157.5 48-50-176
 REVIEWED BY JA Lerch *JL* - all samples 49-578-157.5D 48-50-176.7
 LABORATORY PNL-325 begin w/699 49-578-160 48-50-168-1
 CASE # TPP 16772 prefix 49-578-161 48-50-168-2
 SDG # Report 1; Rev 0 50-538-EB 52-54468.5
TOC 50-538-155.7

DATA ASSESSMENT SUMMARY - all soil

QUALITY CONTROL CHECK	ANALYSIS	TOC		
1. <u>Holding Time</u>		<u>0</u>		
2. <u>Matrix Spike</u>		<u>0</u>		
3. <u>Duplicate Analysis</u>		<u>X</u>		
4. <u>Blanks</u>		<u>0</u>		
5. <u>Calibration/Control Stds</u>		<u>0</u>		
6. <u>Other QC - see attachment</u>				
7. _____				
8. _____				
9. _____				
10. _____				

0 = data had no problems
 X = data qualified due to minor problems
 M = data qualified due to major problems/some data may be unusable

OVERALL ASSESSMENT: no major problems - all results
acceptable w/qualification

NOTES: none

o Refer to the corresponding attachments for explanation of any problems.

RCRA LEVEL C QC

Name JA Lerch *fl* Date 02/08/91

QC Check: holding time

COMMENTS: 14 day requirement met for
all samples

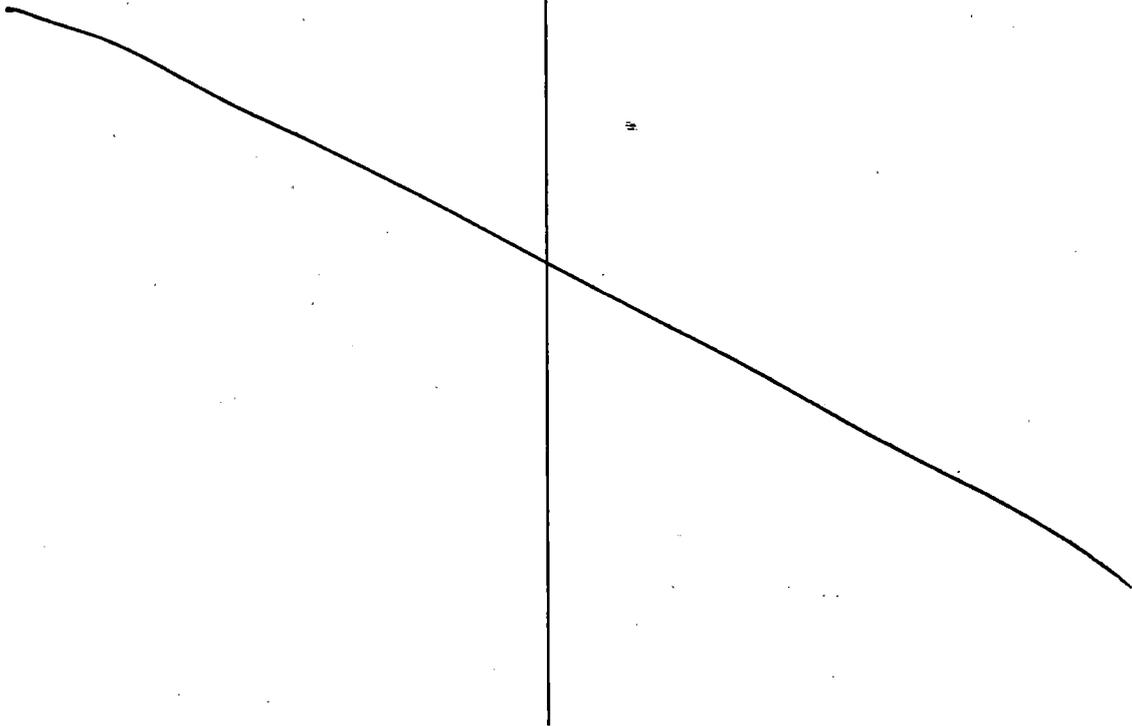
ACTION: none

<u>sample #</u>	<u>constituent</u>	<u>value/qual</u>	<u>sample #</u>	<u>constituent</u>	<u>value/qual</u>
 					

RCRA LEVEL C QC

Name JA Lerch JF Date 02/08/91QC Check: Matrix SpikeCOMMENTS: spike + spike duplicate 70R acceptable- no MS or MSD required by SOW or procedureACTION: none

<u>sample #</u>	<u>constituent</u>	<u>value/qual</u>	<u>sample #</u>	<u>constituent</u>	<u>value/qual</u>
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RCRA LEVEL C QC

Name JA Lerch Date 02/08/90

QC Check: Duplicate Analysis

COMMENTS: all samples run in duplicate, some RPD's high (>15%)

ACTION: qualify associated results as per OSM guidelines

<u>sample #</u>	<u>constituent</u>	<u>value/qual</u>	<u>sample #</u>	<u>constituent</u>	<u>value/qual</u>
699-49-578-157.5	TOC	J			
699-49-578-157.5D	↓	↓			
699-49-578-160	↓	↓			
699-50-538-EB	↓	↓			
699-50-538-155.7	↓	↓			

RCRA LEVEL C QC

Name JA Lerch *JL* Date 02/08/91QC Check: BlanksCOMMENTS: daily blanks are used to set quantitation
limits (see CASE NARRATIVE)evaluation of contamination cannot
be made - all results sig > than
any blank values

ACTION: _____

nonesample # constituent value/qualsample # constituent value/qual

RCRA LEVEL C QC

Name JA Lerch Date 02/08/91

QC Check: Calibration/control Std

COMMENTS: glucose std used for calibration;
recoveries acceptable

ACTION: none

<u>sample #</u>	<u>constituent</u>	<u>value/qual</u>	<u>sample #</u>	<u>constituent</u>	<u>value/qual</u>
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~~Table content is crossed out with a large diagonal line.~~

RCRA LEVEL C QCName J A Lerch *JL* Date 02/08/91QC Check: Other QCCOMMENTS: Table 2: ug C in sample = result -
blank value; sample values
may be biased lowACTION: none

<u>sample #</u>	<u>constituent</u>	<u>value/qual</u>	<u>sample #</u>	<u>constituent</u>	<u>value/qual</u>
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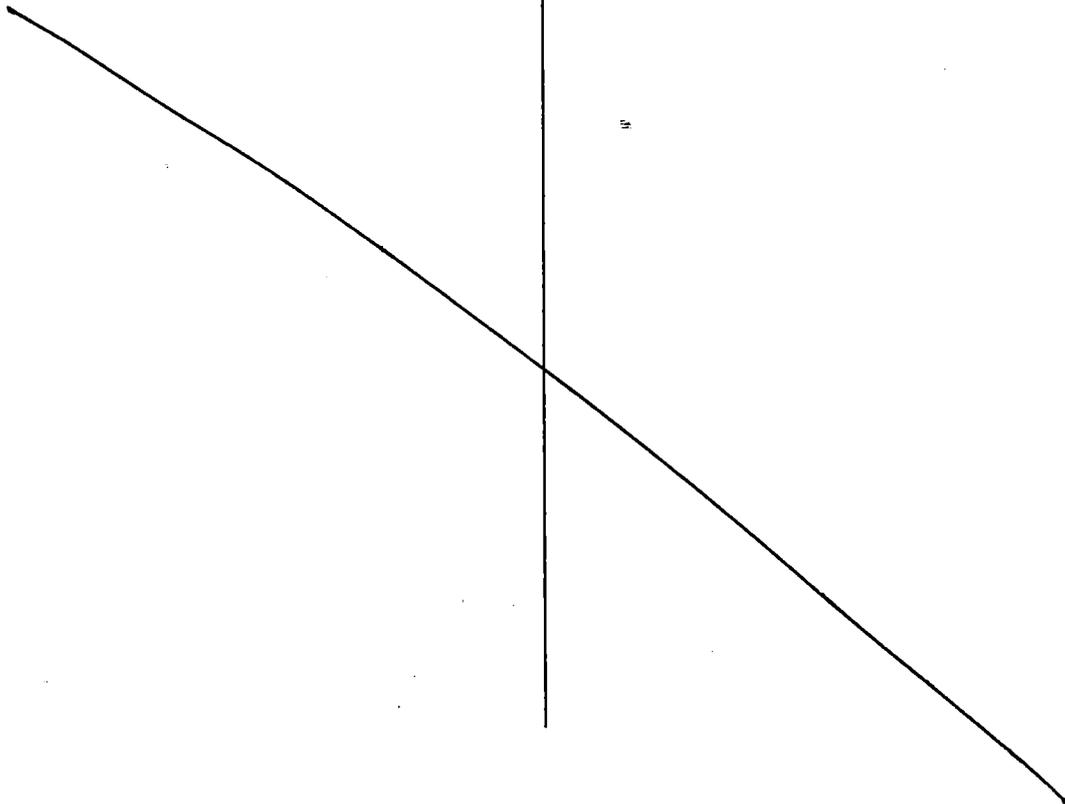


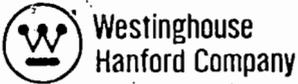
Table 2: 200-BP-1 Total Organic Carbon Analysis Data

WHC Sample ID#	PNL-ALO #	Sample wt. g	ug C Blank (Pt Boat in Ladle)	ug C Result	ug C in Sample	ug C/g Sample	% std dev of Dups	Date Sampled	Date Analyzed	Glucose Spike g	ug C Spike g	ug C (Spike) Sample + Blank) Observed	% Spike Recovery
699-49-57B-157.5	90-3280	0.18792	4.75	37.29	32.54	173 J	26%	4/24/90	4/27/90				
"	"	0.19745	4.75	28.45	23.7	120		4/24/90	4/27/90				
699-49-57B-157.5D	90-3281	0.25495	4.75	29.06	24.31	95 J	39%	4/24/90	4/27/90				
"	"	0.31045	4.75	21.47	16.72	54		4/24/90	4/27/90				
699-49-57B-160	90-3282	0.27366	4.75	23.53	18.78	69 J	19%	4/24/90	4/27/90				
"	"	0.27637	4.75	19.3	14.55	53		4/24/90	4/27/90				
699-49-57B-161	90-3283	0.27576	3.16	34.41	31.25	113	1%	4/24/90	4/30/90				
"	"	0.34931	3.16	42.35	39.19	112		4/24/90	4/30/90				
699-50-53B-EB	90-3314	0.18475	2.92	20.23	17.31	94 J	34%	4/25/90	5/01/90				
"	"	0.24803	2.92	17.13	14.21	57		4/25/90	5/01/90				
699-50-53B-155.7	90-3315	0.29305	2.92	15.63	12.71	43 J	53%	4/25/90	5/01/90				
"	"	0.3047	2.92	31.92	29.05	95		4/25/90	5/01/90				
Spike													
699-49-57B-157.5D	90-3281	0.14141	4.8	-	(10.55)	-		4/24/90	5/03/90	0.0030	(1228)	1090.7	87.56
Spike Duplicate													
699-49-57B-157.5D	"	0.15612	4.8	-	(11.65)	-		4/24/90	5/03/90	0.0040	(1608)	1455.39	88.84
6699-48-50-168-1	90-3462	0.2176	4.67	43.02	38.35	176	15%	5/03/90	5/15/90				
"	"	0.26443	4.67	42.03	37.36	141		5/03/90	5/15/90				
699-48-50-176	90-3460	0.2063	12.48	43.29	30.81	149 *	1%	5/04/90	5/16/90				
"	"	0.2602	12.48	50.84	38.36	147 *		5/04/90	5/16/90				
699-48-50-168-2	90-3463	0.3129	4.67	45.72	41.05	131	8%	5/03/90	5/15/90				
"	"	0.30397	4.67	49.18	44.51	146		5/03/90	5/15/90				
699-48-50-176.7	90-3461	0.1986	12.48	56.34	43.86	221 *	1%	5/04/90	5/16/90				
"	"	0.1997	12.48	55.99	43.51	218 *		5/04/90	5/16/90				
699-52-54-168.5	90-3728	0.12935	4.42	40.65	36.23	280	10%	5/22/90	5/30/90				
"	"	0.11188	4.42	42.41	37.99	340		5/22/90	5/30/90				
"	"	0.1258	4.42	38.86	34.44	274		5/22/90	5/30/90				
"	"	0.12742	4.42	43.24	38.82	305		5/22/90	5/30/90				

* Results may be low due to uncertainty in blank value. Based on an average blank value of 5 ug C, the reported sample values may be ~20% low.

2910-1416198

JJ
02/08/90



OSM RCRA LEVEL C DATA ASSESSMENT

DATE 12/31/90 SAMPLES/MATRIX 55-55-160 52-57-157B
 REVIEWED BY JA Lerch *-all samples begin w/699 prefix* 55-55-160A 52-57-160B
 LABORATORY PNL-325 55-55-162 55-55-166
 CASE # TPP 16772 52-57-160 55-55-190
 SDG # Report 3; Rev 0 52-57-157A 52-57-162
TOC 52-57-160A

DATA ASSESSMENT SUMMARY

QUALITY CONTROL CHECK	ANALYSIS	TOC		
1. <u>Holding time</u>		<u>0</u>		
2. <u>Matrix Spike</u>		<u>0</u>		
3. <u>Duplicate Analysis</u>		<u>X</u>		
4. <u>Blanks (see attach)</u>		<u>0</u>		
5. <u>Calibration/Control Std</u>		<u>0</u>		
6. <u>Other QC</u>		<u>see attach</u>		
7. _____		_____		
8. _____		_____		
9. _____		_____		
10. _____		_____		

0 = data had no problems
 X = data qualified due to minor problems
 M = data qualified due to major problems/some data may be unusable

OVERALL ASSESSMENT: no major problems - all results acceptable w/qualification

NOTES: see other for PNL-WHC sample ID correlations + sample matrix table

o Refer to the corresponding attachments for explanation of any problems.

RCRA LEVEL C QC

Name JA Lerch Date 12/31/90

QC Check: Holding time

COMMENTS: 28 day holding time met for
all samples

ACTION: none

<u>sample #</u>	<u>constituent</u>	<u>value/qual</u>	<u>sample #</u>	<u>constituent</u>	<u>value/qual</u>
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RCRA LEVEL C QC

Name

JA Lerch

Date

12/31/90

QC Check:

Matrix Spike

COMMENTS:

all MS recoveries for water within
acceptable limits- no MS run on soils

- MS not required by TPP or SOW according to case Narrative

ACTION:

nonesample # constituent value/qualsample # constituent value/qual

RCRA LEVEL C QC

Name JA Kerch *JK* Date 12/31/90QC Check: Duplicate AnalysisCOMMENTS: Duplicate RPD high on sample
699-55-55-162ACTION: qualify associated results as per
OSM guidelines

<u>sample #</u>	<u>constituent</u>	<u>value/qual</u>	<u>sample #</u>	<u>constituent</u>	<u>value/qual</u>
699-55-55-162	TOC	21.5 J			

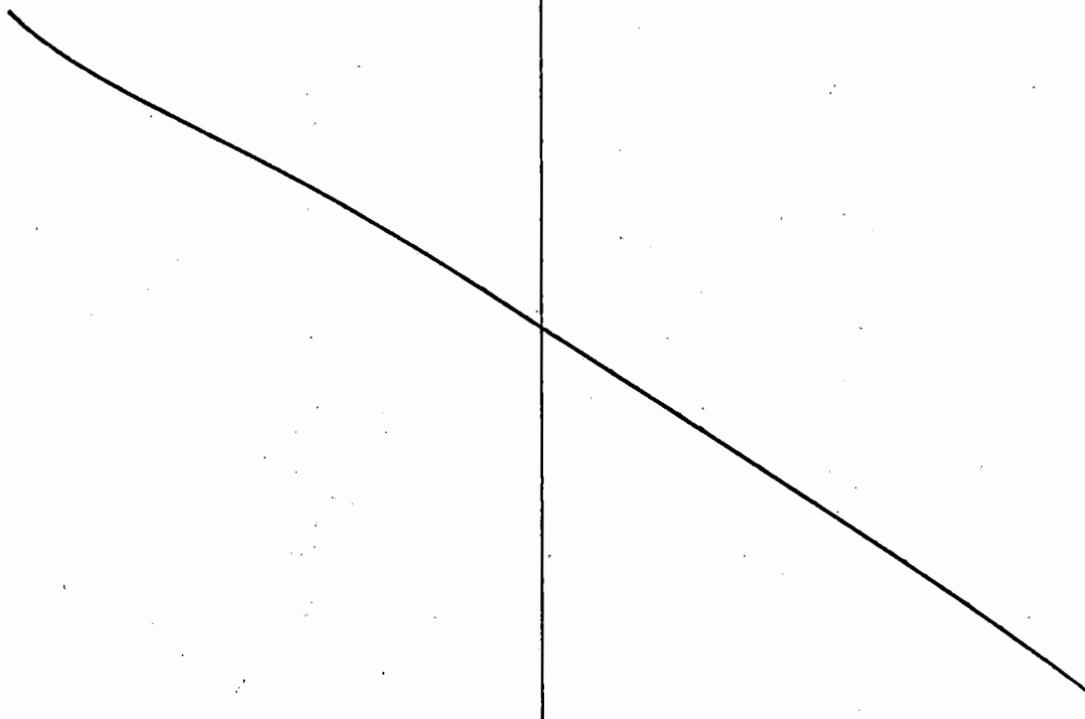
RCRA LEVEL C QC

Name JA Lerch *JL* Date 12/31/90QC Check: Blank Analysis

COMMENTS: Daily blanks are used to set daily
sample quantitation limits (for more info
See CASE NARRATIVE: TOC Analysis Results)
evaluation of contamination cannot be made

ACTION: none

<u>sample #</u>	<u>constituent</u>	<u>value/qual</u>	<u>sample #</u>	<u>constituent</u>	<u>value/qual</u>
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RCRA LEVEL C QC

Name JA Lerch *fl* Date 12/30/90

QC Check: Calibration/Control Std

COMMENTS: TOC - all Std recoveries ok

ACTION: none

<u>sample #</u>	<u>constituent</u>	<u>value/qual</u>	<u>sample #</u>	<u>constituent</u>	<u>value/qual</u>
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~~Table content is crossed out with a large diagonal line.~~

RCRA LEVEL C QC

Name JA Lerch *JL* Date 12/30/90

QC Check: Other QC

COMMENTS: none

ACTION: none

sample # constituent value/qual | sample # constituent value/qual

Table 2: 200-BP-1 Total Organic Carbon Analysis Data
Soil Samples

WHC Sample #	PNL ALO #	Sample Type	Sample wt. g	ug C Results	ug C in Sample	mg/Kg Sample	RSD (%) Dups	% rec. spike	Date Sampled	Date Analyzed
699-55-55-160	90-6716-1	Sample	0.28326	28.84	26.13	92.3	8		10-23-90	10-26-90
"	90-6716-2	Duplicate	0.25249	28.81	26.1	103			10-23-90	10-26-90
"	90-6716-3	Standard						99.25		10-26-90
"	90-6716-4	Blank		2.71						10-26-90
699-55-55-160-A	90-6717-1	Sample	0.28147	37.81	35.1	125	8		10-23-90	10-26-90
"	90-6717-2	Duplicate	0.3173	37.97	35.26	111			10-23-90	10-26-90
"	90-6717-3	Standard						99.25		10-26-90
"	90-6717-4	Blank		2.71						10-26-90
699-55-55-162	90-6718-1	Sample	0.55697	14.71	12	21.5	24		10-23-90	10-26-90
"	90-6718-2	Duplicate	0.60811	21.29	18.58	30.6			10-23-90	10-26-90
"	90-6718-3	Standard						99.25		10-26-90
"	90-6718-4	Blank		2.71						10-26-90
699-52-57-160	90-6719-1	Sample	0.33163	22.93	20.22	61.0	3		10-23-90	10-26-90
"	90-6719-2	Duplicate	0.39409	25.6	22.89	58.1			10-23-90	10-26-90
"	90-6719-3	Standard						99.25		10-26-90
"	90-6719-4	Blank		2.71						10-26-90
699-52-57-160-B	90-6723-1	Sample	0.3902	34.54	32.83	84.1	3		10-23-90	10-26-90
"	90-6723-2	Duplicate	0.2981	28.93	26.22	88.0			10-23-90	10-26-90
"	90-6723-3	Standard						99.12		10-26-90
"	90-6723-4	Blank		2.71						10-26-90
699-55-55-166	90-6724-1	Sample	0.36091	24.92	22.21	61.5	14		10-24-90	10-26-90
"	90-6724-2	Duplicate	0.40881	33.39	30.68	75.1			10-24-90	10-26-90
"	90-6724-3	Standard						99.12		10-26-90
"	90-6724-4	Blank		2.71						10-26-90
699-55-55-190	90-6725-1	Sample	0.4421	17.1	10.5	23.8	7		10-29-90	11-13-90
"	90-6725-2	Duplicate	0.4401	16.09	9.49	21.6			10-29-90	11-13-90
"	90-6725-3	Standard						101.7		11-13-90
"	90-6725-4	Blank		6.6						11-13-90
699-52-57-162.0	90-6726-1	Sample	0.31368	21.63	15.03	47.9	2		10-26-90	11-13-90
"	90-6726-2	Duplicate	0.27817	19.48	12.88	46.3			10-26-90	11-13-90
"	90-6726-3	Standard						101.7		11-13-90
"	90-6726-4	Blank		6.6						11-13-90

Total Organic Carbon by PNL Procedure 7-40.37, on Instrument WA92040, 325 Bldg., rm 313. Data reported from LRB 52996, pp 53-57.

JJ
12/31/90

9613474-0170

Table 3: 200-BP-1 Total Organic Carbon Analysis Data
Water Samples

WHC Sample #	PNL Sample #	Sample Type	ug/mL Sample	Ave. ug/mL Sample	RSD of Dups (%)	Spike %Rec	C4 Cntrl %Rec	Lab Cntrl %Rec	Date Sampled	Analyzed
		10ppm Lab Cntrl	10.0 9.4 10.1	9.8				98		
		Water Blank	0.08 0.13	0.11						
699-52-57-157-A	90-6720-1	Sample	0.41	0.36	19.6				10-23-90	10-26-90
	90-6720-2	Duplicate	0.31							
	90-6720-3	Sample+Spike	2.06	2.08	1.4	115				
	"	"	2.10							
699-52-57-157-B	90-6721-1	Sample	0.99	0.90	14.1				10-23-90	10-26-90
	90-6721-2	Duplicate	0.81							
	90-6721-3	Sample+Spike	2.04	2.06	1.4	77				
	"	"	2.08							
699-52-57-160-A	90-6722-1	Sample	0.65	0.62	8.0				10-23-90	10-26-90
	90-6722-2	Duplicate	0.58							
	90-6722-3	Sample+Spike	2.65	2.46	10.9	123				
	"	"	2.27							
	90-6722-5	Blank	0.06	0.12						
	"	"	0.17							
	90-6722-4	Blank+Spike	1.89	1.87	1.5		117			
	"	"	1.85							
		10ppm Lab Cntrl	10.6 10.4	10.5	1.4			105		

Total Organic Carbon by PNL Procedure 7-40.7, on Instrument WA64102, 325 Bldg., rm 400. Data reported from LRB 53093, pp 55.

Samples and Controls spiked at 1.5 ppm. The 1.5 ppm spike level is about 2xDL and therefore spikes exhibit somewhat poor recovery

96130741071