

**START**

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

**TOTAL ORGANIC CARBON DATA PACKAGE No. 2**

**Revision 0**

**November 21, 1990**



**Prepared by: B.M. Gillespie**

**Pacific Northwest Laboratory**

**(PNL Project #16772)**



i KDD 5/28/96

## 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) 17662 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

11-26-90  
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

11/26/90  
Date

TABLE 1: 200-BP-1 Sample Numbers

| <u>WHC Sample Number</u> | <u>PNL ALO Sample Number</u> | <u>Sample Type</u> |
|--------------------------|------------------------------|--------------------|
| 699-49-57B-216           | 90-5337                      | Soil               |
| 699-49-57B-216A          | 90-5338                      | Soil               |
| 699-49-57B-216B          | 90-5339                      | Water              |
| 699-49-57B-216C          | 90-5340                      | Water              |
| 699-49-57B-220           | 90-5341                      | Soil               |
| 699-49-57B-216D          | 90-5342                      | Water              |
| 699-49-57B-229           | 90-5348                      | Soil               |
| 699-49-57B-299A          | 90-5349                      | Water              |
| 699-50-53B-208           | 90-5354                      | Soil               |
| 699-50-53B-208A          | 90-5355                      | Soil               |
| 699-50-53B-214           | 90-6702                      | Soil               |
| 699-50-53B-225           | 90-6703                      | 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 CO<sub>2</sub> 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 purposes of this report, the daily blank value is used as the lower quantification limit for the analyses. 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 in this data package. This "method detection limit," defined as three times the standard deviation of the blank values, is  $\sim 5 \mu\text{g}$  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 less than 2% to 89%. 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  $\alpha$ -D Glucose standard) for this set of data, the recoveries ranged from 88% to 102%. The average recovery was 97.5% with a standard deviation of 4%. The conclusion is that the precision from this set of data is  $\pm 4\%$  relative, and a bias (accuracy) of -3% 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 three of the soil sample analyses in this data report. The three analyses that failed to meet hold times were performed two days late due to the required 100% real time surveillance backlog by the QA engineers. The "late" analyses of the samples has no impact on the results.

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 mg/ml.

Samples were analyzed in duplicate. Duplicate results differed significantly. The percent standard deviations ranged from less than 1% to 25%. 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 95% to 105%. The average recovery for the 10 ppm standard was 100% with a standard deviation of 5%. The conclusion is that the precision from this set of data is  $\pm 5\%$  relative, and a bias (accuracy) of 0 on the average. The spike recoveries, however, were not as good. The average recovery was 71% with a standard deviation of 19%. 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 not met for the water sample analyses in this data report. Upon analysis of the samples within the hold time, the results were found to be extremely poor. The instrument was in need of repair. Samples were reanalyzed as soon as the instrument was repaired. The "late" analysis of the samples has no significant impact on the results as the water samples were properly acidified in the field prior to delivery.

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

| WHC Sample #     | PNL Sample # | Sample Type | Sample Wt, g | ug C Result | ug C in Sample | mg C/Kg Sample | % Std Dev of Dups | Date Sampled | Analyzed |
|------------------|--------------|-------------|--------------|-------------|----------------|----------------|-------------------|--------------|----------|
| 699-49-57B-216   | 90-5337-1    | Sample      | 0.10728      | 15.42       | 10.3           | 96.0 J         | 19.48             | 10-01-90     | 10-16-90 |
| " "              | 90-5337-2    | Duplicate   | 0.11847      | 13.74       | 8.62           | 72.8           |                   | 10-01-90     | 10-16-90 |
| " "              | 90-5337-4    | Blank       |              |             |                | 5.12           |                   |              | 10-16-90 |
| 699-49-57B-216-A | 90-5338-1    | Sample      | 0.15658      | 13.3        | 8.18           | 52.2 J         | 1.81              | 10-01-90     | 10-16-90 |
| " "              | 90-5338-2    | Duplicate   | 0.18086      | 14.33       | 9.21           | 50.9           |                   | 10-01-90     | 10-16-90 |
| " "              | 90-5338-4    | Blank       |              |             |                | 5.12           |                   |              | 10-16-90 |
| 699-49-57B-220   | 90-5341-1    | Sample      | 0.20066      | 11.98       | 7.82           | 39.0 J         | 3.55              | 10-02-90     | 10-17-90 |
| " "              | 90-5341-2    | Duplicate   | 0.177        | 10.72       | 6.56           | 37.1           |                   | 10-02-90     | 10-17-90 |
| " "              | 90-5341-4    | Blank       |              |             |                | 4.16           |                   |              | 10-17-90 |
| 699-49-57B-229   | 90-5348-1    | Sample      | 0.25607      | 17.61       | 12.79          | 50.0 J         | 37.42             | 10-08-90     | 10-18-90 |
| " "              | 90-5348-2    | Duplicate   | 0.2927       | 29.96       | 25.14          | 85.9           |                   | 10-08-90     | 10-18-90 |
| " "              | 90-5348-4    | Blank       |              |             |                | 4.82           |                   |              | 10-18-90 |
| 699-50-53B-208   | 90-5354-1    | Sample      | 0.12673      | 7.68        | 2.86           | 22.6 J         | 53.21             | 10-10-90     | 10-18-90 |
| " "              | 90-5354-2    | Duplicate   | 0.1192       | 6.04        | 1.22           | 10.2           |                   | 10-10-90     | 10-18-90 |
| " "              | 90-5354-4    | Blank       |              |             |                | 4.82           |                   |              | 10-18-90 |
| 699-50-53B-208A  | 90-5355-1    | Sample      | 0.13256      | 8.33        | 3.51           | 26.5           | 7.15              | 10-10-90     | 10-18-90 |
| " "              | 90-5355-2    | Duplicate   | 0.16214      | 9.57        | 4.75           | 29.3           |                   | 10-10-90     | 10-18-90 |
| " "              | 90-5355-4    | Blank       |              |             |                | 4.82           |                   |              | 10-18-90 |
| 699-50-53B-214   | 90-6702-1    | Sample      | 0.30895      | 9.17        | 4.35           | 14.1           | 9.42              | 10-11-90     | 10-18-90 |
| " "              | 90-6702-2    | Duplicate   | 0.31202      | 9.84        | 5.02           | 16.1           |                   | 10-11-90     | 10-18-90 |
| " "              | 90-6702-4    | Blank       |              |             |                | 4.82           |                   |              | 10-18-90 |
| 699-50-53B-225   | 90-6703-1    | Sample      | 0.21405      | 16.94       | 12.12          | 56.6 * R       | 88.84             | 10-12-90     | 10-18-90 |
| " "              | 90-6703-2    | Duplicate   | 0.22741      | 61.2        | 56.38          | 248            |                   | 10-12-90     | 10-18-90 |
| " "              | 90-6703-4    | Blank       |              |             |                | 4.82           |                   |              | 10-18-90 |

\* Sample was very wet.

Detection Limits for the three blank results above (3 times std. dev.) is 1.5ppm.

Total Organic Carbon by PNL Procedure 7-40.37, on Instrument WA92040, 325 Bldg., rm 313. Data reported from LRB 52996, pp 48-51.

Relative Standard Deviation of the nine standards analyzed is 1.95%.

*JF*  
10/09/91

9613478.1643

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

| WHC Sample #    | PNL Sample # | Sample Type     | ug/mL<br>Sample     | Ave.<br>ug/mL<br>Sample | RSD of<br>Dups<br>(%) | Spike<br>%Rec | C4<br>Cntrl<br>%Rec | Lab<br>Cntrl<br>%Rec | Date<br>Sampled | Analyzed |
|-----------------|--------------|-----------------|---------------------|-------------------------|-----------------------|---------------|---------------------|----------------------|-----------------|----------|
|                 |              | 10ppm Lab Cntrl | 10.1<br>10.5        | 10.3                    |                       |               |                     | 103                  |                 |          |
| 699-49-57B-216B | 90-5339-1    | Sample          | 0.67                | J 0.63                  | 9.0                   |               |                     |                      | 10-01-90        | 10-24-90 |
|                 | 90-5339-2    | Duplicate       | 0.59                |                         |                       |               |                     |                      |                 |          |
|                 | 90-5339      | Triplicate      | 0.65                | 0.61                    | 9.3                   |               |                     |                      |                 |          |
|                 | "            | Quadruplicate   | 0.57                |                         |                       |               |                     |                      |                 |          |
|                 | 90-5339-3    | Sample+Spike    | 1.46<br>1.3         | 1.38                    | 8.2                   | 50            |                     |                      |                 |          |
|                 | 90-5339-4    | Blank+Spike     | 1.16<br>1.22        | 1.19                    | 3.6                   |               | 77                  |                      |                 |          |
|                 | 90-5339-5    | Blank           | 0.05<br>0.004       | 0.03                    |                       |               |                     |                      |                 |          |
|                 | 90-5339-6    | Dupl+Spike      | 1.57<br>1.35        | 1.46                    | 11                    | 56            |                     |                      |                 |          |
| 699-49-57B-216C | 90-5340-1    | Sample          | 0.40                | J 0.34                  | 25                    |               |                     |                      | 10-01-90        | 10-24-90 |
|                 | 90-5340-2    | Duplicate       | 0.28                |                         |                       |               |                     |                      |                 |          |
|                 | 90-5340-3    | Sample+Spike    | 1.40<br>1.20        | 1.30                    | 11                    | 64            |                     |                      |                 |          |
| 699-49-57B-216D | 90-5342-1    | Sample          | 0.16                | J 0.17                  | 4.3                   |               |                     |                      | 10-02-90        | 10-24-90 |
|                 | 90-5342-2    | Duplicate       | 0.17                |                         |                       |               |                     |                      |                 |          |
|                 | 90-5342-3    | Sample+Spike    | 1.40<br>1.30        | 1.35                    | 5.2                   | 79            |                     |                      |                 |          |
|                 |              | 10ppm Lab Cntrl | 9.3<br>9.1<br>9.9   | 9.4                     |                       |               |                     | 94                   |                 |          |
|                 |              | 10ppm Lab Cntrl | 10.0<br>9.4<br>10.1 | 9.8                     |                       |               |                     | 98                   |                 |          |
| 699-49-57B-229A | 90-5349-1    | Sample          | 1.34                | J 1.33                  | 1.1                   |               |                     |                      | 10-08-90        | 10-25-90 |
|                 | 90-5349-2    | Duplicate       | 1.32                |                         |                       |               |                     |                      |                 |          |
|                 | 90-5349-3    | Sample+Spike    | 2.94<br>2.82        | 2.88                    | 2.9                   | 103           |                     |                      |                 |          |
|                 |              | 10ppm Lab Cntrl | 10.6<br>10.4        | 10.5                    |                       |               |                     | 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

J  
2/09/91

905310.644

SAMPLE RECEIPT-FORMDelivered by: Steffler Date/Time: 10/2/90 1600Received by: M W UrieCustomer Sample Number(s): <sup>(-99-49-578-)</sup>  
216, 216-A, 216-B, 216-CALO Sample Number(s): 90-5337, 90-5338, 90-5339 -90-53401. Customer Chain-of-Custody Form: Present  Absent 

2. Additional Shipping Forms (list):

SAMPLE ANALYSIS REQUEST

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

Present  Absent If Present, Condition: 90-5337 Sealed only against cap - not bottle  
OTHERS OKAY

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).

PICKED INTO 325 BLDG BY STEFFLER COULD NOT VERIFY SHIPPING CONTAINER.

6. Condition of Sample Vials.

GOODV FELT COLD SAMPLES

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

AGREEMENT MWU

8. Resolution of Problems or Discrepancies.

N/A

RETURN COMPLETED FORM TO PROJECT MANAGER

BC1-302

9613478 1646

Westinghouse Hanford Company

CHAIN OF CUSTODY

Company Contact: W S Thompson Telephone: 373-3818  
 Sample Collected by: R. Z. Stiller Date: 10/1/90 Time: 1400  
 Sample Locations: 699-49-57B  
 Ice Chest No.: 51500 POLYISOLEX Field Logbook and Page No.: WMC-N-277-2 22, 23  
 Remarks: samples from 699-49-57B to be carried by ASL van for analysis to 200-BP-1 TOC.  
 Bill of Lading No.: 0 NA Offsite Property No.: NA  
 Method of Shipment: hand carry / ASL van  
 Shipped to: hand carry to 325 PNL LAB. in ASL LAB.  
 Possible Sample Hazards: none indicated by field instruments

Sample Identification

- 1) 699-49-57B-216  
1,250 ml amber glass, aquifer soil, SW846, Method 9060, TOC.
- 2) 699-49-57B-216-A  
1,250 ml amber glass aquifer soil, SW846, Method 9060, TOC.
- 3) 699-49-57B-216-B  
1,125 ml plastic bottle, Method 9060, TOC, water, 2ml HCL
- 4) 699-49-57B-216-C  
1,125 ml plastic bottle, Method 9060, TOC, water, 2ml HCL

*WST 10/1/90*

Chain of Possession

|   |                                      |                                       |
|---|--------------------------------------|---------------------------------------|
| Relinquished by:<br><u>J. S. Thompson</u> | Received by:<br><u>R. Z. Stiller</u> | Date/Time:<br><u>10/1/90</u>          |
| Relinquished by:<br><u>R. Z. Stiller</u>  | Received by:<br><u>M. W. White</u>   | Date/Time:<br><u>10/2/90 1600 HRS</u> |
| Relinquished by:                          | Received by:                         | Date/Time:                            |
| Relinquished by:                          | Received by:                         | Date/Time:                            |



Westinghouse  
Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector W.S. Thompson / RE Suttler Date Sampled 10/1/90 Time 11:40 hours  
 Company Contact W.S. Thompson Telephone (509) 373-3818 <sup>1055</sup>

| Sample Number                                    | Number and Type of Sample Containers | Type of Sample*      | Analysis Requested    |
|--|--------------------------------------|----------------------|-----------------------|
| 1) 699-49-57B-216                                | 1, 250 ml amber glass                | aqueous soil, SW 846 | Method 9060 TOC       |
| 2) 699-49-57B-216-A                              | 1, 250 ml amber glass                | aqueous soil, SW 846 | Method 9060, T.O.C.   |
| 3) 699-49-57B-216 B                              | 1, 125 ml plastic bottle             | Method 9060 TOC      | 2 ml HCl preservative |
| 4) 699-49-57B-216 C                              | 1, 125 ml plastic bottle             | Method 9060 TOC      | 2 ml HCl preservative |
| <del>Empty rows crossed out with a large X</del> |                                      |                      |                       |

Field Information\*\* samples hand carried to X 325 PNL Lab.

Special Handling and/or Storage keep cool on wet ice

PART II: LABORATORY SECTION

Received by MW Th Title Group Leader Date 10/2/90  
 Analysis Required \_\_\_\_\_

\*Indicate whether sample is soil, sludge, water, etc.

\*\*Use back of page for additional information relative to sample location.

7615478.1010

SAMPLE RECEIPT FORM

Delivered by: STEFFLER Date/Time: 10/2 1600

Received by: M W. URIE

Customer Sample Number(s): 699-49-57B-220, 699-49-57B-216D

ALO Sample Number(s): 90-5341 90-5342

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

2. Additional Shipping Forms (list):  
REQ. FOR SAMPLE 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).

PICKED INTO 325 BLDG BY STEFFLER COULD NOT VERIFY SHIPPING CONTAINER. SAMPLES FELT COLD

6. Condition of Sample Vials.

GOOD

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

AGREE MWL

8. Resolution of Problems or Discrepancies.

N/A

RETURN COMPLETED FORM TO PROJECT MANAGER

9613478, 1649

Company Contact W S Thompson Telephone 373-3818

Sample Collected by W S Thompson <sup>RZ Steffler</sup> Date 10/2/90 Time 0830, 0750

Sample Locations 699-49-57B; 600 AREA; just north of B/C ribs

Ice Chest No. 1 - SLEEPY POLYCOOLER Field Logbook and Page No. WMC-N-287-2 pg-24-

Remarks samples to be collected and shipped to 325 PNL LAB

Analysis of SW846, 9060, Total Organic Carbon

Bill of Lading No. NA Offsite Property No. NA

Method of Shipment hand carry in ASL sample van

Shipped to 325 PNL LAB

Possible Sample Hazards none indicated with field instruments

Sample Identification

1) 699-49-57B-220  
1,250 ml, amber glass, soil, Method 9060 T.O.C. analysis

2) 699-49-57B-216D, 1,125 ml plastic, 2ml HCL, water, Method 9060 T.O.C

Chain of Possession

|  |   |                                    |
|--|---|------------------------------------|
| Relinquished by: <u>W.S. Thompson</u><br><u>Wendy Thompson</u> | Received by: <u>R.Z. Steffler</u><br><u>R.Z. Steffler</u> | Date/Time: <u>10/2/90 1010HRS</u>  |
| Relinquished by: <u>R.Z. Steffler</u>                          | Received by: <u>MW</u>                                    | Date/Time: <u>10/2/90 1600 HRS</u> |
| Relinquished by:   | Received by:  | Date/Time:                         |
| Relinquished by:   | Received by: <u>BC1-106</u>                               | Date/Time:                         |



SAMPLE RECEIPT FORM

Delivered by: Steffler Date/Time: 10/9/90 8:05

Received by: M. Urie

Customer Sample Number(s): 699-49-57B-229 699-49-57B-299A

ALO Sample Number(s): SOIL 90-5348 WATER 90-5349

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

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

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).

SAMPLE HAS BE DELIVERED TO 325 BLDG - ICE NOT VERIFIED - SAMPLES COLD

6. Condition of Sample Vials.

GOOD

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

Agree MW

8. Resolution of Problems or Discrepancies.

RETURN COMPLETED FORM TO PROJECT MANAGER

9613478, 1652

Westinghouse Hanford Company

CHAIN OF CUSTODY

Company Contact W.S. Thompson Telephone 373-3818

Sample Collected by W.S. Thompson; R.Z. Stiller Date 8/10/90 Time 1345; 1350

Sample Locations 699-49-57B-229

Ice Chest No. "SLEEPY POLYCOOLER" Field Logbook and Page No. WHC-N-287-2 pg 36-38

Remarks Samples to be analyzed for 200-13P-1 Total Organic Carbon Analysis

Bill of Lading No. NA Offsite Property No. NA

Method of Shipment hand carry by ASL sample van to 325 PNL

Shipped to 325 PNL Lab

Possible Sample Hazards none indicated with field instruments

Sample Identification

1) 699-49-57B-229 90-5348  
1, 120ml, amber glass, soil; TOC; Method 9060

2) 699-49-57B-229 A 90-5349  
1, 250 ml, amber glass; water; TOC; Method 9060; 1 ml H<sub>2</sub>SO<sub>4</sub> added

~~NA~~

~~NA~~

Chain of Possession

|   |   |                                |
|---|---|--------------------------------|
| Relinquished by: <u>W.S. Thompson</u><br><u>W.S. Thompson</u> | Received by: <u>R.Z. Stiller</u><br><u>R.Z. Stiller</u> | Date/Time: <u>10/8/90 1435</u> |
| Relinquished by: <u>R.Z. Stiller</u>                          | Received by: <u>M.W. Urie</u>                           | Date/Time: <u>10/9/90 8:05</u> |
| Relinquished by:  | Received by:  | Date/Time:                     |
| Relinquished by:  | Received by: <u>BC2-379</u>                             | Date/Time:                     |



Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector W.S. Thompson; RE Steffler Date Sampled 10/8/90 Time 1345 hours  
Company Contact W.S. Thompson Telephone (509) 373-3818

| Sample Number  | Number and Type of Sample Containers | Type of Sample* | Analysis Requested   |
|----------------|--------------------------------------|-----------------|--|
| 699-49-57B-229 | 1, 120ml, amber glass                | soil            | TOC; Method 9060   |
| 699-49-57-229A | 1, 250ml, amber glass                | water           | TOC Method 9060; 1 ml H <sub>2</sub> SO <sub>4</sub> added |
| NA             |                                      |                 |  |

Field Information\*\* Samples to be analyzed for Total <sup>organic carbon</sup> ~~organic carbon~~; Method 9060;  
10/8/90 WST

Special Handling and/or Storage hand carry to 325 PNL Lab for analysis

PART II: LABORATORY SECTION

Received by M W Uchi Title Group Leader Date 10/9/90  
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: Stuffer Date/Time: 10/10/90 13:05

Received by: Chie

Customer Sample Number(s): 699-5053B-208, 208A

ALO Sample Number(s): 90-5354, 5355

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

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

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/ma

8. Resolution of Problems or Discrepancies.

N/A

RETURN COMPLETED FORM TO PROJECT MANAGER





Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector W.S. Thompson / R.E. Steffler Date Sampled 10/10/90 Time 0900 hours  
Company Contact W.S. Thompson Telephone (509) 373-3818 0900  
200-BP-1 RI/FS

| Sample Number       | Number and Type of Sample Containers | Type of Sample* | Analysis Requested   |
|---------------------|--------------------------------------|-----------------|--|
| 1) 699-50-538-208,  | 120ml. amber;                        | AQUIFER SOIL;   | Analysis for <sup>TOC Method 9060</sup> Total Organic Carbon |
| 2) 699-50-538-208A, | 120 ml. amber;                       | aquifer soil;   | Analysis for Total Organic Carbon (TOC) Method 9060          |
| <del>NA</del>       |                                      |                 |  |

Field Information\*\* Samples to be analyzed for Total Organic Carbon (T.O.C) supporting 200-BP-1 RI/FS

Special Handling and/or Storage hand carry to 325PNL LAB /300AREA; by ASL Sample Van

PART II: LABORATORY SECTION

Received by INW thin Title Group Leader Date 10/10/90  
Analysis Required \_\_\_\_\_

\*Indicate whether sample is soil, sludge, water, etc.

\*\*Use back of page for additional information relative to sample location.

9610978.1657

SAMPLE RECEIPT FORM

Delivered by: R. STEFFLER Date/Time: 10/11/90 - 1300hrs

Received by: MIKE URIE

Customer Sample Number(s): 699-50-53B-214

ALO Sample Number(s): 90-6702

1. Customer Chain-of-Custody Form: Present  Absent
2. Additional Shipping Forms (list): RAS AND 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). GOOD
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

BC-314





SAMPLE RECEIPT FORM

Delivered by: Steffler Date/Time: 10/15/90 11:25

Received by: M. Urie

Customer Sample Number(s): 644-50-538-225, 644-55-55-075-073, 074A

ALO Sample Number(s): 90-6703, 90-6704, 90-6705, 90-6706

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 MUI

8. Resolution of Problems or Discrepancies.

N/A

RETURN COMPLETED FORM TO PROJECT MANAGER

9613478.1661

Westinghouse Hanford Company

CHAIN OF CUSTODY

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

Sample Collected by W.S. Thompson / RZ. Steffler Date 10/12/90 Time 1335

Sample Locations 199-50-53B wellsite

Ice Chest No. WST 10/12/90 MC-01 Epsilon #5 Field Logbook and Page No. WMC-N-287-2p. 52-53

Remarks Sample to be analyzed for TOC (Total Organic Carbon)  
WV 200-BP-1 RT / FS.

Bill of Lading No. NA Offsite Property No. NA

Method of Shipment hand carry to 325 PNL LAB (300 AREA)

Shipped to 325 PNL LAB.

Possible Sample Hazards none indicated with field instruments

Sample Identification

199-50-53B-225 200-BP-1  
1, 120ml, amber glass, soil, analysis of Total Organic Carbon (TOC)

Chain of Possession

|   |   |                                      |
|---|---|--------------------------------------|
| Relinquished by: <u>W. S. Thompson</u><br><u>Kendy Thompson</u> | Received by: <u>R. Z. Steffler</u><br><u>R. Z. Steffler</u> | Date/Time: <u>10/12/90 1350 hrs.</u> |
|---|---|--------------------------------------|

|  |                                       |                                  |
|--|---------------------------------------|----------------------------------|
| Relinquished by: <u>R. Z. Steffler</u> | Received by: <u>M. W. [Signature]</u> | Date/Time: <u>10/15/90 11:25</u> |
|--|---------------------------------------|----------------------------------|

|                  |              |            |
|------------------|--------------|------------|
| Relinquished by: | Received by: | Date/Time: |
|------------------|--------------|------------|

|                  |                             |            |
|------------------|-----------------------------|------------|
| Relinquished by: | Received by: <u>BC1-318</u> | Date/Time: |
|------------------|-----------------------------|------------|



ALO CHAIN OF CUSTODY Soil

| <u>90-5337</u><br>ALO SAMPLE NUMBER | <u>TOC</u><br>ANALYSIS REQUESTED | <u>699-49-57B-216</u><br>SAMPLE DESCRIPTION |
|-------------------------------------|----------------------------------|---|
| SENDER <u>MW Uru</u>                |                                  | <u>10/10/90</u><br>DATE                     |
| RECEIVER <u>D. Ross</u>             |                                  | <u>10-10-90</u><br>DATE                     |

| <u>90-5338</u><br>ALO SAMPLE NUMBER | <u>TOC</u><br>ANALYSIS REQUESTED | <u>699-49-57B-216-A</u><br>SAMPLE DESCRIPTION |
|-------------------------------------|----------------------------------|---|
| SENDER <u>MW Uru</u>                |                                  | <u>10/10/90</u><br>DATE                       |
| RECEIVER <u>D. Ross</u>             |                                  | <u>10-10-90</u><br>DATE                       |

| <u>90-5341</u><br>ALO SAMPLE NUMBER | <u>TOC</u><br>ANALYSIS REQUESTED | <u>699-49-57B-220</u><br>SAMPLE DESCRIPTION |
|-------------------------------------|----------------------------------|---|
| SENDER <u>MW Uru</u>                |                                  | <u>10/10/90</u><br>DATE                     |
| RECEIVER <u>D. Ross</u>             |                                  | <u>10-10-90</u><br>DATE                     |

| <u>90-5348</u><br>ALO SAMPLE NUMBER | <u>TOC</u><br>ANALYSIS REQUESTED | <u>699-49-57B-229</u><br>SAMPLE DESCRIPTION |
|-------------------------------------|----------------------------------|---|
| SENDER <u>MW Uru</u>                |                                  | <u>10/10/90</u><br>DATE                     |
| RECEIVER <u>D. Ross</u>             |                                  | <u>10-10-90</u><br>DATE                     |

Original - Project Management Office  
 Copy - Sender  
 Copy - Receiver

Applicable Test Instruction  
 TI-200BP-1-8 /TI-200BP-1-12

ALO CHAIN OF CUSTODY

|                                     |                                  |   |
|-------------------------------------|----------------------------------|---|
| <u>90-5354</u><br>ALO SAMPLE NUMBER | <u>TOC</u><br>ANALYSIS REQUESTED | <u>699-50-53B-208</u><br>SAMPLE DESCRIPTION |
| SENDER <u>MW Uni</u>                |                                  | <u>10/12/90</u><br>DATE                     |
| RECEIVER <u>ES Ross</u>             |                                  | <u>10-12-90</u><br>DATE                     |

|                                     |                                  |  |
|-------------------------------------|----------------------------------|--|
| <u>90-5355</u><br>ALO SAMPLE NUMBER | <u>TOC</u><br>ANALYSIS REQUESTED | <u>699-50-53B-208A</u><br>SAMPLE DESCRIPTION |
| SENDER <u>MW Uni</u>                |                                  | <u>10/12/90</u><br>DATE                      |
| RECEIVER <u>ES Ross</u>             |                                  | <u>10-12-90</u><br>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-1-13



ALO CHAIN OF CUSTODY

|                                     |                                  |   |
|-------------------------------------|----------------------------------|---|
| <u>90-6703</u><br>ALO SAMPLE NUMBER | <u>TOC</u><br>ANALYSIS REQUESTED | <u>699-50-53B-225</u><br>SAMPLE DESCRIPTION |
| SENDER <u>MW Min</u>                |                                  | <u>10/17/90</u><br>DATE                     |
| RECEIVER <u>DA Ross</u>             |                                  | <u>10-17-90</u><br>DATE                     |

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

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

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

Original - Project Management Office  
 Copy - Sender  
 Copy - Receiver

Applicable Test Instruction  
TI-200BP-1-17

BOB-005



OSM RCRA LEVEL C DATA ASSESSMENT

|             |                        |  |                    |                    |
|-------------|------------------------|--|--------------------|--------------------|
| DATE        | <u>02/09/91</u>        | SAMPLES/MATRIX                         | <u>49-57B-216</u>  | <u>49-57B-229</u>  |
| REVIEWED BY | <u>JA Lerch</u>        | - all samples<br>begin w/699<br>prefix | <u>49-57B-216A</u> | <u>49-57B-299A</u> |
| LABORATORY  | <u>PNL-325</u>         |  | <u>49-57B-216B</u> | <u>50-53B-208</u>  |
| CASE #      | <u>TPP 16772</u>       |  | <u>49-57B-216C</u> | <u>50-53B-208A</u> |
| SDG #       | <u>Report 2; Rev 0</u> |  | <u>49-57B-220</u>  | <u>50-53B-214</u>  |
|             | <u>TOC</u>             |  | <u>49-57B-216D</u> | <u>50-53B-225</u>  |

DATA ASSESSMENT SUMMARY

| QUALITY CONTROL CHECK              | ANALYSIS | TOC      |  |  |
|------------------------------------|----------|----------|--|--|
| 1. <u>Holding time</u>             |          | <u>X</u> |  |  |
| 2. <u>Spike Analysis</u>           |          | <u>X</u> |  |  |
| 3. <u>Duplicate Analysis</u>       |          | <u>X</u> |  |  |
| 4. <u>Blanks</u>                   |          | <u>O</u> |  |  |
| 5. <u>Calibrations/Control Std</u> |          | <u>O</u> |  |  |
| 6. <u>Other QC</u>                 |          | <u>O</u> |  |  |
| 7. _____                           |          |          |  |  |
| 8. _____                           |          |          |  |  |
| 9. _____                           |          |          |  |  |
| 10. _____                          |          |          |  |  |

O = 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: sample result for 699-50-53B-225 unusable  
(R) due to high duplicate std-dev; all other  
results acceptable w/qualification

NOTES: see "Other QC" for table of sample #'s/matrix

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

RCRA LEVEL C QCName JA Lerch *JL*Date 02/09/91QC Check: Holding TimeCOMMENTS: Holding time (14 days) exceeded on  
several samplesACTION: qualify results as per ASM guidelines

| <u>sample #</u>  | <u>constituent</u> | <u>value/qual</u> | <u>sample #</u> | <u>constituent</u> | <u>value/qual</u> |
|------------------|--------------------|-------------------|-----------------|--------------------|-------------------|
| 699-49-57B-216   | TOC                | J                 |                 |                    |                   |
| 699-49-57B-216-A | ↓                  | ↓                 |                 |                    |                   |
| 699-49-57B-220   |                    |                   |                 |                    |                   |
| 699-49-57B-216B  |                    |                   |                 |                    |                   |
| 699-49-57B-216C  |                    |                   |                 |                    |                   |
| 699-49-57B-216D  |                    |                   |                 |                    |                   |
| 699-49-57B-229A  |                    |                   |                 |                    |                   |

RCRA LEVEL C QCName JA Lerch JL Date 02/09/91QC Check: Spike AnalysisCOMMENTS: some water spike recoveries low  
- no spikes on soil samples (none were  
required by the SOW or PNC procedure)ACTION: qualify 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> |
|-----------------|--------------------|-------------------|-----------------|--------------------|-------------------|
| 699-49-57B-216B | TOC                | J                 |                 |                    |                   |
| 699-49-57B-216C | ↓                  | ↓                 |                 |                    |                   |
| 699-49-57B-216D | ↓                  | ↓                 |                 |                    |                   |

RCRA LEVEL C QC

Name JA Kerch / J Date 02/09/91

QC Check: Duplicates

COMMENTS: several dup std Dev high  
-Dev for 699-49-53B-225 very high (88%)

ACTION: qualify 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> |
|-----------------|--------------------|-------------------|-----------------|--------------------|-------------------|
| 699-49-57B-216  | TOC                | J                 |                 |                    |                   |
| 699-49-57B-229  | ↓                  | J                 |                 |                    |                   |
| 699-50-53B-208  |                    | J                 |                 |                    |                   |
| 699-50-53B-225  |                    | R                 |                 |                    |                   |
| 699-49-57B-216C |                    | J                 |                 |                    |                   |

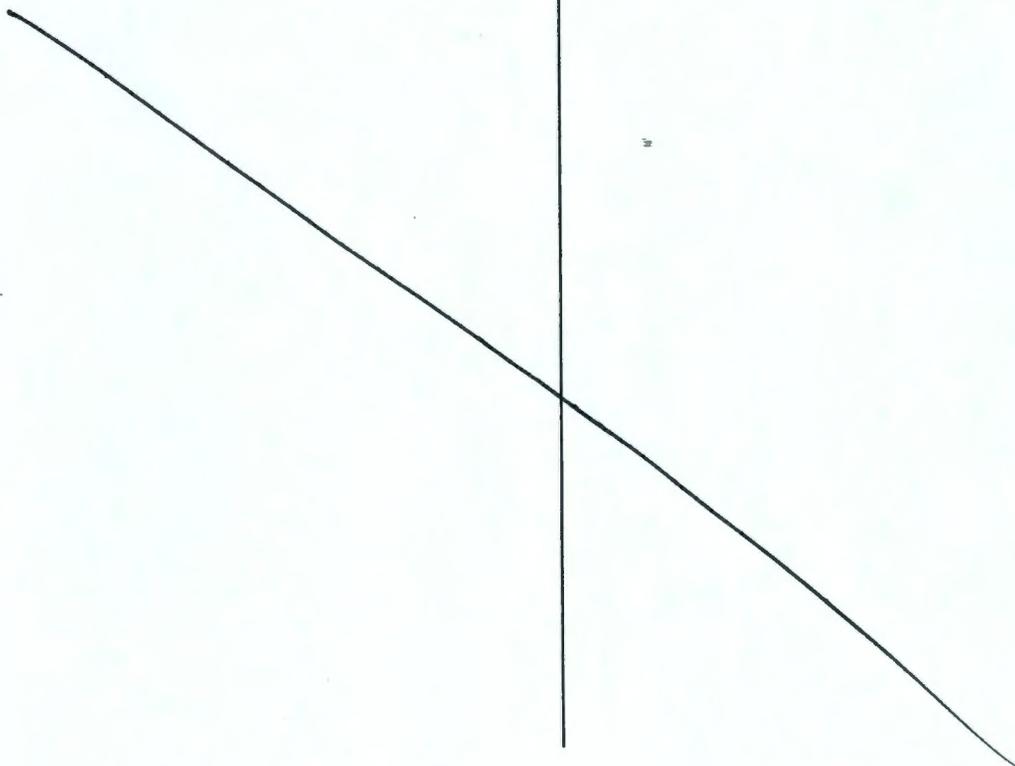
## RCRA LEVEL C QC

Name JA Lerch JJ Date 02/09/91QC Check: Blanks

COMMENTS: daily blanks are used to set  
quantitation limits (see CASE NARRATIVE)  
- evaluation of possible 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> |
|-----------------|--------------------|-------------------|-----------------|--------------------|-------------------|
|-----------------|--------------------|-------------------|-----------------|--------------------|-------------------|



RCRA LEVEL C QC

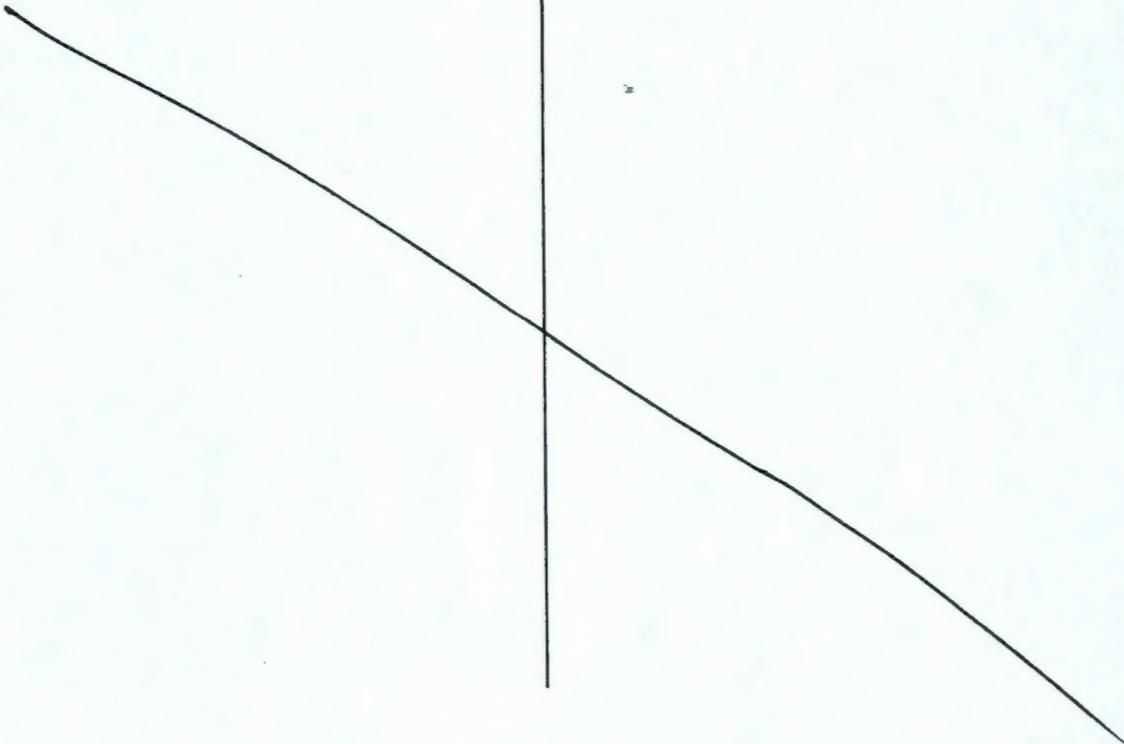
Name JA Lerch Date 02/09/91

QC Check: Calibrations / Control Stds.

COMMENTS: Calibration and control std 70R  
acceptable

ACTION: none

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



101478.1673

RCRA LEVEL C QC

Name JA Lerch / 1 Date 02/09/91

QC Check: Other ac

COMMENTS: none

ACTION: none

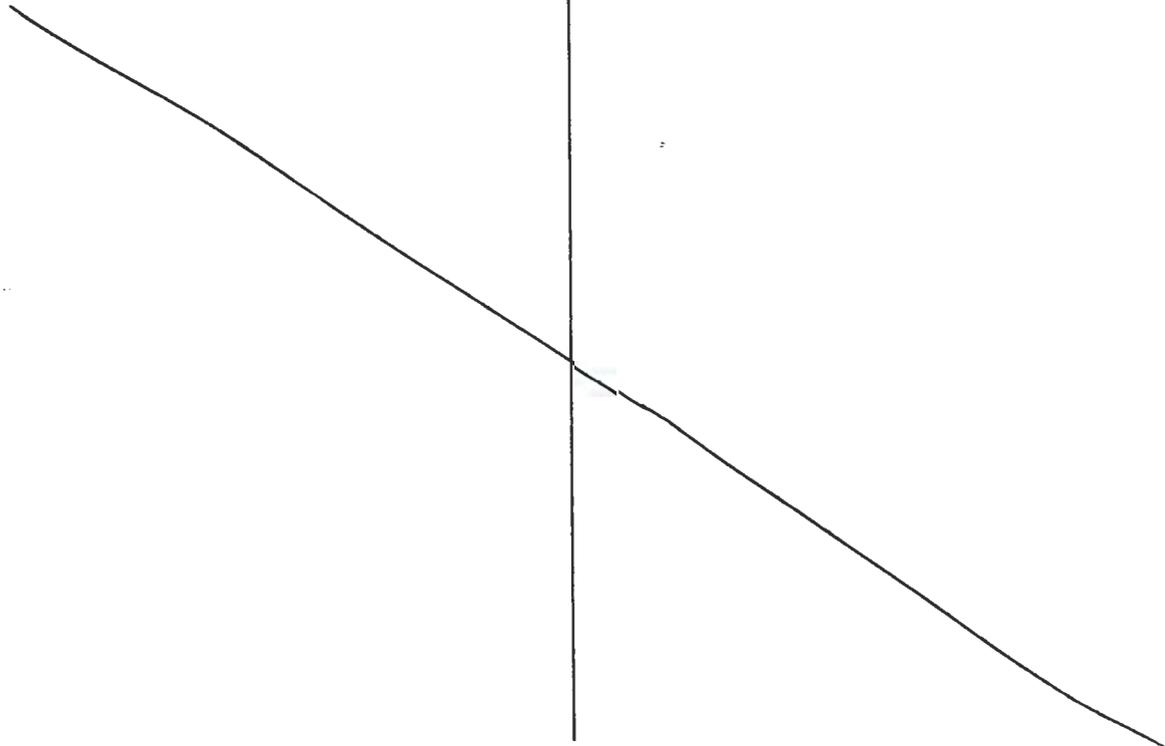
| <u>sample #</u>  | <u>constituent</u> | <u>value/qual</u> | <u>sample #</u> | <u>constituent</u> | <u>value/qual</u> |
|--|--------------------|-------------------|-----------------|--------------------|-------------------|
|  |                    |                   |                 |           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

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

| WHC Sample #    | PNL Sample # | Sample Type     | ug/mL<br>Sample     | Ave.<br>ug/mL<br>Sample | RSD of<br>Dups<br>(%) | Spike<br>%Rec | C4<br>Cntrl<br>%Rec | Lab<br>Cntrl<br>%Rec | Date<br>Sampled | Analyzed |
|-----------------|--------------|-----------------|---------------------|-------------------------|-----------------------|---------------|---------------------|----------------------|-----------------|----------|
|                 |              | 10ppm Lab Cntrl | 10.1<br>10.5        | 10.3                    |                       |               |                     | 103                  |                 |          |
| 699-49-57B-2168 | 90-5339-1    | Sample          | 0.67                | J 0.63                  | 9.0                   |               |                     |                      | 10-01-90        | 10-24-90 |
|                 | 90-5339-2    | Duplicate       | 0.59                |                         |                       |               |                     |                      |                 |          |
|                 | 90-5339      | TriPLICATE      | 0.65                | 0.61                    | 9.3                   |               |                     |                      |                 |          |
|                 | "            | Quadruplicate   | 0.57                |                         |                       |               |                     |                      |                 |          |
|                 | 90-5339-3    | Sample+Spike    | 1.46                | 1.38                    | 8.2                   | 50            |                     |                      |                 |          |
|                 | "            |                 | 1.3                 |                         |                       |               |                     |                      |                 |          |
|                 | 90-5339-4    | Blank+Spike     | 1.16                | 1.19                    | 3.6                   |               | 77                  |                      |                 |          |
|                 |              |                 | 1.22                |                         |                       |               |                     |                      |                 |          |
| 699-49-57B-216C | 90-5340-1    | Sample          | 0.40                | J 0.34                  | 25                    |               |                     |                      | 10-01-90        | 10-24-90 |
|                 | 90-5340-2    | Duplicate       | 0.28                |                         |                       |               |                     |                      |                 |          |
|                 | 90-5340-3    | Sample+Spike    | 1.40                | 1.30                    | 11                    | 64            |                     |                      |                 |          |
|                 | "            |                 | 1.20                |                         |                       |               |                     |                      |                 |          |
|                 | "            |                 | "                   |                         |                       |               |                     |                      |                 |          |
| 699-49-57B-216D | 90-5342-1    | Sample          | 0.16                | J 0.17                  | 4.3                   |               |                     |                      | 10-02-90        | 10-24-90 |
|                 | 90-5342-2    | Duplicate       | 0.17                |                         |                       |               |                     |                      |                 |          |
|                 | 90-5342-3    | Sample+Spike    | 1.40                | 1.35                    | 5.2                   | 79            |                     |                      |                 |          |
|                 |              |                 | 1.30                |                         |                       |               |                     |                      |                 |          |
|                 |              | 10ppm Lab Cntrl | 9.3<br>9.1<br>9.9   | 9.4                     |                       |               |                     | 94                   |                 |          |
|                 |              | 10ppm Lab Cntrl | 10.0<br>9.4<br>10.1 | 9.8                     |                       |               |                     | 98                   |                 |          |
| 699-49-57B-229A | 90-5349-1    | Sample          | 1.34                | J 1.33                  | 1.1                   |               |                     |                      | 10-08-90        | 10-25-90 |
|                 | 90-5349-2    | Duplicate       | 1.32                |                         |                       |               |                     |                      |                 |          |
|                 | 90-5349-3    | Sample+Spike    | 2.94                | 2.88                    | 2.9                   | 103           |                     |                      |                 |          |
|                 | "            |                 | 2.82                |                         |                       |               |                     |                      |                 |          |
|                 |              | 10ppm Lab Cntrl | 10.6<br>10.4        | 10.5                    |                       |               |                     | 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

J  
2/09/91

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

| WHC Sample #     | PNL Sample # | Sample Type | Sample Wt, g         | ug C Result | ug C in Sample | mg C/Kg Sample | % Std Dev of Dups | Date Sampled | Analyzed |
|------------------|--------------|-------------|----------------------|-------------|----------------|----------------|-------------------|--------------|----------|
| 699-49-57B-216   | 90-5337-1    | Sample      | 0.10728              | 15.42       | 10.3           | 96.0 J         | 19.48             | 10-01-90     | 10-16-90 |
| " "              | 90-5337-2    | Duplicate   | 0.11847              | 13.74       | 8.62           | 72.8           |                   | 10-01-90     | 10-16-90 |
| " "              | 90-5337-4    | Blank       |                      |             |                | 5.12           |                   |              | 10-16-90 |
| 699-49-57B-216-A | 90-5338-1    | Sample      | 0.15658              | 13.3        | 8.18           | 52.2 J         | 1.81              | 10-01-90     | 10-16-90 |
| " "              | 90-5338-2    | Duplicate   | 0.18086              | 14.33       | 9.21           | 50.9           |                   | 10-01-90     | 10-16-90 |
| " "              | 90-5338-4    | Blank       |                      |             |                | 5.12           |                   |              | 10-16-90 |
| 699-49-57B-220   | 90-5341-1    | Sample      | 0.20066              | 11.98       | 7.82           | 39.0 J         | 3.55              | 10-02-90     | 10-17-90 |
| " "              | 90-5341-2    | Duplicate   | 0.177                | 10.72       | 6.56           | 37.1           |                   | 10-02-90     | 10-17-90 |
| " "              | 90-5341-4    | Blank       |                      |             |                | 4.16           |                   |              | 10-17-90 |
| 699-49-57B-229   | 90-5348-1    | Sample      | 0.25607              | 17.61       | 12.79          | 50.0 J         | 37.42             | 10-08-90     | 10-18-90 |
| " "              | 90-5348-2    | Duplicate   | 0.2927               | 29.96       | 25.14          | 85.9           |                   | 10-08-90     | 10-18-90 |
| " "              | 90-5348-4    | Blank       |                      |             |                | 4.82           |                   |              | 10-18-90 |
| 699-50-53B-208   | 90-5354-1    | Sample      | 0.12673              | 7.68        | 2.86           | 22.6 J         | 53.21             | 10-10-90     | 10-18-90 |
| " "              | 90-5354-2    | Duplicate   | 0.1192               | 6.04        | 1.22           | 10.2           |                   | 10-10-90     | 10-18-90 |
| " "              | 90-5354-4    | Blank       |                      |             |                | 4.82           |                   |              | 10-18-90 |
| 699-50-53B-208A  | 90-5355-1    | Sample      | 0.13256 <sup>u</sup> | 8.33        | 3.51           | 26.5           | 7.15              | 10-10-90     | 10-18-90 |
| " "              | 90-5355-2    | Duplicate   | 0.16214              | 9.57        | 4.75           | 29.3           |                   | 10-10-90     | 10-18-90 |
| " "              | 90-5355-4    | Blank       |                      |             |                | 4.82           |                   |              | 10-18-90 |
| 699-50-53B-214   | 90-6702-1    | Sample      | 0.30895              | 9.17        | 4.35           | 14.1           | 9.42              | 10-11-90     | 10-18-90 |
| " "              | 90-6702-2    | Duplicate   | 0.31202              | 9.84        | 5.02           | 16.1           |                   | 10-11-90     | 10-18-90 |
| " "              | 90-6702-4    | Blank       |                      |             |                | 4.82           |                   |              | 10-18-90 |
| 699-50-53B-225   | 90-6703-1    | Sample      | 0.21405              | 16.94       | 12.12          | 56.6 * R       | 88.84             | 10-12-90     | 10-18-90 |
| " "              | 90-6703-2    | Duplicate   | 0.22741              | 61.2        | 56.38          | 248            |                   | 10-12-90     | 10-18-90 |
| " "              | 90-6703-4    | Blank       |                      |             |                | 4.82           |                   |              | 10-18-90 |

\* Sample was very wet.

Detection Limits for the three blank results above (3 times std. dev.) is 1.5ppm.

Total Organic Carbon by PNL Procedure 7-40.37, on Instrument WA92040, 325 Bldg., rm 313. Data reported from LRB 52996, pp 48-51.

Relative Standard Deviation of the nine standards analyzed is 1.95%.

*JF*  
10/2/09/91