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Correspondence No.  
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June 17, 2004

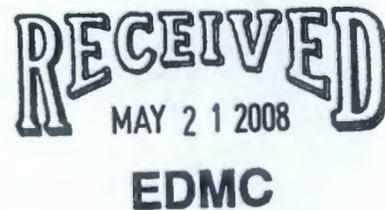
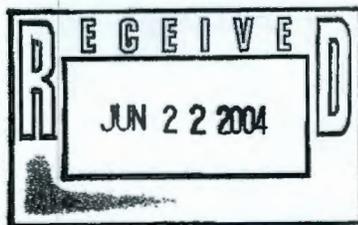
Subject: FINAL REPORT FOR THE SOIL SAMPLES FROM 216-Z-9 TRENCH-  
COLLECTED DURING MARCH AND APRIL OF FISCAL YEAR 2004

*22S20040101 REV1*

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July 30, 2007

07-ATL-051

Mr. S. J. Trent  
Environmental Information Systems  
Fluor Hanford, Inc.  
Post Office Box 1000, E6-35  
Richland, Washington 99352-1000



Dear Mr. Trent:

REISSUE - FINAL REPORT FOR THE SOIL SAMPLES FROM 216-Z-9 TRENCH -  
COLLECTED DURING MARCH AND APRIL OF FISCAL YEAR 2004

This letter provides a correction to letter CH2M-0401824, *Final Report for the Soil Samples from 216-Z-9 Trench - Collected During March and April of Fiscal Year 2004*, which was issued on June 17, 2004.

Following a customer request on June 27, 2007, the "opportunistic analytes" reported for samples in group 222S20040101 were re-evaluated. The evaluation determined that an error was made. The raw data indicate no 1,2-dibromo-3-chloropropane was detected for sample B191Y4. This compound was removed from Table 8 of the report. The attachment provides a new table. Please replace page 10 in CH2M-0401824 with the attached page.

If you have any questions regarding this report, please call me at 373-4314.

Sincerely,

Ruth A. Bushaw, Project Coordinator

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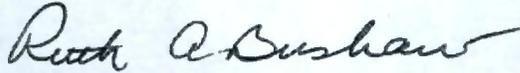
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Mr. S. J. Trent  
Page 2  
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CH2M-0401824

Should you have questions regarding this matter, please contact R. A. Bushaw at 373-4314.

Very truly yours,



Ruth A. Bushaw, Project Coordinator  
Analytical Project Management

dtb

Attachments (4)

000003

CH2M-0401824

Attachment 1

NARRATIVE

Consisting of 14 pages, including coversheet

0009004

## 222-S LABORATORY

### FINAL REPORT FOR THE SOIL SAMPLES FROM 216-Z-9 TRENCH—COLLECTED DURING MARCH AND APRIL OF FY 2004

#### 1.0 INTRODUCTION

Seven soil samples from the 216-Z-9 characterization borehole were received at the 222-S Laboratory between March 24 and April 21, 2004. The samples were analyzed in accordance with the *222-S Laboratory Quality Assurance Plan* (Reference 1), *216-Z-9 Trench Characterization Borehole Sampling and Analysis Concurrence for Analytical Requirements* (analytical instructions) (Reference 2), *Semi-Volatile Organic Compound Analysis* (Reference 3), and *Volatile Organic Compound Analysis* (Reference 4), referenced in the cover letter.

A Data Summary Report is included as Attachment 2. The correlation between the customer sample identification number and laboratory identification numbers is presented in the Sample Breakdown Diagrams included as Attachment 3. Copies of the Chain of Custody and Generator Knowledge Information forms are included as Attachment 4.

#### 2.0 SAMPLE APPEARANCE

For easier tracking of results, the samples were logged into the laboratory database as four different sample delivery groups (SDG), as noted in the following.

**SDG 222S20040061**—This SDG consists of one customer sample numbered B17N61. This sample was collected on March 23, 2004. It was delivered to the laboratory on March 24, 2004, in three 40-mL amber bottles with septum lids. Analysis for low-level volatile organic compounds (VOC) was the only request for this sample. The sample was described as dark brown, medium coarse sand.

**SDG 222S20040073**—This SDG consists of three customer samples numbered B18XW3, B18XR8, and B190T8-A. Samples B18XW3 and B18XR8 were collected on April 8, 2004. Sample B18XW3 was delivered to the laboratory on April 14, 2004, in three 40-mL amber bottles with septum lids for low-level VOC analysis only. For sample B18XR8, three 5-g En Core® samplers were received on April 8, 2004, for high-level VOC analysis. On April 16, 2004, two 60-mL bottles and one 120-mL bottle were received as B18XR8 for semivolatile organic compound analysis (SVOA), polychlorinated biphenyl (PCB) analysis and inorganic and radionuclide analyses listed in the analytical instruction. The samples were described as dark brown, medium coarse sand.

*8 pages 2/16/06*

Sample B190T8-A was collected and delivered to the laboratory on April 15, 2004. As received, it was labeled as B190T8 for a radscreen analysis. However, after receipt, the customer point of contact requested an additional isotopic plutonium analysis and requested that the results be reported using the sample number B190T8-A. The sample was described as dark brown, medium coarse sand.

**SDG 222S20040100**—This SDG consists of two customer samples numbered B17N64 and B17N68. These samples were collected and delivered to the laboratory on April 21, 2004. Sample B17N64 was received in five 40-mL amber bottles with septum lids for low-level VOC analysis only. Sample B17N68 was received in three 5-g En Core® samplers for high-level VOC analysis only. Sample B17N68 was described like the previous samples: dark brown, medium coarse sand.

For sample B17N64, three of the five bottles contained dark brown, medium coarse sand and the remaining two bottles contained lighter colored, beige, medium coarse sand. The initial low-level VOC analysis was performed using the first three of the bottles in numerical order and was reported as sample number S04M000115. The bottle chosen for the sample analysis contained the beige sand, while the bottles chosen for the matrix spike (MS) and matrix spike duplicate (MSD) analyses both contained the darker brown sand. The customer point of contact was informed of the discrepancy and an additional VOC analysis was requested on the remaining vial that contained darker sand. No additional MS or MSD analyses were performed. The sample results for the additional analysis are reported as sample B17N64-A (S04M000124), as the customer requested.

**SDG 222S20040101**—This SDG consists of one customer sample numbered B191Y4. The sample was collected and delivered to the laboratory on April 21, 2004. Five bottles were received for analysis; one 60-mL bottle was received for SVOA, one 500-mL bottle for radionuclide analysis, and three 40-mL amber glass bottles with septum lids for VOC analysis. On April 28, 2004, the customer point of contact canceled the request for SVOA and radionuclide analyses, and the 60-mL and 500-mL bottles were returned to the customer on April 29, 2004.

The 40-mL bottles were filled to the top with soil, leaving no head-space. No preservative was added to the sample bottles in the field. With the sample received in this configuration, it was unclear whether low-level or high-level VOC analysis was requested, so the chemist preserved portions of the sample for both analyses. The customer point of contact was informed of the decision made by the responsible chemist concerning the VOC, and requested the laboratory to report the high-level VOC analysis using sample number B191Y4-A.

### 3.0 SAMPLE HANDLING

Except for VOC analyses, the samples were stirred with a spatula prior to removing aliquots for analysis. With this type of sample, this method is typically not sufficient to achieve homogenization. However, the relative percent difference (RPD) between sample and duplicate results for most analytes meet the acceptance criteria listed in the analytical instructions, indicating good precision was obtained.

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*R. Dwyer*

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As noted in Section 2.0 for B191Y4, the sample was provided in three amber glass bottles with no preservative. Because the bottles had to be opened in a hood to obtain aliquots for analysis, the sample integrity was compromised and the results may be biased low.

#### 4.0 HOLDING TIMES

The analytical instructions requested that the laboratory make every effort to meet the SW-846 (Reference 5 in the cover letter) holding times for VOA. Additionally, an e-mail message was received from the customer point of contact on April 19, 2004, requesting the laboratory to make every effort to meet all analytical holding times.

The holding times were met for all analyses except for pH, sulfide, and mercury (Hg) for sample B18XR8. For pH (24 hour) and sulfide (7 day), the holding times were not met because of an 8-day delay between the field sampling and delivery of the sample. For the Hg analysis, the 28-day holding time was not met because of a combination of the 8-day delay between sampling and delivery, and issues with scheduling resources and preparation of the fume hoods for the laboratory outage.

#### 5.0 ANALYTICAL RESULTS

The Data Summary Report, included as Attachment 2, presents the analytical results for the requested analytes. In this table, solid samples that were prepared by water digest are indicated with a "W" in the aliquot class (A#) column, and an "S" indicates a distillation preparation was used. An "A" indicates an acid digest of a solid, and an "E" indicates that the stronger acid soil leach procedure was used to prepare the sample prior to analysis. If there is no letter identifier in this column, this indicates that the analysis was performed on a direct subsample with no separate preparation, or with sample preparation that was included as part of the analytical procedure steps.

Note that for most analytes, the results reported for the blank in the Data Summary Report are in the same units as indicated for the sample. However, for the ion chromatography (IC), inductively coupled plasma (ICP) spectroscopy, uranium by phosphorescence (total uranium), and ICP-mass spectrometry (ICP-MS) analyses, the results reported for the blank are actually  $\mu\text{g/mL}$ .

##### 5.1 VOLATILE ORGANIC COMPOUND ANALYSIS ISSUES

**Sample B18XW3 (S04M000096)**—The concentration reported for carbon tetrachloride ( $\text{CCl}_4$ ) exceeded the calibration range for the requested low-level VOC analysis. Therefore, the result of  $260 \mu\text{g/kg}$  should be considered an estimate. Since the entire sample was used in process during the first analysis, no reanalysis was possible. Sample B18XR8 (S04M000095) was collected at the same time on the same day. This sample was submitted to the laboratory for high-level VOC analysis. No  $\text{CCl}_4$  was detected in this sample at a detection limit of  $240 \mu\text{g/kg}$ . For the high-level VOC analysis, some of the  $\text{CCl}_4$  might have been lost due to the required process of opening the En Core® sampler to the atmosphere to transfer the sample to a vial for preserving.

**Sample B17N64 (S04M000115)**—The concentration reported for acetone exceeded the calibration range for the requested low-level VOC analysis. Therefore, the result of 170 µg/kg should be considered an estimate. Since the entire sample was used in process during the first analysis, no reanalysis was possible. Sample B17N68 (S04M000116) was collected at the same time on the same day. This sample was submitted to the laboratory for high-level VOC analysis. Acetone was detected at 660 µg/kg, but the result should be considered an estimate because it is less than the estimated quantitation limit (EQL), which is 10 times the reported detection limit. For the high-level VOC analysis, some of acetone might have been lost due to the required process of opening the En Core® sampler to the atmosphere to transfer the sample to a vial for preserving.

**Sample B191Y4 (S04M000118)**—The concentration reported for CCl<sub>4</sub> exceeded the calibration range for the aliquot that was preserved for low-level VOC analysis. Therefore, the result of 290 µg/kg should be considered an estimate. Since opening the sample vial greatly compromises low-level VOC analysis, no low-level reanalysis was requested. Sample B191Y4-A (S04M000123) was an aliquot removed from the same sample vial and preserved for high-level VOC analysis. For this analysis, CCl<sub>4</sub> was not detected at a detection limit of 130 µg/kg. Again, opening the vial may have compromised the analysis due to loss of analyte to the atmosphere. No reanalysis was requested.

## 6.0 QUALITY CONTROL RESULTS

### 6.1 LABORATORY CONTROL SAMPLES

For nonradionuclide analyses, the accuracy of the analysis was evaluated from the recovery of both a laboratory control sample (LCS) and an MS. The requested accuracy was LCS or MS within 70-130% recovery. For radionuclides, the accuracy of the gross (or total) alpha, gross (or total) beta, and ICP-MS analytes was evaluated from the LCS and MS recoveries. For all other radionuclide analyses, the accuracy was evaluated only from the LCS recovery. The requested radionuclide accuracy was LCS or MS within 80-120% recovery.

For the VOC analysis, a ketone mix containing acetone, 2-butanone, and 4-methyl-2-pentanone were part of the standard mix used for LCS analysis for sample B16N61 in addition to the requested set of compounds indicated in the letters from H. L. Anastos (References 3 and 4 in the cover letter). These compounds are part of the quality control (QC) protocol associated with an unrelated project. Although the LCS and MS recoveries for ketones were not required to be reported, they are included in the Data Summary Report (Attachment 2) for sample B17N61 only.

All LCS recoveries were acceptable in accordance with the analytical instructions and the 222-S Laboratory Quality Assurance Plan (QAPP-016) (Reference 1 in the cover letter).

### 6.2 METHOD AND PREPARATION BLANKS

For most analyses, no analytes were detected in the method or preparation blank. However, the following analytes were detected in the blanks prepared and analyzed with the samples.

- a. Chromium (Cr) and lead (Pb) were detected in the acid digest blank analyzed with sample B18XR8. The level of Cr measured in the blank was about 60% of the concentration measured in the sample. The level Pb measured in the blank was about 10% of that measured in the sample. The sample was reprepared and reanalyzed and the reanalysis results confirmed that the original sample results were not affected by the contamination detected in the blank. The reanalysis was not reported because a larger sample size was used, which may have caused incomplete digestion of some analytes. This issue did not affect the comparison of the Cr and Pb results between the two digests.
- b. Uranium (U) was detected in the blank that was prepared and analyzed with sample B18XR8 for total U. The level of U detected in the blank was about 9% of that detected in the sample. The reported results are considered estimates because they are less than 10 times the reported detection limit. They should also be considered biased high due to contamination. If the results are corrected for the high bias, they are confirmed by the sum of the U isotopes reported from the ICP-MS analysis. The sample was not reanalyzed because they were in agreement with the ICP-MS and because they would still be reported as estimates on a reanalysis due to the large dilution required to reduce matrix interference.
- c. Thorium-232,  $^{235}\text{U}$ , and  $^{238}\text{U}$  were detected in the blank prepared and analyzed with sample B18XR8 by ICP-MS. For all three analytes, the level detected in the blank was considered insignificant because it was less than 5% of the concentration reported for the sample, as allowed by QAPP-016.
- d. Beta activity was detected in the blank prepared and analyzed with sample B18XR8 for total beta. However, the contamination was considered insignificant because the blank activity was less than 5% of the activity in the sample, as allowed by QAPP-016.
- e. Nitrite ( $\text{NO}_2$ ) was detected in the water digest preparation blank analyzed with sample B18XR8. However, the contamination was considered insignificant because no  $\text{NO}_2$  was detected in the sample.
- f. Acetone was detected in the blanks analyzed with samples B18XR8 (S04M000095) (high-level VOC), B18XW3 (S04M000096) (low-level VOC), and B17N64-A (S04M000124) (low-level VOC). For sample B18XR8, no acetone was detected in the sample, so the blank contamination was considered insignificant. For sample B17N64-A, the blank result was less than the EQL and was considered insignificant. But for sample B18XW3, the acetone concentration reported for the blank was greater than the EQL and was about 20% of the sample concentration. For this sample, since the entire sample was used in process during the first analysis, no reanalysis was possible. Therefore, the acetone result should be considered biased high for B18XW3.
- g. Low levels of 2-butanone were detected in the blanks analyzed with samples B18XW3 (S04M000096) (low-level VOC) and B17N64-A (S04M000124) (low-level VOC). In both instances, the blank result was less than the EQL and was considered insignificant.

### 6.3 DUPLICATE ANALYSES

One duplicate analysis was performed for each analyte for each SDG. The requested precision for analysis was an RPD  $\pm 20\%$  for radionuclides and  $\pm 30\%$  for all other methods. For VOC, SVOA, and PCB analyzed, the analysis precision was determined by calculating the RPD between an MS and MSD. These are discussed in Section 6.4.

In addition to the RPDs requested in the analytical instructions, QAPP-016 states that the RPD criterion is not applicable when the sample results are less than 10 times the reported detection limit for nonradionuclide analyses or if the counting uncertainty is greater than 15% for radionuclide analyses. Although total U and C1 had RPDs greater than 30% and  $^{233}\text{U}$  and  $^{234}\text{U}$  had RPDs greater than 20%, the sample results were all less than 10 times the reported detection limits. For  $^{90}\text{Sr}$ , the RPD was also greater than 20%, but the counting uncertainty was greater than 15%. All other analyte results met RPD criteria stated in the analytical instruction.

### 6.4 MATRIX SPIKE AND MATRIX SPIKE DUPLICATE

Where applicable, one MS sample was analyzed for each analyte for each SDG. For the VOC analysis, the samples were batched based on when they were received. High-level and low-level samples were analyzed in separate batches. One MS and one MSD was analyzed for each analytical batch. The SDGs were batched as indicated below.

- a. Batch 1      Low-level batch:  
SDG 222S20040061 only - B17N61 (S04M000022) was the only sample in this batch; MS and MSD analyzed with this sample.
- b. Batch 2      High-level batch:  
SDG 222S20040073 only - B18XR8 (S04M000095) was the only high-level sample in this batch; MS and MSD analyzed with this sample.
- c. Batch 3      Low-level batch:  
SDG 222S20040073 only - B18XW3 (S04M000096) was the only low-level sample in this batch; MS and MSD analyzed with this sample.
- d. Batch 4      Low-level batch:  
SDG 222S20040100 - B17N64 (S04M000115); MS and MSD analyzed with this sample.  
SDG 222S20040101 - B191Y4 (S04M000118); no additional QC run with this sample.
- e. Batch 5      Low-level batch:  
SDG 222S20040100 - B17N64-A (S04M000124); this was an additional analysis request for this sample based on variation of colors of the soil in the five vials received. There were insufficient vials available to provide additional QC for this sample.

- f. Batch 6      High-level batch:  
 SDG 222S20040100 – B17N68 (S04M000116); MS and MSD analyzed with this sample.  
 SDG222S20040101 –B191Y4-A (S04M000123); no additional QC run with this sample.

For nonradionuclide analyses, the accuracy of the analysis was evaluated from both the LCS and MS recoveries. The requested accuracy was LCS or MS within 70-130% recovery. An MS analysis was not applicable for the pH analysis. For the SVOA and VOC analyses, the analytical instructions requested that the laboratory report MS recoveries only for the representative set of compounds indicated in the letters from H. L. Anastos (References 3 and 4 in the cover letter). For PCB analysis, only Aroclor-1254 is included in the MS because it is the aroclor most commonly detected in samples on the Hanford site. All analytes met the accuracy criterion stated in the analytical instructions.

In addition to the MS analysis, an MSD was analyzed with the SVOA, VOC, and PCB analyses to evaluate method precision. The spike RPD between the MS and MSD met the precision criterion for all analyses.

For the VOC analysis, a ketone mix containing acetone, 2-butanone, and 4-methyl-2-pentanone were part of the standard mix used for MS analysis for sample B17N61 in addition to those compounds listed in the Anastos letters. These compounds are part of the QC protocol associated with an unrelated project. Although the ketones were not required to be reported, they are included in the Data Summary Report for B17N61 only, but they are not included in the MS/MSD evaluation.

For radionuclides, the accuracy of the gross (or total) alpha, gross (or total) beta, and ICP-MS analytes was evaluated from the LCS and MS recoveries. For all other radionuclide analyses, the accuracy was evaluated only from the LCS, which is discussed in Section 6.1. The requested radionuclide accuracy was LCS or MS within 80-120% recovery. All analytes met the accuracy criterion stated in the analytical instructions.

The Data Summary Report included as Attachment 2 does not report the recoveries for the MSD analysis or the RPD for the MS/MSD analysis. This information is provided in Table 1 through Table 5 for VOA, Table 6 for SVOA, and Table 7 for PCB analysis.

**Table 1. MS/MSD Recoveries and RPD for VOA for B17N61.**

Compound	MS (%)	MSD (%)	RPD (%)
Benzene	88	88	0
Chlorobenzene	90	88	2
1,1-Dichloroethene	70	75	7
Toluene	87	86	1
Trichloroethene	88	88	0

**Table 2. MS/MSD Recoveries and RPD for VOA for B18XW3.**

Compound	MS (%)	MSD (%)	RPD (%)
Benzene	101	102	1
Chlorobenzene	99	101	2
1,1-Dichloroethene	94	93	1
Toluene	95	98	3
Trichloroethene	102	102	0

**Table 3. MS/MSD Recoveries and RPD for VOA for B18XR8.**

Compound	MS (%)	MSD (%)	RPD (%)
Benzene	91	91	0
Chlorobenzene	91	91	0
1,1-Dichloroethene	92	106	14
Toluene	89	89	0
Trichloroethene	89	88	1

**Table 4. MS/MSD Recoveries and RPD for VOA for B17N64.**

Compound	MS (%)	MSD (%)	RPD (%)
Benzene	102	103	1
Chlorobenzene	100	100	0
1,1-Dichloroethene	94	92	2
Toluene	94	94	0
Trichloroethene	100	102	2

**Table 5. MS/MSD Recoveries and RPD for VOA for B17N68.**

Compound	MS (%)	MSD (%)	RPD (%)
Benzene	99	109	10
Chlorobenzene	109	114	4
1,1-Dichloroethene	85	84	1
Toluene	106	117	10
Trichloroethene	91	96	5

**Table 6. MS/MSD Recoveries and RPD for SVOA for B18XR8.**

Compound	MS (%)	MSD (%)	RPD (%)
Phenol	87	92	6
2-Chlorophenol	81	84	4
1,4-Dichlorobenzene	75	83	10
N-Nitroso-di-n-propylamine	82	88	7
1,2,4-Trichlorobenzene	83	90	8
4-Chloro-3-methylphenol	85	88	3
Acenaphthene	87	92	6
4-Nitrophenol	86	89	3
2,4-Dinitrotoluene	80	85	6
Pentachlorophenol	72	76	5
Pyrene	79	86	8

**Table 7. MS/MSD Recoveries and RPD for PCB for B18XR8.**

Compound	MS (%)	MSD (%)	RPD (%)
Aroclor 1254	86	87	1

## 6.5 SURROGATE RECOVERIES

Surrogate standards are added to all field and QC samples for VOC, SVOA, and PCB analyses. The surrogate is added to monitor total method recovery through preparation, sample matrix cleanup, and analysis. All surrogate standard recoveries met the requirements in QAPP-016.

## 6.6 OPPORTUNISTIC ANALYTES

The VOC analysis contains results for compounds that were calibrated for in the method but were not requested in the analytical instructions. These results are considered "opportunistic" rather than tentatively identified compounds (TIC) because the results are more accurate. The calculated results, chemical abstract system (CAS) numbers, and method detection limits (MDL) for these compounds are presented in Table 8. The MDLs are included in parentheses after the sample results. Results that should be considered estimated because the concentration was not greater than 10 times the MDL are indicated with a (J) and those that are estimated because the concentration exceeded the calibration range are indicated with an (E).

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Attachment

TABLE 8. OPPORTUNISTIC COMPOUND RESULTS FOR VOC

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**Table 1. Opportunistic Compound Results for VOC.**

Compound	CAS#	Units	B17N61	B18XW3	B17N64	B17N64-A	B191Y4-A	B191Y4
n-Butanol	71-36-3	µg/kg	260 (25)	1500 (20) (E)	ND	301 (19)	ND	947 (22) (E)
Tetrahydrofuran	109-99-9	µg/kg	9.6 (2.2) (J)	112 (1.8)	93 (2.4)	36 (1.7)	ND	51 (2.0)
2-Hexanone	591-78-6	µg/kg	ND	1.3 (0.6) (J)	1.3 (0.8) (J)	7.6 (0.6)	ND	1.5 (0.6) (J)
2-Pentanone	107-87-9	µg/kg	ND	ND	6.6 (2.4) (J)	6.0 (1.7) (J)	ND	ND
Carbon disulfide	75-15-0	µg/kg	ND	ND	ND	ND	ND	11 (0.9)
Styrene	100-42-5	µg/kg	ND	ND	ND	ND	ND	2.9 (0.7) (J)

10 ND—Not detected.

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For sample B17N61 (S04M000022), three opportunistic VOC compounds were reported in the preliminary report as detected in the sample. However, further examination of the data determined that methyl acetate was detected in most of the blanks, LCS, and samples. Therefore, that compound was considered to be contamination from an unknown source and not related to the sample matrix. The result is not included in this section of the report.

## 6.7 TENTATIVELY IDENTIFIED COMPOUNDS

The analytical instructions (Reference 2) list five compounds for VOC analysis that the laboratory does not routinely report, as indicated in the letter from H. L. Anastos (Reference 4). The laboratory was requested to perform a TIC search for these compounds. These compounds were not detected in any of the samples.

Several other TICs were identified in the samples. The TICs are identified by the instrument library search based only on masses in the spectra and are not based on retention times or verified with independent check standards. These compounds could be misidentified because of matrix effects. The concentrations are estimated based only on the nearest internal standard and a presumed response factor of 1. The TIC results are presented in Table 9.

For sample B17N61 (S04M000022), the preliminary report indicated that three TICs were identified during the VOC analysis. However, further examination of the data determined that cyclotetrasiloxane, octamethyl was detected in most of the blanks, LCS, and samples. Therefore, that compound was considered to be contamination from an unknown source and not related to the sample matrix. The result is not included in this section of the report.

## 6.8 TARGET QUANTITATION LIMITS

The analytical instructions listed target quantitation limits (TQL) for each requested analyte except mercury. The Data Summary Report provides MDLs. These must be converted to EQL to compare these to the requested TQLs. For all of the inorganic methods, the EQL is calculated as 10 times the reported MDL. The radionuclide analyses use several different conversion factors for determining the EQL. For gamma energy analysis (GEA) and  $^{237}\text{Np}$ , the EQL is five times the reported MDL. For total alpha, total beta and  $^{90}\text{Sr}$ , the EQL is three times the reported MDL. For the determination of isotopic plutonium and americium by alpha energy analysis, the MDL is the EQL.

The laboratory was unable to meet all of the requested TQLs due to necessary dilutions of the samples. These dilutions ensured analyte concentrations did not exceed calibration ranges and avoided contamination and carry-over problems. For radionuclide analysis, sample sizes were chosen based on allowable activity in a sample that is allowed in the counting room, or level of activity compared to the standard amount of tracer added, or a sample size limit in the procedure. The laboratory used the largest feasible sample sizes to obtain the lowest detection limits possible for these analyses.

**Table 9. Tentatively Identified Compounds from VOC Analysis.**

Compound	CAS	Units	B17N61	B17N63	B17N64	B17N64-A	B17N64
2-Propanol, 2-methyl- (tert-butanol)	75-65-0	µg/kg	4.3	ND	ND	ND	ND
1-Hexanol, 2-ethyl	104-76-7	µg/kg	8.5	ND	ND	ND	ND
Butanal	123-72-8	µg/kg	ND	18	ND	ND	ND
Methane, nitro	75-52-5	µg/kg	ND	5.5	ND	ND	ND
2,5-Cyclohexadiene-1,4-dione, 2,6-bis(1,1-dimethylethyl)-	719-22-2	µg/kg	ND	4.5	6.2	ND	ND
1-Hexanol, 2-ethyl	104-76-7	µg/kg	ND	24	ND	12	ND
Ethane, hexachloro	67-72-1	µg/kg	ND	5.2	ND	15	ND
Isopropyl alcohol	67-63-0	µg/kg	ND	ND	ND	ND	10
Pentanal	110-62-3	µg/kg	ND	ND	ND	8.9	ND
Hexanal	66-25-1	µg/kg	ND	ND	ND	13	ND
Ethene, tribromo	598-16-3	µg/kg	ND	ND	ND	5.7	ND
Benzoic acid, 2-[(trimethylsilyl)oxy]-, trimethylsilyl ester	3789-85-3	µg/kg	ND	ND	ND	ND	6.3

ND—Not detected.

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## 7.0 ANALYTICAL PROCEDURES

Table 10 presents the 222-S Laboratory analytical procedures used to generate the reported results.

**Table 10. Analytical Procedures.**

Analysis	Preparation Procedure	Analysis Procedure
<b>Inorganic Analyses</b>		
pH	Direct	LA-212-105 Rev. D-0
Hg	Direct	LA-325-106 Rev. C-0
CN	Direct	LA-695-102 Rev. I-2
NH <sub>4</sub>	Distillation	LA-533-101 Rev. K-0
IC	Water digest	LA-533-107 Rev. C-2
Sulfide	Direct	LA-361-101 Rev. A-2
Total U	Acid digest	LA-925-009 Rev. D-5
ICP	Acid digest	LA-505-161 Rev. D-1
ICP-MS	Acid digest	LA-506-102 Rev. A-0
<b>Radionuclide Analyses</b>		
Total alpha/total beta	Environmental digest	LA-508-101 Rev. I-1
GEA	Environmental digest	LA-548-121 Rev. F-5
<sup>90</sup> Sr	Environmental digest	LA-220-103 Rev. F-10
<sup>237</sup> Np	Environmental digest	LA-933-141 Rev. H-7
<sup>238</sup> Pu, <sup>239/240</sup> Pu	Environmental digest	LA-953-104 Rev. D-1
<sup>241</sup> Am	Environmental digest	LA-953-104 Rev. D-1
<b>Organic Analyses</b>		
VOA	Direct	LA-523-118 Rev. A-2
SVOA	Organic extraction	LA-523-135 Rev. A-2
PCB	Organic extraction	LA-523-140 Rev. B-0

**Notes:**

Acid digest procedure: LA-505-163 Rev. D-2

Water digest procedure: LA-504-101 Rev. I-0

Distillation procedure: LA-544-112 Rev. A-1

Environmental acid digest procedure: LA-544-101 Rev. C-5

Organic extraction procedure: LA-523-138 Rev. D-0

CH2M-0401824

Attachment 2

DATA SUMMARY REPORT

Consisting of 12 pages, including coversheet

0000018

Attachment 2  
Z9 TRENCH4

CORE NUMBER: 222S20040061  
SEGMENT #: B17N61

SEGMENT PORTION: VOA

Sample#	R A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count	Err%
S04M000022		Vinyl Chloride	ug/Kg	n/a	<1.5	<1.7	n/a	n/a	n/a	n/a	2	n/a	
S04M000022		Chloromethane	ug/Kg	n/a	<1.6	<1.8	n/a	n/a	n/a	n/a	2	n/a	
S04M000022		Methylene Chloride	ug/Kg	n/a	<1.3	<1.4	n/a	n/a	n/a	n/a	1	n/a	
S04M000022		Acetone	ug/Kg	1.1e+02	<0.92	26	n/a	n/a	n/a	1.1e+02	1	n/a	
S04M000022		1,1-Dichloroethane	ug/Kg	n/a	<0.80	<0.88	n/a	n/a	n/a	n/a	0.9	n/a	
S04M000022		1,2-Dichloroethene (cis & tran	ug/Kg	n/a	<1.4	<1.5	n/a	n/a	n/a	n/a	1	n/a	
S04M000022		Chloroform	ug/Kg	n/a	<0.72	0.96	n/a	n/a	n/a	n/a	0.8	n/a	
S04M000022		1,2-Dichloroethane	ug/Kg	n/a	<0.76	<0.84	n/a	n/a	n/a	n/a	0.8	n/a	
S04M000022		2-Butanone	ug/Kg	1.1e+02	<0.82	36	n/a	n/a	n/a	1.0e+02	0.9	n/a	
S04M000022		1,1,1-Trichloroethane	ug/Kg	n/a	<0.70	<0.77	n/a	n/a	n/a	n/a	0.8	n/a	
S04M000022		Carbon Tetrachloride	ug/Kg	n/a	<1.3	19	n/a	n/a	n/a	n/a	1	n/a	
S04M000022		Trichloroethene	ug/Kg	90	<0.86	<0.95	n/a	n/a	n/a	88	0.9	n/a	
S04M000022		Benzene	ug/Kg	88	<0.66	<0.73	n/a	n/a	n/a	88	0.7	n/a	
S04M000022		4-Methyl-2-pentanone	ug/Kg	1.0e+02	<0.74	<0.82	n/a	n/a	n/a	1.0e+02	0.8	n/a	
S04M000022		Tetrachloroethene	ug/Kg	n/a	<0.70	<0.77	n/a	n/a	n/a	n/a	0.8	n/a	
S04M000022		Toluene	ug/Kg	86	<0.64	<0.71	n/a	n/a	n/a	87	0.7	n/a	
S04M000022		Chlorobenzene	ug/Kg	91	<0.76	<0.84	n/a	n/a	n/a	90	0.8	n/a	
S04M000022		Ethylbenzene	ug/Kg	n/a	<0.98	<1.1	n/a	n/a	n/a	n/a	1	n/a	
S04M000022		Xylenes (total)	ug/Kg	n/a	<1.6	<1.8	n/a	n/a	n/a	n/a	2	n/a	
S04M000022		1,1-Dichloroethene	ug/Kg	73	<0.76	<0.84	n/a	n/a	n/a	70	0.8	n/a	

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Attachment 2  
Z9 TRENCH5  
Data Summary Report

CORE NUMBER: 222S20D40073  
SEGMENT #: B18XR8

SEGMENT PORTION: Acid Digest

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000103	A		Silver -ICP-Acid Digest	ug/g	95.8	<4.00e-03	<0.743	0.924	n/a	n/a	94.5	0.74	n/a
S04M000103	A		Arsenic -ICP-Acid Digest	ug/g	113	<0.0514	<9.55	<9.63	n/a	n/a	111	9.6	n/a
S04M000103	A		Barium -ICP-Acid Digest	ug/g	97.8	<7.30e-03	43.4	46.7	45.1	7.42	96.9	1.4	n/a
S04M000103	A		Beryllium -ICP-Acid Digest	ug/g	103	<7.70e-03	<1.43	<1.44	n/a	n/a	102	1.4	n/a
S04M000103	A		Bismuth -ICP-Acid Digest	ug/g	94.9	<0.0508	<9.44	<9.52	n/a	n/a	94.6	9.4	n/a
S04M000103	A		Cadmium -ICP-Acid Digest	ug/g	94.6	<4.20e-03	11.7	13.0	12.4	10.5	92.4	0.78	n/a
S04M000103	A		Chromium -ICP-Acid Digest	ug/g	97.3	0.0496	15.5	15.1	15.3	2.34	95.5	2.7	n/a
S04M000103	A		Copper -ICP-Acid Digest	ug/g	97.6	<7.90e-03	13.2	13.7	13.4	3.63	96.4	1.5	n/a
S04M000103	A		Lithium -ICP-Acid Digest	ug/g	100	<8.10e-03	10.4	11.3	10.8	8.29	99.6	1.5	n/a
S04M000103	A		Manganese -ICP-Acid Digest	ug/g	95.5	<3.40e-03	310	336	323	8.22	95.9	0.63	n/a
S04M000103	A		Nickel -ICP-Acid Digest	ug/g	97.4	0.0142	25.4	27.4	26.4	7.45	94.5	2.3	n/a
S04M000103	A		Phosphorus -ICP-Acid Digest	ug/g	95.9	<0.0556	533	557	545	4.26	98.8	10	n/a
S04M000103	A		Lead -ICP-Acid Digest	ug/g	91.4	<0.0246	5.76	7.11	6.44	20.9	89.8	4.6	n/a
S04M000103	A		Antimony -ICP-Acid Digest	ug/g	93.3	<0.0502	<9.32	<9.41	n/a	n/a	79.5	9.3	n/a
S04M000103	A		Selenium -ICP-Acid Digest	ug/g	96.8	<0.0494	<9.18	<9.26	n/a	n/a	96.4	9.2	n/a
S04M000103	A		Strontium -ICP-Acid Digest	ug/g	99.6	<3.30e-03	15.2	17.3	16.3	13.0	98.4	0.61	n/a
S04M000103	A		Zinc -ICP-Acid Digest	ug/g	92.3	<6.90e-03	42.3	42.6	42.4	0.808	91.3	1.3	n/a

SEGMENT PORTION: Environmental Acid Digest

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000104	E		Uranium by Phosphorescence	ug/g	94.8	5.66e-03	1.22	1.66	1.44	30.6	80.4	0.83	n/a
S04M000104	E		Pu-239/240 by TRU-SPEC Resin	uCi/g	90.9	<1.22e-04	2.26e-03	2.61e-03	2.44e-03	14.4	n/a	1.3e-04	2.0
S04M000104	E		Pu-238 by TRU-SPEC Resin IonEx	uCi/g	n/a	<1.31e-04	6.57e-04	5.45e-04	6.01e-04	18.6	n/a	1.4e-04	2.8
S04M000104	E		Np237 by TTA Extraction	uCi/g	103	<2.34e-05	2.89e-05	2.45e-05	2.67e-05	16.5	n/a	3.8e-05	80
S04M000104	E		Thorium-232 by ICP/MS	ug/g	103	0.319	6.36	5.71	6.04	10.7	94.2	9.6e-04	n/a
S04M000104	E		Uranium-233 by ICP/MS Acid Dig	ug/g	n/a	<3.60e-03	3.24e-04	2.53e-04	2.88e-04	24.5	n/a	7.2e-05	n/a
S04M000104	E		Uranium-234 by ICP/MS Acid Dig	ug/g	n/a	<1.20e-03	6.78e-05	5.44e-05	6.11e-05	22.0	n/a	2.4e-05	n/a
S04M000104	E		Uranium-235 by ICP/MS Acid Dig	ug/g	99.9	9.74e-03	6.79e-03	6.44e-03	6.62e-03	5.39	109	8.8e-05	n/a
S04M000104	E		Uranium-238 by ICP/MS Acid Dig	ug/g	101	1.38	0.922	0.910	0.916	1.35	98.5	4.4e-03	n/a
S04M000104	E		Cobalt-60 by GEA	uCi/g	103	<1.37e-05	<1.53e-05	<1.37e-05	n/a	n/a	n/a	1.5e-05	n/a
S04M000104	E		Antimony-125 by GEA	uCi/g	n/a	<3.69e-05	<3.47e-05	<3.75e-05	n/a	n/a	n/a	3.5e-05	n/a
S04M000104	E		Cesium-134 by GEA	uCi/g	n/a	<1.10e-05	<1.25e-05	<1.20e-05	n/a	n/a	n/a	1.3e-05	n/a
S04M000104	E		Cesium-137 by GEA	uCi/g	108	7.09e-05	<2.61e-05	<2.54e-05	n/a	n/a	n/a	2.6e-05	n/a
S04M000104	E		Europium-152 by GEA	uCi/g	n/a	<1.96e-05	<2.07e-05	<2.12e-05	n/a	n/a	n/a	2.1e-05	n/a
S04M000104	E		Europium-154 by GEA	uCi/g	n/a	<4.87e-05	<4.40e-05	<4.77e-05	n/a	n/a	n/a	4.4e-05	n/a
S04M000104	E		Europium-155 by GEA	uCi/g	n/a	<1.68e-05	<2.06e-05	<2.11e-05	n/a	n/a	n/a	2.1e-05	n/a
S04M000104	E		Am-241 by TRU-SPEC Resin IonEx	uCi/g	104	<0.0166	0.309	0.299	0.304	3.29	n/a	0.032	2.3
S04M000104	E		Alpha Env: Solids/Miscs	uCi/g	100	<6.51e-05	0.296	0.279	0.288	5.91	85.8	1.5e-04	1.2
S04M000104	E		Beta in Env. Solids/Misc	uCi/g	109	1.84e-03	0.0548	0.0509	0.0528	7.38	108	4.2e-04	2.4
S04M000228	E		Sr-89/90 Env. Solids	uCi/g	101	<4.05e-07	7.41e-07	5.08e-07	6.24e-07	37.3	n/a	7.9e-07	82

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SEGMENT PORTION: NH4 Distillation

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000105		S	Ammonium Ion-IC-Dionex 100	ug/g	103	<0.100	192	161	177	17.8	83.6	1.1e+02	n/a

SEGMENT PORTION: PCB

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000107			Aroclor-1016WET by SW-846 8082	ug/Kg	n/a	<16	<39	n/a	n/a	n/a	n/a	4.e+01	n/a
S04M000107			Aroclor-1221WET by SW-846 8082	ug/Kg	n/a	<5.2	<12	n/a	n/a	n/a	n/a	1.e+01	n/a
S04M000107			Aroclor-1232WET by SW-846 8082	ug/Kg	n/a	<92	<2.2e+02	n/a	n/a	n/a	n/a	2.e+02	n/a
S04M000107			Aroclor-1242WET by SW-846 8082	ug/Kg	n/a	<17	<40	n/a	n/a	n/a	n/a	4.e+01	n/a
S04M000107			Aroclor-1248WET by SW-846 8082	ug/Kg	n/a	<5.3	<13	n/a	n/a	n/a	n/a	1.e+01	n/a
S04M000107			Aroclor-1254WET by SW-846 8082	ug/Kg	84	<3.1	<7.4	n/a	n/a	n/a	n/a	86	7
S04M000107			Aroclor-1260WET by SW-846 8082	ug/Kg	n/a	<23	<54	n/a	n/a	n/a	n/a	5.e+01	n/a

SEGMENT PORTION: Parent

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000101			Cyanide Water Distillation	ug/g	102	<0.550	<0.451	<0.405	n/a	n/a	99.0	0.45	n/a
S04M000101			Mercury by CVAA (PE) with FIAS	ug/g	104	<1.00e-04	0.0900	0.0960	0.0930	6.45	98.0	0.040	n/a
S04M000101			pH on Solid Samples	pH	n/a	n/a	5.97	5.99	5.98	0.334	n/a	0.010	n/a
S04M000101			Sulfide by Microdist. & ISE	ug/g	90.7	<0.158	<14.6	14.6	n/a	n/a	87.2	15	n/a

SEGMENT PORTION: SVOA

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000106			Pentachlorophenol	ug/Kg	74	<4.0e+02	<9.6e+02	n/a	n/a	n/a	72	1.e+03	n/a
S04M000106			Phenol	ug/Kg	86	<4.0e+02	<9.6e+02	n/a	n/a	n/a	87	1.e+03	n/a
S04M000106			2-Chlorophenol	ug/Kg	80	<4.0e+02	<9.6e+02	n/a	n/a	n/a	81	1.e+03	n/a
S04M000106			Pyrene	ug/Kg	91	<4.0e+02	<9.6e+02	n/a	n/a	n/a	79	1.e+03	n/a
S04M000106			N-Nitroso-di-n-propylamine	ug/Kg	86	<4.0e+02	<9.6e+02	n/a	n/a	n/a	82	1.e+03	n/a
S04M000106			1,2,4-Trichlorobenzene SV	ug/Kg	89	<4.0e+02	<9.6e+02	n/a	n/a	n/a	83	1.e+03	n/a
S04M000106			4-Chloro-3-methylphenol	ug/Kg	85	<4.0e+02	<9.6e+02	n/a	n/a	n/a	85	1.e+03	n/a
S04M000106			Acenaphthene	ug/Kg	94	<4.0e+02	<9.6e+02	n/a	n/a	n/a	88	1.e+03	n/a
S04M000106			4-Nitrophenol	ug/Kg	83	<4.0e+02	<9.6e+02	n/a	n/a	n/a	86	1.e+03	n/a
S04M000106			2,4-Dinitrotoluene	ug/Kg	85	<4.0e+02	<9.6e+02	n/a	n/a	n/a	81	1.e+03	n/a
S04M000106			2-Methylphenol	ug/Kg	n/a	<4.0e+02	<9.6e+02	n/a	n/a	n/a	n/a	1.e+03	n/a
S04M000106			3 & 4 Methylphenol Total	ug/Kg	n/a	<4.0e+02	<9.6e+02	n/a	n/a	n/a	n/a	1.e+03	n/a
S04M000106			1,4-Dichlorobenzene	ug/Kg	84	<4.0e+02	<9.6e+02	n/a	n/a	n/a	75	1.e+03	n/a
S04M000106			Tri-n-butylphosphate	ug/Kg	n/a	<4.0e+02	<9.6e+02	n/a	n/a	n/a	n/a	1.e+03	n/a

SEGMENT PORTION: VOA

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000095			Vinyl Chloride	ug/Kg	n/a	<6.0e+02	<5.6e+02	n/a	n/a	n/a	n/a	6.e+02	n/a
S04M000095			Chloromethane	ug/Kg	n/a	<6.6e+02	<6.2e+02	n/a	n/a	n/a	n/a	6.e+02	n/a
S04M000095			Methylene Chloride	ug/Kg	n/a	<2.5e+02	<2.4e+02	n/a	n/a	n/a	n/a	2.e+02	n/a
S04M000095			Acetone	ug/Kg	n/a	8.5e+02	<1.7e+02	n/a	n/a	n/a	n/a	2.e+02	n/a
S04M000095			1,1-Dichloroethane	ug/Kg	n/a	<3.2e+02	<3.0e+02	n/a	n/a	n/a	n/a	3.e+02	n/a
S04M000095			1,2-Dichloroethene (cis & tran	ug/Kg	n/a	<2.8e+02	<2.6e+02	n/a	n/a	n/a	n/a	3.e+02	n/a
S04M000095			Chloroform	ug/Kg	n/a	<1.4e+02	<1.4e+02	n/a	n/a	n/a	n/a	1.e+02	n/a

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Sample#	R A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000095		1,2-Dichloroethane	ug/Kg	n/a	<1.5e+02	<1.4e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000095		2-Butanone	ug/Kg	n/a	<1.6e+02	<1.5e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000095		1,1,1-Trichloroethane	ug/Kg	n/a	<1.4e+02	<1.3e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000095		Carbon Tetrachloride	ug/Kg	n/a	<2.6e+02	<2.4e+02	n/a	n/a	n/a	n/a	2.e+02	n/a
S04M000095		Trichloroethene	ug/Kg	1.0e+02	<1.7e+02	<1.6e+02	n/a	n/a	n/a	89	2.e+02	n/a
S04M000095		Benzene	ug/Kg	1.0e+02	<1.3e+02	<1.2e+02	n/a	n/a	n/a	91	1.e+02	n/a
S04M000095		4-Methyl-2-pentanone	ug/Kg	n/a	<1.5e+02	<1.4e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000095		Tetrachloroethene	ug/Kg	n/a	<1.4e+02	<1.3e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000095		Toluene	ug/Kg	96	<1.3e+02	<1.2e+02	n/a	n/a	n/a	89	1.e+02	n/a
S04M000095		Chlorobenzene	ug/Kg	1.0e+02	<1.5e+02	<1.4e+02	n/a	n/a	n/a	91	1.e+02	n/a
S04M000095		Ethylbenzene	ug/Kg	n/a	<2.0e+02	<1.8e+02	n/a	n/a	n/a	n/a	2.e+02	n/a
S04M000095		Xylenes (total)	ug/Kg	n/a	<3.2e+02	<3.0e+02	n/a	n/a	n/a	n/a	3.e+02	n/a
S04M000095		1,1-Dichloroethene	ug/Kg	1.2e+02	<1.5e+02	<1.4e+02	n/a	n/a	n/a	92	1.e+02	n/a

SEGMENT PORTION: Water Digest

Sample#	R A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000102	W	Fluoride IC SW846	ug/g	97.6	<0.0120	<24.9	<24.7	n/a	n/a	102	25	n/a
S04M000102	W	Chloride SW-846	ug/g	94.0	<0.0170	39.7	61.7	50.7	43.5	95.2	35	n/a
S04M000102	W	Nitrite IC SW846	ug/g	96.0	0.130	<224	<222	n/a	n/a	96.4	2.2e+02	n/a
S04M000102	W	Nitrate by IC SW846	ug/g	98.4	<0.139	5.91e+03	6.26e+03	6.09e+03	5.75	101	2.9e+02	n/a
S04M000102	W	Phosphate by IC SW846	ug/g	98.5	<0.120	<249	<247	n/a	n/a	98.3	2.5e+02	n/a
S04M000102	W	Sulfate by IC SW846	ug/g	95.8	<0.138	<287	<284	n/a	n/a	97.8	2.9e+02	n/a

3200000

Attachment 2  
Z9 TRENCH5  
Data Summary Report

CORE NUMBER: 222S20040073  
SEGMENT #: B18XW3

SEGMENT PORTION: VOA

Sample#	R A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count	Err%
S04M000096		Vinyl Chloride	ug/Kg	n/a	<1.5	<1.3	n/a	n/a	n/a	n/a	1	1	n/a
S04M000096		Chloromethane	ug/Kg	n/a	<1.6	<1.5	n/a	n/a	n/a	n/a	1	1	n/a
S04M000096		Methylene Chloride	ug/Kg	n/a	<1.3	<1.1	n/a	n/a	n/a	n/a	1	1	n/a
S04M000096		Acetone	ug/Kg	n/a	10	51	n/a	n/a	n/a	n/a	0.8	1	n/a
S04M000096		1,1-Dichloroethane	ug/Kg	n/a	<0.80	<0.72	n/a	n/a	n/a	n/a	0.7	1	n/a
S04M000096		1,2-Dichloroethene (cis & tran	ug/Kg	n/a	<1.4	<1.2	n/a	n/a	n/a	n/a	1	1	n/a
S04M000096		Chloroform	ug/Kg	n/a	<0.72	15	n/a	n/a	n/a	n/a	0.6	1	n/a
S04M000096		1,2-Dichloroethane	ug/Kg	n/a	<0.76	<0.68	n/a	n/a	n/a	n/a	0.7	1	n/a
S04M000096		2-Butanone	ug/Kg	n/a	0.94	27	n/a	n/a	n/a	n/a	0.7	1	n/a
S04M000096		1,1,1-Trichloroethane	ug/Kg	n/a	<0.70	<0.63	n/a	n/a	n/a	n/a	0.6	1	n/a
S04M000096		Carbon Tetrachloride	ug/Kg	n/a	<1.3	2.6e+02	n/a	n/a	n/a	n/a	1	1	n/a
S04M000096		Trichloroethene	ug/Kg	1.0e+02	<0.86	<0.77	n/a	n/a	n/a	1.0e+02	0.8	1	n/a
S04M000096		Benzene	ug/Kg	1.0e+02	<0.66	<0.59	n/a	n/a	n/a	1.0e+02	0.6	1	n/a
S04M000096		4-Methyl-2-pentanone	ug/Kg	n/a	<0.74	<0.66	n/a	n/a	n/a	n/a	0.7	1	n/a
S04M000096		Tetrachloroethene	ug/Kg	n/a	<0.70	0.94	n/a	n/a	n/a	n/a	0.6	1	n/a
S04M000096		Toluene	ug/Kg	96	<0.64	<0.57	n/a	n/a	n/a	95	0.6	1	n/a
S04M000096		Chlorobenzene	ug/Kg	1.0e+02	<0.76	<0.68	n/a	n/a	n/a	99	0.7	1	n/a
S04M000096		Ethylbenzene	ug/Kg	n/a	<0.98	<0.88	n/a	n/a	n/a	n/a	0.9	1	n/a
S04M000096		Xylenes (total)	ug/Kg	n/a	<1.6	<1.4	n/a	n/a	n/a	n/a	1	1	n/a
S04M000096		1,1-Dichloroethene	ug/Kg	97	<0.76	<0.68	n/a	n/a	n/a	94	0.7	1	n/a

2300000

Attachment 2  
29 TRENCH5  
Data Summary Report

CORE NUMBER: 222S20040073  
SEGMENT #: 8190TB-A *Pages 6/23/04*

SEGMENT PORTION: Environmental Acid Digest

Sample#	R A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000108	E	Pu-239/240 by TRU-SPEC Resin	uCi/g	111	<1.26e-03	4.99e-03	5.79e-03	5.39e-03	14.8	n/a	1.3e-03	4.4
S04M000108	E	Pu-238 by TRU-SPEC Resin IonEX	uCi/g	n/a	<1.46e-03	<1.48e-03	<1.86e-03	n/a	n/a	n/a	1.5e-03	1.0e+02

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Attachment 2  
Z9 TRENCH5  
Data Summary Report

CORE NUMBER: 222S20040100  
SEGMENT #: B17N64

SEGMENT PORTION: VOA

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count	Err%
S04M000115			Vinyl Chloride	ug/Kg	n/a	<1.5	<1.8	n/a	n/a	n/a	n/a	2	2	n/a
S04M000115			Chloromethane	ug/Kg	n/a	<1.6	<2.0	n/a	n/a	n/a	n/a	2	2	n/a
S04M000115			Methylene Chloride	ug/Kg	n/a	<1.3	<1.5	n/a	n/a	n/a	n/a	1	1	n/a
S04M000115			Acetone	ug/Kg	n/a	<0.92	1.7e+02	n/a	n/a	n/a	n/a	1	1	n/a
S04M000115			1,1-Dichloroethane	ug/Kg	n/a	<0.80	<0.96	n/a	n/a	n/a	n/a	1	1	n/a
S04M000115			1,2-Dichloroethene (cis & tran	ug/Kg	n/a	<1.4	<1.6	n/a	n/a	n/a	n/a	2	2	n/a
S04M000115			Chloroform	ug/Kg	n/a	<0.72	8.7	n/a	n/a	n/a	n/a	0.9	0.9	n/a
S04M000115			1,2-Dichloroethane	ug/Kg	n/a	<0.76	<0.91	n/a	n/a	n/a	n/a	0.9	0.9	n/a
S04M000115			2-Butanone	ug/Kg	n/a	<0.82	75	n/a	n/a	n/a	n/a	1	1	n/a
S04M000115			1,1,1-Trichloroethane	ug/Kg	n/a	<0.70	<0.84	n/a	n/a	n/a	n/a	0.8	0.8	n/a
S04M000115			Carbon Tetrachloride	ug/Kg	n/a	<1.3	92	n/a	n/a	n/a	n/a	1	1	n/a
S04M000115			Trichloroethene	ug/Kg	1.0e+02	<0.86	<1.0	n/a	n/a	n/a	1.0e+02	1	1	n/a
S04M000115			Benzene	ug/Kg	1.0e+02	<0.66	<0.79	n/a	n/a	n/a	1.0e+02	0.8	0.8	n/a
S04M000115			4-Methyl-2-pentanone	ug/Kg	n/a	<0.74	1.2	n/a	n/a	n/a	n/a	0.9	0.9	n/a
S04M000115			Tetrachloroethene	ug/Kg	n/a	<0.70	2.0	n/a	n/a	n/a	n/a	0.8	0.8	n/a
S04M000115			Toluene	ug/Kg	97	<0.64	1.3	n/a	n/a	n/a	94	0.8	0.8	n/a
S04M000115			Chlorobenzene	ug/Kg	1.0e+02	<0.76	<0.91	n/a	n/a	n/a	1.0e+02	0.9	0.9	n/a
S04M000115			Ethylbenzene	ug/Kg	n/a	<0.98	<1.2	n/a	n/a	n/a	n/a	1	1	n/a
S04M000115			Xylenes (total)	ug/Kg	n/a	<1.6	<1.9	n/a	n/a	n/a	n/a	2	2	n/a
S04M000115			1,1-Dichloroethene	ug/Kg	95	<0.76	<0.91	n/a	n/a	n/a	94	0.9	0.9	n/a

530000

Attachment 2  
Z9 TRENCH5  
Data Summary Report

CORE NUMBER: 222S20040100  
SEGMENT #: B17N64-A

SEGMENT PORTION: VOA

Sample#	R A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count	Err%
S04M000124		Vinyl Chloride	ug/Kg	n/a	<1.5	<1.3	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000124		Chloromethane	ug/Kg	n/a	<1.6	<1.4	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000124		Methylene Chloride	ug/Kg	n/a	<1.3	<1.1	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000124		Acetone	ug/Kg	n/a	7.2	79	n/a	n/a	n/a	n/a	0.8	n/a	n/a
S04M000124		1,1-Dichloroethane	ug/Kg	n/a	<0.80	<0.67	n/a	n/a	n/a	n/a	0.7	n/a	n/a
S04M000124		1,2-Dichloroethene (cis & tran	ug/Kg	n/a	<1.4	<1.2	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000124		Chloroform	ug/Kg	n/a	<0.72	13	n/a	n/a	n/a	n/a	0.6	n/a	n/a
S04M000124		1,2-Dichloroethane	ug/Kg	n/a	<0.76	<0.64	n/a	n/a	n/a	n/a	0.6	n/a	n/a
S04M000124		2-Butanone	ug/Kg	n/a	0.95	80	n/a	n/a	n/a	n/a	0.7	n/a	n/a
S04M000124		1,1,1-Trichloroethane	ug/Kg	n/a	<0.70	<0.59	n/a	n/a	n/a	n/a	0.6	n/a	n/a
S04M000124		Carbon Tetrachloride	ug/Kg	n/a	<1.3	2.4e+02	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000124		Trichloroethene	ug/Kg	99	<0.86	<0.72	n/a	n/a	n/a	n/a	0.7	n/a	n/a
S04M000124		Benzene	ug/Kg	98	<0.66	<0.56	n/a	n/a	n/a	n/a	0.6	n/a	n/a
S04M000124		4-Methyl-2-pentanone	ug/Kg	n/a	<0.74	<0.62	n/a	n/a	n/a	n/a	0.6	n/a	n/a
S04M000124		Tetrachloroethene	ug/Kg	n/a	<0.70	5.4	n/a	n/a	n/a	n/a	0.6	n/a	n/a
S04M000124		Toluene	ug/Kg	95	<0.64	<0.54	n/a	n/a	n/a	n/a	0.5	n/a	n/a
S04M000124		Chlorobenzene	ug/Kg	97	<0.76	<0.64	n/a	n/a	n/a	n/a	0.6	n/a	n/a
S04M000124		Ethylbenzene	ug/Kg	n/a	<0.98	<0.82	n/a	n/a	n/a	n/a	0.8	n/a	n/a
S04M000124		Xylenes (total)	ug/Kg	n/a	<1.6	<1.3	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000124		1,1-Dichloroethene	ug/Kg	94	<0.76	<0.64	n/a	n/a	n/a	n/a	0.6	n/a	n/a

16-jun-2004 07:58:14

Attachment 2  
29 TRENCH5  
Data Summary Report

CORE NUMBER: 222S20040100  
SEGMENT #: B17N68

SEGMENT PORTION: VOA

Sample#	R A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000116		Vinyl Chloride	ug/Kg	n/a	<1.5e+02	<1.7e+02	n/a	n/a	n/a	n/a	2.e+02	n/a
S04M000116		Chloromethane	ug/Kg	n/a	<1.6e+02	<1.8e+02	n/a	n/a	n/a	n/a	2.e+02	n/a
S04M000116		Methylene Chloride	ug/Kg	n/a	<1.3e+02	<1.4e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000116		Acetone	ug/Kg	n/a	<92	6.6e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000116		1,1-Dichloroethane	ug/Kg	n/a	<80	<89	n/a	n/a	n/a	n/a	9.e+01	n/a
S04M000116		1,2-Dichloroethene (cis & tran	ug/Kg	n/a	<1.4e+02	<1.5e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000116		Chloroform	ug/Kg	n/a	<72	<80	n/a	n/a	n/a	n/a	8.e+01	n/a
S04M000116		1,2-Dichloroethane	ug/Kg	n/a	<76	<84	n/a	n/a	n/a	n/a	8.e+01	n/a
S04M000116		2-Butanone	ug/Kg	n/a	<82	<91	n/a	n/a	n/a	n/a	9.e+01	n/a
S04M000116		1,1,1-Trichloroethane	ug/Kg	n/a	<70	<77	n/a	n/a	n/a	n/a	8.e+01	n/a
S04M000116		Carbon Tetrachloride	ug/Kg	n/a	<1.3e+02	<1.4e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000116		Trichloroethene	ug/Kg	83	<86	<95	n/a	n/a	n/a	91	9.e+01	n/a
S04M000116		Benzene	ug/Kg	94	<66	<73	n/a	n/a	n/a	1.0e+02	7.e+01	n/a
S04M000116		4-Methyl-2-pentanone	ug/Kg	n/a	<74	<82	n/a	n/a	n/a	n/a	8.e+01	n/a
S04M000116		Tetrachloroethene	ug/Kg	n/a	<70	<77	n/a	n/a	n/a	n/a	8.e+01	n/a
S04M000116		Toluene	ug/Kg	1.0e+02	<64	<71	n/a	n/a	n/a	1.1e+02	7.e+01	n/a
S04M000116		Chlorobenzene	ug/Kg	99	<76	<84	n/a	n/a	n/a	1.1e+02	8.e+01	n/a
S04M000116		Ethylbenzene	ug/Kg	n/a	<98	<1.1e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000116		Xylenes (total)	ug/Kg	n/a	<1.6e+02	<1.8e+02	n/a	n/a	n/a	n/a	2.e+02	n/a
S04M000116		1,1-Dichloroethene	ug/Kg	79	<76	<84	n/a	n/a	n/a	85	8.e+01	n/a

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Attachment 2  
29 TRENCH5  
Date Summary Report

CORE NUMBER: 222S20040101  
SEGMENT #: B191Y4

SEGMENT PORTION: VOA

Sample#	R A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count	Err%
S04M000118		Vinyl Chloride	ug/Kg	n/a	<1.5	<1.5	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000118		Chloromethane	ug/Kg	n/a	<1.6	<1.6	n/a	n/a	n/a	n/a	2	n/a	n/a
S04M000118		Methylene Chloride	ug/Kg	n/a	<1.3	<1.2	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000118		Acetone	ug/Kg	n/a	<0.92	41	n/a	n/a	n/a	n/a	0.9	n/a	n/a
S04M000118		1,1-Dichloroethane	ug/Kg	n/a	<0.80	<0.79	n/a	n/a	n/a	n/a	0.8	n/a	n/a
S04M000118		1,2-Dichloroethene (cis & tran	ug/Kg	n/a	<1.4	<1.4	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000118		Chloroform	ug/Kg	n/a	<0.72	14	n/a	n/a	n/a	n/a	0.7	n/a	n/a
S04M000118		1,2-Dichloroethane	ug/Kg	n/a	<0.76	<0.75	n/a	n/a	n/a	n/a	0.7	n/a	n/a
S04M000118		2-Butanone	ug/Kg	n/a	<0.82	22	n/a	n/a	n/a	n/a	0.8	n/a	n/a
S04M000118		1,1,1-Trichloroethane	ug/Kg	n/a	<0.70	<0.69	n/a	n/a	n/a	n/a	0.7	n/a	n/a
S04M000118		Carbon Tetrachloride	ug/Kg	n/a	<1.3	2.9e+02	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000118		Trichloroethene	ug/Kg	1.0e+02	<0.86	1.1	n/a	n/a	n/a	n/a	0.8	n/a	n/a
S04M000118		Benzene	ug/Kg	1.0e+02	<0.66	0.97	n/a	n/a	n/a	n/a	0.6	n/a	n/a
S04M000118		4-Methyl-2-pentanone	ug/Kg	n/a	<0.74	<0.73	n/a	n/a	n/a	n/a	0.7	n/a	n/a
S04M000118		Tetrachloroethene	ug/Kg	n/a	<0.70	1.6	n/a	n/a	n/a	n/a	0.7	n/a	n/a
S04M000118		Toluene	ug/Kg	97	<0.64	0.97	n/a	n/a	n/a	n/a	0.6	n/a	n/a
S04M000118		Chlorobenzene	ug/Kg	1.0e+02	<0.76	0.98	n/a	n/a	n/a	n/a	0.7	n/a	n/a
S04M000118		Ethylbenzene	ug/Kg	n/a	<0.98	<0.97	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000118		Xylenes (total)	ug/Kg	n/a	<1.6	<1.6	n/a	n/a	n/a	n/a	2	n/a	n/a
S04M000118		1,1-Dichloroethene	ug/Kg	95	<0.76	1.1	n/a	n/a	n/a	n/a	0.7	n/a	n/a

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FLUOR Hanford Inc.		CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-018-097		Page 1 of 1	
Collector Gent/Pope/Pfister/Hughes		Company Contact Steve Trent		Telephone No. 373-5869		Project Coordinator TRENT, SJ		Price Code 8N Data Turnaround 60 Days	
Project Designation 216-Z-9 Trench Characterization Borehole - Soil		Sampling Location 216-Z-9/C3426		SAF No. F03-018		Air Quality <input type="checkbox"/>			
Ice Chest No. <b>ERC-99-005</b>		Field Logbook No. HNF-N-3361		COA 119152ES10		Method of Shipment Government Vehicle			
Shipped To 222-S Lab Operations		Offsite Property No. N/A		Bill of Lading/Air Bill No. N/A					
POSSIBLE SAMPLE HAZARDS/REMARKS RADIOACTIVE TIE TO: B191Y5				Preservation		Cool 4C	Cool 4C	None	
Special Handling and/or Storage				Type of Container		aGs*	aG	P	
				No. of Container(s)		3	1	1	
				Volume		40mL	60mL	500mL	
				See item (1) in Special Instructions.		See item (2) in Special Instructions.	See item (3) in Special Instructions.		
SAMPLE ANALYSIS									
Sample No.	Matrix *	Sample Date	Sample Time						
B191Y4	SOIL	4/21/04	0930	X	X	X			
<p style="text-align: center;">These two bottles were relabeled as B191Y7 for return. PARB 4/29/04</p>									
CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS				Matrix *	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<p>** The laboratory is to achieve a detection limit of 5 pCi/g and 10 pCi/g for gross alpha and gross beta, respectively.</p> <p>(1) VOA - 8260A - Complete; VOA - 8260A (Add-On) (Acetonitrile, Hexane, n-Butylbenzene)</p> <p>(2) Semi-VOA - 8270A (TCL); Semi-VOA - 8270A (Add-On) (1,2,4-Trimethylbenzene, Cyclohexanone, Tributyl phosphate)</p> <p>(3) Gross Alpha; Gross Beta; Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Antimony-125, Cesium-134); Americium-241; Isotopic Plutonium; Isotopic Thorium (Thorium-232); Isotopic Uranium, Strontium-89,90 - Sr-90; Neptunium-237; Total Uranium</p> <p>60mL and 500mL bottles associated with these analyses were returned to customer on a new chain of custody per email request from S.J. Trent 4/28/04</p>	
M6-ENT/DP/MSJ		4/21/04		Greg Thomas Greg Thomas		4/21/04			
Greg Thomas Greg Thomas		4/21/04		R. Book R. Steele		4/21/04			
LABORATORY SECTION		Received By				Title		Date/Time	
FINAL SAMPLE DISPOSITION		Disposal Method				Disposed By		Date/Time	

03600000

## GENERATOR KNOWLEDGE INFORMATION

1. Chain of Custody Number \_\_\_\_\_ CACN/COA 118478ES20 Customer Identification Number \_\_\_\_\_

2. List generator knowledge or description of process that produced sample. Or list description of sample source:  
216-Z-9 Trench DNAPL Investigation

MSDS Available?  No  Yes Hanford MSDS No. \_\_\_\_\_

3. List all waste codes and constituents associated with the waste or media that was sampled, regardless of CERCLA status.

a) Does the sample contain any of the following listed waste codes?  
*By checking "unknown" the customer understands that no knowledge is available following a careful search.*

	List Federal Waste Code(s):	List Constituent(s):		
P Codes: _____	_____	_____	<input type="radio"/> Yes	<input checked="" type="radio"/> No <input type="radio"/> Unknown
U Codes: _____	_____	_____	<input type="radio"/> Yes	<input checked="" type="radio"/> No <input type="radio"/> Unknown
K Codes: _____	_____	_____	<input type="radio"/> Yes	<input checked="" type="radio"/> No <input type="radio"/> Unknown
F Codes: <u>F001</u>	<u>Carbon tetrachloride</u>		<input checked="" type="radio"/> Yes	<input type="radio"/> No <input type="radio"/> Unknown

b) List applicable characteristic waste codes, flash point, pH, constituents, and concentrations as appropriate.

D001: <input type="checkbox"/> FP <100°F	<input type="checkbox"/> FP ≥100 <140°F	<input type="checkbox"/> DOT Oxidizer	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> Unknown
D002: <input type="checkbox"/> pH ≤2	<input type="checkbox"/> pH ≥12.5	<input type="checkbox"/> Solid Corrosive (WSC2)	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> Unknown
D003: <input type="checkbox"/> Cyanide	<input type="checkbox"/> Sulfide	<input type="checkbox"/> Water Reactive	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> Unknown
D004-D043 (Identify applicable waste codes and concentrations):		<input checked="" type="checkbox"/> Other (i.e., peroxide former, explosive, air reactive)	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> Unknown

c) If characteristic, list any known underlying hazardous constituents (UHCs) reasonably expected to be present, and their concentrations that may be present above the LDR treatment standard (40 CFR 268.48):  
N/A

d) List any known Land Disposal Restrictions (LDR) subcategories, if applicable (40 CFR 268.40):  
N/A

e) List any applicable Washington State dangerous waste codes: (not required if federally regulated) (\*State mixture rule for ignitability)

WT01: <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown	WP01: <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown
WT02: <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown	WP02: <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown
W001: <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown	WP03: <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown
List constituents and concentrations:	F003:* <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown

4. Is this material TSCA regulated for PCBs?  Yes  No  Unknown  Analysis Requested

List concentration if applicable: \_\_\_\_\_  
 If yes, what is the source of the PCBs? (see TSCA PCB Hanford Site User Guide, DOE/RL-2001-50)

<input type="checkbox"/> PCB Liquid Waste	<input type="checkbox"/> PCB Bulk Product Waste	<input type="checkbox"/> PCB Transformer ≥500 ppm	<input type="checkbox"/> Unknown
<input type="checkbox"/> PCB Remediation Waste	<input type="checkbox"/> PCB R&D Waste	<input type="checkbox"/> PCB contaminated electrical equipment (capacitor/ballast) <500 ppm	
<input type="checkbox"/> PCB Spill Material	<input type="checkbox"/> PCB Item	<input type="checkbox"/> Other PCB Waste (list) _____	

5. Is this material TRU?  Yes  No  Unknown

6 ACCURACY OF INFORMATION  
 Based on my inquiry of those individuals immediately responsible for obtaining this information, that to the best of my knowledge, the information entered in this document is true, accurate, and complete.

Print & Sign [Signature] Date 10/6/03

Attachment 2  
29 TRENCH5  
Data Summary Report

CORE NUMBER: 222S20040101  
SEGMENT #: B191Y4-A

SEGMENT PORTION: VOA

Sample#	R A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000123		Vinyl Chloride	ug/Kg	n/a	<1.5e+02	<1.5e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000123		Chloromethane	ug/Kg	n/a	<1.6e+02	<1.6e+02	n/a	n/a	n/a	n/a	2.e+02	n/a
S04M000123		Methylene Chloride	ug/Kg	n/a	<1.3e+02	<1.2e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000123		Acetone	ug/Kg	n/a	<92	5.9e+02	n/a	n/a	n/a	n/a	9.e+01	n/a
S04M000123		1,1-Dichloroethane	ug/Kg	n/a	<80	<79	n/a	n/a	n/a	n/a	8.e+01	n/a
S04M000123		1,2-Dichloroethene (cis & tran	ug/Kg	n/a	<1.4e+02	<1.4e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000123		Chloroform	ug/Kg	n/a	<72	<71	n/a	n/a	n/a	n/a	7.e+01	n/a
S04M000123		1,2-Dichloroethane	ug/Kg	n/a	<76	<75	n/a	n/a	n/a	n/a	7.e+01	n/a
S04M000123		2-Butanone	ug/Kg	n/a	<82	<81	n/a	n/a	n/a	n/a	8.e+01	n/a
S04M000123		1,1,1-Trichloroethane	ug/Kg	n/a	<70	<69	n/a	n/a	n/a	n/a	7.e+01	n/a
S04M000123		Carbon Tetrachloride	ug/Kg	n/a	<1.3e+02	<1.3e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000123		Trichloroethene	ug/Kg	83	<86	<85	n/a	n/a	n/a	n/a	8.e+01	n/a
S04M000123		Benzene	ug/Kg	94	<66	<65	n/a	n/a	n/a	n/a	6.e+01	n/a
S04M000123		4-Methyl-2-pentanone	ug/Kg	n/a	<74	<73	n/a	n/a	n/a	n/a	7.e+01	n/a
S04M000123		Tetrachloroethene	ug/Kg	n/a	<70	<69	n/a	n/a	n/a	n/a	7.e+01	n/a
S04M000123		Toluene	ug/Kg	1.0e+02	<64	<63	n/a	n/a	n/a	n/a	6.e+01	n/a
S04M000123		Chlorobenzene	ug/Kg	99	<76	<75	n/a	n/a	n/a	n/a	7.e+01	n/a
S04M000123		Ethylbenzene	ug/Kg	n/a	<98	<97	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000123		Xylenes (total)	ug/Kg	n/a	<1.6e+02	<1.6e+02	n/a	n/a	n/a	n/a	2.e+02	n/a
S04M000123		1,1-Dichloroethene	ug/Kg	79	<76	<75	n/a	n/a	n/a	n/a	7.e+01	n/a

0000031

CH2M-0401824

Attachment 3

**SAMPLE BREAKDOWN DIAGRAM**

Consisting of 6 pages, including coversheet

0000032

Z9 TRENCH4  
216-Z-9 Borehole samples  
Group 222S20040061

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B17N61

3x40 mL amber  
glass septum bottle  
(cool 4°C)



S04M000022  
VOA  
(Method 8260B)  
(low-level)

000000

# Z9 TRENCH5

## 216-Z-9 Borehole samples

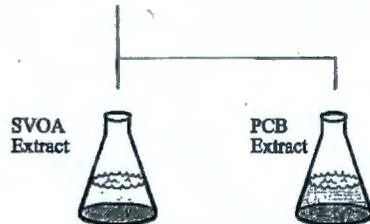
### Group 222S20040073

**B18XR8**

60 mL amber glass septum bottle (cool 4°C)



S04M000099  
Received



S04M000106  
SVOA  
(Method 8270C)

S04M000107  
PCB  
(Method 8082)

**B190T8-A**

20 mL glass/poly



S04M000097  
GEA radscreen



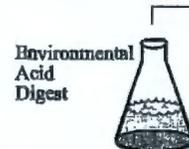
S04M000108  
<sup>238</sup>Pu and <sup>239</sup>Pu

**B18XR8**

60 mL amber glass septum bottle (cool 4°C)



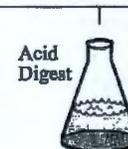
S04M000100  
Received



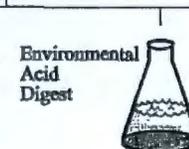
S04M000228  
<sup>90</sup>Sr



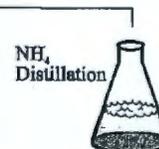
S04M000102  
IC: F, Cl, NO<sub>3</sub>, NO<sub>2</sub>, PO<sub>4</sub>, SO<sub>4</sub>



S04M000103  
ICP: Sb, As, Ba, Be, Bi, Cd, Cr, Cu, Pb, Li, Mn, Ni, Se, Ag, P, Sr, Zn



S04M000104  
Total Alpha/Beta  
<sup>237</sup>Np  
<sup>241</sup>Am  
<sup>238</sup>Pu  
<sup>239</sup>Pu  
GEA: <sup>60</sup>Co, <sup>137</sup>Cs, <sup>134</sup>Cs, <sup>137</sup>Cs, <sup>152</sup>Bu, <sup>154</sup>Bu, <sup>153</sup>Bu



S04M000105  
IC: NH<sub>4</sub>

**B18XR8**

120 ml bottle (cool 4°C)



S04M000101  
Received  
Hg  
pH  
CN  
Sulfide

000000

Z9 TRENCH5  
216-Z-9 Borehole samples  
Group 222S20040073

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**B18XW3**

3x40 mL amber  
glass septum bottle  
(cool 4°C)



S04M000096  
VOA  
(Method 8260B)  
(low-level)

**B18XR8**

3x5 g EnCore  
Sampler  
(cool 4°C)



S04M000095  
VOA  
(Method 8260B)  
(high-level)

584666

Z9 TRENCH5  
216-Z-9 Borehole samples  
Group 222S20040100

B17N64

3x40 mL amber  
glass septum bottle  
(cool 4°C)



S04M000115  
VOA  
(Method 8260B)  
(low-level)

B17N64-A

2x40 mL amber  
glass septum bottle  
(cool 4°C)



S04M000124  
VOA  
(Method 8260B)  
(additional low-level  
analysis)

B17N68

3x5 g EnCore  
Sampler  
(cool 4°C)



S04M000116  
VOA  
(Method 8260B)  
(high-level)

0000025

Z9 TRENCH5  
216-Z-9 Borehole samples  
Group 222S20040101

B191Y4

3x40 mL amber  
glass septum bottle  
(cool 4°C)



S04M000118

VOA  
(Method 8260B)  
(preserved a portion for  
low-level analysis)

B191Y4-A



S04M000123

VOA  
(Method 8260B)  
(preserved a portion for  
high-level analysis)

B191Y4

60 mL amber  
glass bottle  
(cool 4°C)



S04M000119

Received

B191Y4

500 mL bottle



S04M000120

Received

Analysis request was cancelled per customer  
contact on 4/28/04. Samples were returned to  
customer on 4/29/04.

1800004

CH2M-0401824

Attachment 4

SAMPLE RECEIPT PAPERWORK

Consisting of 12 pages, including coversheet

0000038

FLUOR Hanford Inc.		CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-018-058		Page 1 of 1		
Collector Pope/Pfister/Hughes		Company Contact Steve Trent		Telephone No. 373-5869		Project Coordinator TRENT, SJ		Price Code 8N		
Project Designation 216-Z-9 Trench Characterization Borehole - Soil		Sampling Location 216-Z-9/C3426 - Interval 86'-88.5' - 90'-92.5'		SAF No. F03-018		Air Quality <input type="checkbox"/>		Data Turnaround 60 Days		
Ice Chest No. GRP-04-008		Field Logbook No. HNF-N-3361		COA 119152ES10		Method of Shipment Government Vehicle				
Shipped To 222-S Lab Operations		Offsite Property No. N/A		Bill of Lading/Air Bill No. N/A						
<b>POSSIBLE SAMPLE HAZARDS/REMARKS</b> RADIOACTIVE TIE TO: B17N60  <b>Special Handling and/or Storage</b> SAMPLERS: Collect 5 g with the encore sampler. If RAD < 0.5 mrem/hr take sample to WSCF. Sample analysis must occur in 48 hours or preserve with methanol.					Preservation	Cool 4C				
					Type of Container	P				
					No. of Container(s)	3				
					Volume	5g				
SAMPLE ANALYSIS					See Item (1) in Special Instructions.					
Sample No.	Matrix *	Sample Date	Sample Time							
B17N61	SOIL	3-23-4	0835	-						
CHAIN OF POSSESSION					SPECIAL INSTRUCTIONS					Matrix *
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		(1) VOA - 8260A - Complete; VOA - 8260A (Add-On) (Acetonitrile, Hexane, n-Butylbenzene)		S=Soil SB=Sediment SO=Solid SL=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Tissue WT=Wipe L=Liquid V=Vegetation X=Other
Karin Hughes		3-23-4 12:30		in Cooler on RMA Trailer		3-23-4 12:30				
216 Z 9 RMA Trailer		3-24-4 13:30		Karin Hughes		3-24-4 13:30				
Karin Hughes		3-23-4 13:45		RL Chambers		3-24-4 13:45				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time				
LABORATORY SECTION	Received By			Title			Date/Time			
FINAL SAMPLE DISPOSITION	Disposal Method			Disposed By			Date/Time			

FLUOR Hanford Inc.		CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-018-082	Page 1 of 1
Collector Pope/Pfister/Hughes/Wiberg		Company Contact Steve Trent		Telephone No. 373-5869		Project Coordinator TRENT, SJ	
Project Designation 216-Z-9 Trench Characterization Borehole - Soil		Sampling Location 216-Z-9/C3426		DEPTH 110' - 112.5'		Price Code 8N Data Turnaround 60 Days	
Ice Chest No.		Field Logbook No. HNF-N-3361		COA 119152ES10		Air Quality <input type="checkbox"/>	
Shipped To 222-S Lab Operations		Offsite Property No. N/A		Method of Shipment Government Vehicle			
Bill of Lading/Air Bill No. N/A							
POSSIBLE SAMPLE HAZARDS/REMARKS		Preservation		Cool 4C			
Special Handling and/or Storage		Type of Container		P			
		No. of Container(s)		3			
		Volume		5g			
SAMPLE ANALYSIS		See item (1) in Special Instructions.					
Sample No.	Matrix *	Sample Date	Sample Time				
B18XR8	SOIL	4/8/04	1015	✓			
CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS			Matrix *
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	(1) VOA - 8260A - Complete; VOA - 8260A (Add-On) (Acetonitrile, Hexane, n-Butylbenzene)			S=Soil SB=Soilmen SO=Solid SL=Sludge W=Water O=Oil A=Air DS=Dross Solids DL=Dross Liquids T=Tissue W=Wipe L=Liquid V=Vegetation X=Other
<i>Dane Wiberg</i>	4/8/04 1435	<i>site Frige</i>	4/8/04 1435				
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time				
<i>Site Frige</i>	4/8/04 1534	<i>David Tyra/De</i>	4/8/04 1534				
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time				
<i>David Tyra/De</i>	4/8/04 1556	<i>Keith Fuller for M. Rollman</i>	4/8/04 1558				
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time				
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time				
LABORATORY SECTION	Received By	Title					Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By					Date/Time

216-Z-9

FLUOR Hanford Inc.		CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-018-091	Page 1 of 1	
Collector Pope/Pfister/Hughes/Wiberg		Company Contact Steve Treat		Telephone No. 373-5869	Project Coordinator TRENT, SJ	Price Code 8N	Data Turnaround 60 Days	
Project Designation 216-Z-9 Trench Characterization Borehole - Soil		Sampling Location 216-Z-9/C3426		110'-112.5' <sup>AP</sup>	SAF No. F03-018	Air Quality <input type="checkbox"/>		
Ice Chest No. S/N 2/03-050024		Field Logbook No. HNF-N-3361		COA 119152ES10	Method of Shipment Government Vehicle			
Shipped To 222-S Lab Operations		Offsite Property No. N/A		Bill of Lading/Air Bill No. N/A				
POSSIBLE SAMPLE HAZARDS/REMARKS					Preservation	Cool 4C		
Special Handling and/or Storage					Type of Container	G		
					No. of Container(s)	3		
					Volume	40mL		
					SAMPLE ANALYSIS		See item (1) in Special Instructions.	
Sample No.	Matrix *	Sample Date	Sample Time					
B18XW3	SOIL	4-8-4	1615	✓				
CHAIN OF POSSESSION					SPECIAL INSTRUCTIONS		Matrix *	
Relinquished By/Removed From R. PFISTER/Hughes		Date/Time 4-8-4 1435	Received By/Stored In SITE FRIG		Date/Time 4-8-4 1435	(1) VOA - 8260A - Complete; VOA - 8260A (Add-On) (Acetonitrile, Hexane, n-Butylbenzene)		S=Soil SE=Sediment SO=Solid SI=Sludge W=Water O=Oil A=Air DS=Dry Solids DL=Dry Liquids T=Truss WF=Wipe L=Liquid V=Vegetation X=Other
Relinquished By/Removed From Site Frig		Date/Time 4/14/04 1015	Received By/Stored In Grey Thomas / Greg Thomas		Date/Time 4/14/04 1015			
Relinquished By/Removed From Grey Thomas / Greg Thomas		Date/Time 4/14/04 1100	Received By/Stored In RT Steele / RT Steele		Date/Time 4/14/04 1100			
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time			
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time			
LABORATORY SECTION		Received By	Title		Date/Time			
FINAL SAMPLE DISPOSITION		Disposal Method	Disposed By		Date/Time			

1. SHIP FROM U.S. DEPT. OF ENERGY C/O  
 Company Fluor Hanford, Inc  
 Address Z-9 Trench / 200W  
 City, State, Zip Richland, WA 99352  
 Contact M. A. Baechler  
 Phone 509-531-0638

**RADIOACTIVE SHIPMENT RECORD** 0000327 3.  
 Page 1 of 1

Ship  Prepaid  Collect 4.  
 Via  Motor  Air Psgr  UPS  
 Rail  Air Cargo  Site Carrier  
 SHIPMENT AUTHORIZATION NUMBER N/A

2. SHIP TO  
 Company CH2M Hill Hanford Group  
 Address 222-S Analytical Laboratory / 200W  
 City, State, Zip Richland, WA 99352  
 Attention R. A. Bushaw  
 Phone 509-373-4314

Markings Applied 6.  
 Radioactive - LSA   
 Radioactive - SCO   
 Type A   
 Type B with trefoll   
 LSA Description 8.  
 LSA-I   
 LSA-II   
 LSA-III   
 SCO-I   
 SCO-II   
 Labels Applied 10.  
 Empty   
 Radioactive White - I   
 Radioactive Yellow - II   
 Radioactive Yellow - III   
 Subsidiary Hazard

For Normal Form only 7.  
 Identify  
 Physical Form  Liquid  Gas  
 Solid  
 Chemical Form  Elemental  
 Metal  Nitrate  
 Oxide  Mixture  
 Other

5. HM Proper Shipping Name: \_\_\_\_\_ Radioactive Material,  
 excepted package - empty packaging 7 UN2910  
 excepted package - instruments or articles 7 UN2910  
 excepted package - limited quantity of material 7 UN2910  
 excepted package - articles manufactured from natural or depleted uranium or natural thorium 7 UN2910  
 Special Form, n.o.s. 7 UN2974  
 Low Specific Activity, n.o.s. 7 UN2912  
 n.o.s. 7 UN2982  
 Fissile, n.o.s. 7 UN2918  
 Surface Contaminated Object 7 UN2913  
 X Type A Package 7 UN2915

EMERGENCY RESPONSE 9.  
 Telephone 509-373-3800  
 Emergency Response Guide(s) 163  
 Highway Route Controlled Quantity   
 Exclusive Use Shipment   
 with instructions  
 Placards Applied   
 If Rail Specify:  
 Fissile Excepted, Grams 2.612E-5   
 Excepted Package Statement

Warning - Fissile Material Controlled Shipment. Do Not Load More Than \_\_\_\_\_ Packages Per Vehicle. In Loading and Storage Areas, Keep at Least 20 Feet From Other Packages Bearing Radioactive Labels.

No. Pkg.	Model Package	COC/Spec	Serial No.	Seal No.	Isotopes	T.I.	Bq/Package	Gr. Wt. Kg.	
1	VPS-BXKT-005C	4B2V/X71/S/03/USA 7M4563	2/03-05024	N/A	Am-241, Pu-239	0	5.40E5	35	
TOTALS							0	5.40E5	35

12. This is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.  
 Certifier's Signature: M.A. Baechler On behalf of DOE-RL Date: 04/14/2004 Organization: FH Geosciences Support Complete Cost Code (Inc. End Function): 119152ES20

13. Surface Dose Rate of Package  <0.005 or \_\_\_\_\_ mSv/hr  
 <0.5 or \_\_\_\_\_ mrem/hr (N+β γ)  
 Dose Rate @ 1 Meter from Surface of Package  <0.005 or \_\_\_\_\_ mSv/hr  
 <0.5 or \_\_\_\_\_ mrem/hr (N+β γ)  
 Smears of Outer Container  
 <0.41 Bq (22 dpm) β γ/cm<sup>2</sup>  
 <0.04 Bq (2.2 dpm) α /cm<sup>2</sup>  
 <Tbl. 2-2 HSRM Onsite Limits  
 TRUCK LOAD OR EXCLUSIVE USE  
 Surface  <2 mSv/hr (200 mrem/hr)  
 @ 2 meters  <0.1 mSv/hr (10 mrem/hr)  
 @ Cab  <0.02 mSv/hr (2 mrem/hr) (Using N+β γ)  
 Additional Data and Instructions (inc. Readings on Internal Packaging) NA  
 Signature - Radiation Monitoring: R. Bushaw  
 Bldg. NEAK Survey No. GW-04-0358 Date 4/14/04  
Z-9 CR13

14. Vehicle Number 663-06269 DRIVER SIGNATURE M.A. Baechler RECEIVER SIGNATURE R. Bushaw Date 4/14/04

15. OFFSITE AUTHORIZATION  
 Shipment has been inspected and verified to be in compliance with DOT regulations  
 Authorized Signature \_\_\_\_\_ Printed Name \_\_\_\_\_ Date \_\_\_\_\_

16. AUTHORIZATION FOR SHIPMENT  
 AIR TRANSPORT CERTIFICATION  N/A  
 CARGO AIRCRAFT  Cargo Aircraft Only Labels Applied  
 PASSENGER AIRCRAFT  Ltd Qty  Research/Medical Diagnosis  Human Medical Research  
 Pkg. Dimensions (cm) \_\_\_\_\_

17. OFFSITE AUTHORIZATION  
 Tracking No. \_\_\_\_\_ Date Shipped \_\_\_\_\_ Routing \_\_\_\_\_ ETA \_\_\_\_\_  
 Surveyed By \_\_\_\_\_ Date \_\_\_\_\_ Approved for Shipment Offsite \_\_\_\_\_ Date \_\_\_\_\_

FLUOR Hanford Inc.		CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F03-018-096	Page 1 of 1
Collector <b>PHIL GENT</b>	Company Contact <b>STEVE TRENT</b>	Telephone No. <b>373 5869</b>	Project Coordinator <b>TRENT, SJ</b>		Price Code <b>8N</b>	Data Turnaround <b>60 Days</b>
Project Designation <b>216-Z-9 Trench Characterization Borehole - Soil</b>		Sampling Location <b>216-Z-9/C3426 112'</b>		SAF No. <b>F03-018</b>	Air Quality <input type="checkbox"/>	
Ice Chest No. <b>GRP-04-006</b>	Field Logbook No. <b>HNF-N-3601</b>	COA <b>119152ES10</b>		Method of Shipment <b>G.V.</b>		
Shipped To <b>222-S Lab Operations</b>		Offsite Property No. <b>N/A</b>		Bill of Lading/Air Bill No. <b>N/A</b>		

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	<b>NONE</b>																	
	Special Handling and/or Storage	Type of Container	<b>P</b>																
		No. of Container(s)	<b>1</b>																
		Volume	<b>20ml</b>																
SAMPLE ANALYSIS																			
Sample No.	Matrix *	Sample Date	Sample Time																
B19078	<b>SOIL</b>	<b>4/15/04</b>	<b>1413</b>	<b>✓</b>															

CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS				Matrix *			
Relinquished By/Removed From <b>P.M. GENT</b>	Date/Time <b>4/15/04</b>	Received By/Stored In <b>R. Buchanan</b>	Date/Time <b>4/15/04</b>					<ul style="list-style-type: none"> <li>S=Soil</li> <li>SS=Soft Sediment</li> <li>SO=Solid</li> <li>SI=Sediment</li> <li>W=Water</li> <li>O=Oil</li> <li>A=Air</li> <li>DS=Dry Solids</li> <li>DL=Dry Liquids</li> <li>T=Flame</li> <li>WI=Wipe</li> <li>L=Liquid</li> <li>V=Vegetation</li> <li>X=Other</li> </ul>			
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time								
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time								
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time								
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time								
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time								
LABORATORY SECTION	Received By	Title		Date/Time							
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By				Date/Time					

A-6003-618(03/03)

370000

FLUOR Hanford Inc.		CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-018-082		Page 1 of 1				
Collector Pope/Pfister/Hughes/Wiberg		Company Contact Steve Trent		Telephone No. 373-5869		Project Coordinator TRENT, SJ		Price Code <b>8N</b>				
Project Designation 216-Z-9 Trench Characterization Borehole - Soil		Sampling Location 216-Z-9/C3426		SAF No. F03-018		Air Quality <input type="checkbox"/>		Data Turnaround <b>60 Days</b>				
Ice Chest No.		Field Logbook No. HNF-N-3361		COA 119152ES10		Method of Shipment Government Vehicle						
Shipped To 222-S Lab Operations		Offsite Property No. N/A		Bill of Lading/Air Bill No. N/A								
POSSIBLE SAMPLE HAZARDS/REMARKS					Preservation		Cool 4C					
Special Handling and/or Storage					Type of Container		aG		G/P			
					No. of Container(s)		2		1			
					Volume		60mL		120mL			
					See item (1) in Special Instructions.		See item (2) in Special Instructions.					
SAMPLE ANALYSIS												
Sample No.		Matrix *	Sample Date	Sample Time								
B18XR8		SOIL	4/8/04	1015	X	X						
CHAIN OF POSSESSION					SPECIAL INSTRUCTIONS					Matrix *		
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<p>(1) Semi-VOA - 8270A (TCL); Semi-VOA - 8270A (Add-On) (1,2,4-Trimethylbenzene, Cyclohexanone, Tributyl phosphate); PCBs - 8082</p> <p>(2) ICP Metals - 6010A (TAL); ICP Metals - 6010A (Add-on) (Arsenic, Beryllium, Bismuth, Lead, Lithium, Phosphorus, Selenium, Strontium); Mercury - 7471 - (CV); IC Anions - 300.0 (Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate); Ammonia - 350.4; Total Cyanide - 9010; Sulfides - 9030; pH (Soil) - 9045</p> <p style="text-align: right;">300.7 8902 4/16/04</p> <p>Sample shippers removed the sample custody seal during repackaging for shipment &amp; then sealed the transportation container.</p>			<ul style="list-style-type: none"> <li>S=Soil</li> <li>SB=Sludge</li> <li>SD=Solid</li> <li>SO=Soil</li> <li>W=Water</li> <li>O=Oil</li> <li>A=Air</li> <li>DS=Draw Solids</li> <li>DL=Draw Liquids</li> <li>T=Trace</li> <li>WI=Wipe</li> <li>L=Liquid</li> <li>V=Vegetation</li> <li>X=Other</li> </ul>	
<i>Steve Trent</i>		4/8/04 1435		<i>Site Manager</i>		4/8/04 1435						
<i>Site Manager</i>		4/16/04 1100		<i>Greg Thomas</i>		4/16/04 1130						
<i>Greg Thomas</i>		4/16/04 1130		<i>Debbie Day</i>		4/16/04 11:30						
LABORATORY SECTION		Received By		Title		Date/Time						
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time						
		<i>Debbie Day</i>		<i>Sample Custodian</i>		4/16/04 11:30						

1. SHIP FROM U.S. DEPT. OF ENERGY C/O Company <u>Fluor Hanford, Inc.</u> Address <u>Z-9 Trench / 200W</u> City, State, Zip <u>Richland, WA 99352</u> Contact <u>M. A. Baechler</u> Phone <u>509-531-0638</u>		<b>RADIOACTIVE SHIPMENT RECORD</b>		0000331 3. Page1 of1
Ship <input checked="" type="checkbox"/> Prepaid <input type="checkbox"/> Collect		Via <input checked="" type="checkbox"/> Motor <input type="checkbox"/> Air Psgr <input type="checkbox"/> UPS <input type="checkbox"/> Rail <input type="checkbox"/> Air Cargo <input type="checkbox"/> Site Carrier		4.
SHIPMENT AUTHORIZATION NUMBER <u>N/A</u>				

2. SHIP TO Company <u>CH2M Hill Hanford Group</u> Address <u>222-S Laboratory / 200W</u> City, State, Zip <u>Richland, WA 99352</u> Attention <u>R. A. Bushaw</u> Phone <u>509-373-4314</u>		6. Markings Applied Radioactive - LSA <input type="checkbox"/> Radioactive - SCO <input type="checkbox"/> Type A <input checked="" type="checkbox"/> Type B w/ threfoil <input type="checkbox"/>	7. For Normal Form only Identify Physical Form <input type="checkbox"/> Liquid <input type="checkbox"/> Gas <input checked="" type="checkbox"/> Solid Chemical Form <input type="checkbox"/> Elemental <input type="checkbox"/> Metal <input type="checkbox"/> Nitrate <input checked="" type="checkbox"/> Oxide <input type="checkbox"/> Mixture <input type="checkbox"/> Other
--	--	--	---

5. HM Proper Shipping Name: _____ Radioactive Material,	8. LSA Description LSA-I <input type="checkbox"/> LSA-II <input type="checkbox"/> LSA-III <input type="checkbox"/> SCO-I <input type="checkbox"/> SCO-II <input type="checkbox"/>	9. EMERGENCY RESPONSE Telephone <u>509-373-3800</u> Emergency Response Guide(s) <u>163</u>																																																				
<table border="1"> <tr><td><input type="checkbox"/></td><td>excepted package - empty packaging</td><td>7</td><td>UN2910</td></tr> <tr><td><input type="checkbox"/></td><td>excepted package - instruments or articles</td><td>7</td><td>UN2910</td></tr> <tr><td><input type="checkbox"/></td><td>excepted package - limited quantity of material</td><td>7</td><td>UN2910</td></tr> <tr><td><input type="checkbox"/></td><td>excepted package - articles manufactured from natural or depleted uranium or natural thorium</td><td>7</td><td>UN2910</td></tr> <tr><td><input type="checkbox"/></td><td>Special Form, n.o.s.</td><td>7</td><td>UN2974</td></tr> <tr><td><input type="checkbox"/></td><td>Low Specific Activity, n.o.s.</td><td>7</td><td>UN2912</td></tr> <tr><td><input type="checkbox"/></td><td>n.o.s.</td><td>7</td><td>UN2982</td></tr> <tr><td><input type="checkbox"/></td><td>Fissile, n.o.s.</td><td>7</td><td>UN2918</td></tr> <tr><td><input type="checkbox"/></td><td>Surface Contaminated Object</td><td>7</td><td>UN2913</td></tr> <tr><td><input checked="" type="checkbox"/></td><td>Type A Package</td><td>7</td><td>UN2915</td></tr> </table>	<input type="checkbox"/>	excepted package - empty packaging	7	UN2910	<input type="checkbox"/>	excepted package - instruments or articles	7	UN2910	<input type="checkbox"/>	excepted package - limited quantity of material	7	UN2910	<input type="checkbox"/>	excepted package - articles manufactured from natural or depleted uranium or natural thorium	7	UN2910	<input type="checkbox"/>	Special Form, n.o.s.	7	UN2974	<input type="checkbox"/>	Low Specific Activity, n.o.s.	7	UN2912	<input type="checkbox"/>	n.o.s.	7	UN2982	<input type="checkbox"/>	Fissile, n.o.s.	7	UN2918	<input type="checkbox"/>	Surface Contaminated Object	7	UN2913	<input checked="" type="checkbox"/>	Type A Package	7	UN2915	10. Labels Applied Empty <input type="checkbox"/> Radioactive White - I <input checked="" type="checkbox"/> Radioactive Yellow - II <input type="checkbox"/> Radioactive Yellow - III <input type="checkbox"/> Subsidiary Hazard <input type="checkbox"/>	<table border="1"> <tr><td><input type="checkbox"/></td><td>Highway Route Controlled Quantity</td></tr> <tr><td><input type="checkbox"/></td><td>Exclusive Use Shipment with instructions</td></tr> <tr><td><input type="checkbox"/></td><td>Placards Applied</td></tr> <tr><td><input type="checkbox"/></td><td>If Rail Specify:</td></tr> <tr><td><input checked="" type="checkbox"/></td><td>Fissile Excepted, Grams <u>3.55E-4</u></td></tr> <tr><td><input type="checkbox"/></td><td>Excepted Package Statement</td></tr> </table>	<input type="checkbox"/>	Highway Route Controlled Quantity	<input type="checkbox"/>	Exclusive Use Shipment with instructions	<input type="checkbox"/>	Placards Applied	<input type="checkbox"/>	If Rail Specify:	<input checked="" type="checkbox"/>	Fissile Excepted, Grams <u>3.55E-4</u>	<input type="checkbox"/>	Excepted Package Statement
<input type="checkbox"/>	excepted package - empty packaging	7	UN2910																																																			
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<input type="checkbox"/>	excepted package - articles manufactured from natural or depleted uranium or natural thorium	7	UN2910																																																			
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<input checked="" type="checkbox"/>	Fissile Excepted, Grams <u>3.55E-4</u>																																																					
<input type="checkbox"/>	Excepted Package Statement																																																					

Warning -- Fissile Material Controlled Shipment. Do Not Load More Than N/A Packages Per Vehicle. In Loading and Storage Areas, Keep at Least 20 Feet From Other Packages Bearing Radioactive Labels.

11. No. Pkg.	Modal Package	COC/Spec	Serial No.	Seal No.	Isotopes	T.I.	Bq/Package	Gr. Wt. Kg.
1	VPS-BXRT-	4H2V/X71/S/03/USA	2/03-	N/A	Am-241, Pu-239	0	6.61E6	35
	005	/M4563	050024					
TOTALS							0	6.61E6 35

12. This is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Certifier's Signature: M.A. Baechler On behalf of DOE-RL Date: 04/16/2004 Organization: FH Geosciences Support Complete Cost Code (Inc. End Function): 119152E20

13. Surface Dose Rate of Package:  <0.005 or \_\_\_\_\_ mSv/hr (0.5 or \_\_\_\_\_ mrem/hr (N+3 γ))

Dose Rate @ 1 Meter from Surface of Package:  <0.005 or \_\_\_\_\_ mSv/hr (0.5 or \_\_\_\_\_ mrem/hr (N+3 γ))

Smears of Outer Container:  <0.41 Bq (22 dpm) β γ/cm<sup>2</sup>  <0.04 Bq (2.2 dpm) α/cm<sup>2</sup>  Tbl. 2-2 HSRM Onsite Limits

TRUCK LOAD OR EXCLUSIVE USE:  Surface <2 mSv/hr (200 mrem/hr) @ 2 meters  <0.1 mSv/hr (10 mrem/hr) @ Cab  <0.02 mSv/hr (2 mrem/hr) or sleeper (Using N+3 γ)

Signature - Radiation Monitoring: R. She Bldg. NEAR Z-9 CRIB Survey No. GW-04-0365 Date: 4/16/04

14. TRANSPORTER DRIVER SIGNATURE: M.A. Baechler RECEIVER SIGNATURE: [Signature] Date: 4/16/04

15. OFFSITE AUTHORIZATION: Shipment has been inspected and verified to be in compliance with DOT regulations. Authorized Signature: \_\_\_\_\_ Printed Name: \_\_\_\_\_ Date: \_\_\_\_\_

16. AUTHORIZATION FOR SHIPMENT: AIR TRANSPORT CERTIFICATION  N/A CARGO AIRCRAFT  Cargo Aircraft Only Labels Applied PASSENGER AIRCRAFT  Ltd Qty <3 T.I.  Research/Medical Diagnosis  Human Medical Research Pkg. Dimensions (cm): \_\_\_\_\_

17. OFFSITE AUTHORIZATION: Tracking No. \_\_\_\_\_ Date Shipped \_\_\_\_\_ Routing \_\_\_\_\_ ETA \_\_\_\_\_ Surveyed By \_\_\_\_\_ Date \_\_\_\_\_ Approved for Shipment Offsite \_\_\_\_\_ Date \_\_\_\_\_

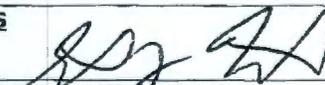
FLUOR Hanford Inc.		CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-018-059		Page 1 of 1															
Collector Pope/Pfister/Hughes		Company Contact Steve Trent		Telephone No. 373-5869		Project Coordinator TRENT, SJ		Price Code <b>8N</b> Data Turnaround <b>60 Days</b>															
Project Designation 216-Z-9 Trench Characterization Borehole - Soil		Sampling Location 216-Z-9/C3426 - Interval 119'-121.5'			SAF No. F03-018		Air Quality <input type="checkbox"/>																
Ice Chest No. <b>6PP-03-006</b>		Field Logbook No. <b>4-15-04 282</b> HNF-N-2261-360-1		COA 119152ES10		Method of Shipment Government Vehicle																	
Shipped To 222-S Lab Operations		Offsite Property No. N/A			Bill of Lading/Air Bill No. N/A																		
POSSIBLE SAMPLE HAZARDS/REMARKS RADIOACTIVE TIE TO: B17NN4					Preservation	Cool 4C																	
Special Handling and/or Storage SAMPLERS TO PUT 5 g soil into each vial with the encore sampler. Bottles are pre-labeled. Write the Hets number from the chain on each vial.					Type of Container	aGs*																	
					No. of Container(s)	5																	
					Volume	40mL																	
SAMPLE ANALYSIS					See Item (1) in Special Instructions.																		
Sample No.	Matrix *	Sample Date	Sample Time																				
B17N64	SOIL	4-21-04	1400	✓																			
CHAIN OF POSSESSION					Sign/Print Names					SPECIAL INSTRUCTIONS					Matrix *								
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		** 222-S Laboratory will provide 40 mL VOA vials that have been pre-preserved with sodium bisulfate. (1) VOA - 8260A - Complete; VOA - 8260A (Add-On) (Acetonitrile, Hexane, n-Butylbenzene)					S=Soil SB=Soilment SO=Solid SL=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Traces W=Wipe L=Liquid V=Vegetation X=Other										
<i>Dana Wilberg</i>		4/15/04		<i>RH Hetal Rf Steele</i>		15 45																	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time																	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time																	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time																	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time																	
LABORATORY SECTION		Received By			Title			Date/Time															
FINAL SAMPLE DISPOSITION		Disposal Method			Disposed By			Date/Time															

0000045

FLUOR Hanford Inc.		CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-018-060		Page 1 of 1	
Collector Pope/Pfister/Hughes		Company Contact Steve Trent		Telephone No. 373-5869		Project Coordinator TRENT, SJ		Price Code 8N Data Turnaround 60 Days	
Project Designation 216-Z-9 Trench Characterization Borehole - Soil		Sampling Location 216-Z-9/C3426 - Interval 119'-121.5'		SAF No. F03-018		Air Quality <input type="checkbox"/>			
Ice Chest No. <i>GPP-03-006</i>		Field Logbook No. <i>4-19-03 ASH</i> HNF-N- <del>2361</del> <i>360-1</i>		COA 119152ES10		Method of Shipment Government Vehicle			
Shipped To 222-S Lab Operations		Offsite Property No. N/A		Bill of Lading/Air Bill No. N/A					
POSSIBLE SAMPLE HAZARDS/REMARKS <i>RADIOACTIVE TIE TO: B17NN4</i>				Preservation	Cool 4C				
Special Handling and/or Storage <i>SAMPLERS: Collect 5 g with the encore sampler. If RAD &lt; 0.5 mrem/hr take sample to WSCF. Sample analysis must occur in 48 hours or preserve with methanol.</i>				Type of Container	P				
				No. of Container(s)	3				
				Volume	5g				
SAMPLE ANALYSIS				See item (1) in Special Instructions.					
Sample No.	Matrix *	Sample Date	Sample Time						
B17N68	SOIL	4-21-4	1400	<input checked="" type="checkbox"/>					
CHAIN OF POSSESSION				Sign/Print Names		SPECIAL INSTRUCTIONS			
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	(1) VOA - 8260A - Complete; VOA - 8260A (Add-On) (Acetonitrile, Hexane, n-Butylbenzene)				Matrix * S=Soil SE=Settlement SO=Solid SL=Sludge W=Water O=Oil A=Air DB=Drum Bottles DL=Drum Liquids T=Tissue Wf=Wipe L=Liquid V=Vegetation X=Other	
<i>Dana W. [Signature]</i>	<i>4/21/04</i>	<i>R. [Signature]</i>	<i>15:45</i>						
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time						
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time						
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time						
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time						
LABORATORY SECTION	Received By	Title						Date/Time	
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By						Date/Time	

000004

Original pd

<b>SAMPLE DISPOSITION RECORD</b>		<b>SDR NUM</b>	SDRF04-026
		<b>REV NUM</b>	1
		<b>DATE INITIATED</b>	6/13/2006
<b><u>SAMPLE EVENT INFORMATION</u></b>			
<b>SAF NUM</b>	F03-018		
<b>OPERABLE UNIT</b>	200-PW-1		
<b>PROJECT</b>	CPP 200 Area		
<b>SAMPLING EVENT TITLE</b>	216-Z-9 Trench Characterization		
<b>LABORATORY</b>	222-S Lab Operations		
<b><u>SAMPLING INFORMATION</u></b>			
<b>NUMBER OF SAMPLES</b>	3		
<b>SAMPLE NUMBERS</b>	B191Y4, B191Y4-A, B191Y5		
<b>SAMPLE MATRIX</b>	SOIL		
<b>SDG NUM</b>	222S20040099, 222S20040101		
<b>COLLECTION DATE</b>	4/15/2004		
<b><u>ISSUE BACKGROUND</u></b>			
<b>CLASS</b>	Project Data Use		
<b>TYPE</b>	Chain of Custody Problem		
<b>DESCRIPTION</b>	Chain of Custody Problem		
<b><u>DISPOSITION</u></b>			
<b>DESCRIPTION</b>	Incorrect date was written on COC. The date reflected for sample collection is 4/21/04. Correct date should be 4/15/04		
<b>JUSTIFICATION</b>	A spiltspoon sample was collected on 4/15/04 for PNNL. The D&D project decided to expropriate a liner from this spiltspoon to provide supplemental analytical data for the project. The liner was extracted from the spiltspoon and assigned the sample numbers listed above. The sample collection date assigned erroneously reflected the date on which the liner was removed from the spiltspoon rather than the date on which the split spoon had been collected from the borehole. The sample date for these samples was subsequently changed to reflect the date on which the spiltspoon sampler was extracted from the borehole.		
<b><u>APPROVAL SIGNATURES</u></b>			
TRENT, SJ		9/12/06	
<b>PROJECT COORDINATOR (PRINT/SIGN NAME)</b>		<b>DATE</b>	
ROHAY, VJ		09/12/06	
<b>TASK MANAGER (PRINT/SIGN NAME)</b>		<b>DATE</b>	