

CONTROL COPY NO. 1 of 8

DELIVERABLE (COMBINED 224A AND 224E)

POND SLUDGE WASTE CHARACTERIZATION REPORT AND
CLARIFIER SLUDGE WASTE CHARACTERIZATION REPORT

FOR

ADMIN RECORD

EG&G ROCKY FLATS

PREPARED BY

HALLIBURTON NUS ENVIRONMENTAL CORPORATION

JANUARY 1992

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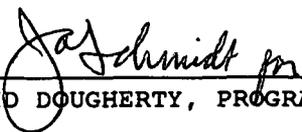
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1.0 INTRODUCTION

1.1 Authorization

This report has been prepared by HALLIBURTON NUS Environmental Corporation (HALLIBURTON NUS) as part of EG&G Letter Subcontract PC-84017JB. The purpose of this report is to summarize and evaluate the characterization data collected for the sludges and waters from the following sources:

- Pond 207A
- Pond 207B North
- Pond 207B Center
- Pond 207B South
- Pond 207C
- Clarifier

This report is defined as combined deliverable number 224A and 224E. A separate report summarizing the characterization data for pondcrete and saltcrete will be prepared when sampling and analysis of those wastes has been completed.

1.2 Background

Five lined solar evaporation ponds, designated ponds 207A, 207B north, 207B center, 207B south, and 207C, are to be closed as part of a RCRA consent order negotiated with the state of Colorado. In support of the closure project, HALLIBURTON NUS has been awarded a contract to stabilize the pond sludges and a portion of the pond water. One of the initial tasks of the project was the collection and analysis of pond water and sludge samples to support the development of stabilization recipes. Specific goals of the pond characterization program were as follows:

- Characterize the liquids and the sludges in the ponds and the clarifier.
- Determine the variability of constituents in each media within a given pond.
- Determine the variability of constituents in each media between ponds.
- Evaluate the compatibility of the ponds to support any design options that include pond consolidation.

1.3 Scope of Work

The scope of work for the pond characterization effort was defined in the combined deliverable number 211A, 211E, 221A, and 221E, the "Pond Sludge Sampling Plan, Clarifier Sludge Sampling Plan, Pond Sludge Analysis Plan, and Clarifier Sludge Analysis Plan." This deliverable was prepared by HALLIBURTON NUS and approved by EG&G Rocky Flats in July 1991. Combined deliverable 212A and 212E, the Pond Sludge Sampling Procedure and the Clarifier Sampling Procedure, provided the detailed sampling instructions for the pond and clarifier water and sludges. This deliverable was issued in August 1991, and was subsequently modified by three revisions, the last of which was issued November 25, 1991.

Section 2.0 provides additional detail concerning the sampling and analytical program.

2.0 SAMPLING AND ANALYSIS PROGRAM

2.1 Sampling Locations

The Sampling Plan specified the collection of discrete water and sludge samples from each of the four quadrants in each of the five ponds. The plan also called for the collection of a field composite made from equal aliquots from the four quadrants. The purpose of the composite samples was to provide characterization data for comparison with the individual quadrant samples, and to provide analytical data of the bulk sample on which treatability studies will be conducted. The original plan was written under the assumption that the samples for characterization and treatability studies would be collected at the same time. However, this did not occur. Characterization samples were collected in advance of the treatability study samples while a floating pump system was constructed to obtain the larger volumes needed for the treatability study. Therefore, if the composite samples were collected during the characterization sampling effort, they would not be representative of the bulk samples collected later for treatability studies. A decision was made to collect the composite samples during the treatability study sampling effort. The composite samples would provide a baseline analysis of the treatability samples and would also be somewhat representative of the pond contents as a whole.

Quadrant samples were collected from the ponds as planned, with the following exceptions:

- Pond 207A - The water level in the pond was low, exposing the pond liner in the southwest corner of the pond. Therefore, it was only possible to collect three water samples from this pond.
- Pond 207A - Insufficient sludge was present in the pond to enable sludge sampling from the quadrants. A pump sump located in the northeast corner of the pond contained the only appreciable accumulation of sludge, and was the only sludge sample collected from this pond.
- Pond 207C - The samplers were unable to collect four quadrant-specific sludge samples from the pond because of insufficient material in the eastern quadrants. Therefore, only the southwest and northwest quadrant sludge samples were collected. In lieu of the eastern quadrant samples, an interior composite sample was collected. Sludge from four locations in the east-central portion of the pond was composited to make this sample. A fourth sludge sample was collected from the material that collected along the waterline. Samples of this material were collected from eight locations around the pond berm and composited.

Samples were collected from the clarifier as planned. Four sludge and water samples were collected from the clarifier bridge. One sample was collected near the clarifier wall, one was collected near the center of the bridge, and one sample was collected at the end of the bridge near the center of the clarifier. One duplicate sample was also collected from the clarifier.

Table 2-1 summarizes the pond water characterization samples, and Table 2-2 summarizes the pond sludge characterization samples, which were collected and analyzed. Figure 2-1 shows the approximate pond sampling locations, while Figure 2-2 shows the approximate clarifier sampling locations.

2.2 Sampling Procedures

All samples were collected by EG&G personnel. HALLIBURTON NUS provided one person during each sampling event to assist in sample bottle labelling, preparing the chain-of-custody forms, and maintaining the field log book. A copy of the field notes can be found in Appendix C. Copies of the chain-of-custody forms are in Appendix D.

As noted previously, sampling was conducted in accordance with combined deliverable 212A and 212E, "Pond Sludge Sampling Procedure and Clarifier Sampling Procedure," and subsequent revisions. Any deviations from the procedures due to conditions encountered in the field are documented in the field log book notes (Appendix C). Changes in the number or location of samples were previously documented in Section 2.1.

2.3 Analytical Program

2.3.1 Laboratory Analyses

The laboratory analytical program for pond waters and sludges is summarized in Table 2-3. The rationale for selecting these parameters was described in detail in the combined Sampling and Analysis Plans for the pond and clarifier sludges and waters. The following issues are highlighted to facilitate interpretation of the database:

- Analysis of select VOAs, select semivolatiles, select alcohols, metals, cyanide, and TCLP parameters were conducted to achieve a data quality objective Level IV. This provides data of a quality similar to that required for CLP (i.e., legally defensible data). All other parameter are engineering parameters and only require a DQO level of III.
- The analytical program included TCLP metals analysis of both the pond waters and the pond sludges. For the pond sludges, the analysis included the acidic extraction as per the method. For the waters, the method specifies that for samples with less than 0.5 percent suspended solids, should be filtered through a 0.6-0.8 μm glass filter to remove the suspended solids, followed by analysis of the filtrate. In essence, the analysis for metals in the filtrate represents a determination of the dissolved metals concentration at the natural pH of the liquid, since no pH adjustment of the filtrate is performed. Since all the pond waters contained less than 0.5 percent suspended solids, this method was followed for all TCLP analyses of pond waters.
- The specified analysis for amenable cyanide routinely resulted in negative values. These negative results are quite common with this method and are a result of matrix interferences. Samples are divided into two aliquots for

cyanide analysis. The first aliquot is analyzed for cyanide and is reported as total cyanide. The second aliquot is pretreated with calcium hypochlorite and also submitted for cyanide analysis. The cyanide result for the pretreated aliquot minus the result for total cyanide equals the reported result for amenable cyanide. The addition of calcium hypochlorite results in reactions with thiocyanates and organometalics. These reactions will tend to elevate the cyanide result for the treated aliquot, thus causing a negative value for the calculated amenable cyanide result.

- The Blaine fineness analysis of solids was not performed. To make the results of the analysis meaningful, the test was required to be performed on a specified grain size fraction. When the engineers who had originally requested this analysis were consulted, they indicated that this analysis was no longer useful for the design of the treatment system.
- Geotechnical analyses of the pond sludges were initiated using the analytical methods specified in Table 2-3. In the middle of the geotechnical analytical effort, a decision was made to modify the analytical methods to account for possible interferences that might result from the relatively high salt content in some of the sludges. The modified methods involved the filtration of samples to remove water from the sludges instead of drying. Because of the large volumes that required filtration and the extremely slow filtration rates, the revised analyses are still in progress. The results reported in the database are for the original methods only and do not reflect the modified methods. Missing data in the database are a result of the decision to suspend analyses using the original specified methods and to reanalyze using the modified methods. The results of the modified analytical methods will be reported in the next revision of this report.

2.3.2 Field Measurements

Pond water samples were analyzed in the field for the following parameters:

- Temperature
- pH
- Specific conductance

All measurements were made by EG&G Rocky Flats personnel using equipment supplied by EG&G or another contractor.

2.4 Data Validation and Evaluation

All laboratory analytical data were subjected to the process of data validation. Formal data validation is a systematic review and evaluation of data that serves as an independent QA check of the laboratory results. It is also a means of evaluating laboratory performance and determining the impact, if any, of noncompliances on the data. Through the use of data qualifiers, validation lends interpretive guidance concerning proper usage and limitations of the data.

Data validation was conducted in accordance with the EPA "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" and "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses," as applied for use within EPA Region VIII. The validation performed on the characterization samples was the same as, which would be performed on Contract Laboratory Protocol (CLP) samples.

Internal memoranda documenting the validation process were prepared and are included in Appendix B. These memoranda explain the findings of the validation process, interpret the actions taken on the data, and summarize the data qualifiers assigned. The results of the validation process have been entered into the database in Appendix A.

Summary tables were prepared for both water and sludge media for the ponds and the clarifier to facilitate review and interpretation of the data. These tables are included in Section 3.0. The tables include information on the frequency of positive detections within the total sample set, the range of positive detections, the mean concentration, the standard deviation, and the relative standard deviation. The presentation and interpretation of data is relatively straightforward when a given analyte is detected in all the samples. However, the situation is complicated when analytes are detected in some samples but not in others. Even though quantitation was not possible at the stated detection limit in a given sample, it does not necessarily mean that the analyte was not present. It is possible that the analyte is present, but at a concentration less than the quantitation limit. This problem is exacerbated when the detection limits are elevated because of matrix interferences.

EPA has recognized this problem, especially where analytical data are used as the basis for quantitative risk assessments. Current guidance (USEPA, 1989) calls for assigning a value of one half the detection limit to nondetect samples for statistical analysis. This is not a perfect solution, and it can produce apparent inconsistencies in the data. For instance, it is possible for a mean concentration to be higher than the maximum quantitated value. This can result when elevated detection limits result in a nondetect value reported by the laboratory, but one half the detection limit being higher than any of the positive quantitations. For this reason, the mean, standard deviation, and the relative standard deviation must be evaluated with consideration of the frequency of detection and the detection limits of nondetect analyses. The database in Appendix A includes the quantitation limits for all nondetect analyses.

TABLE 2-1

**SAMPLE COLLECTION SUMMARY - POND WATERS
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO**

POND	SAMPLE NUMBER	SAMPLE DESCRIPTION	DATE SAMPLED
207A	PW-207A-NE	Northeast Quadrant	8-19-91
	PW-207A-NW	Northwest Quadrant	8-19-91
	PW-207A-SE	Southeast Quadrant	8-19-91
	PW-207A-T	Trip Blank	8-19-91
207B-North	PW-207BN-NE	Northeast Quadrant	8-8-91
	PW-207BN-NW	Northwest Quadrant	8-8-91
	PW-207BN-SE	Southeast Quadrant	8-8-91
	PW-207BN-SW	Southwest Quadrant	8-8-91
	PW-207BN-T	Trip Blank	8-8-91
207B-Center	PW-207BC-NE	Northeast Quadrant	8-12-91
	PW-207BC-NW	Northwest Quadrant	8-12-91
	PW-207BC-SE	Southeast Quadrant	8-12-91
	PW-207BC-SW	Southwest Quadrant	8-12-91
	PW-207BC-T	Trip Blank	8-12-91
207B-South	PW-207BS-NE	Northeast Quadrant	8-15-91
	PW-207BS-NW	Northwest Quadrant	8-15-91
	PW-207BS-NW-D	Northwest Quadrant Duplicate	8-15-91
	PW-207BS-SE	Southeast Quadrant	8-15-91
	PW-207BS-SW	Southwest Quadrant	8-15-91
	PW-207BS-B	Rinsate Blank	8-15-91
	PW-207BS-F	Field Blank	8-15-91
	PW-207BS-T	Trip Blank	8-15-91
207C	PW-207C-NE	Northeast Quadrant	8-21-91
	PW-207C-NE-D	Northeast Quadrant Duplicate	8-21-91
	PW-207C-NW	Northwest Quadrant	8-21-91
	PW-207C-SE	Southeast Quadrant	8-21-91
	PW-207C-SW	Southwest Quadrant	8-21-91
	PW-207C-B	Rinsate Blank	8-21-91
	PW-207C-F	Field Blank	8-21-91
	PW-207C-T	Trip Blank	8-21-91
Clarifier	CW-001	Sample 1	8-22-91
	CW-001-D	Sample 1 Duplicate	8-22-91
	CW-002	Sample 2	8-22-91
	CW-003	Sample 3	8-22-91
	CW-000-B	Rinsate Blank	8-22-91
	CW-000-F	Field Blank	8-22-91
	CW-000-T	Trip Blank	8-22-91

TABLE 2-2

SAMPLE COLLECTION SUMMARY - POND SLUDGES
 SOLAR POND/PONDCRETE PROJECT
 ROCKY FLATS PLANT, COLORADO

POND	SAMPLE NUMBER	SAMPLE DESCRIPTION	DATE SAMPLED
207A	PS-207A-NE	Northeast Quadrant	8-19-91
207B-North	PS-207BN-NE	Northeast Quadrant	8-8-91
	PS-207BN-NW	Northwest Quadrant	8-8-91
	PS-207BN-SE	Southeast Quadrant	8-8-91
	PS-207BN-SW	Southwest Quadrant	8-8-91
	PS-207BN-T	Trip Blank	8-8-91
207B-Center	PS-207BC-NE	Northeast Quadrant	8-12-91
	PS-207BC-NW	Northwest Quadrant	8-12-91
	PS-207BC-SE	Southeast Quadrant	8-12-91
	PS-207BC-SW	Southwest Quadrant	8-12-91
	PS-207BC-T	Trip Blank	8-12-91
207B-South	PS-207BS-NE	Northeast Quadrant	8-19-91
	PS-207BS-NW	Northwest Quadrant	8-19-91
	PS-207BS-NW-D	Northwest Quadrant Duplicate	8-19-91
	PS-207BS-SE	Southeast Quadrant	8-19-91
	PS-207BS-SW	Southwest Quadrant	8-19-91
	PS-207BS-B	Rinsate Blank	8-19-91
	PS-207BS-F	Field Blank	8-19-91
	PS-207BS-T	Trip Blank	8-19-91
207C	PS-207C-NW	Northwest Quadrant	8-22-91
	PS-207C-NW-D	Northwest Quadrant Duplicate	8-22-91
	PS-207C-SW	Southwest Quadrant	8-23-91
	PS-207C-C	Pond Sludge Composite	8-23-91
	PS-207C-CB	Pond Sludge Berm Composite	8-23-91
	PS-207C-B	Rinsate Blank	8-23-91
	PS-207C-F	Field Blank	8-23-91
PS-207C-T	Trip Blank	8-23-91	
Clarifier	CS-001	Sample 1	8-22-91
	CS-001-D	Sample 1 Duplicate	8-22-91
	CS-002	Sample 2	8-22-91
	CS-003	Sample 3	8-22-91
	CS-000-B	Rinsate Blank	8-22-91
	CS-000-F	Field Blank	8-22-91
	CS-000-T	Trip Blank	8-22-91

TABLE 2-3
 SUMMARY OF ANALYTICAL PROGRAM
 SOLAR POND/PONDCRETE PROJECT
 ROCKY FLATS PLANT, COLORADO
 PAGE 3 OF 3

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 POND SLUDGE AND CLARIFIER SLUDGE
 WASTE CHARACTERIZATION REPORT

(1) Deliverables for DQO Level IV parameters are as close to CLP as possible. Deliverables for DQO Level III parameters include signed and dated chain-of-custody forms, calculations, copies of analyst logbooks, and data summaries.

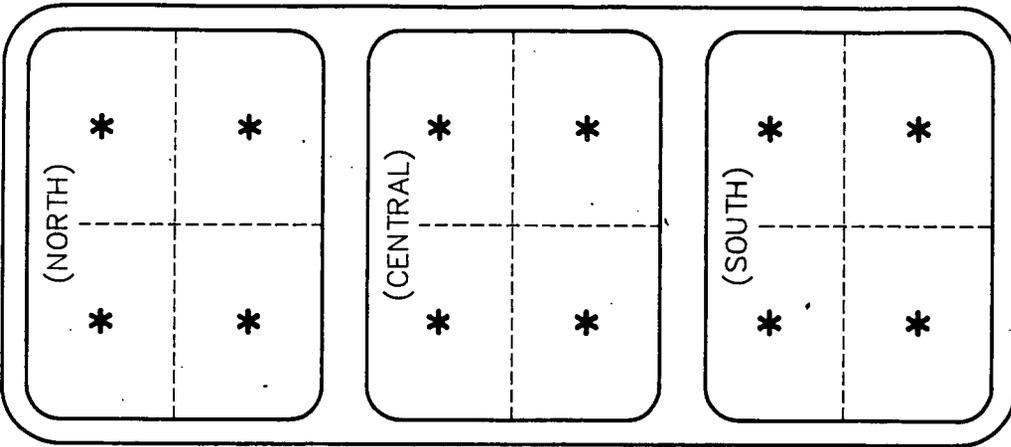
(2) F001, F002, F003, and F005 (spent solvents) Land Disposal Restriction (LDR) analytes.

<u>Select VOAs</u>	<u>Select Semivolatiles</u>	<u>Select Alcohols</u>
Tetrachloroethylene	Cyclohexanone	N-butyl Alcohol
Trichloroethylene	Pyridine	Methanol
Methylene Chloride	2-Nitropropane	Isobutanol
1,1,1-Trichloroethane	1,2-Dichlorobenzene	2-Ethoxyethanol
Carbon Tetrachloride		
Chlorobenzene		
1,1,2-Trichloro-1,2,2-Trifluoroethane		
Trichlorofluoromethane		
1,1,2-Trichloroethane		
Xylene		
Acetone		
Ethyl Acetate		
Ethylbenzene		
Ethyl Ether		
Methyl Isobutyl Ketone		
Toluene		
Methyl Ethyl Ketone		
Carbon Disulfide		
Benzene		

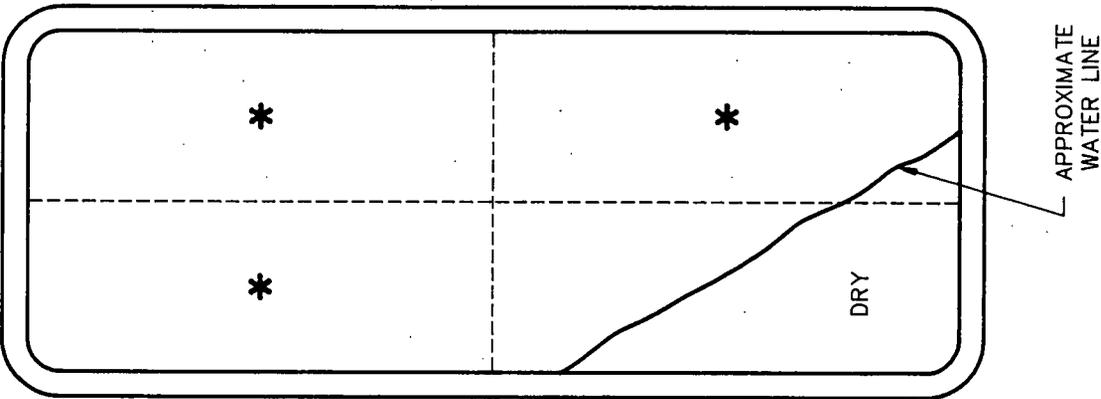
(3) Extraction was done as per SW 1311.



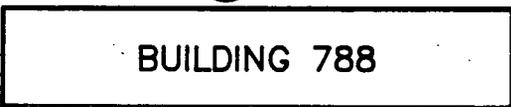
SOLAR POND 207B



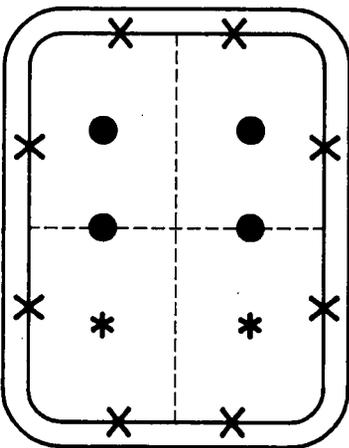
SOLAR POND 207A



CLARIFIER



SOLAR POND 207C



NORTH 79th DRIVE

SOUTH 79th DRIVE

LEGEND

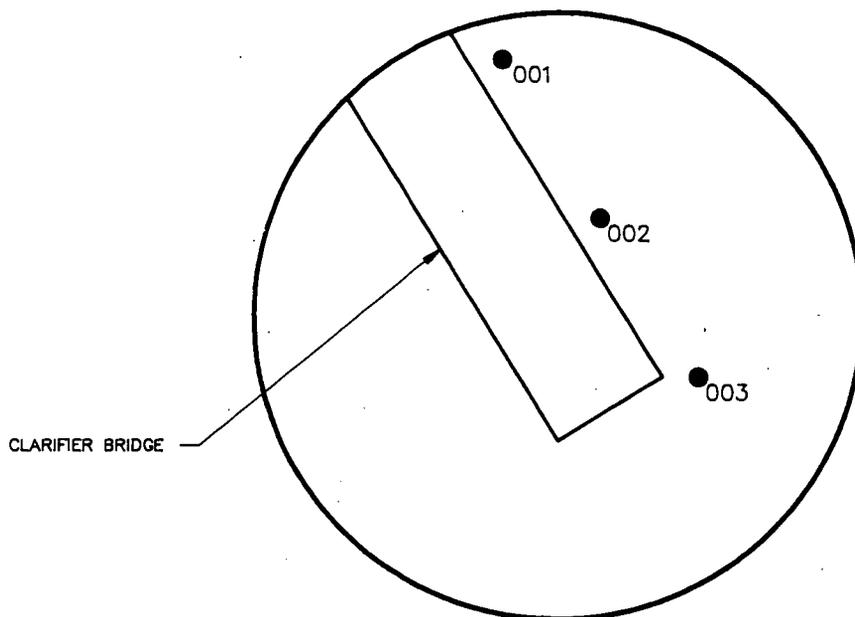
- * APPROXIMATE QUADRANT SAMPLING LOCATION
- X 207C POND SLUDGE BERM COMPOSITE SAMPLING LOCATIONS
- 207C POND SLUDGE COMPOSITE SAMPLING LOCATIONS

FIGURE 2-1

**SOLAR POND SAMPLING LOCATIONS
ROCKY FLATS PLANT, COLORADO**
NOT TO SCALE



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LEGEND

- APPROXIMATE CLARIFIER SAMPLING LOCATION

FIGURE 2-2

CALRIFIER SAMPLING LOCATIONS
ROCKY FLATS PLANT, COLORADO
NOT TO SCALE



3.0 ANALYTICAL DATA EVALUATION

3.1 Field Measurements

As part of the field sampling activities for pond waters, field measurements of pH, temperature, and specific conductance were collected. These data are summarized in Table 3-1. Because of equipment problems, data for Pond 207B-North were not collected. The field data are discussed in detail for each pond in the following sections.

3.2 Pond 207A

3.2.1 Water

Only three aqueous samples were collected from Pond 207A, from the northwest, southwest, and northeast quadrants. Because of the low water level in the pond, a sample could not be collected from the southwest quadrant. In general, the three water samples show little variability, and the pond water appears to be less contaminated than the water from the other ponds and the clarifier.

The pH of the pond water is approximately 9.8, based on field measurements. The water was yellow in color with low turbidity. The specific conductance of the water is approximately 9000 $\mu\text{mho/cm}$, which is less than the specific conductance for the other ponds and the clarifier. The water temperature at the time of sampling was 25°C (77°F).

No target volatile organics, semi-volatile organics, or alcohols were detected in the samples. Table 3-2 summarizes the laboratory analytical data for Pond 207A waters.

The inorganic analyses show the predominant cations to be sodium, potassium, and magnesium. However, sodium, which was detected at the highest concentration, was detected at a concentration of less than 0.2 percent by weight, indicating a relatively low salt content when compared to Pond 207C (refer to Table 3-10). Arsenic (205 $\mu\text{g/l}$), barium (139 $\mu\text{g/l}$), boron (1430 $\mu\text{g/l}$), and chromium (44 $\mu\text{g/l}$) were detected in all three samples at the average concentrations noted. Lead, mercury, nickel, selenium, and silver were not detected in any of the samples. Cadmium was detected in only one sample, at 5 $\mu\text{g/l}$, which was the detection limit for the sample. The metals analyses showed little variability between quadrants, as indicated by the low relative standard deviations shown on Table 3-2.

TCLP leach data show positive detections for only arsenic (238 $\mu\text{g/l}$ average) and silver (one positive detection at 6 $\mu\text{g/l}$). It is interesting to note that the arsenic was detected at concentrations equal to or greater than the concentrations in the raw water. Because the pond liquid contained less than 0.5 percent solids, the method (SW 1311) specifies that the liquid be filtered and the filtrate analyzed for the metals of interest. The data indicates that all the arsenic is soluble at the ambient pH. No LDR standards were exceeded, nor were the TCLP standards for classifying the waters as RCRA hazardous waste based on the characteristic of toxicity.

Total cyanide was detected in all three samples, but at concentrations less than 1 mg/l. The concentrations of ammonia and phosphorus were also negligible. Total dissolved solids averaged 7800 mg/l and nitrate, the predominant anion averaged 980 mg/l. The average TOC concentration was 69 mg/l, indicating low organic content in the aqueous phase.

3.2.2 Sludge

Very little sludge was present in Pond 207A, resulting in only one sample being obtained from a pump sump located in the northeast corner of the pond. These analytical data are summarized in Table 3-3.

Four of the target volatile organics were detected in the sample, with PCE (290 µg/kg) and 1,1,2-trichloro-1,2,2-trifluoroethane (260 µg/kg) at the highest concentrations. No target semivolatile organics or alcohols were detected.

Metals detected in the sludge sample included arsenic (40.2 mg/kg), barium (210 mg/kg), boron (84.3 mg/kg), cadmium (1300 mg/kg), chromium (658 mg/kg), lead (89 mg/kg), and nickel (102 mg/kg). Predominant cations include sodium and magnesium, both at greater than 1 percent by weight. An elevated detection limit for potassium resulted in no detection for this compound. Only arsenic, barium, and cadmium were detected in the TCLP leachate. The cadmium leachate concentration (485 µg/l) exceeded the LDR standard of 66 µg/l for electroplating wastes (F006, F007, and F009).

The sludge sample contained 12.7 percent solids. Significant organics were present, as indicated by the TOC value of 14,000 mg/kg. Low concentrations of ammonia and total cyanide were detected. The majority of geotechnical analyses following the revised methods to account for salt content have not been completed.

3.3 Pond 207B-North

3.3.1 Water

Four water samples were collected from Pond 207B-North, one from each quadrant. The samples were visually described as being clear with low turbidity. No measurements of pH, specific conductance, or temperature were made because of equipment problems. However, the laboratory pH ranged from 8.3 to 8.5, which is the lowest of all the ponds. Laboratory analytical data are summarized in Table 3-4.

No target volatile organics, semivolatile organics, or alcohols were detected.

Metals detected in all four samples include barium and boron. Arsenic was detected in three out of four samples, chromium in two, and selenium in only one. Cadmium, lead, mercury, nickel, and silver were not detected in any of the samples. Predominant cations include sodium, calcium, magnesium, and potassium, all below 400 mg/l. Only barium was detected in all four TCLP analyses. Chromium was detected in one TCLP analysis. Again, because the sample was low

in solids, the TCLP analysis constituted analysis of the water following filtration. The TCLP metals analysis therefore represents the soluble metals concentrations at the ambient pH. It should be noted that the TCLP analysis for arsenic was rejected during data validation. No LDR standards were exceeded, nor were the TCLP standards for classifying the waters as RCRA hazardous waste based on the characteristic of toxicity.

The pond water contained very low levels of total cyanide (average 0.03 mg/l) and ammonia (average 0.4 mg/l). The TDS averaged 2800 mg/l, while the organic content, as measured by TOC, averaged 36 mg/l. The average concentrations of chloride, nitrate, and sulfate were all relatively low at 98 mg/l, 320 mg/l, and 130 mg/l, respectively.

3.3.2 Sludge

Four sludge samples were collected in Pond 207B-North, one from each quadrant. The sludge was more concentrated than the sludges from the other ponds, averaging 24.9 percent solids. This is approximately twice the solids content of the sludges from the other ponds. Laboratory analytical data are summarized in Table 3-5.

No target volatile organics, semivolatile-organics, or alcohols were detected in the sludge.

Barium, chromium, and lead were the only metals of concern detected in all four samples. Cadmium was detected in three samples, while mercury and nickel were detected in two samples. Boron was detected in only one of the four samples. Arsenic, selenium, and silver were not detected in any of the samples. Magnesium is the predominant cation present in the sludge. Neither potassium nor sodium were detected, although both had relatively high detection limits. Barium and cadmium were detected in the TCLP leachates from all four samples, while chromium and nickel were detected in three of the leachates. TCLP arsenic data were rejected during data validation. No LDR standards were exceeded, nor were the TCLP standards for classifying the sludges as RCRA hazardous waste based on the characteristic of toxicity.

Total cyanide was not detected in any of the sludge samples, while an average of 22 mg/kg ammonia was detected. TOC averaged 3200 mg/kg. The dried solids showed a slight tendency to swell (0-10 percent) following immersion in water. The Atterberg data indicate that the sludge can be identified as having engineering properties similar to organic and/or inorganic clays with medium to high plasticity.

3.4 Pond 207B-Center

3.4.1 Water

Four water samples, one from each quadrant, were collected from Pond 207B-Center. The water was dark blue as a result of the addition of dye to enhance evaporation, with low turbidity. The pH, as measured in the field, was

approximately 9.0. The specific conductance ranged from 13,500 to 15,000 $\mu\text{mho/cm}$. The temperature of the samples reported in the field was 15.5°C (59.9°F), but this appears to be an anomalous value since the temperatures in the other ponds was approximately 10 C warmer. The field data are summarized in Table 3-1, while the laboratory analytical data are summarized in Table 3-6.

No target volatile organics, semivolatile organics, or alcohols were detected in the water samples.

Arsenic, barium, boron, chromium, and nickel were detected in all four samples. Selenium was detected in only one of the samples. Cadmium, lead, mercury, and silver were not detected in any of the samples. Sodium was the predominant cation, at an average concentration of approximately 0.3 percent. Potassium, magnesium, and calcium were detected at lesser concentrations.

Because of the low solids content of the waters, the TCLP analysis for metals was performed on the liquid following filtration without pH adjustment. As with the other pond water TCLP analyses, the TCLP metals data therefore represents the analysis of soluble metals. Arsenic was the only metal detected in all four TCLP leachates, again showing the solubility of this compound at the ambient alkaline pH of the pond water. Chromium and nickel were detected in three of the leachates, barium in two, and cadmium in one. None of the values were above regulatory standards.

Low levels of total cyanide (average 0.4 mg/l) and ammonia (average 0.3 mg/l) were detected. The TDS of the waters was 1.6 percent, with the predominant anions being nitrates and sulfates. The TOC of the waters averaged 155 mg/l, and the low TSS values (average of 9 mg/l) confirmed the observation of low turbidity made in the field.

3.4.2 Sludge

Four samples of sludge, one from each quadrant, were collected from Pond 207B-Center. The sludge averaged 8.7 percent solids, less than the concentration in Pond 207B-North (refer to Table 3-5), but comparable to the solids concentration in Pond 207B-South (refer to Table 3-9). Table 3-7 summarizes the laboratory analytical data for the sludge from Pond 207B-Center.

Tetrachloroethene (PCE) was detected in two of the four samples at 37 and 180 $\mu\text{g/kg}$. No other volatile organics were detected. No target semivolatile organics or alcohols were detected.

Barium and cadmium were detected in all four sludge samples. Chromium was detected in three of the samples, while boron and mercury were each detected in one sample. Arsenic, lead, nickel, selenium, and silver were not detected in any of the samples. It should be noted that arsenic was detected in the TCLP leachate from the samples, therefore there had to be arsenic present in the sludge at concentrations less than the detection limit (i.e., the detection limit for arsenic in sludge is higher than for arsenic in the TCLP leachate). The TCLP leachate also contained barium, cadmium, and chromium from all four samples.

Nickel was also detected in the leachate from one sample. The cadmium leached at a level exceeding the LDR standard.

Low levels (average 0.64 mg/kg) of total cyanide were detected in all four samples. Ammonia was present at an average concentration of 43 mg/kg. The average concentration of TOC was 7400 mg/kg, indicating a high organic content in the sludge.

The dry solids swelled 60-70 percent when wetted, significantly higher than the swelling noted for solids from Pond 207B-North. The Atterberg data indicate that the sludge can be identified as having engineering properties similar to organic clays and silts with medium to high plasticity.

3.5 Pond 207B-South

3.5.1 Water

Five water samples were collected from Pond 207B-South, one from each quadrant plus a duplicate from the northwest quadrant. The water was blue in color due to the addition of dye to enhance solar evaporation, and had low turbidity. The pH of the water was approximately 9.0, as measured in the field. The specific conductance was 17,000-18,000 $\mu\text{mho/cm}$, slightly higher than that of Pond 207B-Center (refer to Table 3-6). The water temperature at the time of sampling was 25°C (77°F). Field data are summarized in Table 3-1. Laboratory analytical data are summarized in Table 3-8.

No target volatile organics, semivolatile organics, or alcohols were detected in any of the samples.

Arsenic, barium, and boron were detected in all five samples, while chromium and nickel were detected in three out of five samples. Cadmium, lead, mercury, selenium, and silver were not detected in any of the samples. Sodium was the predominant cation (average concentration of approximately 0.24 percent), with lesser amounts of potassium, magnesium, and calcium. In the TCLP leachate, arsenic and barium were the only metals detected in all five samples. Nickel was detected in three sample leachates, while chromium was detected in two. No LDR standards were exceeded, nor were the TCLP standards for classifying the waters as RCRA hazardous waste based on the characteristic of toxicity. As with the other pond waters, the TCLP analysis for metals is essentially the analysis of soluble metals, since the method specifies the analysis of the liquid without extraction, following filtering, for samples with less than 0.5 percent solids. The data show that most, if not all, arsenic and barium are soluble at the ambient pH of the pond. The chromium and nickel in the TCLP leachate, although not detected in all samples, was detected at concentrations similar to the detections in the unfiltered samples, also indicating that these metals are highly soluble at pH 9.

Low levels of ammonia (0.6 mg/l average) and total cyanide (0.29 mg/l average) were detected in the pond water. Dissolved solids averaged 1.5 percent, while the organic content was relatively low, as measured by TOC (92 mg/l average).

The suspended solids concentration was also low (22 mg/l average), confirming the visual observation of low turbidity.

3.5.2 Sludge

Five sludge samples were also collected from Pond 207B-South, one from each quadrant and a duplicate from the northwest quadrant. Table 3-9 summarizes the laboratory analytical data for Pond 207B-South sludge. The sludge averaged 9.8 percent solids, similar to the solids concentration in Pond A (refer to Table 3-3) and Pond 207B-Center (refer to Table 3-7).

Two target volatile organics were detected in the sludge, tetrachloroethene (PCE) in all five samples, and trichloroethene (TCE) in three of five samples. No target semivolatiles or alcohols were detected.

Barium, cadmium, and chromium were detected in all five samples. Boron was detected in two samples, while arsenic, lead, and mercury were each detected in only one sample. Nickel, selenium, and silver were not detected in any samples. Arsenic, barium, cadmium, and chromium were detected in all five TCLP leachate samples. None were at concentrations exceeding LDR standards or sufficient to classify the sludge as hazardous based on the characteristic of toxicity.

Total cyanide was detected in all samples at an average concentration of 1.3 mg/l. TOC averaged 8600 mg/l, indicating a significant organic content in the sludge. Geotechnical analyses using revised methodology to account for the salt content of the waste have not yet been completed.

3.6 Pond 207C

3.6.1 Water

Five water samples were collected from Pond 207C, one from each quadrant and a duplicate sample from the northeast quadrant. The pond water was a golden color, with a few black flecks noted in what was otherwise described as a low turbidity liquid. The pH of the water was approximately 10.2, the highest of all the ponds. The specific conductance of the water was off the scale of the monitoring instrument, greater than 50,000 umho/cm. The pond water temperature at the time of sampling was 25°C (77°F). Field data are summarized in Table 3-1. Laboratory analytical data are summarized in Table 3-10.

Two target volatile organics were detected in the 207C pond water. 2-Butanone (Methyl ethyl ketone) was detected in four of the five samples. All four of the detected values were greater than the land disposal restriction standard for the compound. Methylene chloride was detected in only one of the samples. No target semivolatile organics or alcohols were detected in any of the samples.

In general, the concentrations of inorganics in Pond 207C water were higher than those in the other ponds. Arsenic, barium, boron, cadmium, chromium, and nickel were detected in all five water samples. Lead and selenium were each detected in two of the samples. Chromium, lead, and nickel were at concentrations that

exceed the LDR standards for those compounds. Sodium (average 13.8 percent) and potassium (average 5.58 percent) were both detected at percent levels in the Pond 207C water, confirming the high salt content in the water and consistent with the high TDS levels (average 46 percent) in the water. Five metals were detected in all five of the TCLP leachates; arsenic, cadmium, chromium, nickel, and silver. Again, the TCLP method for a liquid with less than 0.5 percent solids specifies analysis of the liquid following filtration, in essence making the TCLP leachate representative of the dissolved metals fraction. It should be noted that silver was detected in the TCLP leachate, but not in the total inorganic analysis. This appears to be because of a slightly higher detection limit for the total analysis, which masks the presence of silver at the levels detected in the TCLP leachate, which had a lower detection limit. It is also noted that the maximum concentrations of arsenic, chromium, and nickel in the TCLP leachate were higher than the maximum concentrations detected in the total inorganic analysis, which is opposite of what should be expected based on an understanding of the analytical methodology.

The water in Pond 207C had much higher alkalinity than the other ponds, consistent with the higher pH. As mentioned earlier, the TDS in the pond water averaged 46 percent. The organic content was also relatively high, as measured by TOC (average 1400 mg/l). Total cyanide concentrations ranged from 3.3 to 20 mg/l, with all values exceeding the LDR standard. Anion concentrations were in the percent level, including nitrate (6.2 percent average), chloride (2.3 percent average), and sulfate (1.7 percent average). The average specific gravity of the water was the highest of all the ponds at 1.332, indicative of the high dissolved salt content.

3.6.2 Sludge

The five sludge samples collected in Pond 207C included two quadrant-specific samples plus one duplicate, a composite from the eastern portion of the pond where there was insufficient sludge to collect quadrant-specific samples, and a composite of sludge from the berms above the water line. The sludges represent a mixture of the crystalline material and the fine-grained material that underlies the crystals, although not in any measured proportion. Analytical data for Pond 207C sludge are summarized in Table 3-11.

Five of the target volatile organics were detected in the sludge samples. Tetrachloroethene (PCE) and 2-Butanone (MEK) were detected in all five samples. Benzene and trichloroethene (TCE) were detected in two of the samples, while 1,1,2-trichloro-1,2,2-trifluoroethane was detected in one sample. None were at concentrations of regulatory concern. No target semivolatile compounds were detected. Pyrene, a semivolatile that was quantitated because it is used as a standard, was detected in two of the samples. No target alcohols were detected.

All metal analytes, with the exception of selenium, were detected in all five sludge samples. The concentrations of boron, cadmium, chromium, lead, mercury, nickel, and silver were significantly higher than the concentrations in the other pond sludges. Arsenic, cadmium, chromium, nickel, and silver were detected in all five TCLP leachates. Barium was detected in three, lead in two, and mercury in one TCLP leachate. The leachate concentrations of cadmium and nickel exceeded

their respective LDR standards, and cadmium leached at a concentration sufficient to classify the sludge as a RCRA waste based on the characteristic of toxicity.

The concentration of total cyanide in the sludge ranged from 13 to 170 mg/kg, considerably higher than the other pond sludges, but still below the LDR standard of 590 mg/kg. Amenable cyanide was not run on these samples, but will be run on the treatability study samples received at a later date.

The moisture analysis of the sludge indicates an average solids content of 66 percent. However, because of the unique crystalline nature of a portion of the sludge, a revised method that accounts for this possible interference will be conducted along with the other geotechnical analyses that have not yet been completed.

3.7 Clarifier

3.7.1 Water

Four aqueous samples, one of which was a duplicate, were collected from the clarifier. All samples were collected from the clarifier bridge that extended from the side of the clarifier to the center. The sample locations were spaced evenly along the length of the bridge. The water samples were yellow/green in color, with a few black solids noted. Otherwise, the samples were relatively clear with low turbidity. The pH of the ponds was approximately 10 to 10.2, which is higher than the A and B ponds, and similar to the pH of Pond 207C. The specific conductance ranged from 30,000 to 40,000 umho/cm, which is again higher than that of the A and B ponds, but less than the value for Pond 207C. The temperature at the time of sampling was 27.9°C (82.2°F), which was slightly higher than the temperature of the ponds.

No target volatile organics, semivolatile organics, or alcohols were detected in the clarifier water. Table 3-12 summarizes the laboratory analytical data for clarifier water.

The clarifier water contained considerable amounts of inorganic contaminants. Arsenic, barium, boron, cadmium, chromium, mercury, nickel, and silver were detected in all four samples. Of these, cadmium and chromium showed the widest range of concentrations. Lead was detected in two of the four samples. Sodium was the predominant cation, at an average concentration of approximately 1.2 percent. Potassium and magnesium were detected at lesser concentrations. In the TCLP leachate, only arsenic was detected in all four samples. It is noted that the concentration in the leachate is significantly higher than the concentration of the raw water, even though the TCLP analysis involved simply the analysis of the water following filtration. Nickel was detected in three of the four leachates, at concentrations approximating those detected in the raw water analysis. This indicates that the nickel is highly soluble at the natural pH of the pond. Chromium was detected in two of the leachates.

Total cyanide was detected in the water at concentrations ranging from 2.4 to 3 mg/l, exceeding the lowest LDR standard of 1.2 mg/l. All the calculated

amenable cyanide values were negative. Ammonia was detected in all four samples at concentrations ranging from 5 to 14 mg/l. The organic content of the water averaged 165 mg/l TOC. The TDS had an average concentration of 5.9 percent. Nitrate was the anion detected at the highest average concentration (7300 mg/l).

3.7.2 Sludge

Three sludge samples plus one duplicate were collected from the clarifier, at approximately the same locations as the water samples. Analytical data for the clarifier sludge samples are summarized in Table 3-13. The sludge had a relatively high solids content, averaging 39.4 percent solids. However, it should be noted that this includes an apparent high value of 66.9 percent solids for sample CS-001D. When this value is excluded, the average solids concentration drops to 30.2 percent.

Four target volatile organics were detected in the sludge; 1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, 2-butanone, and tetrachloroethene (PCE). Of these, only PCE is of a regulatory concern. PCE was detected in one sludge sample at a concentration of 1000 µg/kg, which could potentially leach from the sample at a concentration exceeding the LDR standard of 50 µg/l in the TCLP zero headspace extract. This is based on the conservative assumption that all the PCE will leach following the 20:1 dilution called for in the method.

The clarifier sludge, in general, contained heavy metals in concentrations equal to or greater than the sludges from the ponds. All of the target inorganics were detected in all four of the samples, with the exception of arsenic, which was detected in only two of the samples, and selenium, which was not detected. The highest values in any of the sludges for the following constituents were found in samples from the clarifier; cadmium (4660 mg/kg), chromium (3190 mg/kg), lead (191 mg/kg), mercury (14 mg/kg), nickel (902 mg/kg), and silver (166 mg/kg).

Four metals, arsenic, cadmium, chromium, and nickel, were detected in the TCLP leachate in all four samples. Cadmium and nickel exceeded their respective LDR standards, while cadmium also exceeded the TCLP standard for classifying the sludge as a hazardous waste based on the characteristic of toxicity. Silver, barium, lead, and mercury were also detected in some of the leachate samples.

Total cyanide was detected in all four samples at concentrations ranging from 21 to 190 mg/kg. These concentrations are still below the LDR standard of 590 mg/kg. Ammonia was also detected in all four samples at concentrations generally equal to or greater than the concentrations in the pond sludges. The TOC of the sludge averaged 5175 mg/kg, which is in the range of the other sludges and indicates a significant organic content.

TABLE 3-1

FIELD DATA SUMMARY - POND WATER
 SOLAR POND/PONDCRETE PROJECT
 ROCKY FLATS PLANT, COLORADO

POND	QUADRANT	DATE	pH UNITS	TEMPERATURE (°C)	SPECIFIC CONDUCTANCE (umho/cm)	VISUAL OBSERVATION
207A	NE	8/19/91	9.73	25	9500	Yellow, clear, low turbidity
	NW	8/19/91	9.82	25	8500	
	SE	8/19/91	9.83	25	9000	
207B-North	NE	8/8/91	--	--	--	Clear, low turbidity
	NW	8/8/91	--	--	--	
	SE	8/8/91	--	--	--	
	SW	8/8/91	--	--	--	
207B-Center	NE	8/12/91	9.04	15.5*	14,500	Blue, low turbidity
	NW	8/12/91	9.03	15.5*	13,500	
	SE	8/12/91	9.04	15.5*	15,000	
	SW	8/12/91	9.04	15.5*	15,000	
207B-South	NE	8/15/91	9.09	25.0	17,000	Blue, clear, low turbidity
	NW	8/15/91	9.07	25.0	17,000	
	SE	8/15/91	9.08	25.0	18,000	
	SW	8/15/91	9.03	25.1	17,000	
207C	NE	8/21/91	--	--	--	Golden, clear, low turbidity with a few black flecks
	NW	8/21/91	10.22	25.0	>50,000	
	SE	8/21/91	10.19	25.0	>50,000	
	SW	8/21/91	10.24	25.0	>50,000	
Clarifier	1	8/22/91	10.22	27.9	33,000	Yellow/green with a few black flecks. Fairly clear, low turbidity.
	2	8/22/91	9.98	27.9	40,000	
	3	8/22/91	10.19	27.9	30,000	

* Possible anomalous result

-- No data

> Greater than

umho/cm - micromhos per centimeter

TABLE 3-2

SUMMARY OF POND WATER CHARACTERIZATION DATA - POND 207A
SOLAR POND/POND/CONCRETE PROJECT
ROCKY FLATS PLANT, COLORADO

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION (1)	STANDARD DEVIATION (1)	% RELATIVE STANDARD DEVIATION (1)
VOLATILES(2)	ug/l	0/3	ND	ND	ND	ND
SEMIVOLATILES(2)	ug/l	0/3	ND	ND	ND	ND
ALCOHOLS(2)	mg/l	0/3	ND	ND	ND	ND
INORGANICS						
Arsenic	ug/l	3/3	188-224	205	18	8.8
Barium	ug/l	3/3	135-141	139	3.2	2.3
Boron	ug/l	3/3	1400-1460	1430	30	2.1
Cadmium	ug/l	1/3	5	3	1.4	43
Calcium	ug/l	0/3	ND	ND	ND	ND
Chromium	ug/l	3/3	38-49	44	5.6	13
Lead	ug/l	0/3	ND	ND	ND	ND
Magnesium	ug/l	3/3	120,000-124,000	123,000	2300	1.9
Mercury	ug/l	0/3	ND	ND	ND	ND
Nickel	ug/l	0/3	ND	ND	ND	ND
Potassium	ug/l	3/3	388,000-397,000	394,000	4900	1.2
Selenium	ug/l	0/3	ND	ND	ND	ND
Silver	ug/l	0/3	ND	ND	ND	ND
Sodium	ug/l	3/3	1,840,000-1,870,000	1,860,000	17,320	0.9
TCLP LEACH						
Arsenic	ug/l	3/3	233-246	238	6.8	2.8
Barium	ug/l	0/3	ND	ND	ND	ND
Cadmium	ug/l	R	R	R	R	R
Chromium	ug/l	0/3	ND	ND	ND	ND
Lead	ug/l	0/3	ND	ND	ND	ND
Mercury	ug/l	0/3	ND	ND	ND	ND
Nickel	ug/l	0/3	ND	ND	ND	ND
Selenium	ug/l	0/3	ND	ND	ND	ND
Silver	ug/l	1/3	6	4	1.7	43
pH	units	3/3	9.6-9.7	9.6	--	--

TABLE 3-2
SUMMARY OF POND WATER CHARACTERIZATION DATA - POND 207A
SOLAR POND/POND/CONCRETE PROJECT
ROCKY FLATS PLANT, COLORADO
PAGE 2 OF 2

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION (1)	STANDARD DEVIATION (1)	% RELATIVE STANDARD DEVIATION (1)
MISCELLANEOUS						
Alkalinity (Methyl Orange)	mg/l	3/3	250	250	0.0	0.0
Alkalinity (Phenolphthalein)	mg/l	3/3	84-89	87	2.5	2.9
Ammonia	mg/l	3/3	0.3	0.3	0.0	0.0
Chloride	mg/l	3/3	380-430	400	25	6.2
Cyanide-Amenable	mg/l	0/3	(-0.79)-(-0.47)	-0.63	--	--
Cyanide-Total	mg/l	3/3	0.39-0.47	0.43	0.04	9.3
Gross Alpha	pCi/l	3/3	610-790	690	91.6	13
Gross Beta	pCi/l	3/3	1000	1000	0.0	0.0
Nitrate	mg/l	3/3	970-1000	980	17.3	1.8
pH	units	3/3	9.7	9.7	0.0	0.0
Phosphorus, Total (as P)	mg/l	3/3	0.06-0.07	0.06	0.006	9.1
Specific Gravity		3/3	1.010-1.012	1.011	0.001	0.1
Sulfate (as SO ₄)	mg/l	3/3	460-510	480	26.4	0.6
TDS (Total Dissolved Solids)	mg/l	3/3	7600-7900	7800	153	2.0
TOC (Total Organic Carbon)	mg/l	3/3	68-70	69	1.0	1.4
TSS (Total Suspended Solids)	mg/l	3/3	14-23	19	4.6	24

ND Not Detected
R Rejected

- (1) Values calculated using 1/2 detection limit for nondetects, based on guidance contained in the Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A). Interim Final, December 1989.
- (2) Only compounds with positive detections are listed. The complete list of compounds analyzed is shown in Table 2-3. The complete database is included in Appendix A.

TABLE 3-3

**SUMMARY OF POND SLUDGE CHARACTERIZATION DATA - POND 207A
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO**

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS
VOLATILES⁽¹⁾			
1,1,1-Trichloroethane	ug/kg	1/1	24
1,1,2-Trichloro-1,2,2-trifluoroethane	ug/kg	1/1	260
Tetrachloroethene (PCE)	ug/kg	1/1	290
Trichloroethene (TCE)	ug/kg	1/1	29
SEMIVOLATILES⁽¹⁾	ug/kg	0/1	
ALCOHOLS⁽¹⁾	mg/kg	0/1	
MISCELLANEOUS			
Ammonia	mg/kg	1/1	36
Atterberg - Liquid Limit	--	NA	NA
Atterberg - Plastic Index	--	NA	NA
Atterberg - Plastic Limit	--	NA	NA
Bulk Density (Dried Solids)	g/cc	NA	NA
Cyanide-Amenable	mg/kg	NA	NA
Cyanide-Total	mg/kg	1/1	1.6
Gross Alpha	pCi/g	1/1	570
Gross Beta	pCi/g	1/1	95
Moisture-Gravimetric	%	1/1	87.3
Moisture-Karl Fisher	%	1/1	34
pH	units	1/1	8.9
Specific Gravity	--	1/1	1.1
Swell Test	%	NA	NA
TOC (Total Organic Carbon)	mg/kg	1/1	14,000
Chloride ⁽²⁾	mg/l	1/1	20
Nitrate ⁽²⁾	mg/l	1/1	35
% Recovery of Solids ⁽²⁾	%	1/1	11.6
Phosphorus, Total (as P) ⁽²⁾	mg/l	1/1	0.1
Sulfate ⁽²⁾	mg/l	1/1	20
TDS (Total Dissolved Solids) ⁽²⁾	mg/l	1/1	480
INORGANICS			
Arsenic	mg/kg	1/1	40.2
Barium	mg/kg	1/1	210
Boron	mg/kg	1/1	84.3
Cadmium	mg/kg	1/1	1300
Chromium	mg/kg	1/1	658
Lead	mg/kg	1/1	89
Magnesium	mg/kg	1/1	11,400
Mercury	mg/kg	0/1	ND
Nickel	mg/kg	1/1	102
Potassium	mg/kg	0/1	ND
Selenium	mg/kg	0/1	ND
Silver	mg/kg	0/1	ND
Sodium	mg/kg	1/1	14,500
TCLP LEACH			
Arsenic	ug/l	1/1	185
Barium	ug/l	1/1	1710
Cadmium	ug/l	1/1	485
Chromium	ug/l	0/1	ND
Lead	ug/l	0/1	ND
Mercury	ug/l	0/1	ND
Nickel	ug/l	0/1	ND
Selenium	ug/l	0/1	ND
Silver	ug/l	0/1	ND
pH	units	1/1	6.1

NA Not Analyzed
pCi/g Picocuries per Gram
ND Not Detected

- (1) Only compounds with positive detections are listed. The complete list of compounds analyzed is shown in Table 2-3. The complete database is included in Appendix A.
(2) Following ASTM Leach

Deliverable (Combined) 224A and 224E
POND SLUDGE AND CLARIFIER SLUDGE
WASTE CHARACTERIZATION REPORT

TABLE 3-4

SUMMARY OF POND WATER CHARACTERIZATION DATA - POND 207B NORTH
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
VOLATILES ⁽²⁾	ug/l	0/4	ND	ND	ND	ND
SEMIVOLATILES ⁽²⁾	ug/l	0/4	ND	ND	ND	ND
ALCOHOLS ⁽²⁾	mg/l	0/4	ND	ND	ND	ND
INORGANICS						
Arsenic	ug/l	3/4	60-63	51	21	41
Barium	ug/l	4/4	117-120	118	1	1
Boron	ug/l	4/4	149-171	157	10	6
Cadmium	ug/l	0/4	ND	ND	ND	ND
Calcium	ug/l	4/4	137,000-140,000	138,000	1400	1
Chromium	ug/l	2/4	10-16	9	5	58
Lead	ug/l	0/4	ND	ND	ND	ND
Magnesium	ug/l	4/4	64,800-65,900	65,200	480	0.7
Mercury	ug/l	0/4	ND	ND	ND	ND
Nickel	ug/l	0/4	ND	ND	ND	ND
Potassium	ug/l	4/4	55,700-56,400	55,900	340	0.6
Selenium	ug/l	1/4	76	42	23	55
Silver	ug/l	0/4	ND	ND	ND	ND
Sodium	ug/l	4/4	254,000-345,000	296,000	41,000	14
TCLP LEACH						
Arsenic	ug/l	R	R	R	R	R
Barium	ug/l	4/4	215-230	221	7	3
Cadmium	ug/l	0/4	ND	ND	ND	ND
Chromium	ug/l	1/4	16	8	6	71
Lead	ug/l	0/4	ND	ND	ND	ND
Mercury	ug/l	0/4	ND	ND	ND	ND
Nickel	ug/l	0/4	ND	ND	ND	ND
Selenium	ug/l	0/4	ND	ND	ND	ND
Silver	ug/l	0/4	ND	ND	ND	ND
pH	units	4/4	8.3-8.5	8.4	--	--

Deliverable (Combined) 224A and 224E
POND SLUDGE AND CLARIFIER SLUDGE
WASTE CHARACTERIZATION REPORT

TABLE 3-4
 SUMMARY OF POND WATER CHARACTERIZATION DATA - POND 207B NORTH
 SOLAR POND/PONDCRETE PROJECT
 ROCKY FLATS PLANT, COLORADO
 PAGE 2 OF 2

Deliverable (Combined) 224A and 224E
 POND SLUDGE AND CLARIFIER SLUDGE
 WASTE CHARACTERIZATION REPORT

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
MISCELLANEOUS						
Alkalinity (Methyl Orange)	mg/l	4/4	110	110	0.0	0.0
Alkalinity (Phenolphthalein)	mg/l	3/4	2-3	2	1	55
Ammonia	mg/l	4/4	0.3-0.5	0.4	0.1	28
Chloride	mg/l	4/4	96-100	98	1.7	2
Cyanide-Amenable	mg/l	4/4	(-0.017)-(-0.014)	-0.006	--	--
Cyanide-Total	mg/l	4/4	0.016-0.043	0.030	0.01	36
Gross Alpha	pCi/l	4/4	40-52	47	6.4	14
Gross Beta	pCi/l	4/4	75-510	290	177	61
Nitrate	mg/l	4/4	310-330	320	8	3
pH	units	4/4	8.3-8.5	8.4	--	--
Phosphorus, Total (as P)	mg/l	4/4	0.02-0.08	0.05	0.02	52
Specific Gravity	--	4/4	1.008	1.008	0.0	0.0
Sulfate (as SO ₄)	mg/l	4/4	120-160	130	20	15
TDS (Total Dissolved Solids)	mg/l	4/4	2700-2800	2800	50	1.8
TOC (Total Organic Carbon)	mg/l	4/4	35-37	36	1	2.3
TSS (Total Suspended Solids)	mg/l	1/4	15	7.5	5	66

ND Not Detected
 R Rejected
 pCi/l Picocuries per Liter

- (1) Values calculated using 1/2 detection limit for nondetects, based on guidance contained in the Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A). Interim Final, December 1989.
- (2) Only compounds with positive detections are listed. The complete list of compounds analyzed is shown in Table 2-3. The complete database is included in Appendix A.

TABLE 3-5

**SUMMARY OF POND SLUDGE CHARACTERIZATION DATA - POND 207B NORTH
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO**

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
VOLATILES ⁽²⁾	ug/kg	0/4	ND	ND	ND	ND
SEMIVOLATILES ⁽²⁾	ug/kg	0/4	ND	ND	ND	ND
ALCOHOLS ⁽²⁾	mg/kg	0/4	ND	ND	ND	ND
MISCELLANEOUS						
Ammonia	mg/kg	4/4	9.8-35	22	10.4	47
Atterberg - Liquid Limit	--	4/4	71-75	73	1.7	2
Atterberg - Plastic Index	--	4/4	34-40	37	3.2	8
Atterberg - Plastic Limit	--	4/4	33-37	36	1.9	5
Bulk Density (Dried Solids)	g/cc	4/4	0.84-0.90	0.87	0.025	3
Cyanide-Amenable	mg/kg	NA	NA	NA	NA	NA
Cyanide-Total	mg/kg	0/4	ND	ND	ND	ND
Gross Alpha	pCi/g	4/4	5.2-11	8.9	2.55	29
Gross Beta	pCi/g	4/4	5.1-9.8	7.3	2.38	33
Moisture-Gravimetric	%	4/4	71.8-76.8	75.1	2.25	3
Moisture-Karl Fisher	%	4/4	23.5-27.9	25.6	1.81	7
pH	units	4/4	7.6-7.7	7.7	--	--
Specific Gravity	--	4/4	1.2	1.2	0.00	0.0
Swell Test	%	4/4	0-10	7.5	5.00	67
TOC (Total Organic Carbon)	mg/kg	4/4	3000-3400	3200	170	5
Chloride ⁽³⁾	mg/l	4/4	4-24	12	8.6	71
Nitrate ⁽³⁾	mg/l	4/4	1.7-9.8	6.8	3.6	53
% Recovery of Solids ⁽³⁾	%	4/4	16.6-25.8	20.8	4.16	20
Phosphorus, Total (as P) ⁽³⁾	mg/l	4/4	0.01-0.05	0.03	0.02	61
Sulfate ⁽³⁾	mg/l	4/4	150-160	155	5.8	40
TDS (Total Dissolved Solids) ⁽³⁾	mg/l	4/4	160-220	190	25.8	14
INORGANICS						
Arsenic	mg/kg	0/4	ND	ND	ND	ND
Barium	mg/kg	4/4	89.1-116	105	11.7	11
Boron	mg/kg	1/4	12.8	7.3	1.2	16
Cadmium	mg/kg	3/4	6.7-8.5	7.1	0.9	13
Chromium	mg/kg	4/4	7.9-33.3	23.2	11.9	51
Lead	mg/kg	4/4	13.8-21.3	15.8	3.6	23
Magnesium	mg/kg	4/4	3270-4160	3805	380	10
Mercury	mg/kg	2/4	0.7-0.8	0.5	0.3	72
Nickel	mg/kg	2/4	7.1-9.5	6.2	2.6	42
Potassium	mg/kg	0/4	ND	ND	ND	ND
Selenium	mg/kg	0/4	ND	ND	ND	ND
Silver	mg/kg	0/4	ND	ND	ND	ND
Sodium	mg/kg	0/4	ND	ND	ND	ND

Deliverable (Combined) 224A and 224E
POND SLUDGE AND CLARIFIER SLUDGE
WASTE CHARACTERIZATION REPORT

TABLE 3-5
SUMMARY OF POND SLUDGE CHARACTERIZATION DATA - POND 207B NORTH
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO
PAGE 2 OF 2

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
TCLP LEACH						
Arsenic	ug/l	R	R	R	R	R
Barium	ug/l	4/4	1060-1210	1140	76.1	7
Cadmium	ug/l	4/4	54-104	73	21.6	29
Chromium	ug/l	3/4	10-57	22	24.2	111
Lead	ug/l	0/4	ND	ND	ND	ND
Mercury	ug/l	0/4	ND	ND	ND	ND
Nickel	ug/l	3/4	20-56	28	19.8	69
Selenium	ug/l	0/4	ND	ND	ND	ND
Silver	ug/l	0/4	ND	ND	ND	ND
pH	ug/l	4/4	5.7-5.9	5.8	0.1	2

NA Not Analyzed
 ND Not Detected
 pCi/g Picocuries per Gram
 R Rejected

- (1) Values calculated using 1/2 detection limit for nondetects, based on guidance contained in the Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A). Interim Final, December 1989.
- (2) Only compounds with positive detections are listed. The complete list of compounds analyzed is shown in Table 2-3. The complete database is included in Appendix A.
- (3) Following ASTM Leach

TABLE 3-6

SUMMARY OF POND WATER CHARACTERIZATION DATA - POND 207B CENTER
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
VOLATILES ⁽²⁾	ug/l	0/4	ND	ND	ND	ND
SEMIVOLATILES ⁽²⁾	ug/l	0/4	ND	ND	ND	ND
ALCOHOLS ⁽²⁾	mg/l	0/4	ND	ND	ND	ND
INORGANICS						
Arsenic	ug/l	4/4	314-330	321	7	2.1
Barium	ug/l	4/4	68-70	69	1	1.4
Boron	ug/l	4/4	3440-3530	3480	40	1.1
Cadmium	ug/l	0/4	ND	ND	ND	ND
Calcium	ug/l	4/4	26,400-27,700	27,000	600	2.3
Chromium	ug/l	4/4	22-32	28	5	16.7
Lead	ug/l	0/4	ND	ND	ND	ND
Magnesium	ug/l	4/4	216,000-220,000	218,000	2000	0.7
Mercury	ug/l	0/4	ND	ND	ND	ND
Nickel	ug/l	4/4	28-31	29	1	4.9
Potassium	ug/l	4/4	791,000-807,000	800,000	8000	1.0
Selenium	ug/l	1/4	81	43	26	59.6
Silver	ug/l	0/4	ND	ND	ND	ND
Sodium	ug/l	4/4	2,060,000-4,060,000	3,150,000	823,000	26.1
TCLP LEACH						
Arsenic	ug/l	4/4	180-251	221	31	14.2
Barium	ug/l	2/4	214-258	162	87	53.8
Cadmium	ug/l	1/4	5	3	1	40.0
Chromium	ug/l	3/4	20-27	20	8	42.2
Lead	ug/l	0/4	ND	ND	ND	ND
Mercury	ug/l	0/4	ND	ND	ND	ND
Nickel	ug/l	3/4	21-30	24	4	17.0
Selenium	ug/l	0/4	ND	ND	ND	ND
Silver	ug/l	0/4	ND	ND	ND	ND
pH	units	4/4	9.1-9.2	9.1	--	--

TABLE 3-6
SUMMARY OF POND WATER CHARACTERIZATION DATA - POND 207B CENTER
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO
PAGE 2 OF 2

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
MISCELLANEOUS						
Alkalinity (Methyl Orange)	mg/l	4/4	1400	1400	0.0	0.0
Alkalinity (Phenolphthalein)	mg/l	4/4	230-240	235	.6	2.4
Ammonia	mg/l	4/4	0.2-0.4	0.3	0.1	27.2
Chloride	mg/l	0/4	ND	ND	ND	ND
Cyanide-Amenable	mg/l	4/4	(-0.83) - (-5.3)	-1.97	--	--
Cyanide-Total	mg/l	4/4	0.34-0.57	0.40	0.12	28.9
Gross Alpha	pCi/l	4/4	1800-2300	2100	210	10.1
Gross Beta	pCi/l	4/4	2700-3000	2900	130	4.5
Nitrate	mg/l	4/4	1900-2100	2000	100	5.1
pH	units	4/4	9.1-9.2	9.1	--	--
Phosphorus, Total (as P)	mg/l	4/4	4.2	4.2	0.0	0.0
Specific Gravity	--	4/4	1.016-1.018	1.017	0.001	0.10
Sulfate (as SO ₄)	mg/l	4/4	740-1000	880	109	12.4
TDS (Total Dissolved Solids)	mg/l	4/4	16,000	16,000	0.0	0.0
TOC (Total Organic Carbon)	mg/l	4/4	93-320	155	110	71.4
TSS (Total Suspended Solids)	mg/l	2/4	11-16	9	5.3	57.5

ND Not Detected
pCi/l Picocuries per Liter

- (1) Values calculated using 1/2 detection limit for nondetects, based on guidance contained in the Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A). Interim Final, December 1989.
- (2) Only compounds with positive detections are listed. The complete list of compounds analyzed is shown in Table 2-3. The complete database is included in Appendix A.

TABLE 3-7
SUMMARY OF POND SLUDGE CHARACTERIZATION DATA - POND 207B CENTER
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
VOLATILES ⁽²⁾						
Tetrachloroethene (PCE)	ug/kg	2/4	37-180 ^{cuu}	70	73	105
SEMIVOLATILES ⁽²⁾	ug/kg	0/4	ND	ND	ND	ND
ALCOHOLS ⁽²⁾	mg/kg	0/4	ND	ND	ND	ND
MISCELLANEOUS						
Ammonia	mg/kg	4/4	25-58	43	14	32
Atterberg - Liquid Limit	--	4/4	77-85	83	4	5
Atterberg - Plastic Index	--	4/4	20-40	29	9	33
Atterberg - Plastic Limit	--	4/4	45-65	52	9	18
Bulk Density (Dried Solids)	g/cc	4/4	0.81-0.88	0.84	0.03	4
Cyanide-Amenable	mg/kg	NA	NA	NA	NA	NA
Cyanide-Total	mg/kg	4/4	0.34-1.3	0.64	0.45	71
Gross Alpha	pCi/g	4/4	13-19	17	3	17
Gross Beta	pCi/g	4/4	12-16	15	2	13
Moisture-Gravimetric	%	4/4	89.9-93.4	91.3	1.5	2
Moisture-Karl Fisher	%	4/4	42-53	48	5	10
pH	units	4/4	9.1-9.2	9.2	---	---
Specific Gravity	--	4/4	1.0	1.0	0.0	0.0
Swell Test	%	4/4	60-70	63	5	08
TOC (Total Organic Carbon)	mg/kg	4/4	5500-8800	7400	1500	20
Chloride ⁽³⁾	mg/l	3/4	210-300	200	80	40
Nitrate ⁽³⁾	mg/l	4/4	50-74	66	11	16
% Recovery of Solids ⁽³⁾	%	4/4	9.3-13.7	10.5	2.2	21
Phosphorus, Total (as P) ⁽³⁾	mg/l	4/4	1.4-3.9	2.1	1.1	56
Sulfate ⁽³⁾	mg/l	4/4	33-90	49	28	57
TDS (Total Dissolved Solids) ⁽³⁾	mg/l	4/4	670-770	740	45	6

TABLE 3-7
SUMMARY OF POND SLUDGE CHARACTERIZATION DATA - POND 207B CENTER
SOLAR POND/PONDCRETE PROJECT - ROCKY FLATS PLANT
PAGE 2 OF 2

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
INORGANICS						
Arsenic	mg/kg	0/4	ND	ND	ND	ND
Barium	mg/kg	4/4	46.5-120	82.3	30	37
Boron	mg/kg	1/4	151	84	46	55
Cadmium	mg/kg	4/4	46.5-84.4	57.9	17.9	31
Chromium	mg/kg	3/4	48.5-130	63.1	52	82
Lead	mg/kg	0/4	ND	ND	ND	ND
Magnesium	mg/kg	4/4	7,190-19,800	12,400	5,300	43
Mercury	mg/kg	1/4	5.5	1.8	2.5	141
Nickel	mg/kg	0/4	ND	ND	ND	ND
Potassium	mg/kg	3/4	10,900-15,400	10,700	4,350	41
Selenium	mg/kg	0/4	ND	ND	ND	ND
Silver	mg/kg	0/4	ND	ND	ND	ND
Sodium	mg/kg	4/4	35,200-54,200	42,000	8,400	20
TCLP LEACH						
Arsenic	ug/l	4/4	122-181	145	26	18
Barium	ug/l	4/4	2660-3690	3220	430	13
Cadmium	ug/l	4/4	114-153	136	17	12
Chromium	ug/l	4/4	11-54	34	22	65
Lead	ug/l	0/4	ND	ND	ND	ND
Mercury	ug/l	0/4	ND	ND	ND	ND
Nickel	ug/l	1/4	28	14.5	9	62
Selenium	ug/l	0/4	ND	ND	ND	ND
Silver	ug/l	0/4	ND	ND	ND	ND
pH	units	4/4	4.9-6.1	5.8	---	---

ND Not Detected
NA Not Analyzed
pCi/g Picocuries per Gram

- (1) Values calculated using 1/2 detection limit for nondetects, based on guidance contained in the Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A), Interim Final, December 1989.
- (2) Only compounds with positive detections are listed. The complete list of compounds analyzed is shown in Table 2-3. The complete database is included in Appendix A.
- (3) Following ASTM Leach

TABLE 3-8

SUMMARY OF POND WATER CHARACTERIZATION DATA - POND 207 B SOUTH
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
VOLATILES (2)	ug/l	0/5	ND	ND	ND	ND
SEMIVOLATILES (2)	ug/l	0/5	ND	ND	ND	ND
ALCOHOLS (2)	mg/l	0/5	ND	ND	ND	ND
INORGANICS						
Arsenic	ug/l	5/5	263-276	270	6	3
Barium	ug/l	5/5	110-118	115	3	3
Boron	ug/l	5/5	2730-2800	2760	30	1
Cadmium	ug/l	0/5	ND	ND	ND	ND
Calcium	ug/l	5/5	52,000-52,700	52,400	270	0.5
Chromium	ug/l	3/5	14-21	13	8	59
Lead	ug/l	0/5	ND	ND	ND	ND
Magnesium	ug/l	5/5	187,000-190,000	188,000	1225	0.6
Mercury	ug/l	0/5	ND	ND	ND	ND
Nickel	ug/l	3/5	20-32	19	9	49
Potassium	ug/l	5/5	684,000-696,000	691,000	5100	0.7
Selenium	ug/l	0/5	ND	ND	ND	ND
Silver	ug/l	0/5	ND	ND	ND	ND
Sodium	ug/l	5/5	2,010,000-2,660,000	2,360,000	283,000	12
TCLP LEACH						
Arsenic	ug/l	5/5	167-390	228	93	41
Barium	ug/l	5/5	269-319	291	19	64
Cadmium	ug/l	0/5	ND	ND	ND	ND
Chromium	ug/l	2/5	10-87	22	36	161
Lead	ug/l	0/5	ND	ND	ND	ND
Mercury	ug/l	0/5	ND	ND	ND	ND
Nickel	ug/l	3/5	21-24	17	7	39
Selenium	ug/l	0/5	ND	ND	ND	ND
Silver	ug/l	0/5	ND	ND	ND	ND
pH	units	5/5	9.0	9.0	0.0	0.0

TABLE 3-8
SUMMARY OF POND WATER CHARACTERIZATION DATA - POND 207B SOUTH
SOLAR POND/PONDCRETE PROJECT
PAGE 2 OF 2

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
MISCELLANEOUS						
Alkalinity (Methyl Orange)	mg/l	5/5	900-910	905	5.5	0.6
Alkalinity (Phenolphthalein)	mg/l	5/5	140-160	150	7.1	5
Ammonia	mg/l	5/5	0.5-0.6	0.6	0.05	10
Chloride	mg/l	0/5	ND	ND	ND	ND
Cyanide-Amenable	mg/l	0/5	(-0.86) - (-2.6)	---	---	---
Cyanide-Total	mg/l	5/5	0.28-0.31	0.29	0.01	4
Gross Alpha	pCi/l	5/5	1500-2100	1900	250	13
Gross Beta	pCi/l	5/5	2500-2900	2700	164	6
Nitrate	mg/l	5/5	1600-1800	1700	84	5
pH	units	5/5	9.1	9.1	0.0	0.0
Phosphorus, Total (as P)	mg/l	5/5	2.6-2.8	2.8	0.09	3
Specific Gravity		4/4	1.016-1.020	1.019	0.002	0.2
Sulfate (as SO ₄)	mg/l	5/5	540-600	560	26	5
TDS (Total Dissolved Solids)	mg/l	5/5	14,000-15,000	15,000	550	4
TOC (Total Organic Carbon)	mg/l	5/5	58-110	92	22	24
TSS (Total Suspended Solids)	mg/l	5/5	11-39	22	11	49

- (1) Average calculated using 1/2 detection limit for nondetects, based on guidance contained in the Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation manual (Part A), Interim Final, December 1989.
- (2) Only compounds with positive detections are listed. The complete list of compounds analyzed is shown in Table 2-5. The complete database is included in Appendix A.

TABLE 3-9

SUMMARY OF POND SLUDGE CHARACTERIZATION DATA - POND 207B SOUTH
SOLAR POND/POND/CONCRETE PROJECT
ROCKY FLATS PLANT, COLORADO

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
VOLATILES⁽²⁾						
Tetrachloroethene (PCE)	ug/kg	5/5	32-460	238	153	64
Trichloroethene (TCE)	ug/kg	3/5	47-57	41	14	34
SEMIVOLATILES⁽²⁾						
	ug/kg	0/5	ND	ND	ND	ND
ALCOHOLS⁽²⁾						
	mg/kg	0/5	ND	ND	ND	ND
MISCELLANEOUS						
Ammonia	mg/kg	4/5	17-34	20	10	53
Atterberg - Liquid Limit	--	NA	NA	NA	NA	NA
Atterberg - Plastic Index	--	NA	NA	NA	NA	NA
Atterberg - Plastic Limit	--	NA	NA	NA	NA	NA
Bulk Density (Dried Solids)	g/cc	NA	NA	NA	NA	NA
Cyanide-Amenable	mg/kg	NA	NA	NA	NA	NA
Cyanide-Total	mg/kg	5/5	0.46-4.1	1.3	1.5	115
Gross Alpha	pCi/g	5/5	31-61	38	13	33
Gross Beta	pCi/g	5/5	21-47	27	11.1	41
Moisture-Gravimetric	%	5/5	88.3-92.3	90.2	1.9	2
Moisture-Karl Fisher	%	4/4	39-50	45	5	11
pH	units	5/5	9.1	9.1	0.0	0.0
Specific Gravity	--	4/4	1.0-1.1	1.1	0.05	5
Swell Test	%	NA	NA	NA	NA	NA
TOC (Total Organic Carbon)	mg/kg	5/5	6,800-11,000	8600	1,600	18
Chloride ⁽³⁾	mg/l	0/5	ND	ND	ND	ND
Nitrate ⁽³⁾	mg/l	5/5	77-89	84	5	6
% Recovery of Solids ⁽³⁾	%	5/5	6.4-12.4	8.9	2.2	24
Phosphorus, Total (as P) ⁽³⁾	mg/l	5/5	0.09-1.7	0.8	0.7	85
Sulfate ⁽³⁾	mg/l	5/5	23-40	32	6	20
TDS (Total Dissolved Solids) ⁽³⁾	mg/l	5/5	740-790	760	20	2

TABLE 3-9
SUMMARY OF POND SLUDGE CHARACTERIZATION DATA - POND 207B SOUTH
SOLAR POND/POND/CONCRETE PROJECT
ROCKY FLATS PLANT, COLORADO
PAGE 2 OF 2

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
INORGANICS						
Arsenic	mg/kg	1/5	59.7	27.7	18.2	65
Barium	mg/kg	5/5	62.2-134	107	33.2	31
Boron	mg/kg	2/5	336-349	166	161	96
Cadmium	mg/kg	5/5	7.4-30.4	22.7	9.3	41
Chromium	mg/kg	5/5	25.2-51.9	38.1	12.0	31
Lead	mg/kg	1/5	61	24	21	86
Magnesium	mg/kg	5/5	5140-15,200	10,500	4,100	39
Mercury	mg/kg	1/5	5	1.4	2.0	72
Nickel	mg/kg	0/5	ND	ND	ND	ND
Potassium	mg/kg	1/5	8910	5720	2,300	40
Selenium	mg/kg	0/5	ND	ND	ND	ND
Silver	mg/kg	0/5	ND	ND	ND	ND
Sodium	mg/kg	4/5	30,000-44,600	30,000	17,000	56
TCLP LEACH						
Arsenic	ug/l	5/5	194-233	211	21	10
Barium	ug/l	5/5	1660-2770	1960	460	23
Cadmium	ug/l	5/5	19-32	24	6	24
Chromium	ug/l	5/5	23-56	41	12	29
Lead	ug/l	0/5	ND	ND	ND	ND
Mercury	ug/l	0/5	ND	ND	ND	ND
Nickel	ug/l	0/5	ND	ND	ND	ND
Selenium	ug/l	0/5	ND	ND	ND	ND
Silver	ug/l	0/5	ND	ND	ND	ND
pH	units	5/5	5.4-5.9	5.7	---	---

ND Not Detected
NA Not Analyzed
pCi/g Picocuries per Gram

- (1) Values calculated using 1/2 detection limit for nondetects, based on guidance contained in the Risk Assessment Guidance for Superfund, Volum I, Human Health Evaluation Manual (Part A), Interim Final, December 1989.
- (2) Only compounds with positive detections are listed. The complete list of compounds analyzed is shown in Table 2-3. The complete data base is included in Appendix A.
- (3) Following ASTM Leach

Deliverable (Combined) 224A and 224E
POND SLUDGE AND CLARIFIER SLUDGE
WASTE CHARACTERIZATION REPORT

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TABLE 3-10

**SUMMARY OF POND WATER CHARACTERIZATION DATA - POND 207C
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO**

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
VOLATILES⁽²⁾						
2-Butanone	ug/l	4/5	77-110	76	43	56
Methylene Chloride	ug/l	1/5	8	5.6	1.3	24
SEMIVOLATILES⁽²⁾	ug/l	0/5	ND	ND	ND	ND
ALCOHOLS⁽²⁾	mg/l	0/5	ND	ND	ND	ND
INORGANICS						
Arsenic	ug/l	5/5	3350-4110	3690	374	10.1
Barium	ug/l	5/5	110-150	130	14	10.9
Boron	ug/l	5/5	437,000-494,000	463,000	26,000	5.6
Cadmium	ug/l	5/5	430-560	490	50	10.3
Calcium	ug/l	0/5	ND	ND	ND	ND
Chromium	ug/l	5/5	3320-3940	3520	250	7.2
Lead	ug/l	2/5	300	210	80	39.1
Magnesium	ug/l	5/5	1300-3870	2790	930	33.3
Mercury	ug/l	0/5	ND	ND	ND	ND
Nickel	ug/l	5/5	2540-2920	2680	170	6.5
Potassium	%	5/5	5.45-5.92	5.58	0.19	3.5
Selenium	ug/l	2/5	600-3000	1980	1400	70.7
Silver	ug/l	0/5	ND	ND	ND	ND
Sodium	%	5/5	13.6-14.2	13.8	0.25	1.8
TCLP LEACH						
Arsenic	ug/l	5/5	4660-5510	4960	330	6.5
Barium	ug/l	0/5	ND	ND	ND	ND
Cadmium	ug/l	5/5	350-560	430	80	18.6
Chromium	ug/l	5/5	2240-9160	3780	3000	79.8
Lead	ug/l	0/5	ND	ND	ND	ND
Mercury	ug/l	0/5	ND	ND	ND	ND
Nickel	ug/l	5/5	2330-4930	2980	1100	37.0
Selenium	ug/l	0/5	ND	ND	ND	ND
Silver	ug/l	5/5	150-430	250	110	44.3
pH	units	5/5	10.2	10.2	0.0	0.0

TABLE 3-10
SUMMARY OF POND WATER CHARACTERIZATION DATA - POND 207C
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO
PAGE 2 OF 2

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
MISCELLANEOUS						
Alkalinity (Methyl Orange)	mg/l	5/5	58,000-63,000	60,000	1900	3.2
Alkalinity (Phenolphthalein)	mg/l	5/5	25,000-32,000	29,000	2500	8.6
Ammonia	mg/l	5/5	1.8-6.4	3.7	2	53.2
Chloride	mg/l	5/5	21,000-25,000	23,000	1600	6.9
Cyanide-Amenable	mg/l	0/5	(-120)-(-0.77)	-34	---	---
Cyanide-Total	mg/l	5/5	3.3-20	7.7	7	91.3
Gross Alpha	pCi/l	5/5	63-130	99	27	27.3
Gross Beta	pCi/l	5/5	170-230	190	23	11.9
Nitrate	mg/l	5/5	57,000-66,000	62,000	3500	5.6
pH	units	5/5	10.0-10.1	10	---	---
Phosphorus, Total (as P)	mg/l	5/5	520-610	570	32	5.7
Specific Gravity	--	5/5	1.316-1.348	1.332	0.02	0.01
Sulfate (as SO ₄)	mg/l	5/5	16,000-18,000	17,000	700	4.1
TDS (Total Dissolved Solids)	mg/l	5/5	300,000-510,000	460,000	88,500	19.4
TOC (Total Organic Carbon)	mg/l	5/5	1200-1600	1400	150	11.1
TSS (Total Suspended Solids)	mg/l	5/5	220-1400	530	490	91.5

ND Not Detected
pCi/l Picocuries per Liter

- (1) Values calculated using 1/2 detection limit for nondetects, based on guidance contained in the Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). Interim Final, December 1989.
- (2) Only compounds with positive detections are listed. The complete list of compounds analyzed is shown in Table 2-3. The complete database is included in Appendix A.

TABLE 3-11

SUMMARY OF POND SLUDGE CHARACTERIZATION DATA - POND 207C
 SOLAR POND/PONDCRETE PROJECT
 ROCKY FLATS PLANT, COLORADO

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION (1)	STANDARD DEVIATION (1)	% RELATIVE STANDARD DEVIATION (1)
VOLATILES (2)						
1,1,2-Trichloro-1,2,2-trifluoroethane	ug/kg	1/5	33	10.2	12.7	125
2-Butanone	ug/kg	5/5	16-160	110	63.3	57
Benzene	ug/kg	2/5	7-31	10.5	11.5	109
Tetrachloroethene (PCE)	ug/kg	5/5	8-73	22.2	28.4	128
Trichloroethene (TCE)	ug/kg	2/5	5-7	3.9	0.96	25
SEMI-VOLATILES (2)						
Pyrene	ug/kg	2/5	190-320	286	56.5	20
ALCOHOLS (2)						
	mg/kg	0/5	ND	ND	ND	ND
MISCELLANEOUS						
Ammonia	mg/kg	0/5	ND	ND	ND	ND
Atterberg - Liquid Limit	--	NA	NA	NA	NA	NA
Atterberg - Plastic Index	--	NA	NA	NA	NA	NA
Atterberg - Plastic Limit	--	NA	NA	NA	NA	NA
Bulk Density (Dried Solids)	g/cc	NA	NA	NA	NA	NA
Cyanide-Amenable	mg/kg	NA	NA	NA	NA	NA
Cyanide-Total	mg/kg	5/5	13-170	72	80.5	111
Gross Alpha	pCi/g	5/5	2700-8700	5000	2,400	49
Gross Beta	pCi/g	5/5	420-1200	710	314	44
Moisture-Gravimetric	%	5/5	34.8-48.8	44.0	5.9	13
Moisture-Karl Fisher	%	NA	NA	NA	NA	NA
pH	units	5/5	10.2-10.5	10.4	--	--
Specific Gravity	--	NA	NA	NA	NA	NA
Swell Test	%	NA	NA	NA	NA	NA
TOC (Total Organic Carbon)	mg/kg	5/5	6400-9000	7700	1100	14
Chloride (3)	mg/l	5/5	660-990	770	126	16
Nitrate (3)	mg/l	5/5	8900-11,000	10,000	750	7
% Recovery of Solids (3)	%	5/5	9.2-18.8	11.6	4.0	35
Phosphorus, Total (as P) (3)	mg/l	5/5	22-38	31	7.5	24
Sulfate (3)	mg/l	5/5	810-1300	970	190	20
TDS (Total Dissolved Solids) (3)	mg/l	5/5	18,000-24,000	21,000	2,600	12

TABLE 3-11
SUMMARY OF POND SLUDGE CHARACTERIZATION DATA - POND 207C
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO
PAGE 2 OF 2

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION (1)	STANDARD DEVIATION (1)	% RELATIVE STANDARD DEVIATION (1)
INORGANICS						
Arsenic	mg/kg	5/5	18-37	28	7.9	28
Barium	mg/kg	5/5	13.2-61.5	31	18.3	59
Boron	mg/kg	5/5	455-781	612	128.3	21
Cadmium	mg/kg	5/5	27.3-665	164 ⁽⁴⁾	280.5	171
Chromium	mg/kg	5/5	252-960	618	256.9	42
Lead	mg/kg	5/5	7.9-38.5	19.4	11.6	60
Magnesium	mg/kg	5/5	1340-6250	3370	1836.0	54
Mercury	mg/kg	5/5	0.7-1.0	0.9	0.1	16
Nickel	mg/kg	5/5	17.4-146	52.3 ⁽⁵⁾	52.8	101
Potassium	mg/kg	5/5	64,500-87,200	78,100	8640	11
Selenium	mg/kg	0/5	ND	ND	ND	ND
Silver	mg/kg	5/5	35.1-73.6	54.1	14.0	26
Sodium	mg/kg	5/5	139,000-193,000	157,600	21,570	14
TCLP LEACH						
Arsenic	ug/l	5/5	447-538	506	37.3	7
Barium	ug/l	3/5	481-559	377	186.0	49
Cadmium	ug/l	5/5	342-5230	1490 ⁽⁶⁾	2100	142
Chromium	ug/l	5/5	1840-3940	2770	841	30
Lead	ug/l	2/5	33-52	26	16.5	63
Mercury	ug/l	1/5	0.4	0.2	0.13	84
Nickel	ug/l	5/5	563-2140	986 ⁽⁷⁾	654	66
Selenium	ug/l	0/5	ND	ND	ND	ND
Silver	ug/l	5/5	9-23	18	5.9	33
pH	units	5/5	4.8-5.3	5.1	--	--

ND Not Detected
NA Not Analyzed
pCi/g Picocuries per Gram

- (1) Values calculated using 1/2 detection limit for nondetects, based on guidance contained in the Risk Assessment Guidance for Superfund Volume 1, Human Health Evaluation Manual (Part A). Interim Final, December 1989.
- (2) Only compounds with positive detections are listed. The complete list of compounds analyzed is shown in Table 2-3. The complete database is included in Appendix A.
- (3) Following ASTM Leach
- (4) When the Pond Sludge Berm Composite (Sample PS207C-CB) value of 665 is excluded, the average falls to 38.8 mg/kg.
- (5) When the Pond Sludge Berm Composite (Sample PS207C-CB) value of 146 is excluded, the average falls to 28.9 mg/kg.
- (6) When the Pond Sludge Berm Composite (Sample PS207C-CB) value of 5230 is excluded, the average falls to 552 mg/kg.
- (7) When the Pond Sludge Berm Composite (Sample PS207C-CB) value of 2140 is excluded, the average falls to 698 mg/kg.

TABLE 3-12

SUMMARY OF POND WATER CHARACTERIZATION DATA - CLARIFIER
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
VOLATILES ⁽²⁾	ug/l	0/4	ND	ND	ND	ND
SEMI-VOLATILES ⁽²⁾	ug/l	0/4	ND	ND	ND	ND
ALCOHOLS ⁽²⁾	mg/l	0/4	ND	ND	ND	ND
INORGANICS						
Arsenic	ug/l	4/4	272-342	313	32	10
Barium	ug/l	4/4	30-91	49	29	58
Boron	ug/l	4/4	23,300-34,700	28,000	5,400	19
Cadmium	ug/l	4/4	38-570	221	250	113
Calcium	ug/l	0/4	ND	ND	ND	ND
Chromium	ug/l	4/4	138-825	355	319	90
Lead	ug/l	2/4	34-46	28	15	55
Magnesium	ug/l	4/4	2580-6730	3900	1910	50
Mercury	ug/l	4/4	2.2-4.6	3.5	1.0	28
Nickel	ug/l	4/4	258-393	320	58	18
Potassium	mg/l	4/4	4860-7000	5720	1020	18
Selenium	ug/l	0/4	ND	ND	ND	ND
Silver	ug/l	4/4	66-110	85	20	24
Sodium	mg/l	4/4	9940-14,800	11,940	2310	19
TCLP LEACH						
Arsenic	ug/l	4/4	1400-1800	1540	180	12
Barium	ug/l	0/4	ND	ND	ND	ND
Cadmium	ug/l	1/1 ⁽³⁾	50	50	0	0
Chromium	ug/l	2/4	110-140	58	45	51
Lead	ug/l	0/4	ND	ND	ND	ND
Mercury	ug/l	0/4	ND	ND	ND	ND
Nickel	ug/l	3/4	240-350	250	110	44
Selenium	ug/l	0/4	ND	ND	ND	ND
Silver	ug/l	0/4	ND	ND	ND	ND
pH	units	4/4	10.1	10.1	0	0

TABLE 3-12
SUMMARY OF POND WATER CHARACTERIZATION DATA - CLARIFIER
SOLAR POND/PONDCRETE PROJECT
ROCKY FLAT PLANT, COLORADO
PAGE 2 OF 2

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
MISCELLANEOUS						
Alkalinity (Methyl Orange)	mg/l	4/4	5500-8200	6800	1130	17
Alkalinity (Phenolphthalein)	mg/l	4/4	2300-3100	2800	340	12
Ammonia	mg/l	4/4	5-14	9	4	40
Chloride	mg/l	4/4	1600-3200	2090	750	36
Cyanide-Amenable	mg/l	0/4	(-14)-(-3.3)	---	---	---
Cyanide-Total	mg/l	4/4	2.4-3	2.7	0.3	9
Gross Alpha	pCi/l	4/4	16-19	17	2	9
Gross Beta	pCi/l	4/4	22-30	25	4	14
Nitrate	mg/l	4/4	5700-10,000	7300	1900	26
pH	units	4/4	9.9-10	10	---	---
Phosphorus, Total (as P)	mg/l	4/4	78-84	81	3	3
Specific Gravity	---	NA	NA	NA	NA	NA
Sulfate (as SO ₄)	mg/l	4/4	2600-3200	2800	280	10
TDS (Total Dissolved Solids)	mg/l	4/4	46,000-68,000	59,000	2200	16
TOC (Total Organic Carbon)	mg/l	4/4	140-190	165	21	13
TSS (Total Suspended Solids)	mg/l	4/4	68-180	140	51	36

ND Not Detected
NA Not Analyzed
pCi/l Picocuries per Liter

- (1) Values calculated using 1/2 detection limit for nondetects, based on guidance contained in the Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). Interim Final, December 1989.
- (2) Only compounds with positive detections are listed. The complete list of compounds analyzed is shown in Table 2-3. The complete database is included in Appendix A.
- (3) Three out of four values were rejected during data validation.

TABLE 3-13

SUMMARY OF POND SLUDGE CHARACTERIZATION DATA - CLARIFIER
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO

ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
VOLATILES⁽²⁾						
1,1,1-Trichloroethane	ug/kg	3/4	9-29	18	11	59
1,1,2-Trichloro-1,2,2-trifluoroethane	ug/kg	4/4	45-150	92	45	49
2-Butanone	ug/kg	4/4	87-180	122	43	35
Tetrachloroethene (PCE)	ug/kg	4/4	280-1000	610	360	60
SEMIVOLATILES⁽²⁾						
	ug/kg	0/4	ND	ND	ND	ND
ALCOHOLS⁽²⁾						
	mg/kg	0/4	ND	ND	ND	ND
MISCELLANEOUS						
Ammonia	mg/kg	4/4	28-84	62	24	39
Atterberg - Liquid Limit	--	NA	NA	NA	NA	NA
Atterberg - Plastic Index	--	NA	NA	NA	NA	NA
Atterberg - Plastic Limit	--	NA	NA	NA	NA	NA
Bulk Density (Dried Solids)	g/cc	NA	NA	NA	NA	NA
Cyanide-Amenable	mg/kg	NA	NA	NA	NA	NA
Cyanide-Total	mg/kg	4/4	21-190	87	80	93
Gross Alpha	pCi/g	4/4	3400-6600	5250	1490	28
Gross Beta	pCi/g	4/4	540-860	695	150	21
Moisture-Gravimetric	%	4/4	33.1-72.5	60.6 ⁽⁵⁾	18.4	30
Moisture-Karl Fisher	%	NA	NA	NA	NA	NA
pH	units	4/4	9.7-9.8	9.75	---	---
Specific Gravity	--	NA	NA	NA	NA	NA
Swell Test	%	NA	NA	NA	NA	NA
TOC (Total Organic Carbon)	mg/kg	4/4	3500-6400	5175	1380	27
Chloride ⁽³⁾	mg/l	4/4	160-180	168	10	6
Nitrate ⁽³⁾	mg/l	4/4	410-450	430	18	4
% Recovery of Solids ⁽³⁾	%	4/4	18.0-22.2	21	2	9
Phosphorus, Total (as P) ⁽³⁾	mg/l	4/4	33-52	46	9	19
Sulfate ⁽³⁾	mg/l	4/4	210-280	243	33	14
TDS (Total Dissolved Solids) ⁽³⁾	mg/l	4/4	4600-5400	4950	340	7

TABLE 3-13
SUMMARY OF POND SLUDGE CHARACTERIZATION DATA - CLARIFIER
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO
PAGE 2 OF 2

Deliverable (Combined) 224a and 224e
POND SLUDGE AND CLARIFIER SLUDGE
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ANALYSIS	UNITS	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTIONS	MEAN CONCENTRATION ⁽¹⁾	STANDARD DEVIATION ⁽¹⁾	% RELATIVE STANDARD DEVIATION ⁽¹⁾
INORGANICS						
Arsenic	mg/kg	2/4	13.5-21.9	12	7.2	59
Barium	mg/kg	4/4	94.8-217	183	59.2	32
Boron	mg/kg	4/4	420-1380	930	450	48
Cadmium	mg/kg	4/4	2010-4660	3660	1170	32
Chromium	mg/kg	4/4	1180-3190	2480	894	36
Lead	mg/kg	4/4	83-191	161	52	32
Magnesium	mg/kg	4/4	10,400-24,200	20,500	6250	33
Mercury	mg/kg	4/4	5-14	9	5	51
Nickel	mg/kg	4/4	339-902	700	250	36
Potassium	mg/kg	4/4	28,700-67,900	56,500	18,700	33
Selenium	mg/kg	0/4	ND	ND	ND	ND
Silver	mg/kg	4/4	64.6-166	134.9	47.2	35
Sodium	mg/kg	4/4	39,200-96,300	78,900	27,040	34
TCLP LEACH						
Arsenic	ug/l	4/4	224-282	245	26	10
Barium	ug/l	1/4	530	260	180	70
Cadmium	ug/l	4/4	14,800-25,900	20,650	5390	26
Chromium	ug/l	4/4	214-485	362	119	33
Lead	ug/l	1/4	34	20	10	48
Mercury	ug/l	2/4	0.9-4.9	1.5	2.3	153
Nickel	ug/l	4/4	6990-8300	7400	620	8
Selenium	ug/l	0/4	ND	ND	ND	ND
Silver	ug/l	3/4	10-11	8.5	3.7	43
pH	units	4/4	4.6-4.9	4.75	---	---

ND Not Detected
NA Not Analyzed
pCi/g Picocuries per Gram

- (1) Values calculated using 1/2 detection limit for nondetects, based on guidance contained in the Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). Interim Final, December 1989.
- (2) Only compounds with positive detections are listed. The complete list of compounds analyzed is shown in Table 2-3. The complete database is included in Appendix A.
- (3) Following ASTM Leach
- (4) Samples included: CS-001, CS-001D, CS-002, CS-003.
- (5) When the apparent low value of 33.1% from CS-001D is omitted, the average % moisture is 69.8%.

4.0 SUMMARY AND CONCLUSIONS

4.1 Regulatory Compliance

The overall goal of the solar pond/pondcrete project is to produce a stabilized waste form that meets all regulatory requirements for ultimate land disposal. It is anticipated that the stabilized waste will be disposed at the Nevada Test Site (NTS). Since the pond sludges are a mixed waste, Federal and state regulations that apply to the disposal of hazardous waste are applicable. Additional requirements are listed in the "Nevada Test Site Defense Waste Acceptance Criteria, Certification, and Transfer Requirements," NVO-325 (Rev. 1).

The Land Disposal Restrictions (LDRs), 40 CFR Part 268, apply to all hazardous wastes. The LDR regulations specify treatment standards that must be met prior to land disposal of hazardous waste. Treatment standards can be expressed as a concentration limit in an extract of the waste (CCWE), a concentration limit in the waste (CCW), or as a specified technology. The hazardous waste codes associated with the wastes in the ponds are as follows: F001, F002, F003, F005, F006, F007, F009, and D006. Separate LDR standards have been promulgated for wastewaters and nonwastewaters. Wastewaters are defined by 40 CFR 268 as wastes that contain less than 1 percent TOC and 1 percent TSS by weight. Also, for F001-F005 solvent mixtures, wastewaters must contain less than 1 percent TOC or 1 percent total F001-F005 solvents, by weight. The pond and clarifier waters meet these requirements for classification as wastewaters, while the sludges are classified as nonwastewaters. The LDR treatment standards for wastewaters are listed in Table 4-1, and the LDR treatment standards for nonwastewaters are listed in Table 4-2.

The waters and sludges were subjected to the Toxicity Characterization Leaching Procedure (TCLP) and the extract analyzed for heavy metals. This data can be compared to standards to determine whether the material is a RCRA hazardous waste based on the characteristic of toxicity. The regulatory standards for metal constituents for the toxicity characteristic are as follows:

• Arsenic	5.0 mg/l
• Barium	100.0 mg/l
• Cadmium	1.0 mg/l
• Chromium	5.0 mg/l
• Lead	5.0 mg/l
• Mercury	0.2 mg/l
• Selenium	1.0 mg/l
• Silver	5.0 mg/l

The pond water data was compared to the LDR standards for wastewaters (see Table 4-1), and those constituents exceeding their respective standards are listed in Table 4-3. As shown, only waters from Pond 207C and the clarifier exceed LDR standards. The water from Pond 207C contains total cyanide, chromium, lead, and nickel above their respective standards. 2-Butanone is also present at a concentration at which it could potentially leach above its standard in the leachate. The clarifier water contains chromium, lead, and total cyanide at concentrations exceeding their respective standards.

Table 4-4 lists constituents in the pond waters that exceed regulatory standards for the characteristic of toxicity. Only Pond 207C water would be listed as a RCRA hazardous waste based on the toxicity characteristic, for arsenic and chromium.

The pond sludge data was also compared to the LDR Standards for nonwastewaters (see Table 4-2), and the constituents exceeding their respective standards are listed in Table 4-5. Sludges from all the ponds, except 207B-South, contain constituents that exceed LDR standards. Cadmium exceed its standard in sludges from Pond 207A, Pond 207B-North, Pond 207B-Center, Pond 207C, and the clarifier. Nickel exceeded its LDR standard in sludge from Pond 207C and the clarifier.

Table 4-6 lists constituents in the pond sludge extract that exceed regulatory standards for the characteristic of toxicity. Only sludges from Pond 207C and the clarifier had constituents exceeding the toxicity standard, in both cases cadmium.

Table 4-7 presents a summary of the solar pond and clarifier samples that exceed regulatory standards.

4.2 Conclusions

The following conclusions concerning the pond and clarifier sludge and water have been made based on the characterization data available to date:

- Upon completion of the remaining geotechnical analyses and analysis of the composite samples collected with the bulk treatability samples, characterization sampling and analysis should be complete. Evaluation of the available data indicates that the variability of data within each pond is within acceptable range and is consistent with other environmental data. The data are sufficient to characterize the media in each pond in support of regulatory compliance and stabilization process development evaluation.
- The B ponds can be consolidated if so required for treatment. The pond sludges contain similar constituents at concentrations that are amenable to stabilization singularly or in combination. Table 4-8 shows the range of positive detections of selected parameters for pond sludges. This table has been prepared to facilitate comparison of data between ponds.
- As shown on Table 4-7, a regulatory evaluation of both the pond waters and sludges has been performed.
- The presence of total cyanide in the clarifier water and Pond 207C water will require that these waters be treated for the destruction of cyanide as part of the overall treatment process. 2-Butanone in Pond 207C water and PCE in clarifier sludge might also require treatment before stabilization.
- Although numerous constituents that are potential inhibitors to stabilization are present in the sludge, only the high salt content in Pond 207C appears to be of major concern in the development of a stabilization recipe.

TABLE 4-1

**LDR TREATMENT STANDARDS - POND WATERS
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO**

REGULATED HAZARDOUS CONSTITUENT	LDR TREATMENT STANDARD (WASTEWATERS) ⁽¹⁾				
	F001-F003, F005	F006	F007	F009	D006
Acetone	0.05 mg/l ⁽²⁾	NA	NA	NA	NA
n-Butyl Alcohol	5.0 mg/l ⁽²⁾	NA	NA	NA	NA
Carbon Disulfide	1.05 mg/l ⁽²⁾	NA	NA	NA	NA
Carbon Tetrachloride	0.05 mg/l ⁽²⁾	NA	NA	NA	NA
Chlorobenzene	0.15 mg/l ⁽²⁾	NA	NA	NA	NA
Cyclohexanone	0.125 mg/l ⁽²⁾	NA	NA	NA	NA
1,2-Dichlorobenzene	0.65 mg/l ⁽²⁾	NA	NA	NA	NA
Ethyl Acetate	0.05 mg/l ⁽²⁾	NA	NA	NA	NA
Ethylbenzene	0.05 mg/l ⁽²⁾	NA	NA	NA	NA
Ethyl Ether	0.05 mg/l ⁽²⁾	NA	NA	NA	NA
Isobutanol	5.0 mg/l ⁽²⁾	NA	NA	NA	NA
Methanol	0.25 mg/l ⁽²⁾	NA	NA	NA	NA
Methylene Chloride	0.20 mg/l ⁽²⁾	NA	NA	NA	NA
2-Butanone (MEK)	0.05 mg/l ⁽²⁾	NA	NA	NA	NA
4-Methyl-2-pentanone (MIBK)	0.05 mg/l ⁽²⁾	NA	NA	NA	NA
Pyridine	1.12 mg/l ⁽²⁾	NA	NA	NA	NA
Tetrachloroethene (PCE)	0.079 mg/l ⁽²⁾	NA	NA	NA	NA
Toluene	1.12 mg/l ⁽²⁾	NA	NA	NA	NA
1,1,1-Trichloroethane	1.05 mg/l ⁽²⁾	NA	NA	NA	NA
1,1,2-Trichloro-1,2,2- trifluoroethane	1.05 mg/l ⁽²⁾	NA	NA	NA	NA
Trichloroethene (TCE)	0.062 mg/l ⁽²⁾	NA	NA	NA	NA
Trichlorotrifluoromethane	0.05 mg/l ⁽²⁾	NA	NA	NA	NA
Xylene	0.05 mg/l ⁽²⁾	NA	NA	NA	NA

TABLE 4-1
 LDR TREATMENT STANDARDS - POND WATERS
 SOLAR POND/PONDCRETE PROJECT
 ROCKY FLATS PLANT, COLORADO
 PAGE 2 OF 2

REGULATED HAZARDOUS CONSTITUENT	LDR TREATMENT STANDARD (WASTEWATERS) ⁽¹⁾				
	F001-F003, F005	F006	F007	F009	D006
1,1,2-Trichloroethane	0.03 mg/l ⁽³⁾	NA	NA	NA	NA
Benzene	0.07 mg/l ⁽³⁾	NA	NA	NA	NA
2-Nitropropane	(WETOX or CHOXD) followed by CARBN; or INCIN ⁽⁴⁾	NA	NA	NA	NA
2-Ethoxyethanol	BIODG OR INCIN ⁽⁴⁾	NA	NA	NA	NA
Cyanides (Total)	NA	1.2 mg/l ⁽³⁾	1.9 mg/l ⁽³⁾	1.9 mg/l ⁽³⁾	NA
Cyanides (Amenable)	NA	0.86 mg/l ⁽³⁾	0.1 mg/l ⁽³⁾	0.1 mg/l ⁽³⁾	NA
Cadmium	NA	1.6 mg/l ⁽³⁾	NA	NA	1.0 mg/l ⁽³⁾
Chromium (Total)	NA	0.32 mg/l ⁽³⁾	0.32 mg/l ⁽³⁾	0.32 mg/l ⁽³⁾	NA
Lead	NA	0.04 mg/l ⁽³⁾	0.04 mg/l ⁽³⁾	0.04 mg/l ⁽³⁾	NA
Nickel	NA	0.44 mg/l ⁽³⁾	0.44 mg/l ⁽³⁾	0.44 mg/l ⁽³⁾	NA

- (1) Wastewaters are defined by 40 CFR 268.2(f) as wastes that contain less than 1% TOC and 1% TSS by weight. Also, for F001-F005 solvent mixtures, wastewaters must contain less than 1% TOC or 1% total F001-F005 solvents, by weight.
- (2) Concentration in waste extract (CCWE)
- (3) Concentration in waste (CCW)
- (4) Specified treatment technology

LDR - Land Disposal Restrictions, 40 CFR Part 268
 NA - Not applicable
 WETOX - Wet air oxidation
 CHOXD - Chemical or electrolytic oxidation
 CARBN - Carbon adsorption
 INCIN - Incineration
 BIODG - Biodegradation

ppm
TABLE 4-2

**LDR TREATMENT STANDARDS - POND SLUDGES
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO**

REGULATED HAZARDOUS CONSTITUENT	LDR TREATMENT STANDARD (NONWASTEWATERS) ⁽¹⁾		
	F001-F003, F005	F006, F007, F009	D006
Acetone	0.59 mg/l ⁽²⁾	NA	NA
n-Butyl Alcohol	5.0 mg/l ⁽²⁾	NA	NA
Carbon Disulfide	4.81 mg/l ⁽²⁾	NA	NA
Carbon Tetrachloride	0.96 mg/l ⁽²⁾	NA	NA
Chlorobenzene	0.05 mg/l ⁽²⁾	NA	NA
Cyclohexanone	0.75 mg/l ⁽²⁾	NA	NA
1,2-Dichlorobenzene	0.125 mg/l ⁽²⁾	NA	NA
Ethyl Acetate	0.75 mg/l ⁽²⁾	NA	NA
Ethylbenzene	0.053 mg/l ⁽²⁾	NA	NA
Ethyl Ether	0.75 mg/l ⁽²⁾	NA	NA
Isobutanol	5.0 mg/l ⁽²⁾	NA	NA
Methanol	0.75 mg/l ⁽²⁾	NA	NA
Methylene Chloride	0.96 mg/l ⁽²⁾	NA	NA
2-Butanone (MEK)	0.75 mg/l ⁽²⁾	NA	NA
4-Methyl-2-pentanone (MIBK)	0.33 mg/l ⁽²⁾	NA	NA
Pyridine	0.33 mg/l ⁽²⁾	NA	NA
Tetrachloroethene (PCE)	0.05 mg/l ⁽²⁾ ✓	NA	NA
Toluene	0.33 mg/l ⁽²⁾	NA	NA
1,1,1-Trichloroethane	0.41 mg/l ⁽²⁾	NA	NA
1,1,2-Trichloro-1,2,2- trifluoroethane	0.96 mg/l ⁽²⁾	NA	NA
Trichloroethene (TCE)	0.91 mg/l ⁽²⁾	NA	NA
Trichlorotrifluoromethane	0.96 mg/l ⁽²⁾	NA	NA
Xylene	0.15 mg/l ⁽²⁾	NA	NA
1,1,2-Trichloroethane	7.6 mg/kg ⁽³⁾	NA	NA
Benzene	3.7 mg/kg ⁽³⁾	NA	NA
2-Nitropropane	Incineration ⁽⁴⁾	NA	NA
2-Ethoxyethanol	Incineration ⁽⁴⁾	NA	NA
Cyanides (Total)	NA	590 mg/kg ⁽³⁾	NA
Cyanides (Amenable)	NA	30 mg/kg ⁽³⁾	NA
Cadmium	NA	0.066 mg/l ⁽²⁾	1.0 mg/l ⁽²⁾
Chromium (Total)	NA	5.2 mg/l ⁽²⁾	NA
Lead	NA	0.51 mg/l ⁽²⁾	NA
Nickel	NA	0.32 mg/l ⁽²⁾	NA
Silver	NA	0.072 mg/l ⁽²⁾	NA

TABLE 4-2
LDR TREATMENT STANDARDS - POND SLUDGES
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS FACILITY
PAGE 2 OF 2

- (1) Wastewaters are defined by 40 CFR 268.2(f) as wastes that contain less than 1% TOC and 1% TSS by weight. Also, for F001-F005 solvent mixtures, wastewaters must contain less than 1% TOC or 1% total F001-F005 solvents, by weight.
 - (2) Concentration in waste extract (CCWE)
 - (3) Concentration in waste (CCW)
 - (4) Specified treatment technology
- LDR - Land Disposal Restrictions, 40 CFR Part 268
NA - Not applicable

TABLE 4-3

SOLAR POND WATER SAMPLES EXCEEDING LDR STANDARDS
SOLAR POND/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO

POND	CONSTITUENT	LDR STANDARD (ug/l)	POND WATER CONCENTRATION (ug/l)	SAMPLE NUMBER
207A	None			
207B-North	None			
207B-Center	None			
207B-South	None			
207C	2-Butanone	50 ⁽¹⁾	110	PW207C-NE
			77	PW207C-NE-D
			110	PW207C-NW
			79	PW207C-SW
	Cyanide-Total	1200	3300 20,000 4000 7100 4100	PW-207C-NE PW-207C-NE-D PW-207C-NW PW-207C-SE PW-207C-SW
Chromium	320	3580	PW207C-NE	
		3400	PW207C-NE-D	
		3370	PW207C-NW	
		3320	PW207C-SE	
		3940	PW207C-SW	
Lead	40	300	PW207C-NE	
		300	PW207C-NE-D	
Nickel	440	2610	PW207C-NE	
		2920	PW207C-NE-D	
		2560	PW207C-NW	
		2540	PW207C-SE	
		2790	PW207-SW	
Clarifier	Chromium	320	825	CW-001-D
	Lead	40	46	CW-001-D
	Cyanide-Total	1200	2400	CW-001
2700			CW-001-D	
2800			CW-002	
3000			CW-003	

LDR - Land Disposal Restrictions, 40 CFR, Part 268.

(1) The LDR standard for 2-butanone is based on the CCWE concentration. Only the CCW concentration for pond waters was determined. However, for waters with less than 0.5% solids, the TCLP method includes analysis of the water following filtration, and does not include the Zero Headspace Extraction procedure. Therefore, the CCWE concentration would be equal to the CCW concentration if all the 2-butanone was soluble. This conservative assumption is the basis for listing 2-butanone on this table.

TABLE 4-4

SOLAR POND WATER SAMPLES EXCEEDING TCLP STANDARDS
 SOLAR POND/PONDCRETE PROJECT
 ROCKY FLATS PLANT, COLORADO

POND	CONSTITUENT	TCLP STANDARD ⁽¹⁾ (ug/l)	TCLP EXTRACT CONCENTRATION ⁽²⁾ (ug/l)	SAMPLE NUMBER
207A	None			
207B-North	None			
207B-Center	None			
207B-South	None			
207C	Arsenic	5000	5510	PW207C-NE
	Chromium	5000	9160	PW207C-NE-D
Clarifier	None			

TCLP - Toxicity Characteristic Leaching Procedure.

- (1) Waste is a RCRA hazardous waste based on the characteristic of toxicity if the TCLP standard is exceeded.
- (2) The TCLP method specifies that for liquids with less than 0.5% solids, the liquid should be filtered through a 0.6-0.8 um glass fiber filter to remove the solids, and then analyzed without extraction.

TABLE 4-5

SOLAR POND SLUDGE SAMPLES EXCEEDING LDR STANDARDS
 SOLAR POND/PONDCRETE PROJECT
 ROCKY FLATS PLANT, COLORADO

POND	CONSTITUENT	LDR STANDARD (ug/l)	POND SLUDGE TCLP EXTRACT CONCENTRATION (ug/l)	SAMPLE NUMBER
207A	Cadmium	66	485	PS207A-NE
207B-North	Cadmium	66	67 104 67	PS207BN-NW PS207BN-SE PS207BN-SW
207B-Center	Cadmium	66	153 143 133 114	PS207BC-NE PS207BC-NW PS207BC-SE PS207BC-SW
207B-South	None			
207C	Cadmium	66	945 5230 475 342 444	PS207C-C PS207C-CB PS207C-NW PS207C-NW-D PS207C-SW
	Nickel	320	840 2140 563 624 765	PS207C-C PS207C-CB PS207C-NW PS207C-NW-D PS207C-SW
Clarifier	Cadmium	66	14,800 17,400 25,900 24,500	CS-001 CS-001-D CS-002 CS-003
	Nickel	320	7010 6990 8300 7300	CS-001 CS-001-D CS-002 CS-003

LRD - Land Disposal Restrictions, 40 CFR, Part 268

TABLE 4-6

SOLAR POND SLUDGE SAMPLES EXCEEDING TCLP STANDARDS
 SOLAR POND/PONDCRETE PROJECT
 ROCKY FLATS PLANT, COLORADO

POND	CONSTITUENT	TCLP STANDARD (ug/l)	POND SLUDGE TCLP EXTRACT CONCENTRATION (ug/l)	SAMPLE NUMBER
207A	None	---	---	---
207B-North	None	---	---	---
207B-Center	None	---	---	---
207B-South	None	---	---	---
207C	Cadmium	1000	5230	PS207C-C3
Clarifier	Cadmium	1000	14,800 17,400 25,900 24,500	CS-001 CS-001-D CS-002 CS-003

TCLP - Toxicity Characteristic Leaching Procedure
 --- - No reading

TABLE 4-7

SUMMARY OF SOLAR POND SAMPLES EXCEEDING REGULATORY STANDARDS
 SOLAR POND/PONDCRETE PROJECT
 ROCKY FLATS PLANT, COLORADO

MEDIA	POND	LDR STANDARD EXCEEDED?	TCLP STANDARD EXCEEDED? ⁽¹⁾
Water	207A	No	No
	207B-North	No	No
	207B-Center	No	No
	207B-South	No	No
	207C	Yes (2-Butanone, Cyanide- Total, Chromium, Lead, Nickel)	Yes (Arsenic, Chromium)
	Clarifier	Yes (Cyanide-Total, Chromium, Lead)	No
Sludge	207A	Yes (Cadmium)	No
	207B-North	Yes (Cadmium)	No
	207B-Center	Yes (Cadmium)	No
	207B-South	No	No
	207C	Yes (Cadmium, Nickel)	Yes (Cadmium)
	Clarifier	Yes (Cadmium, Nickel) ⁽²⁾	Yes (Cadmium)

(1) Waste is a RCRA hazardous waste based on the characteristic of toxicity.

(2) Tetrachloroethene (PCE) was detected in one clarifier sludge sample at a concentration (1000 ug/kg) that is greater than or equal to 20 times the CCWE standard for PCE (50 ug/l), which indicates a potential for PCE to exceed the CCWE standard following the TCLP Zero Headspace Extraction.

TABLE 4-8
RANGE OF POSITIVE DETECTIONS OF SELECTED PARAMETERS FOR POND SLUDGE
POND SLUDGE/PONDCRETE PROJECT
ROCKY FLATS PLANT, COLORADO

Analysis	Units	Pond Sludge					
		207A	207B-North	207B-Center	207B-South	Clarifier	207C
Arsenic	mg/kg	40.2	ND	ND	59.7	13.5-21.9	18-37
Barium	mg/kg	210	89.1-116	46.5-120	62.2-134	948-217	13.2-61.5
Boron	mg/kg	84.3	12.8	151	336-349	420-1380	455-781
Cadmium	mg/kg	1300	6.7-8.5	46.5-84.4	7.4-30.4	2010-4660	27.3-665
Chromium	mg/kg	658	7.9-33.3	48.5-170	25.2-51.9	1180-3190	252-960
Lead	mg/kg	89	13.3-21.3	ND	61	83-191	7.9-38.5
Magnesium	mg/kg	11,400	3270-4160	7190-19,800	5140-15,200	10,400-24,200	1340-6250
Mercury	mg/kg	ND	0.7-0.8	5.5	5	5-14	0.7-1.0
Nickel	mg/kg	102	7.1-9.5	ND	ND	339-902	17.4-146
Potassium	mg/kg	ND	ND	10,900-15,400	8910	28,700-67,900	64,500-87,200
Selenium	mg/kg	ND	ND	ND	ND	ND	ND
Silver	mg/kg	ND	ND	ND	ND	64.6-166	35.1-73.6
Sodium	mg/kg	14,500	ND	35,200-54,200	30,000-44,600	39,200-96,300	139,000-193,000
CN-Total	mg/kg	1.6	ND	0.34-1.3	0.46-4.1	21-190	13-170
Moisture (Grav.)	%	87.3	71.8-76.8	89.9-93.4	88.3-92.3	33.1-72.5	34.8-48.8
TOC	mg/kg	14,000	3000-3400	5500-8800	6800-11,000	3500-6400	6400-9000
Ammonia	mg/kg	36	9.8-35	25-58	17-34	28-84	ND
Liquid Limit	-	NA	71-75	77-85	NA	NA	NA
Plastic Index	-	NA	34-40	20-40	NA	NA	NA
Plastic Limit	-	NA	33-37	45-65	NA	NA	NA
Swell Test	%	NA	0-10	60-70	NA	NA	NA

NA Not Analyzed
ND Not Detected

Only positive detections are included in this table.

REFERENCES

1. Conner, Jesse R. 1990. Chemical Fixation and Solidification of Hazardous Wastes. Van Nostrand Reinhold, New York, NY.
2. HALLIBURTON NUS. July, 1991. Deliverable (combined) 211A, 211E, 221A and 221E, Pond Sludge Sampling Plan, Clarifier Sludge Sampling Plan, Pond Sludge Analysis Plan and Clarifier Sludge Analysis Plan.
3. HALLIBURTON NUS. September 27, 1991. Rev. 2. Deliverable (combined) 212A and 212E, Pond Sludge Sampling Procedure and Clarifier Sludge Sampling Procedure.
4. EPA (U.S. Environmental Protection Agency). June 1988. Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses.
5. EPA (U.S. Environmental Protection Agency). February 1988. Laboratory Data Validation Functional Guidelines For Evaluating Organic Analyses.
6. EPA (U.S. Environmental Protection Agency). Land Disposal Restrictions. 40 Federal Registry Part 268.

APPENDIX A
ANALYTICAL DATABASE

GLOSSARY

Data Qualifier Definitions

For the purposes of this document the following code letters and associated definitions are provided.

- U - The material was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
- J - The associated numerical value is an estimated quantity.
- R - The data are unusable (compound may or may not be present). Resampling and reanalysis is necessary for verification.
- UJ - The material was analyzed for but was not detected. The sample quantitation limit is an estimated quantity.

SAMPLE ID NUMBER:
SAMPLE TYPE:

PW207BC-NE

PW207BC-NW

PW207BC-SE

PW207BC-SW

PW207BC-T
TRIP BLANK

COMPOUND

***** VOLATILES *****

1,1,1-TRICHLOROETHANE	5U ug/L				
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5U ug/L				
1,1,2-TRICHLOROETHANE	5U ug/L				
1,1-DICHLOROETHENE	5U ug/L				
2-BUTANONE	10U ug/L				
4-METHYL-2-PENTANONE	10UJ ug/L				
ACETONE	10UJ ug/L	49U ug/L	9U ug/L	10UJ ug/L	10UJ ug/L
BENZENE	5U ug/L				
CARBON DISULFIDE	5UJ ug/L				
CARBON TETRACHLORIDE	5U ug/L				
CHLOROBENZENE	5U ug/L				
ETHYL ACETATE	5U ug/L				
ETHYL ETHER	5U ug/L				
ETHYLBENZENE	5U ug/L				
METHYLENE CHLORIDE	8U ug/L	11U ug/L	4U ug/L	4U ug/L	5U ug/L
TETRACHLOROETHENE	5U ug/L				
TOLUENE	5U ug/L	5U ug/L	4U ug/L	5U ug/L	4J ug/L
TRICHLOROETHENE	5U ug/L				
TRICHLOROFLUOROMETHANE	5U ug/L				
XYLENE (total)	3U ug/L	5U ug/L	5U ug/L	5U ug/L	3J ug/L

***** SEMI-VOLATILES *****

1,2,4-TRICHLOROBENZENE	10U ug/L				
1,2-DICHLOROBENZENE	10U ug/L				
1,4-DICHLOROBENZENE	10U ug/L				
2,4-DINITROTOLUENE	10U ug/L				
2-NITROPROPANE	10U ug/L				
ACENAPHTHENE	10U ug/L				
CYCLOHEXANONE	10U ug/L				
N-NITROSO-DI-N-PROPYLAMINE	10U ug/L				
PYRENE	10U ug/L				
PYRIDINE	10UJ ug/L				

***** ALCOHOLS *****

2-ETHOXYETHANOL	50U mg/L				
ISOBUTANOL	1U mg/L				
METHANOL	1U mg/L				
N-BUTYL ALCOHOL	1U mg/L				

SAMPLE ID NUMBER:
SAMPLE TYPE:

PW207BC-NE PW207BC-NW PW207BC-SE PW207BC-SW PW207BC-T
TRIP BLANK

***** INORGANICS *****

ARSENIC	319	ug/L	330	ug/L	319	ug/L	314	ug/L
BARIUM	68.0	ug/L	69.0	ug/L	70.0	ug/L	68.0	ug/L
BORON	3490J	ug/L	3470J	ug/L	3530J	ug/L	3440J	ug/L
CADMIUM	5.0U	ug/L	5.0U	ug/L	5.0U	ug/L	5.0U	ug/L
CALCIUM	26400	ug/L	27300	ug/L	27700	ug/L	26500	ug/L
CHROMIUM	31.0J	ug/L	22.0J	ug/L	26.0J	ug/L	32.0J	ug/L
LEAD	30.0U	ug/L	30.0U	ug/L	30.0U	ug/L	30.0U	ug/L
MAGNESIUM	218000	ug/L	218000	ug/L	220000	ug/L	216000	ug/L
MERCURY	0.2U	ug/L	0.2U	ug/L	0.2U	ug/L	0.2U	ug/L
NICKEL	28.0	ug/L	31.0	ug/L	28.0	ug/L	29.0	ug/L
POTASSIUM	807000	ug/L	794000	ug/L	806000	ug/L	791000	ug/L
SELENIUM	81.0	ug/L	60.0U	ug/L	60.0U	ug/L	60.0U	ug/L
SILVER	20.0U	ug/L	11.0U	ug/L	10.0U	ug/L	6.0U	ug/L
SODIUM	4060000	ug/L	3250000	ug/L	2060000	ug/L	3220000	ug/L

***** MISCELLANEOUS *****

ALKALINITY (Methyl Orange)	1400	mg/L	1400	mg/L	1400	mg/L	1400	mg/L
ALKALINITY (Phenolphthalein)	230	mg/L	240	mg/L	240	mg/L	230	mg/L
AMMONIA	0.3	mg/L	0.2	mg/L	0.4	mg/L	0.3	mg/L
CHLORIDE	1000U	mg/L	1000U	mg/L	1000U	mg/L	1000U	mg/L
CYANIDE - AMENABLE	-0.90	mg/L	-0.85	mg/L	-5.3	mg/L	-0.83	mg/L
CYANIDE - TOTAL	0.34J	mg/L	0.34J	mg/L	0.57J	mg/L	0.34J	mg/L
GROSS ALPHA	2100+-300JpCi/L		2000+-300JpCi/L		1800+-200JpCi/L		2300+-300JpCi/L	
GROSS BETA	2700+-300JpCi/L		2800+-300JpCi/L		3000+-300JpCi/L		2900+-300JpCi/L	
NITRATE	1900	mg/L	2100	mg/L	1900	mg/L	1900	mg/L
pH	9.1		9.2		9.1		9.1	
PHOSPHORUS, TOTAL (AS P)	4.2J	mg/L	4.2J	mg/L	4.2J	mg/L	4.2J	mg/L
SPECIFIC GRAVITY	1.016		0.016		1.016		1.018	
SULFATE (AS SO4)	740	mg/L	860	mg/L	1000	mg/L	920	mg/L
TDS (Total Dissolved Solids)	16000	mg/L	16000	mg/L	16000	mg/L	16000	mg/L
TOC (Total Organic Carbon)	110	mg/L	320	mg/L	93	mg/L	96	mg/L
TSS (Total Suspended Solids)	11J	mg/L	10UJ	mg/L	16J	mg/L	10UJ	mg/L

***** TCLP LEACH *****

ARSENIC	213J	ug/L	180J	ug/L	238J	ug/L	251J	ug/L
BARIUM	214	ug/L	161U	ug/L	258	ug/L	193U	ug/L
CADMIUM	5.0U	ug/L	5.0U	ug/L	5.0U	ug/L	5.0	ug/L
CHROMIUM	27.0	ug/L	16.0U	ug/L	24.0	ug/L	20.0	ug/L
LEAD	30.0U	ug/L	30.0U	ug/L	30.0U	ug/L	30.0U	ug/L
MERCURY	0.2U	ug/L	0.2U	ug/L	0.2U	ug/L	0.2U	ug/L
NICKEL	23.0	ug/L	22.0U	ug/L	21.0	ug/L	30.0	ug/L
pH	9.1		9.2		9.1		9.1	
SELENIUM	60.0UJ	ug/L	60.0UJ	ug/L	60.0UJ	ug/L	60.0UJ	ug/L
SILVER	6.0UJ	ug/L	6.0UJ	ug/L	6.0U	ug/L	6.0UJ	ug/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

PW207BN-NE

PW207BN-NW

PW207BN-SE

PW207BN-SW

PW207BN-T
TRIP BLANK

COMPOUND

***** VOLATILES *****

1,1,1-TRICHLOROETHANE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
1,1,2-TRICHLOROETHANE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
1,1-DICHLOROETHENE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
2-BUTANONE	10U ug/L	10U ug/L	10U ug/L	10U ug/L	10U ug/L
4-METHYL-2-PENTANONE	10U ug/L	10U ug/L	10U ug/L	10UJ ug/L	10UJ ug/L
ACETONE	10U ug/L	10U ug/L	10U ug/L	10U ug/L	10UJ ug/L
BENZENE	5U ug/L	5U ug/L	5U ug/L	5UJ ug/L	5U ug/L
CARBON DISULFIDE	5U ug/L	5U ug/L	5U ug/L	5UJ ug/L	5UJ ug/L
CARBON TETRACHLORIDE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
CHLOROBENZENE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
ETHYL ACETATE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
ETHYL ETHER	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
ETHYLBENZENE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
METHYLENE CHLORIDE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
TETRACHLOROETHENE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
TOLUENE	4U ug/L	12U ug/L	8U ug/L	8U ug/L	5U ug/L
TRICHLOROETHENE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
TRICHLOROFLUOROMETHANE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
XYLENE (total)	5U ug/L	5U ug/L	5U ug/L	4U ug/L	4J ug/L

***** SEMI-VOLATILES *****

1,2,4-TRICHLOROBENZENE	10U ug/L	10U ug/L	10U ug/L	10U ug/L	
1,2-DICHLOROBENZENE	10U ug/L	10U ug/L	10U ug/L	10U ug/L	
1,4-DICHLOROBENZENE	10U ug/L	10U ug/L	10U ug/L	10U ug/L	
2,4-DINITROTOLUENE	10U ug/L	10U ug/L	10U ug/L	10U ug/L	
2-NITROPROPANE	10U ug/L	10U ug/L	10U ug/L	10U ug/L	
ACENAPHTHENE	10U ug/L	10U ug/L	10U ug/L	10U ug/L	
CYCLOHEXANONE	10U ug/L	10U ug/L	10U ug/L	10U ug/L	
N-NITROSO-DI-N-PROPYLAMINE	10U ug/L	10U ug/L	10U ug/L	10U ug/L	
PYRENE	10U ug/L	10U ug/L	10U ug/L	10U ug/L	
PYRIDINE	10UJ ug/L	10UJ ug/L	10UJ ug/L	10UJ ug/L	

***** ALCOHOLS *****

2-ETHOXYETHANOL	50U mg/L	50U mg/L	50U mg/L	50U mg/L	
ISOBUTANOL	1U mg/L	1U mg/L	1U mg/L	1U mg/L	
METHANOL	1U mg/L	1U mg/L	1U mg/L	1U mg/L	
N-BUTYL ALCOHOL	1U mg/L	1U mg/L	1U mg/L	1U mg/L	

SAMPLE ID NUMBER:
 SAMPLE TYPE:

PW207BN-NE PW207BN-NW PW207BN-SE PW207BN-SW PW207BN-T
 TRIP BLANK

***** INORGANICS *****

ARSENIC	40.0U	ug/L	63.0	ug/L	60.0	ug/L	63.0	ug/L
BARIIUM	117	ug/L	118	ug/L	118	ug/L	120	ug/L
BORON	158J	ug/L	151J	ug/L	149J	ug/L	171J	ug/L
CADMIUM	5.0U	ug/L	5.0U	ug/L	5.0U	ug/L	5.0U	ug/L
CALCIUM	138000	ug/L	137000	ug/L	137000	ug/L	140000	ug/L
CHROMIUM	16.0J	ug/L	10.0UJ	ug/L	10.0J	ug/L	10.0UJ	ug/L
LEAD	30.0U	ug/L	30.0U	ug/L	30.0U	ug/L	30.0U	ug/L
MAGNESIUM	64800	ug/L	65100	ug/L	65000	ug/L	65900	ug/L
MERCURY	0.2U	ug/L	0.2U	ug/L	0.2U	ug/L	0.2U	ug/L
NICKEL	20.0U	ug/L	20.0U	ug/L	20.0U	ug/L	20.0U	ug/L
POTASSIUM	55700	ug/L	55800	ug/L	55700	ug/L	56400	ug/L
SELENIUM	60.0U	ug/L	60.0U	ug/L	76.0	ug/L	60.0U	ug/L
SILVER	6.0U	ug/L	7.0U	ug/L	8.0U	ug/L	8.0U	ug/L
SODIUM	254000	ug/L	271000	ug/L	312000	ug/L	345000	ug/L

***** MISCELLANEOUS *****

ALKALINITY (Methyl Orange)	110	mg/L	110	mg/L	110	mg/L	110	mg/L
ALKALINITY (Phenolphthalein)	2	mg/L	2	mg/L	3	mg/L	1U	mg/L
AMMONIA	0.3	mg/L	0.3	mg/L	0.3	mg/L	0.5	mg/L
CHLORIDE	96J	mg/L	98J	mg/L	100J	mg/L	99J	mg/L
CYANIDE - AMENABLE	-0.013	mg/L	0.014	mg/L	-0.008	mg/L	-0.017	mg/L
CYANIDE - TOTAL	0.031J	mg/L	0.043J	mg/L	0.016J	mg/L	0.031J	mg/L
GROSS ALPHA	42+/-12J	pCi/L	40+/-11J	pCi/L	52+/-12J	pCi/L	52+/-12J	pCi/L
GROSS BETA	75+/-11J	pCi/L	290+/-30J	pCi/L	510+/-60J	pCi/L	290+/-30J	pCi/L
NITRATE	320	mg/L	320	mg/L	310	mg/L	330	mg/L
pH	8.4		8.5		8.5		8.3	
PHOSPHORUS, TOTAL (AS P)	0.06J	mg/L	0.08J	mg/L	0.02J	mg/L	0.04J	mg/L
SPECIFIC GRAVITY	1.008		1.008		1.008		1.008	
SULFATE (AS SO4)	160	mg/L	120	mg/L	120	mg/L	120	mg/L
TDS (Total Dissolved Solids)	2800	mg/L	2800	mg/L	2800	mg/L	2700	mg/L
TOC (Total Organic Carbon)	36	mg/L	37	mg/L	35	mg/L	36	mg/L
TSS (Total Suspended Solids)	10UJ	mg/L	10UJ	mg/L	15J	mg/L	10UJ	mg/L

***** TCLP LEACH *****

ARSENIC	R		R		R		R	
BARIIUM	216	ug/L	215	ug/L	221	ug/L	230	ug/L
CADMIUM	5.0U	ug/L	5.0U	ug/L	5.0U	ug/L	5.0U	ug/L
CHROMIUM	16.0	ug/L	10.0U	ug/L	10.0U	ug/L	10.0U	ug/L
LEAD	30.0U	ug/L	30.0U	ug/L	30.0U	ug/L	30.0U	ug/L
MERCURY	0.2U	ug/L	0.2U	ug/L	0.2U	ug/L	0.2U	ug/L
NICKEL	20.0U	ug/L	20.0U	ug/L	20.0U	ug/L	20.0U	ug/L
pH	8.4		8.5		8.5		8.3	
SELENIUM	60.0UJ	ug/L	60.0UJ	ug/L	60.0UJ	ug/L	60.0UJ	ug/L
SILVER	6.0UJ	ug/L	6.0UJ	ug/L	6.0UJ	ug/L	6.0UJ	ug/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

PW207BS-B
RINSATE BLANK

PW207BS-F
FIELD BLANK

PW207BS-NE

PW207BS-NW

PW207BS-NW-D
DUPLICATE

PW207BS-SE

COMPOUND

***** VOLATILES *****

1,1,1-TRICHLOROETHANE	5U ug/L	5U ug/L	5U ug/L	5UJ ug/L	5U ug/L	5U ug/L
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5UJ ug/L	5UJ ug/L	5UJ ug/L	5UJ ug/L	5U ug/L	5UJ ug/L
1,1,2-TRICHLOROETHANE	5U ug/L	5U ug/L	5U ug/L	5UJ ug/L	5U ug/L	5U ug/L
1,1-DICHLOROETHENE	5U ug/L	5U ug/L	5U ug/L	5UJ ug/L	5U ug/L	5U ug/L
2-BUTANONE	10U ug/L	10U ug/L	10U ug/L	10UJ ug/L	10U ug/L	10U ug/L
4-METHYL-2-PENTANONE	10U ug/L	10U ug/L	10U ug/L	10UJ ug/L	10UJ ug/L	10U ug/L
ACETONE	11U ug/L	22U ug/L	10U ug/L	14U ug/L	8U ug/L	6U ug/L
BENZENE	5U ug/L	5U ug/L	5U ug/L	5UJ ug/L	5U ug/L	5U ug/L
CARBON DISULFIDE	5U ug/L	5U ug/L	5U ug/L	5UJ ug/L	5UJ ug/L	5U ug/L
CARBON TETRACHLORIDE	5U ug/L	5U ug/L	5U ug/L	5UJ ug/L	5U ug/L	5U ug/L
CHLOROBENZENE	5U ug/L	5U ug/L	5U ug/L	5UJ ug/L	5U ug/L	5U ug/L
ETHYL ACETATE	5U ug/L	5U ug/L	5U ug/L	5UJ ug/L	5U ug/L	5U ug/L
ETHYL ETHER	5U ug/L	5U ug/L	5U ug/L	5UJ ug/L	5U ug/L	5U ug/L
ETHYLBENZENE	5U ug/L	5U ug/L	5U ug/L	5UJ ug/L	5U ug/L	5U ug/L
METHYLENE CHLORIDE	5U ug/L	5U ug/L	5U ug/L	5UJ ug/L	5U ug/L	5U ug/L
TETRACHLOROETHENE	5U ug/L	5U ug/L	5U ug/L	5UJ ug/L	5U ug/L	5U ug/L
TOLUENE	5U ug/L	5U ug/L	5U ug/L	5UJ ug/L	5U ug/L	5U ug/L
TRICHLOROETHENE	5U ug/L	5U ug/L	5U ug/L	5UJ ug/L	5U ug/L	5U ug/L
TRICHLOROFLUOROMETHANE	5UJ ug/L	5UJ ug/L	5UJ ug/L	5UJ ug/L	5U ug/L	5UJ ug/L
XYLENE (total)	5U ug/L	5U ug/L	5U ug/L	5UJ ug/L	5U ug/L	5U ug/L

***** SEMI-VOLATILES *****

1,2,4-TRICHLOROBENZENE	10U ug/L					
1,2-DICHLOROBENZENE	10U ug/L					
1,4-DICHLOROBENZENE	10U ug/L					
2,4-DINITROTOLUENE	10U ug/L					
2-NITROPROPANE	10U ug/L					
ACENAPHTHENE	10U ug/L					
CYCLOHEXANONE	10U ug/L					
N-NITROSO-DI-N-PROPYLAMINE	10U ug/L					
PYRENE	10UJ ug/L	10UJ ug/L	10U ug/L	10U ug/L	10U ug/L	10U ug/L
PYRIDINE	10UJ ug/L					

***** ALCOHOLS *****

2-ETHOXYETHANOL	50U mg/L	50U mg/L	50U mg/L	50U mg/L	50UJ mg/L	50U mg/L
ISOBUTANOL	1U mg/L	1U mg/L				
METHANOL	1U mg/L	1U mg/L				
N-BUTYL ALCOHOL	1U mg/L	1U mg/L				

SAMPLE ID NUMBER:
 SAMPLE TYPE:

PW207BS-B PW207BS-F PW207BS-NE PW207BS-NW PW207BS-NW-D PW207BS-SE
 RINSATE BLANK FIELD BLANK DUPLICATE

***** INORGANICS *****

ARSENIC	40.0U ug/L	40.0U ug/L	276 ug/L	274 ug/L	263 ug/L	264 ug/L
BARIUM	3.0U ug/L	3.0U ug/L	118 ug/L	115 ug/L	118 ug/L	110 ug/L
BORON	13.0U ug/L	14.0U ug/L	2770J ug/L	2730J ug/L	2770J ug/L	2800J ug/L
CADMIUM	5.0U ug/L	5.0U ug/L	5.0U ug/L	5.0U ug/L	5.0U ug/L	5.0U ug/L
CALCIUM	20.0U ug/L	20.0U ug/L	52000 ug/L	52200 ug/L	52700 ug/L	52400 ug/L
CHROMIUM	10.0UJ ug/L	10.0UJ ug/L	19.0J ug/L	10.0UJ ug/L	21.0J ug/L	10.0UJ ug/L
LEAD	30.0U ug/L	30.0U ug/L	30.0U ug/L	30.0U ug/L	30.0U ug/L	30.0U ug/L
MAGNESIUM	41.0 ug/L	20.0U ug/L	188000 ug/L	187000 ug/L	190000 ug/L	188000 ug/L
MERCURY	0.2U ug/L	0.2U ug/L	0.2U ug/L	0.2U ug/L	0.2U ug/L	0.2U ug/L
NICKEL	20.0U ug/L	20.0U ug/L	20.0U ug/L	20.0U ug/L	32.0 ug/L	24.0 ug/L
POTASSIUM	1000U ug/L	564U ug/L	696000 ug/L	693000 ug/L	694000 ug/L	684000 ug/L
SELENIUM	60.0U ug/L	60.0U ug/L	60.0U ug/L	60.0U ug/L	60.0U ug/L	60.0U ug/L
SILVER	7.0U ug/L	6.0U ug/L	9.0U ug/L	17.0U ug/L	12.0U ug/L	20.0U ug/L
SODIUM	142U ug/L	85.0U ug/L	2620000 ug/L	2360000 ug/L	2160000 ug/L	2010000 ug/L

***** MISCELLANEOUS *****

ALKALINITY (Methyl Orange)			900 mg/L	910 mg/L	910 mg/L	900 mg/L
ALKALINITY (Phenolphthalein)			150 mg/L	150 mg/L	140 mg/L	150 mg/L
AMMONIA			0.6 mg/L	0.6 mg/L	0.5 mg/L	0.6 mg/L
CHLORIDE			1000U mg/L	1000U mg/L	1000U mg/L	1000U mg/L
CYANIDE - AMENABLE	0.005U mg/L	0.005 mg/L	-1.4 mg/L	-1.7 mg/L	-0.86 mg/L	-1.1 mg/L
CYANIDE - TOTAL	0.005UJ mg/L	0.005UJ mg/L	0.31J mg/L	0.30J mg/L	0.29J mg/L	0.29J mg/L
GROSS ALPHA	3UJ mg/L	3U pCi/L	2000+-300JpCi/L	1500+-200JpCi/L	2100+-300JpCi/L	2100+-300JpCi/L
GROSS BETA	6UJ mg/L	6U pCi/L	2900+-300JpCi/L	2500+-300JpCi/L	2800+-300JpCi/L	2800+-300JpCi/L
NITRATE			1700 mg/L	1700 mg/L	1800 mg/L	1600 mg/L
pH			9.1	9.1	9.1	9.1
PHOSPHORUS, TOTAL (AS P)			2.6J mg/L	2.8J mg/L	2.8J mg/L	2.8J mg/L
SPECIFIC GRAVITY			1.020	1.020 mg/L		1.018
SULFATE (AS SO4)			540 mg/L	560 mg/L	540 mg/L	540 mg/L
TDS (Total Dissolved Solids)			14000 mg/L	14000 mg/L	15000 mg/L	15000 mg/L
TOC (Total Organic Carbon)			100 mg/L	58 mg/L	81 mg/L	110 mg/L
TSS (Total Suspended Solids)			11J mg/L	26J mg/L	39J mg/L	18J mg/L

***** TCLP LEACH *****

ARSENIC	R	R	167J ug/L	203J ug/L	215J ug/L	167J ug/L
BARIUM	41.0 ug/L	22.0 ug/L	286 ug/L	284 ug/L	299 ug/L	269 ug/L
CADMIUM	5.0U ug/L					
CHROMIUM	10.0U ug/L	10.0U ug/L	10.0 ug/L	10.0U ug/L	10.0U ug/L	10.0U ug/L
LEAD	30.0U ug/L					
MERCURY	0.2U ug/L					
NICKEL	20.0U ug/L	20.0U ug/L	24.0 ug/L	20.0U ug/L	21.0 ug/L	22.0 ug/L
pH	4.0	6.0	9.0	9.0	9.0	9.0
SELENIUM	60.0UJ ug/L					
SILVER	6.0UJ ug/L	6.0UJ ug/L	6.0U ug/L	6.0UJ ug/L	6.0UJ ug/L	6.0UJ ug/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

PW207BS-SW

PW207BS-T
TRIP BLANK

COMPOUND

***** VOLATILES *****

1,1,1-TRICHLOROETHANE	5U ug/L	5U ug/L
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5UJ ug/L	5UJ ug/L
1,1,2-TRICHLOROETHANE	5U ug/L	5U ug/L
1,1-DICHLOROETHENE	5U ug/L	5U ug/L
2-BUTANONE	10U ug/L	10U ug/L
4-METHYL-2-PENTANONE	10U ug/L	10U ug/L
ACETONE	10U ug/L	33U ug/L
BENZENE	5U ug/L	5U ug/L
CARBON DISULFIDE	5U ug/L	5U ug/L
CARBON TETRACHLORIDE	5U ug/L	5U ug/L
CHLOROBENZENE	5U ug/L	5U ug/L
ETHYL ACETATE	5U ug/L	5U ug/L
ETHYL ETHER	5U ug/L	5U ug/L
ETHYLBENZENE	5U ug/L	5U ug/L
METHYLENE CHLORIDE	5U ug/L	5U ug/L
TETRACHLOROETHENE	5U ug/L	5U ug/L
TOLUENE	5U ug/L	5U ug/L
TRICHLOROETHENE	5U ug/L	5U ug/L
TRICHLOROFLUOROMETHANE	5UJ ug/L	5UJ ug/L
XYLENE (total)	5U ug/L	5U ug/L

***** SEMI-VOLATILES *****

1,2,4-TRICHLOROBENZENE	10U ug/L
1,2-DICHLOROBENZENE	10U ug/L
1,4-DICHLOROBENZENE	10U ug/L
2,4-DINITROTOLUENE	10U ug/L
2-NITROPROPANE	10U ug/L
ACENAPHTHENE	10U ug/L
CYCLOHEXANONE	10U ug/L
N-NITROSO-DI-N-PROPYLAMINE	10U ug/L
PYRENE	10U ug/L
PYRIDINE	10UJ ug/L

***** ALCOHOLS *****

2-ETHOXYETHANOL	50U mg/L
ISOBUTANOL	1U mg/L
METHANOL	1U mg/L
N-BUTYL ALCOHOL	1U mg/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

PW207BS-SW

PW207BS-T
TRIP BLANK

***** INORGANICS *****

ARSENIC	274	ug/L
BARIUM	115	ug/L
BORON	2740J	ug/L
CADMIUM	5.0U	ug/L
CALCIUM	52500	ug/L
CHROMIUM	14.0J	ug/L
LEAD	30.0U	ug/L
MAGNESIUM	187000	ug/L
MERCURY	0.2U	ug/L
NICKEL	20.0	ug/L
POTASSIUM	687000	ug/L
SELENIUM	60.0U	ug/L
SILVER	10.0U	ug/L
SODIUM	2660000	ug/L

***** MISCELLANEOUS *****

ALKALINITY (Methyl Orange)	910	mg/L
ALKALINITY (Phenolphthalein)	160	mg/L
AMMONIA	0.5	mg/L
CHLORIDE	1000U	mg/L
CYANIDE - AMENABLE	-2.6	mg/L
CYANIDE - TOTAL	0.28J	mg/L
GROSS ALPHA	1900+-200J	pCi/L
GROSS BETA	2600+-300J	pCi/L
NITRATE	1600	mg/L
pH	9.1	mg/L
PHOSPHORUS, TOTAL (AS P)	2.8J	mg/L
SPECIFIC GRAVITY	1.016	
SULFATE (AS SO4)	600	mg/L
TDS (Total Dissolved Solids)	15000	mg/L
TOC (Total Organic Carbon)	110	mg/L
TSS (Total Suspended Solids)	17J	mg/L

***** TCLP LEACH *****

ARSENIC	390J	ug/L
BARIUM	319	ug/L
CADMIUM	5.0U	ug/L
CHROMIUM	87.0	ug/L
LEAD	30.0U	ug/L
MERCURY	0.2U	ug/L
NICKEL	20.0U	ug/L
pH	9.0	
SELENIUM	60.0UJ	ug/L
SILVER	11.0U	ug/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

CW-000-B
RINSATE BLANK

CW-000-F
FIELD BLANK

CW-000-T
TRIP BLANK

CW-001

CW-001-D
DUPLICATE

CW-002

COMPOUND

***** VOLATILES *****

1,1,1-TRICHLOROETHANE	5U ug/L					
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5U ug/L					
1,1,2-TRICHLOROETHANE	5U ug/L					
1,1-DICHLOROETHENE	5U ug/L					
2-BUTANONE	10U ug/L					
4-METHYL-2-PENTANONE	10U ug/L					
ACETONE	10U ug/L	10U ug/L	11B ug/L	14U ug/L	13U ug/L	18U ug/L
BENZENE	5U ug/L					
CARBON DISULFIDE	5U ug/L					
CARBON TETRACHLORIDE	5U ug/L					
CHLOROBENZENE	5U ug/L					
ETHYL ACETATE	5U ug/L					
ETHYL ETHER	5U ug/L					
ETHYLBENZENE	5U ug/L					
METHYLENE CHLORIDE	5U ug/L					
TETRACHLOROETHENE	5U ug/L					
TOLUENE	5U ug/L					
TRICHLOROETHENE	5U ug/L					
TRICHLOROFLUOROMETHANE	5U ug/L					
XYLENE (total)	5U ug/L					

***** SEMI-VOLATILES *****

1,2,4-TRICHLOROBENZENE	10U ug/L	10U ug/L		10U ug/L	10U ug/L	10U ug/L
1,2-DICHLOROBENZENE	10U ug/L	10U ug/L		10U ug/L	10U ug/L	10U ug/L
1,4-DICHLOROBENZENE	10U ug/L	10U ug/L		10U ug/L	10U ug/L	10U ug/L
2,4-DINITROTOLUENE	10U ug/L	10U ug/L		10U ug/L	10U ug/L	10U ug/L
2-NITROPROPANE	10UJ ug/L	10UJ ug/L		10UJ ug/L	10UJ ug/L	10UJ ug/L
ACENAPHTHENE	10U ug/L	10U ug/L		10U ug/L	10U ug/L	10U ug/L
CYCLOHEXANONE	10U ug/L	10U ug/L		10U ug/L	10U ug/L	10U ug/L
N-NITROSO-DI-N-PROPYLAMINE	10U ug/L	10U ug/L		10U ug/L	10U ug/L	10U ug/L
PYRENE	10U ug/L	10U ug/L		10U ug/L	10U ug/L	10U ug/L
PYRIDINE	10U ug/L	10U ug/L		10U ug/L	10UJ ug/L	10U ug/L

***** ALCOHOLS *****

2-ETHOXYETHANOL	50U mg/L	1U mg/L		50U mg/L	50U mg/L	50U mg/L
ISOBUTANOL	1U mg/L	1U mg/L		1U mg/L	1U mg/L	1U mg/L
METHANOL	1U mg/L	1U mg/L		1U mg/L	1U mg/L	1U mg/L
N-BUTYL ALCOHOL	1U mg/L	1U mg/L		1U mg/L	1U mg/L	1U mg/L

SAMPLE ID NUMBER:

SAMPLE TYPE:

***** INORGANICS *****

CW-000-B RINSATE BLANK
CW-000-F FIELD BLANK
CW-000-1 TRIP BLANK
CW-001
CW-001-0 DUPLICATE
CW-002

ARSENIC	40.00 ug/L	34.2 ug/L	34.2 ug/L	10200000J ug/L
BARIUM	3.00 ug/L	44.0 ug/L	91.0 ug/L	30.0 ug/L
BORON	6.0 ug/L	29.0 ug/L	23300 ug/L	30200 ug/L
CADMIUM	5.00J ug/L	231J ug/L	570J ug/L	38.0J ug/L
CALCIUM	205 ug/L	173000 ug/L	254000 ug/L	144000 ug/L
CHROMIUM	10.00J ug/L	283J ug/L	825J ug/L	138J ug/L
LEAD	30.00 ug/L	34.0 ug/L	46.0 ug/L	30.00 ug/L
MAGNESIUM	20.00 ug/L	3270 ug/L	6730J ug/L	2580 ug/L
MERCURY	0.20J ug/L	2.2J ug/L	3.8J ug/L	3.5J ug/L
NICKEL	20.00J ug/L	258J ug/L	393J ug/L	293J ug/L
POTASSIUM	692 ug/L	4930000 ug/L	4860000 ug/L	6090000 ug/L
SELENIUM	60.00 ug/L	60.00 ug/L	60.00 ug/L	60.00 ug/L
SILVER	6.00J ug/L	66.0J ug/L	110J ug/L	72.0J ug/L
SODIUM	1000J ug/L	1110J ug/L	10200000J ug/L	12800000J ug/L

***** MISCELLANEOUS *****

ALKALINITY (Methyl Orange)	5500 mg/L	5500 mg/L	6400 mg/L	6900 mg/L
ALKALINITY (Phenolphthalein)	2300 mg/L	2700 mg/L	2700 mg/L	2900 mg/L
AMMONIA	8.5J mg/L	5.0J mg/L	9.8J mg/L	9.8J mg/L
CHLORIDE	1600 mg/L	1700 mg/L	3200 mg/L	3200 mg/L
CYANIDE - AMENABLE	-0.017J mg/L	-14J mg/L	-9.8J mg/L	-9.8J mg/L
CYANIDE - TOTAL	0.0050J mg/L	0.0050J mg/L	2.4J mg/L	2.8J mg/L
GROSS ALPHA	57+/-7 pci/L	16+/-2 pci/L	19+/-2 pci/L	18+/-2 pci/L
GROSS BETA	73+/-8 pci/L	23 +/--3 pci/L	22 +/--3 pci/L	26 +/--3 pci/L
NITRATE	10000J mg/L	5700J mg/L	6900J mg/L	6900J mg/L
pH	10.00	10.00	10.0	10.0
PHOSPHORUS, TOTAL (AS P)	84 mg/L	80 mg/L	78 mg/L	78 mg/L
SPECIFIC GRAVITY	3200 mg/L	2600 mg/L	2800 mg/L	2800 mg/L
SULFATE (AS SO4)	190J mg/L	140J mg/L	160J mg/L	160J mg/L
TDS (Total Dissolved Solids)	46000 mg/L	61000 mg/L	60000 mg/L	60000 mg/L
TOC (Total Organic Carbon)	180J mg/L	140J mg/L	160J mg/L	160J mg/L
TSS (Total Suspended Solids)	180J mg/L	140J mg/L	160J mg/L	160J mg/L

***** TCLP LEACH *****

ARSENIC	200 ug/L	75.0J ug/L	200 ug/L	1400 ug/L
BARIUM	80.0J ug/L	2700 ug/L	3200 ug/L	2800 ug/L
CADMIUM	10.00J ug/L	50.0J ug/L	110J ug/L	1000J ug/L
LEAD	30.00J ug/L	1000J ug/L	3000J ug/L	3000J ug/L
MERCURY	0.20 ug/L	0.20 ug/L	0.20 ug/L	0.20 ug/L
NICKEL	20.00J ug/L	2000J ug/L	310J ug/L	350J ug/L
pH	7.2	10.1	10.1	10.1
SELENIUM	60.00J ug/L	6000J ug/L	6000J ug/L	6000J ug/L
SILVER	6.00J ug/L	60.00J ug/L	60.00J ug/L	60.00J ug/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

CW-003

COMPOUND

***** VOLATILES *****

1,1,1-TRICHLOROETHANE	5U ug/L
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5U ug/L
1,1,2-TRICHLOROETHANE	5U ug/L
1,1-DICHLOROETHENE	5U ug/L
2-BUTANONE	10U ug/L
4-METHYL-2-PENTANONE	10U ug/L
ACETONE	24U ug/L
BENZENE	5U ug/L
CARBON DISULFIDE	5U ug/L
CARBON TETRACHLORIDE	5U ug/L
CHLOROBENZENE	5U ug/L
ETHYL ACETATE	5U ug/L
ETHYL ETHER	5U ug/L
ETHYLBENZENE	5U ug/L
METHYLENE CHLORIDE	5U ug/L
TETRACHLOROETHENE	5U ug/L
TOLUENE	5U ug/L
TRICHLOROETHENE	5U ug/L
TRICHLOROFLUOROMETHANE	5U ug/L
XYLENE (total)	5U ug/L

***** SEMI-VOLATILES *****

1,2,4-TRICHLOROBENZENE	10U ug/L
1,2-DICHLOROBENZENE	10U ug/L
1,4-DICHLOROBENZENE	10U ug/L
2,4-DINITROTOLUENE	10U ug/L
2-NITROPROPANE	10U ug/L
ACENAPHTHENE	10U ug/L
CYCLOHEXANONE	10U ug/L
N-NITROSO-DI-N-PROPYLAMINE	10U ug/L
PYRENE	10U ug/L
PYRIDINE	10U ug/L

***** ALCOHOLS *****

2-ETHOXYETHANOL	50U mg/L
ISOBUTANOL	1U mg/L
METHANOL	1U mg/L
N-BUTYL ALCOHOL	1U mg/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

CW-003

***** INORGANICS *****

ARSENIC	302	ug/L
BARIUM	32.0	ug/L
BORON	34700	ug/L
CADMIUM	43.0J	ug/L
CALCIUM	14200U	ug/L
CHROMIUM	175J	ug/L
LEAD	30.0U	ug/L
MAGNESIUM	3020	ug/L
MERCURY	4.6J	ug/L
NICKEL	335J	ug/L
POTASSIUM	7000000	ug/L
SELENIUM	60.0U	ug/L
SILVER	91.0J	ug/L
SODIUM	14800000J	ug/L

***** MISCELLANEOUS *****

ALKALINITY (Methyl Orange)	8200	mg/L
ALKALINITY (Phenolphthalein)	3100	mg/L
AMMONIA	14J	mg/L
CHLORIDE	1850	mg/L
CYANIDE - AMENABLE	-3.3J	mg/L
CYANIDE - TOTAL	3.0J	mg/L
GROSS ALPHA	16+/-2	nCi/L
GROSS BETA	30 +/-3	nCi/L
NITRATE	6400J	mg/L
pH	9.9	
PHOSPHORUS, TOTAL (AS P)	81	mg/L
SPECIFIC GRAVITY		
SULFATE (AS SO4)	2600	mg/L
TDS (Total Dissolved Solids)	68000J	mg/L
TOC (Total Organic Carbon)	170J	mg/L
TSS (Total Suspended Solids)	170J	mg/L

***** TCLP LEACH *****

ARSENIC	1800	ug/L
BARIUM	260U	ug/L
CADMIUM	R	
CHROMIUM	140J	ug/L
LEAD	300UJ	ug/L
MERCURY	0.2U	ug/L
NICKEL	290J	ug/L
pH	10.1	
SELENIUM	600UJ	ug/L
SILVER	60.0UJ	ug/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

PW207A-NE

PW207A-NW

PW207A-SE

PW207A-T
TRIP BLANK

COMPOUND

***** VOLATILES *****

1,1,1-TRICHLOROETHANE	5U ug/L	5U ug/L	5U ug/L	5U ug/L
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5U ug/L	5U ug/L	5U ug/L	5U ug/L
1,1,2-TRICHLOROETHANE	5U ug/L	5U ug/L	5U ug/L	5U ug/L
1,1-DICHLOROETHENE	5U ug/L	5U ug/L	5U ug/L	5U ug/L
2-BUTANONE	10U ug/L	10U ug/L	10U ug/L	10U ug/L
4-METHYL-2-PENTANONE	10U ug/L	10U ug/L	10U ug/L	10U ug/L
ACETONE	18U ug/L	20U ug/L	24U ug/L	118 ug/L
BENZENE	5U ug/L	5U ug/L	5U ug/L	5U ug/L
CARBON DISULFIDE	5U ug/L	5U ug/L	5U ug/L	5U ug/L
CARBON TETRACHLORIDE	5U ug/L	5U ug/L	5U ug/L	5U ug/L
CHLOROBENZENE	5U ug/L	5U ug/L	5U ug/L	5U ug/L
ETHYL ACETATE	5U ug/L	5U ug/L	5U ug/L	5U ug/L
ETHYL ETHER	5U ug/L	5U ug/L	5U ug/L	5U ug/L
ETHYLBENZENE	5U ug/L	5U ug/L	5U ug/L	5U ug/L
METHYLENE CHLORIDE	5U ug/L	5U ug/L	5U ug/L	5U ug/L
TETRACHLOROETHENE	5U ug/L	5U ug/L	5U ug/L	5U ug/L
TOLUENE	5U ug/L	5U ug/L	5U ug/L	5U ug/L
TRICHLOROETHENE	5U ug/L	5U ug/L	5U ug/L	5U ug/L
TRICHLOROFLUOROMETHANE	5U ug/L	5U ug/L	5U ug/L	5U ug/L
XYLENE (total)	5U ug/L	5U ug/L	5U ug/L	6 ug/L

***** SEMI-VOLATILES *****

1,2,4-TRICHLOROBENZENE	10U ug/L	10U ug/L	10U ug/L	
1,2-DICHLOROBENZENE	10U ug/L	10U ug/L	10U ug/L	
1,4-DICHLOROBENZENE	10U ug/L	10U ug/L	10U ug/L	
2,4-DINITROTOLUENE	10U ug/L	10U ug/L	10U ug/L	
2-NITROPROPANE	10UJ ug/L	10UJ ug/L	10UJ ug/L	
ACENAPHTHENE	10U ug/L	10U ug/L	10U ug/L	
CYCLOHEXANONE	10U ug/L	10U ug/L	10U ug/L	
N-NITROSO-DI-N-PROPYLAMINE	10U ug/L	10U ug/L	10U ug/L	
PYRENE	10U ug/L	10U ug/L	10U ug/L	
PYRIDINE	10U ug/L	10U ug/L	10U ug/L	

***** ALCOHOLS *****

2-ETHOXYETHANOL	50U mg/L	50U ug/L	50U ug/L	
ISOBUTANOL	1U mg/L	1U ug/L	1U ug/L	
METHANOL	1UJ mg/L	1UJ ug/L	1UJ ug/L	
N-BUTYL ALCOHOL	1U mg/L	1U ug/L	1U ug/L	

SAMPLE ID NUMBER:
SAMPLE TYPE:

PW207A-NE

PW207A-NW

PW207A-SE

PW207A-T
TRIP BLANK

***** INORGANICS *****

ARSENIC	224 ug/L	204 ug/L	188 ug/L
BARIUM	135 ug/L	141 ug/L	140 ug/L
BORON	1400 ug/L	1430 ug/L	1460 ug/L
CADMIUM	5.0UJ ug/L	5.0J ug/L	5.0UJ ug/L
CALCIUM	23200U ug/L	24300U ug/L	24000U ug/L
CHROMIUM	49.0J ug/L	45.0J ug/L	38.0J ug/L
LEAD	30.0U ug/L	30.0U ug/L	30.0U ug/L
MAGNESIUM	120000 ug/L	124000 ug/L	124000 ug/L
MERCURY	0.2UJ ug/L	0.2UJ ug/L	0.2UJ ug/L
NICKEL	20.0UJ ug/L	20.0UJ ug/L	20.0UJ ug/L
POTASSIUM	388000 ug/L	396000 ug/L	397000 ug/L
SELENIUM	60.0U ug/L	60.0U ug/L	60.0 ug/L
SILVER	6.0UJ ug/L	6.0UJ ug/L	6.0UJ ug/L
SODIUM	1870000J ug/L	1870000J ug/L	1840000J ug/L

***** MISCELLANEOUS *****

ALKALINITY (Methyl Orange)	250 mg/L	250 mg/L	250 mg/L
ALKALINITY (Phenolphthalein)	87 mg/L	84 mg/L	89 mg/L
AMMONIA	0.3J mg/L	0.3J mg/L	0.3J mg/L
CHLORIDE	380 mg/L	400 mg/L	430 mg/L
CYANIDE - AMENABLE	-0.47J mg/L	-0.63J mg/L	-0.79J mg/L
CYANIDE - TOTAL	0.39J mg/L	0.47J mg/L	0.43J mg/L
GROSS ALPHA	790+-140 pCi/L	610+-120 pCi/L	670+-130 pCi/L
GROSS BETA	1000+-200 pCi/L	1000+-100 pCi/L	1000+-100 pCi/L
NITRATE	970J mg/L	1000J mg/L	970J mg/L
pH	9.7	9.7	9.7
PHOSPHORUS, TOTAL (AS P)	0.07J mg/L	0.06J mg/L	0.06J mg/L
SPECIFIC GRAVITY	1.010	1.012	1.012
SULFATE (AS SO4)	510 mg/L	470 mg/L	460 mg/L
TDS (Total Dissolved Solids)	7900 mg/L	7800 mg/L	7600 mg/L
TOC (Total Organic Carbon)	68J mg/L	69J mg/L	70J mg/L
TSS (Total Suspended Solids)	14J mg/L	20J mg/L	23J mg/L

***** TCLP LEACH *****

ARSENIC	246 ug/L	233 ug/L	236 ug/L
BARIUM	259U ug/L	299U ug/L	235U ug/L
CADMIUM	R ug/L	R ug/L	R ug/L
CHROMIUM	43.0U ug/L	37.0U ug/L	48.0U ug/L
LEAD	30.0UJ ug/L	30.0UJ ug/L	30.0UJ ug/L
MERCURY	0.2U ug/L	0.2U ug/L	0.2U ug/L
NICKEL	20.0UJ ug/L	20.0UJ ug/L	20.0UJ ug/L
pH	9.6	9.6	9.7
SELENIUM	60.0UJ ug/L	60.0UJ ug/L	60.0UJ ug/L
SILVER	6.0J ug/L	6.0UJ ug/L	6.0UJ ug/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

PW207C-B
RINSATE BLANK

PW207C-F
FIELD BLANK

PW207C-NE

PW207C-NE-D
DUPLICATE

PW207C-NW

PW207C-SE

COMPOUND

***** VOLATILES *****

1,1,1-TRICHLOROETHANE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
1,1,2-TRICHLOROETHANE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
1,1-DICHLOROETHENE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
2-BUTANONE	10U ug/L	10U ug/L	110J ug/L	77J ug/L	110 ug/L	10U ug/L
4-METHYL-2-PENTANONE	10U ug/L	10U ug/L	10U ug/L	10U ug/L	10U ug/L	10U ug/L
ACETONE	15U ug/L	14U ug/L	270U ug/L	150U ug/L	220U ug/L	140U ug/L
BENZENE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
CARBON DISULFIDE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
CARBON TETRACHLORIDE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
CHLOROBENZENE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
ETHYL ACETATE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
ETHYL ETHER	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
ETHYLBENZENE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
METHYLENE CHLORIDE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	8 ug/L	5U ug/L
TETRACHLOROETHENE	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
TOLUENE	5U ug/L	3J ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
TRICHLOROETHENE	5U ug/L	5U ug/L	8U ug/L	5U ug/L	5U ug/L	5U ug/L
TRICHLOROFLUOROMETHANE	5U ug/L	3J ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L
XYLENE (total)	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L	5U ug/L

***** SEMI-VOLATILES *****

1,2,4-TRICHLOROBENZENE	10U ug/L	10U ug/L	10UJ ug/L	R	10UJ ug/L	10UJ ug/L
1,2-DICHLOROBENZENE	10U ug/L	10U ug/L	10UJ ug/L	R	10U ug/L	10U ug/L
1,4-DICHLOROBENZENE	10U ug/L	10U ug/L	10UJ ug/L	R	10UJ ug/L	10UJ ug/L
2,4-DINITROTOLUENE	10U ug/L	10U ug/L	10UJ ug/L	R	10UJ ug/L	10UJ ug/L
2-NITROPROPANE	10UJ ug/L	10UJ ug/L	10UJ ug/L	R	10UJ ug/L	10UJ ug/L
ACENAPHTHENE	10U ug/L	10U ug/L	10UJ ug/L	R	10UJ ug/L	10UJ ug/L
CYCLOHEXANONE	10U ug/L	10UJ ug/L	10UJ ug/L	R	10UJ ug/L	10UJ ug/L
N-NITROSO-DI-N-PROPYLAMINE	10U ug/L	10U ug/L	10UJ ug/L	R	10UJ ug/L	10UJ ug/L
PYRENE	10U ug/L	10U ug/L	10UJ ug/L	R	10UJ ug/L	10UJ ug/L
PYRIDINE	10U ug/L	10U ug/L	10U ug/L	R	10UJ ug/L	10UJ ug/L

***** ALCOHOLS *****

2-ETHOXYETHANOL	50U mg/L	50U mg/L	50U ug/L	50U ug/L	50U ug/L	50U ug/L
ISOBUTANOL	1U mg/L	1U mg/L	1U ug/L	1U ug/L	1U ug/L	1U ug/L
METHANOL	1UJ mg/L	1UJ mg/L	1UJ ug/L	1UJ ug/L	1UJ ug/L	1UJ ug/L
N-BUTYL ALCOHOL	1U mg/L	1U mg/L	1U ug/L	1U ug/L	1U ug/L	1U ug/L

SAMPLE ID NUMBER:
 SAMPLE TYPE:

PW207C-B PW207C-F PW207C-NE PW207C-NE-D PW207C-NW PW207C-SE
 RINSATE BLANK FIELD BLANK DUPLICATE

***** INORGANICS *****

ARSENIC	40.0U ug/L	40.0U ug/L	4110 ug/L	3370 ug/L	3550 ug/L	3350 ug/L
BARIUM	3.0U ug/L	3.0U ug/L	130 ug/L	110 ug/L	130 ug/L	130 ug/L
BORON	13.0 ug/L	14.0 ug/L	460000 ug/L	494000 ug/L	438000 ug/L	437000 ug/L
CADMIUM	5.0UJ ug/L	5.0UJ ug/L	490J ug/L	430J ug/L	450J ug/L	500J ug/L
CALCIUM	20.0U ug/L	5930 ug/L	4080U ug/L	1080U ug/L	10100U ug/L	3820U ug/L
CHROMIUM	10.0UJ ug/L	10.0UJ ug/L	3580J ug/L	3400J ug/L	3370J ug/L	3320J ug/L
LEAD	30.0U ug/L	30.0U ug/L	300 ug/L	300 ug/L	300U ug/L	300U ug/L
MAGNESIUM	20.0U ug/L	128 ug/L	2970 ug/L	1300U ug/L	2950U ug/L	2850 ug/L
MERCURY	0.2UJ ug/L	0.2UJ ug/L	2.0UJ ug/L	2.0UJ ug/L	2.0UJ ug/L	2.0UJ ug/L
NICKEL	20.0UJ ug/L	20.0UJ ug/L	2610J ug/L	2920J ug/L	2560J ug/L	2540J ug/L
POTASSIUM	1150 ug/L	1690 ug/L	55200000 ug/L	59200000 ug/L	55200000 ug/L	54700000 ug/L
SELENIUM	60.0U ug/L	60.0U ug/L	600 ug/L	6000U ug/L	3000U ug/L	3000U ug/L
SILVER	6.0UJ ug/L	6.0UJ ug/L	580UJ ug/L	240UJ ug/L	530UJ ug/L	460U ug/L
SODIUM	929J ug/L	1350J ug/L	138000000J ug/L	142000000J ug/L	137000000J ug/L	136000000J ug/L

***** MISCELLANEOUS *****

ALKALINITY (Methyl Orange)			60000 mg/L	63000 mg/L	58000 mg/L	59000 mg/L
ALKALINITY (Phenolphthalein)			29000 mg/L	32000 mg/L	29000 mg/L	29000 mg/L
AMMONIA			5.0 mg/L	6.4J mg/L	1.9J mg/L	1.8J mg/L
CHLORIDE			21000 mg/L	24000 mg/L	25000 mg/L	22000 mg/L
CYANIDE - AMENABLE	-0.013J mg/L	-0.11J mg/L	-23J mg/L	-120J mg/L	-0.77J mg/L	-7.5J mg/L
CYANIDE - TOTAL	0.17J mg/L	0.005UJ mg/L	3.3J mg/L	20J mg/L	4.0J mg/L	7.1J mg/L
GROSS ALPHA	3U pCi/L	3U pCi/L	63+/-9 nCi/L	84+/-10 nCi/L	98 +/-10 nCi/L	130+/-20 nCi/L
GROSS BETA	6U pCi/L	6U pCi/L	170 +/-20 nCi/L	190+/-20 nCi/L	180 +/-20 nCi/L	200 +/-20 nCi/L
NITRATE			65000J mg/L	66000J mg/L	57000J mg/L	62000J mg/L
pH			10.0	10.1	10.1	10.1
PHOSPHORUS, TOTAL (AS P)			570J mg/L	610J mg/L	520J mg/L	560J mg/L
SPECIFIC GRAVITY			1.348 mg/L	1.348 mg/L	1.318 mg/L	1.330 mg/L
SULFATE (AS SO4)			17000 mg/L	17000 mg/L	18000 mg/L	16000 mg/L
TDS (Total Dissolved Solids)			510000 mg/L	500000 mg/L	470000 mg/L	500000 mg/L
TOC (Total Organic Carbon)			1300J mg/L	1600J mg/L	1300J mg/L	1200J mg/L
TSS (Total Suspended Solids)			410J mg/L	1400J mg/L	310J mg/L	330J mg/L

***** TCLP LEACH *****

ARSENIC	40.0U ug/L	40.0U ug/L	5510 ug/L	4810 ug/L	4970 ug/L	4860 ug/L
BARIUM	48.0U ug/L	55.0J ug/L	360U ug/L	400U ug/L	340U ug/L	340U ug/L
CADMIUM	R	R	440J ug/L	560J ug/L	350J ug/L	430J ug/L
CHROMIUM	10.0UJ ug/L	20.0UJ ug/L	2710J ug/L	9160J ug/L	2360J ug/L	2420J ug/L
LEAD	30.0UJ ug/L	30.0UJ ug/L	300UJ ug/L	300UJ ug/L	300UJ ug/L	300UJ ug/L
MERCURY	0.2U ug/L	0.2U ug/L	2.0U ug/L	2.0U ug/L	2.0U ug/L	2.0U ug/L
NICKEL	20.0UJ ug/L	20.0UJ ug/L	2730J ug/L	4930J ug/L	2440J ug/L	2450J ug/L
pH	4.0	4.2	10.2	10.2	10.2	10.2
SELENIUM	60.0UJ ug/L	60.0UJ ug/L	600UJ ug/L	600UJ ug/L	600UJ ug/L	600UJ ug/L
SILVER	6.0UJ ug/L	6.0UJ ug/L	250J ug/L	430J ug/L	210J ug/L	190J ug/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

PW207C-SW

PW207C-T
TRIP BLANK

COMPOUND

***** VOLATILES *****

1,1,1-TRICHLOROETHANE	5U ug/L	5U ug/L
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5U ug/L	5U ug/L
1,1,2-TRICHLOROETHANE	5U ug/L	5U ug/L
1,1-DICHLOROETHENE	5U ug/L	5U ug/L
2-BUTANONE	79 ug/L	10U ug/L
4-METHYL-2-PENTANONE	10U ug/L	10U ug/L
ACETONE	150U ug/L	10U ug/L
BENZENE	5U ug/L	5U ug/L
CARBON DISULFIDE	5U ug/L	5U ug/L
CARBON TETRACHLORIDE	5U ug/L	5U ug/L
CHLOROBENZENE	5U ug/L	5U ug/L
ETHYL ACETATE	5U ug/L	5U ug/L
ETHYL ETHER	5U ug/L	5U ug/L
ETHYLBENZENE	5U ug/L	5U ug/L
METHYLENE CHLORIDE	5U ug/L	5U ug/L
TETRACHLOROETHENE	5U ug/L	5U ug/L
TOLUENE	5U ug/L	5U ug/L
TRICHLOROETHENE	5U ug/L	5U ug/L
TRICHLOROFLUOROMETHANE	5U ug/L	5U ug/L
XYLENE (total)	5U ug/L	5U ug/L

***** SEMI-VOLATILES *****

1,2,4-TRICHLOROBENZENE	10UJ ug/L
1,2-DICHLOROBENZENE	10U ug/L
1,4-DICHLOROBENZENE	10UJ ug/L
2,4-DINITROTOLUENE	10UJ ug/L
2-NITROPROPANE	10UJ ug/L
ACENAPHTHENE	10UJ ug/L
CYCLOHEXANONE	10UJ ug/L
N-NITROSO-DI-N-PROPYLAMINE	10UJ ug/L
PYRENE	10UJ ug/L
PYRIDINE	10UJ ug/L

***** ALCOHOLS *****

2-ETHOXYETHANOL	50U ug/L
ISOBUTANOL	1U ug/L
METHANOL	1UJ ug/L
N-BUTYL ALCOHOL	1U ug/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

PW207C-SW

PW207C-T
TRIP BLANK

***** INORGANICS *****

ARSENIC	4070	ug/L
BARIUM	150	ug/L
BORON	484000	ug/L
CADMIUM	560J	ug/L
CALCIUM	32300J	ug/L
CHROMIUM	3940J	ug/L
LEAD	300U	ug/L
MAGNESIUM	3870U	ug/L
MERCURY	2.0UJ	ug/L
NICKEL	2790J	ug/L
POTASSIUM	54500000	ug/L
SELENIUM	600U	ug/L
SILVER	520U	ug/L
SODIUM	136000000J	ug/L

***** MISCELLANEOUS *****

ALKALINITY (Methyl Orange)	61000	mg/L
ALKALINITY (Phenolphthalein)	25000	mg/L
AMMONIA	3.6J	mg/L
CHLORIDE	23000	mg/L
CYANIDE - AMENABLE	-21J	mg/L
CYANIDE - TOTAL	4.1J	mg/L
GROSS ALPHA	120+/-20	nCi/L
GROSS BETA	230+/-30	nCi/L
NITRATE	62000	mg/L
pH	10.1	
PHOSPHORUS, TOTAL (AS P)	570J	mg/L
SPECIFIC GRAVITY	1.316	
SULFATE (AS SO4)	17000	mg/L
TDS (Total Dissolved Solids)	300000	mg/L
TOC (Total Organic Carbon)	1400J	mg/L
TSS (Total Suspended Solids)	220J	mg/L

***** TCLP LEACH *****

ARSENIC	4660	ug/L
BARIUM	390U	ug/L
CADMIUM	380J	ug/L
CHROMIUM	2240J	ug/L
LEAD	300UJ	ug/L
MERCURY	2.0U	ug/L
NICKEL	2330J	ug/L
pH	10.2	
SELENIUM	600UJ	ug/L
SILVER	150J	ug/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

PS207BC-NE

PS207BC-NW

PS207BC-SE

PS207BC-SW

PS207BC-T
TRIP BLANK

COMPOUND

***** VOLATILES *****

1,1,1-TRICHLOROETHANE	50U ug/kg	71U ug/kg	56U ug/kg	56U ug/kg	5U ug/L
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	50UJ ug/kg	71UJ ug/kg	56UJ ug/kg	56UJ ug/kg	5U ug/L
1,1,2-TRICHLOROETHANE	50U ug/kg	71U ug/kg	56U ug/kg	56U ug/kg	5U ug/L
1,1-DICHLOROETHENE	50U ug/kg	71U ug/kg	56U ug/kg	56U ug/kg	5U ug/L
2-BUTANONE	100U ug/kg	140U ug/kg	110U ug/kg	110U ug/kg	10U ug/L
4-METHYL-2-PENTANONE	100U ug/kg	140U ug/kg	110U ug/kg	110U ug/kg	10UJ ug/L
ACETONE	100U ug/kg	140U ug/kg	110U ug/kg	110U ug/kg	10UJ ug/L
BENZENE	50U ug/kg	71U ug/kg	56U ug/kg	56U ug/kg	5U ug/L
CARBON DISULFIDE	50U ug/kg	71U ug/kg	56U ug/kg	56U ug/kg	5UJ ug/L
CARBON TETRACHLORIDE	50U ug/kg	71U ug/kg	56U ug/kg	56U ug/kg	5U ug/L
CHLOROBENZENE	50U ug/kg	71U ug/kg	56U ug/kg	56U ug/kg	5U ug/L
ETHYL ACETATE	50U ug/kg	71U ug/kg	56U ug/kg	56U ug/kg	5U ug/L
ETHYL ETHER	50U ug/kg	71U ug/kg	56U ug/kg	56U ug/kg	5U ug/L
ETHYLBENZENE	50U ug/kg	71U ug/kg	56U ug/kg	56U ug/kg	3J ug/L
METHYLENE CHLORIDE	30U ug/kg	71U ug/kg	56U ug/kg	40U ug/kg	5U ug/L
TETRACHLOROETHENE	180 ug/kg	71U ug/kg	56U ug/kg	37J ug/kg	5U ug/L
TOLUENE	50U ug/kg	71U ug/kg	56U ug/kg	56U ug/kg	5U ug/L
TRICHLOROETHENE	50U ug/kg	71U ug/kg	56U ug/kg	56U ug/kg	5U ug/L
TRICHLOROFLUOROMETHANE	50UJ ug/kg	71UJ ug/kg	56UJ ug/kg	56UJ ug/kg	5U ug/L
XYLENE (total)	50U ug/kg	71U ug/kg	56U ug/kg	56U ug/kg	5U ug/L

***** SEMI-VOLATILES *****

1,2,4-TRICHLOROBENZENE	3300U ug/kg	4700U ug/kg	3700UJ ug/kg	3700U ug/kg	
1,2-DICHLOROBENZENE	3300U ug/kg	4700U ug/kg	3700U ug/kg	3700U ug/kg	
1,4-DICHLOROBENZENE	3300U ug/kg	4700U ug/kg	3700U ug/kg	3700U ug/kg	
2,4-DINITROTOLUENE	3300UJ ug/kg	4700U ug/kg	3700UJ ug/kg	3700UJ ug/kg	
2-NITROPROPANE	3300U ug/kg	4700U ug/kg	3700U ug/kg	3700U ug/kg	
ACENAPHTHENE	3300UJ ug/kg	4700U ug/kg	3700UJ ug/kg	3700UJ ug/kg	
CYCLOHEXANONE	3300U ug/kg	4700U ug/kg	3700U ug/kg	3700U ug/kg	
N-NITROSO-DI-N-PROPYLAMINE	3300U ug/kg	4700U ug/kg	3700U ug/kg	3700U ug/kg	
PYRENE	3300U ug/kg	4700U ug/kg	3700U ug/kg	3700U ug/kg	
PYRIDINE	3300UJ ug/kg	4700UJ ug/kg	3700UJ ug/kg	3700UJ ug/kg	

***** ALCOHOLS *****

2-ETHOXYETHANOL	500U mg/kg	500U mg/kg	500U mg/kg	500U mg/kg	
ISOBUTANOL	10U mg/kg	10U mg/kg	10U mg/kg	10U mg/kg	
METHANOL	10U mg/kg	10U mg/kg	10U mg/kg	10U mg/kg	
N-BUTYL ALCOHOL	10U mg/kg	10U mg/kg	10U mg/kg	10U mg/kg	

SAMPLE ID NUMBER:
 SAMPLE TYPE:

PS207BC-NE PS207BC-NW PS207BC-SE PS207BC-SW PS207BC-T
 TRIP BLANK

***** INORGANICS *****

ARSENIC	39.6UJ mg/kg	60.6UJ mg/kg	44.4UJ mg/kg	43.5UJ mg/kg
BARIUM	46.5J mg/kg	120J mg/kg	86.7J mg/kg	76.1J mg/kg
BORON	151J mg/kg	138U mg/kg	131U mg/kg	97.8U mg/kg
CADMIUM	46.5J mg/kg	53.0J mg/kg	84.4J mg/kg	47.8J mg/kg
CALCIUM				
CHROMIUM				
LEAD	9.9U mg/kg	48.5J mg/kg	68.9J mg/kg	130J mg/kg
MAGNESIUM	29.7UJ mg/kg	45.5UJ mg/kg	33.3UJ mg/kg	32.6UJ mg/kg
MERCURY	7190 mg/kg	19800 mg/kg	11900 mg/kg	10700 mg/kg
NICKEL	0.9UJ mg/kg	5.5J mg/kg	1.1UJ mg/kg	1.1UJ mg/kg
POTASSIUM	19.8U mg/kg	30.3U mg/kg	22.2U mg/kg	21.7U mg/kg
SELENIUM	9800U ug/kg	15400 mg/kg	11700 mg/kg	10900 mg/kg
SILVER	59.4UJ mg/kg	90.9UJ mg/kg	66.7UJ mg/kg	65.2UJ mg/kg
SODIUM	5.9UJ mg/kg	27.3U mg/kg	6.7UJ mg/kg	10.9U mg/kg
	35200 mg/kg	54200 mg/kg	40200 mg/kg	38100 mg/kg

***** MISCELLANEOUS *****

AMMONIA	25J mg/kg	46J mg/kg	42J mg/kg	58J mg/kg
ATTERBERG - LIQUID LIMIT	77	85	85	84
ATTERBERG - PLASTIC INDEX	32	20	40	22
ATTERBERG - PLASTIC LIMIT	45	65	45	52
BULK DENSITY (DRIED SOLIDS)	0.82 g/cc	0.88 g/cc	0.86 g/cc	0.81 g/cc
CYANIDE - AMENABLE				
CYANIDE - TOTAL	0.34J mg/kg	0.52J mg/kg	1.3J mg/kg	0.38J mg/kg
GROSS ALPHA	19 +/- 4J pCi/g	13 +/- 3J pCi/g	19 +/- 4J pCi/g	16 +/- 4J pCi/g
GROSS BETA	16 +/- 3J pCi/g	14 +/- 4J pCi/g	16 +/- 4J pCi/g	12 +/- 4J pCi/g
MOISTURE - GRAVIMETRIC	89.9 %	93.4 %	91.0 %	90.8 %
MOISTURE - KARL FISHER	42 %	53 %	47 %	51 %
pH	9.2	9.1	9.2	9.2
SPECIFIC GRAVITY	1.0	1.0	1.0	1.0
SWELL TEST	60 %	60 %	70 %	60 %
TOC (Total Organic Carbon)	8800J mg/kg	5500J mg/kg	8300J mg/kg	6800J mg/kg

***** ASTM LEACH *****

CHLORIDE	220J mg/L	300J mg/L	200U mg/L	210J mg/L
NITRATE	70 mg/L	50 mg/L	74 mg/L	70 mg/L
PERCENT RECOVERY OF SOLIDS	9.3 %	13.7 %	9.5 %	9.3 %
PHOSPHORUS, TOTAL (AS P)	1.7 mg/L	3.9 mg/L	1.5 mg/L	1.4 mg/L
SULFATE	37 mg/L	90 mg/L	34 mg/L	33 mg/L
TDS (Total Dissolved Solids)	760 mg/L	670 mg/L	770 mg/L	750J mg/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

PS207BC-NE

PS207BC-NW

PS207BC-SE

PS207BC-SW

PS207BC-T
TRIP BLANK

***** TCLP LEACH *****

ARSENIC	134J ug/L	141J ug/L	122J ug/L	181J ug/L
BARIUM	3340J ug/L	2660J ug/L	3190J ug/L	3690J ug/L
CADIUM	153J ug/L	143 ug/L	133J ug/L	114J ug/L
CHROMIUM	50.0 ug/L	11.0 ug/L	19.0 ug/L	54.0 ug/L
LEAD	30.0UJ ug/L	30.0UJ ug/L	30.0UJ ug/L	30.0UJ ug/L
MERCURY	0.2U ug/L	0.2U ug/L	0.2U ug/L	0.2U ug/L
NICKEL	28 ug/L	20.0U ug/L	20.0U ug/L	20.0U ug/L
pH	5.5	4.9	6.1	5.8
SELENIUM	60.0UJ ug/L	60.0UJ ug/L	60.0UJ ug/L	60.0UJ ug/L
SILVER	6.0UJ ug/L	6.0UJ ug/L	6.0UJ ug/L	6.0UJ ug/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

PS207BN-NE

PS207BN-NW

PS207BN-SE

PS207BN-SW

PS207BN-T
TRIP BLANK

COMPOUND

***** VOLATILES *****

1,1,1-TRICHLOROETHANE	21UJ ug/kg	22U ug/kg	18UJ ug/kg	21U ug/kg	5U ug/L
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	21UJ ug/kg	22U ug/kg	18UJ ug/kg	21UJ ug/kg	5UJ ug/L
1,1,2-TRICHLOROETHANE	21UJ ug/kg	22UJ ug/kg	18UJ ug/kg	21U ug/kg	5U ug/L
1,1-DICHLOROETHENE	21UJ ug/kg	22U ug/kg	18UJ ug/kg	21U ug/kg	5U ug/L
2-BUTANONE	42UJ ug/kg	43U ug/kg	36UJ ug/kg	42U ug/kg	10U ug/L
4-METHYL-2-PENTANONE	42UJ ug/kg	43U ug/kg	36UJ ug/kg	42UJ ug/kg	10U ug/L
ACETONE	42UJ ug/kg	43UJ ug/kg	36UJ ug/kg	42UJ ug/kg	7U ug/L
BENZENE	21UJ ug/kg	22U ug/kg	18UJ ug/kg	21U ug/kg	5U ug/L
CARBON DISULFIDE	21UJ ug/kg	22UJ ug/kg	18UJ ug/kg	21UJ ug/kg	5U ug/L
CARBON TETRACHLORIDE	21UJ ug/kg	22U ug/kg	18UJ ug/kg	21U ug/kg	5U ug/L
CHLOROBENZENE	21UJ ug/kg	22U ug/kg	18UJ ug/kg	21UJ ug/kg	5U ug/L
ETHYL ACETATE	21U ug/kg	22U ug/kg	18U ug/kg	21U ug/kg	5U ug/L
ETHYL ETHER	21UJ ug/kg	22UJ ug/kg	18UJ ug/kg	21UJ ug/kg	5U ug/L
ETHYLBENZENE	21UJ ug/kg	22U ug/kg	18UJ ug/kg	21UJ ug/kg	5U ug/L
METHYLENE CHLORIDE	21UJ ug/kg	22U ug/kg	18UJ ug/kg	21U ug/kg	5U ug/L
TETRACHLOROETHENE	21UJ ug/kg	22U ug/kg	18UJ ug/kg	21UJ ug/kg	5U ug/L
TOLUENE	21UJ ug/kg	22U ug/kg	18UJ ug/kg	21UJ ug/kg	5U ug/L
TRICHLOROETHENE	21UJ ug/kg	22U ug/kg	18UJ ug/kg	21U ug/kg	5U ug/L
TRICHLOROFLUOROMETHANE	21UJ ug/kg	22UJ ug/kg	18UJ ug/kg	21UJ ug/kg	5U ug/L
XYLENE (total)	21UJ ug/kg	22U ug/kg	18UJ ug/kg	21UJ ug/kg	5U ug/L

***** SEMI-VOLATILES *****

1,2,4-TRICHLOROBENZENE	1400U ug/kg	1400U ug/kg	1200U ug/kg	1400U ug/kg	
1,2-DICHLOROBENZENE	1400U ug/kg	1400U ug/kg	1200U ug/kg	1400U ug/kg	
1,4-DICHLOROBENZENE	1400U ug/kg	1400U ug/kg	1200U ug/kg	1400U ug/kg	
2,4-DINITROTOLUENE	1400U ug/kg	1400U ug/kg	1200U ug/kg	1400U ug/kg	
2-NITROPROPANE	1400U ug/kg	1400U ug/kg	1200U ug/kg	1400U ug/kg	
ACENAPHTHENE	1400U ug/kg	1400U ug/kg	1200U ug/kg	1400U ug/kg	
CYCLOHEXANONE	1400U ug/kg	1400U ug/kg	1200U ug/kg	1400U ug/kg	
N-NITROSO-DI-N-PROPYLAMINE	1400U ug/kg	1400U ug/kg	1200U ug/kg	1400U ug/kg	
PYRENE	1400U ug/kg	1400U ug/kg	1200U ug/kg	1400U ug/kg	
PYRIDINE	1400UJ ug/kg	1400UJ ug/kg	1200UJ ug/kg	1400UJ ug/kg	

***** ALCOHOLS *****

2-ETHOXYETHANOL	500U mg/kg	500U mg/kg	500U mg/kg	500U mg/kg	
ISOBUTANOL	10U mg/kg	10U mg/kg	10U mg/kg	10U mg/kg	
METHANOL	10U mg/kg	10U mg/kg	10U mg/kg	10U mg/kg	
N-BUTYL ALCOHOL	10U mg/kg	10U mg/kg	10U mg/kg	10U mg/kg	

SAMPLE ID NUMBER:
SAMPLE TYPE:

PS207BN-NE PS207BN-NW PS207BN-SE PS207BN-SW PS207BN-T
TRIP BLANK

***** INORGANICS *****

ARSENIC	16.7UJ mg/kg	17.2UJ mg/kg	14.2UJ mg/kg	16.5UJ mg/kg
BARIUM	89.1J mg/kg	111J mg/kg	105J mg/kg	116J mg/kg
BORON	18.0U mg/kg	14.2U mg/kg	13.5U mg/kg	12.8J mg/kg
CADMIUM	6.7J mg/kg	6.9J mg/kg	8.5J mg/kg	12.8U mg/kg
CALCIUM				
CHROMIUM	7.9J mg/kg	31.9J mg/kg	33.3J mg/kg	19.8J mg/kg
LEAD	13.8J mg/kg	14.2J mg/kg	21.3J mg/kg	14.0J mg/kg
MAGNESIUM	3270 mg/kg	3940 mg/kg	3850 mg/kg	4160 mg/kg
MERCURY	0.8J mg/kg	0.7J mg/kg	0.3UJ mg/kg	0.4UJ mg/kg
NICKEL	8.4U mg/kg	9.5J mg/kg	7.1 mg/kg	8.2U mg/kg
POTASSIUM	1260U mg/kg	1350U mg/kg	1550U mg/kg	1350U mg/kg
SELENIUM	25.1UJ mg/kg	25.9UJ mg/kg	21.3UJ mg/kg	24.7UJ mg/kg
SILVER	2.5UJ mg/kg	2.6UJ mg/kg	2.1UJ mg/kg	2.5UJ mg/kg
SODIUM	1830U mg/kg	1990U mg/kg	1640U mg/kg	1850U mg/kg

***** MISCELLANEOUS *****

AMMONIA	20J mg/kg	23J mg/kg	35J mg/kg	9.8J mg/kg
ATTERBERG - LIQUID LIMIT	73	75	71	72
ATTERBERG - PLASTIC INDEX	40	40	34	35
ATTERBERG - PLASTIC LIMIT	33	35	37	37
BULK DENSITY (DRIED SOLIDS)	0.84 g/cc	0.87	0.88 g/cc	0.90 g/cc
CYANIDE - AMENABLE				
CYANIDE - TOTAL	0.25UJ mg/kg	0.25UJ mg/kg	0.25UJ mg/kg	0.25UJ mg/kg
GROSS ALPHA	9.4+-3.7J pCi/g	5.2+-3.0J pCi/g	11+-4J pCi/g	10 +/- 4J pCi/g
GROSS BETA	5.4+-3.4J pCi/g	5.1+-3.2J pCi/g	8.8+-3.8J pCi/g	9.8+-3.5J pCi/g
MOISTURE - GRAVIMETRIC	76.1 %	76.8 %	71.8 %	75.7 %
MOISTURE - KARL FISHER	23.5 %	25.3 %	25.7 %	27.9 %
pH	7.7	7.7J	7.6	7.6
SPECIFIC GRAVITY	1.2	1.2	1.2	1.2
SWELL TEST	0 %	10 %	10 %	10 %
TOC (Total Organic Carbon)	3300J mg/kg	3200J mg/kg	3400J mg/kg	3000J mg/kg

***** ASTM LEACH *****

CHLORIDE	13J mg/L	4J mg/L	8J mg/L	24J mg/L
NITRATE	8.7 mg/L	1.7 mg/L	9.8 mg/L	7.0 mg/L
PERCENT RECOVERY OF SOLIDS	18.2 %	16.6 %	25.8 %	22.4 %
PHOSPHORUS, TOTAL (AS P)	0.05L mg/L	0.01L mg/L	0.04L mg/L	0.02L mg/L
SULFATE	160 mg/L	160 mg/L	150 mg/L	150 mg/L
TDS (Total Dissolved Solids)	200 mg/L	220 mg/L	180 mg/L	160 mg/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

PS207BN-NE

PS207BN-NW

PS207BN-SE

PS207BN-SW

PS207BN-T
TRIP BLANK

***** TCLP LEACH *****

ARSENIC	R ug/L	R	R	R
BARIUM	1090J ug/L	1210 ug/L	1060J ug/L	1200J ug/L
CADMIUM	54.0 ug/L	67.0J ug/L	104J ug/L	67.0J ug/L
CHROMIUM	18.0 ug/L	10.0 ug/L	57.0 ug/L	10.0U ug/L
LEAD	30.0UJ ug/L	30.0UJ ug/L	30.0UJ ug/L	30.0UJ ug/L
MERCURY	0.2U ug/L	0.2U ug/L	0.2U ug/L	0.2U ug/L
NICKEL	20.0U ug/L	28.0 ug/L	20.0 ug/L	56.0 ug/L
pH	5.7	5.9	5.7	5.9
SELENIUM	60.0UJ ug/L	60.0UJ ug/L	60.0UJ ug/L	60.0UJ ug/L
SILVER	6.0UJ ug/L	6.0UJ ug/L	7.0U ug/L	6.0UJ ug/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

PS207BS-B
RINSATE BLANK

PS207BS-F
FIELD BLANK

PS207BS-NE

PS207BS-NW

PS207BS-NW-D
DUPLICATE

PS207BS-SE

COMPOUND

***** VOLATILES *****

1,1,1-TRICHLOROETHANE	5U ug/L	5U ug/L	42U ug/kg	62U ug/kg	62U ug/kg	45U ug/kg
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5UJ ug/L	5UJ ug/L	42U ug/kg	62UJ ug/kg	62UJ ug/kg	45U ug/kg
1,1,2-TRICHLOROETHANE	5U ug/L	5U ug/L	42U ug/kg	62U ug/kg	62U ug/kg	45U ug/kg
1,1-DICHLOROETHENE	5U ug/L	5U ug/L	42U ug/kg	62U ug/kg	62U ug/kg	45U ug/kg
2-BUTANONE	10U ug/L	10U ug/L	83U ug/kg	120U ug/kg	120U ug/kg	91U ug/kg
4-METHYL-2-PENTANONE	10U ug/L	10U ug/L	83U ug/kg	120U ug/kg	20U ug/kg	91U ug/kg
ACETONE	17U ug/L	10U ug/L	83UJ ug/kg	120U ug/kg	120U ug/kg	91UJ ug/kg
BENZENE	5U ug/L	5U ug/L	42U ug/kg	62U ug/kg	62U ug/kg	45U ug/kg
CARBON DISULFIDE	5U ug/L	5U ug/L	42U ug/kg	62U ug/kg	62U ug/kg	45U ug/kg
CARBON TETRACHLORIDE	5U ug/L	5U ug/L	42U ug/kg	62U ug/kg	62U ug/kg	45U ug/kg
CHLOROBENZENE	5U ug/L	5U ug/L	42U ug/kg	62U ug/kg	62U ug/kg	45U ug/kg
ETHYL ACETATE	5U ug/L	5U ug/L	42U ug/kg	62U ug/kg	62U ug/kg	45U ug/kg
ETHYL ETHER	5U ug/L	5U ug/L	42U ug/kg	62U ug/kg	62U ug/kg	45U ug/kg
ETHYLBENZENE	5U ug/L	5U ug/L	42U ug/kg	62U ug/kg	62U ug/kg	45U ug/kg
METHYLENE CHLORIDE	5U ug/L	5U ug/L	28U ug/kg	62U ug/kg	62U ug/kg	28U ug/kg
TETRACHLOROETHENE	5U ug/L	5U ug/L	46U ug/kg	210 ug/kg	260 ug/kg	230 ug/kg
TOLUENE	5U ug/L	5U ug/L	42U ug/kg	62U ug/kg	62U ug/kg	45U ug/kg
TRICHLOROETHENE	5U ug/L	5U ug/L	57 ug/kg	47J ug/kg	62U ug/kg	48 ug/kg
TRICHLOROFLUOROMETHANE	5UJ ug/L	5UJ ug/L	42U ug/kg	62UJ ug/kg	62UJ ug/kg	45U ug/kg
XYLENE (total)	5U ug/L	5U ug/L	42U ug/kg	62U ug/kg	62U ug/kg	45U ug/kg

***** SEMI-VOLATILES *****

1,2,4-TRICHLOROBENZENE	10U ug/L	10UJ ug/L	2700U ug/kg	4100U ug/kg	4100U ug/kg	3000U ug/kg
1,2-DICHLOROBENZENE	10U ug/L	10UJ ug/L	2700U ug/kg	4100U ug/kg	4100U ug/kg	3000U ug/kg
1,4-DICHLOROBENZENE	10U ug/L	10UJ ug/L	2700U ug/kg	4100U ug/kg	4100U ug/kg	3000U ug/kg
2,4-DINITROTOLUENE	10U ug/L	10UJ ug/L	2700U ug/kg	4100U ug/kg	4100U ug/kg	3000U ug/kg
2-NITROPROPANE	10U ug/L	10UJ ug/L	2700U ug/kg	4100U ug/kg	4100U ug/kg	3000U ug/kg
ACENAPHTHENE	10U ug/L	10UJ ug/L	2700U ug/kg	4100U ug/kg	4100U ug/kg	3000U ug/kg
CYCLOHEXANONE	10U ug/L	10UJ ug/L	2700U ug/kg	4100U ug/kg	4100U ug/kg	3000U ug/kg
N-NITROSO-DI-N-PROPYLAMINE	10U ug/L	10UJ ug/L	2700U ug/kg	4100U ug/kg	4100U ug/kg	3000U ug/kg
PYRENE	10UJ ug/L	10UJ ug/L	2700U ug/kg	4100U ug/kg	4100U ug/kg	3000U ug/kg
PYRIDINE	10UJ ug/L	10UJ ug/L	2700UJ ug/kg	4100UJ ug/kg	4100UJ ug/kg	3000UJ ug/kg

***** ALCOHOLS *****

2-ETHOXYETHANOL	50U mg/L	50U mg/L	500U mg/kg	500U mg/kg	500UJ mg/kg	500U mg/kg
ISOBUTANOL	1U mg/L	1U mg/L	10U mg/kg	10U mg/kg	10U mg/kg	10U mg/kg
METHANOL	1U mg/L	1U mg/L	10U mg/kg	10U mg/kg	10U mg/kg	10U mg/kg
N-BUTYL ALCOHOL	1U mg/L	1U mg/L	10U mg/kg	10U mg/kg	10U mg/kg	10U mg/kg

SAMPLE ID NUMBER:
 SAMPLE TYPE:

PS207BS-B PS207BS-F PS207BS-NE PS207BS-NW PS207BS-NW-D PS207BS-SE
 RINSATE BLANK FIELD BLANK DUPLICATE

***** INORGANICS *****

ARSENIC	40U ug/L	40.0U ug/L	34.2UJ mg/kg	50.6UJ mg/kg	59.7J mg/kg	37.0UJ mg/kg
BARIUM	3.0U ug/L	3.0U ug/L	80.3J mg/kg	124 mg/kg	134J mg/kg	133J mg/kg
BORON	13.0U ug/L	11.0U ug/L	336J mg/kg	106U mg/kg	112U mg/kg	77.8U mg/kg
CADMIUM	5.0U ug/L	5.0U ug/L	26.5J mg/kg	30.4J mg/kg	28.6J mg/kg	7.4J mg/kg
CALCIUM	20.0U ug/L	20.0U ug/L				
CHROMIUM	10.0UJ ug/L	10.0UJ ug/L	41.9J mg/kg	51.9J mg/kg	45.5J mg/kg	25.9J mg/kg
LEAD	30.0U ug/L	30.0U ug/L	25.6UJ mg/kg	38.0UJ mg/kg	61.0J mg/kg	27.8UJ mg/kg
MAGNESIUM	20.0U ug/L	20.0U ug/L	10200 mg/kg	13800 mg/kg	15200 mg/kg	5140 mg/kg
MERCURY	0.2U ug/L	0.2U ug/L	0.9UJ mg/kg	1.0UJ mg/kg	5.0J mg/kg	1.0UJ mg/kg
NICKEL	20.0U ug/L	20.0U ug/L	17.1U mg/kg	25.3U mg/kg	26.0U mg/kg	18.5U mg/kg
POTASSIUM	673U ug/L	479U ug/L	8910 mg/kg	12100U mg/kg	12900U mg/kg	5580U mg/kg
SELENIUM	300U ug/L	60.0U ug/L	51.3UJ mg/kg	75.9UJ mg/kg	77.9UJ mg/kg	55.6UJ mg/kg
SILVER	6.0U ug/L	6.0U ug/L	5.1UJ mg/kg	26.6U mg/kg	40.3U mg/kg	5.6UJ mg/kg
SODIUM	581U ug/L	431U ug/L	30000 mg/kg	42100 mg/kg	44600 mg/kg	4080U mg/kg

***** MISCELLANEOUS *****

AMMONIA			10U mg/kg	17J mg/kg	22J mg/kg	34J mg/kg
ATTERBERG - LIQUID LIMIT						
ATTERBERG - PLASTIC INDEX						
ATTERBERG - PLASTIC LIMIT						
BULK DENSITY (DRIED SOLIDS)						
CYANIDE - AMENABLE						
CYANIDE - TOTAL	0.005UJ mg/L	0.005UJ mg/L	0.72J mg/kg	4.1J mg/kg	0.89J mg/kg	0.55J mg/kg
GROSS ALPHA	3UJ pCi/L	3UJ pCi/L	61 +/- 8J pCi/g	32 +/- 6J pCi/G	31 +/- 6J pCi/g	37 +/- 6J pCi/g
GROSS BETA	6UJ pCi/L	6UJ pCi/L	47 +/- 6J pCi/g	24 +/- 4J pCi/G	22 +/- 5J pCi/g	22 +/- 4J pCi/g
MOISTURE - GRAVIMETRIC			88.3 %	92.1 %	92.3 %	89.2 %
MOISTURE - KARL FISHER			43 %	50 %		39 %
pH			9.1	9.1	9.1	9.1
SPECIFIC GRAVITY			1.1	1.0		1.1
SWELL TEST						
TOC (Total Organic Carbon)			9200J mg/kg	11000J mg/kg	6800J mg/kg	8400J mg/kg

***** ASTM LEACH *****

CHLORIDE			200U mg/L	200U mg/L	200U mg/L	200U mg/L
NITRATE			89 mg/L	77 mg/L	89 mg/L	86 mg/L
PERCENT RECOVERY OF SOLIDS			8.6 %	6.4 %	9.0 %	8.2 %
PHOSPHORUS, TOTAL (AS P)			1.7 mg/L	0.09 mg/L	0.61 mg/L	1.4 mg/L
SULFATE			30 mg/L	40 mg/L	36 mg/L	31 mg/L
TDS (Total Dissolved Solids)			760 mg/L	790 mg/L	760 mg/L	770 mg/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

PS207BS-SW

PS207BS-T
TRIP BLANK

COMPOUND

***** VOLATILES *****

1,1,1-TRICHLOROETHANE	45U ug/kg	5U ug/L
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	45UJ ug/kg	5UJ ug/L
1,1,2-TRICHLOROETHANE	45U ug/kg	5U ug/L
1,1-DICHLOROETHENE	45U ug/kg	5U ug/L
2-BUTANONE	91U ug/kg	10U ug/L
4-METHYL-2-PENTANONE	91U ug/kg	10U ug/L
ACETONE	91U ug/kg	15U ug/L
BENZENE	45U ug/kg	5U ug/L
CARBON DISULFIDE	45U ug/kg	5U ug/L
CARBON TETRACHLORIDE	45U ug/kg	5U ug/L
CHLOROBENZENE	45U ug/kg	5U ug/L
ETHYL ACETATE	45U ug/kg	5U ug/L
ETHYL ETHER	45U ug/kg	5U ug/L
ETHYLBENZENE	45U ug/kg	5U ug/L
METHYLENE CHLORIDE	45U ug/kg	5U ug/L
TETRACHLOROETHENE	32J ug/kg	5U ug/L
TOLUENE	45U ug/kg	5U ug/L
TRICHLOROETHENE	45U ug/kg	5U ug/L
TRICHLOROFLUOROMETHANE	45UJ ug/kg	5U ug/L
XYLENE (total)	45U ug/kg	9 ug/L

***** SEMI-VOLATILES *****

1,2,4-TRICHLOROBENZENE	3000U ug/kg
1,2-DICHLOROBENZENE	3000U ug/kg
1,4-DICHLOROBENZENE	3000U ug/kg
2,4-DINITROTOLUENE	3000U ug/kg
2-NITROPROPANE	3000U ug/kg
ACENAPHTHENE	3000U ug/kg
CYCLOHEXANONE	3000U ug/kg
N-NITROSO-DI-N-PROPYLAMINE	3000U ug/kg
PYRENE	3000U ug/kg
PYRIDINE	3000UJ ug/kg

***** ALCOHOLS *****

2-ETHOXYETHANOL	500U mg/kg
ISOBUTANOL	10U mg/kg
METHANOL	10U mg/kg
N-BUTYL ALCOHOL	10U mg/kg

SAMPLE ID NUMBER:
SAMPLE TYPE:

PS207BS-SW PS207BS-T
TRIP BLANK

***** INORGANICS *****

ARSENIC	36.0UJ mg/kg
BARIUM	62.2J mg/kg
BORON	349J mg/kg
CADMIUM	20.7J mg/kg
CALCIUM	
CHROMIUM	25.2J mg/kg
LEAD	27.0UJ mg/kg
MAGNESIUM	8170 mg/kg
MERCURY	0.9UJ mg/kg
NICKEL	18.0U mg/kg
POTASSIUM	8800U mg/kg
SELENIUM	54.1UJ mg/kg
SILVER	5.4UJ mg/kg
SODIUM	31200 mg/kg

***** MISCELLANEOUS *****

AMMONIA	21J mg/kg
ATTERBERG - LIQUID LIMIT	
ATTERBERG - PLASTIC INDEX	
ATTERBERG - PLASTIC LIMIT	
BULK DENSITY (DRIED SOLIDS)	
CYANIDE - AMENABLE	
CYANIDE - TOTAL	0.46J mg/kg
GROSS ALPHA	31 +/- 6J pCi/g
GROSS BETA	21 +/- 4J pCi/g
MOISTURE - GRAVIMETRIC	88.9 %
MOISTURE - KARL FISHER	49 %
pH	9.1
SPECIFIC GRAVITY	1.1
SWELL TEST	
TOC (Total Organic Carbon)	7800J mg/kg

***** ASTM LEACH *****

CHLORIDE	200U mg/L
NITRATE	80 mg/L
PERCENT RECOVERY OF SOLIDS	12.4 %
PHOSPHORUS, TOTAL (AS P)	0.3 mg/L
SULFATE	23 mg/L
TDS (Total Dissolved Solids)	740 mg/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

PS207BS-SW

PS207BS-T
TRIP BLANK

***** TCLP LEACH *****

ARSENIC	195J	ug/L
BARIUM	1660J	ug/L
CADMIUM	21.0	ug/L
CHROMIUM	23.0	ug/L
LEAD	30.0UJ	ug/L
MERCURY	0.2U	ug/L
NICKEL	20.0U	ug/L
pH	5.7	
SELENIUM	60.0UJ	ug/L
SILVER	6.0UJ	ug/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

CS-0008
RINSATE BLANK

CS-000F
FIELD BLANK

CS-000T
TRIP BLANK

CS-001

CS-001D
DUPLICATE

CS-002

COMPOUND

***** VOLATILES *****

1,1,1-TRICHLOROETHANE	5U ug/L	5U ug/L	5U ug/L	26J ug/kg	9J ug/kg	18U ug/kg
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5U ug/L	5U ug/L	5U ug/L	100J ug/kg	73J ug/kg	45J ug/kg
1,1,2-TRICHLOROETHANE	5U ug/L	5U ug/L	5U ug/L	16U ug/kg	7U ug/kg	18U ug/kg
1,1-DICHLOROETHENE	5U ug/L	5U ug/L	5U ug/L	16U ug/kg	7U ug/kg	18U ug/kg
2-BUTANONE	10U ug/L	10U ug/L	10U ug/L	180J ug/kg	92J ug/kg	87J ug/kg
4-METHYL-2-PENTANONE	10U ug/L	10U ug/L	10U ug/L	32U ug/kg	15U ug/kg	36U ug/kg
ACETONE	10U ug/L	10U ug/L	10U ug/L	32UJ ug/kg	15UJ ug/kg	36UJ ug/kg
BENZENE	5U ug/L	5U ug/L	5U ug/L	16U ug/kg	7U ug/kg	18U ug/kg
CARBON DISULFIDE	5U ug/L	5U ug/L	5U ug/L	16U ug/kg	7U ug/kg	18U ug/kg
CARBON TETRACHLORIDE	5U ug/L	5U ug/L	5U ug/L	16U ug/kg	7U ug/kg	18U ug/kg
CHLOROBENZENE	5U ug/L	5U ug/L	5U ug/L	16U ug/kg	7U ug/kg	18U ug/kg
ETHYL ACETATE	5U ug/L	5U ug/L	5U ug/L	16U ug/kg	7U ug/kg	18UJ ug/kg
ETHYL ETHER	5U ug/L	5U ug/L	5U ug/L	16U ug/kg	7U ug/kg	18U ug/kg
ETHYLBENZENE	5U ug/L	5U ug/L	5U ug/L	16U ug/kg	7U ug/kg	18U ug/kg
METHYLENE CHLORIDE	5U ug/L	5U ug/L	5U ug/L	16U ug/kg	7U ug/kg	18UJ ug/kg
TETRACHLOROETHENE	5U ug/L	5U ug/L	5U ug/L	1000J ug/kg	280J ug/kg	320 ug/kg
TOLUENE	5U ug/L	5U ug/L	5U ug/L	16U ug/kg	7J ug/kg	18U ug/kg
TRICHLOROETHENE	5U ug/L	5U ug/L	5U ug/L	16U ug/kg	7U ug/kg	18U ug/kg
TRICHLOROFLUOROMETHANE	5U ug/L	5U ug/L	5U ug/L	16U ug/kg	7U ug/kg	18U ug/kg
XYLENE (total)	5U ug/L	5U ug/L	5U ug/L	55U ug/kg	14U ug/kg	18U ug/kg

***** SEMI-VOLATILES *****

1,2,4-TRICHLOROBENZENE	10U ug/L	10U ug/L		1100U ug/kg	490U ug/kg	1200U ug/kg
1,2-DICHLOROBENZENE	10U ug/L	10U ug/L		1100U ug/kg	490U ug/kg	1200U ug/kg
1,4-DICHLOROBENZENE	10U ug/L	10U ug/L		1100U ug/kg	490U ug/kg	1200U ug/kg
2,4-DINITROTOLUENE	10U ug/L	10U ug/L		1100U ug/kg	490U ug/kg	1200U ug/kg
2-NITROPROPANE	10UJ ug/L	10UJ ug/L		1100UJ ug/kg	490UJ ug/kg	1200UJ ug/kg
ACENAPHTHENE	10U ug/L	10U ug/L		1100U ug/kg	490U ug/kg	1200U ug/kg
CYCLOHEXANONE	10U ug/L	10U ug/L		1100U ug/kg	490U ug/kg	1200U ug/kg
N-NITROSO-DI-N-PROPYLAMINE	10U ug/L	10U ug/L		1100U ug/kg	490U ug/kg	1200U ug/kg
PYRENE	10UJ ug/L	10UJ ug/L		1100U ug/kg	490UJ ug/kg	1200U ug/kg
PYRIDINE	10UJ ug/L	10UJ ug/L		1100UJ ug/kg	490UJ ug/kg	1200U ug/kg

***** ALCOHOLS *****

2-ETHOXYETHANOL	50U mg/L	50U mg/L		500U mg/kg	500UJ mg/kg	500U mg/kg
ISOBUTANOL	1U mg/L	1U mg/L		10U mg/kg	10U mg/kg	10U mg/kg
METHANOL	1U mg/L	1U mg/L		10U mg/kg	10U mg/kg	10U mg/kg
N-BUTYL ALCOHOL	1U mg/L	1U mg/L		10U mg/kg	10U mg/kg	10U mg/kg

SAMPLE ID NUMBER:
 SAMPLE TYPE:

CS-000B CS-000F CS-000T CS-001 CS-001D CS-002
 RINSATE BLANK FIELD BLANK TRIP BLANK DUPLICATE

***** INORGANICS *****

ARSENIC	40.0U ug/L	40.0U ug/L	21.9J mg/kg	13.5J mg/kg	14.5UJ mg/kg
BARIUM	3.0U ug/L	3.0U ug/L	217J mg/kg	94.8J mg/kg	215J mg/kg
BORON	41.0 ug/L	99.0 ug/L	687J mg/kg	420J mg/kg	1230J mg/kg
CADMIUM	5.0UJ ug/L	5.0UJ ug/L	4660J mg/kg	2010J mg/kg	3690J mg/kg
CALCIUM	280 ug/L	242 ug/L			
CHROMIUM	10.0UJ ug/L	10.0UJ ug/L	2640J mg/kg	1180J mg/kg	3190J mg/kg
LEAD	30.0U ug/L	30.0U ug/L	182J mg/kg	83.0J mg/kg	191J mg/kg
MAGNESIUM	20.0U ug/L	20.0U ug/L	24200J mg/kg	10400J mg/kg	23300J mg/kg
MERCURY	0.2UJ ug/L	0.2UJ ug/L	5.0 mg/kg	5.3J mg/kg	12 mg/kg
NICKEL	20.0UJ ug/L	20.0UJ ug/L	738J mg/kg	339J mg/kg	902J mg/kg
POTASSIUM	1200 ug/L	1730 ug/L	62300J mg/kg	28700J mg/kg	67900J mg/kg
SELENIUM	60.0U ug/L	60.0U ug/L	194UJ mg/kg	89.7UJ mg/kg	218UJ mg/kg
SILVER	6.0UJ ug/L	6.0UJ ug/L	156J mg/kg	64.6J mg/kg	153J mg/kg
SODIUM	1410J ug/L	1210J ug/L	84000J mg/kg	39200J mg/kg	95900J mg/kg

***** MISCELLANEOUS *****

AMMONIA			84 mg/kg	64 mg/kg	28 mg/kg
ATTERBERG - LIQUID LIMIT					
ATTERBERG - PLASTIC INDEX					
ATTERBERG - PLASTIC LIMIT					
BULK DENSITY (DRIED SOLIDS)					
CYANIDE - AMENABLE					
CYANIDE - TOTAL	0.005UJ mg/L	0.005UJ mg/L	25J mg/kg	21J mg/kg	190J mg/kg
GROSS ALPHA	3U pCi/L	3U pCi/L	6600+-700 pCi/g	6300+-700 pCi/g	3400+-400 pCi/g
GROSS BETA	6U pCi/L	6U pCi/L	780+-80 pCi/g	860+-90 pCi/g	540+-60 pCi/g
MOISTURE - GRAVIMETRIC			69.0J %	33.1J %	72.5J %
MOISTURE - KARL FISHER					
pH			9.7	9.7	9.8
SPECIFIC GRAVITY					
SWELL TEST					
TOC (Total Organic Carbon)			3500J mg/kg	6200J mg/kg	4600J mg/kg

***** ASTM LEACH *****

CHLORIDE			160 mg/L	160 mg/L	180 mg/L
NITRATE			410 mg/L	450 mg/L	440 mg/L
PERCENT RECOVERY OF SOLIDS			22.2 %	21.0 %	18.0 %
PHOSPHORUS, TOTAL (AS P)			51 mg/L	52 mg/L	33 mg/L
SULFATE			210 mg/L	220 mg/L	260 mg/L
TDS (Total Dissolved Solids)			4600 mg/L	4800 mg/L	5000 mg/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

CS-000B
RINSATE BLANK

CS-000F
FIELD BLANK

CS-000T
TRIP BLANK

CS-001

CS-001D
DUPLICATE

CS-002

***** TCLP LEACH *****

ARSENIC	R		R	224J ug/L	282J ug/L	243J ug/L
BARIUM	59.0J ug/L		64.0J ug/L	530J ug/L	369U ug/L	360U ug/L
CADMIUM	R		R	14800J ug/L	17400 ug/L	25900J ug/L
CHROMIUM	50.0 ug/L		10.0UJ ug/L	214J ug/L	326J ug/L	485J ug/L
LEAD	30.0U ug/L		30.0U ug/L	30.0U ug/L	30.0U ug/L	30.0U ug/L
MERCURY	0.2U ug/L		0.2U ug/L	0.2U ug/L	0.2U ug/L	0.9 ug/L
NICKEL	20.0UJ ug/L		20.0UJ ug/L	7010J ug/L	6990J ug/L	8300J ug/L
pH	6.0		5.9	4.9	4.8	4.6
SELENIUM	87.0J ug/L		60.0UJ ug/L	60.0UJ ug/L	60.0UJ ug/L	60.0UJ ug/L
SILVER	30.0U ug/L		6.0U ug/L	6.0U ug/L	11.0 ug/L	10.0 ug/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

CS-003

COMPOUND

***** VOLATILES *****

1,1,1-TRICHLOROETHANE	29	ug/kg
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	150J	ug/kg
1,1,2-TRICHLOROETHANE	16U	ug/kg
1,1-DICHLOROETHENE	16U	ug/kg
2-BUTANONE	130J	ug/kg
4-METHYL-2-PENTANONE	31U	ug/kg
ACETONE	31UJ	ug/kg
BENZENE	16U	ug/kg
CARBON DISULFIDE	16U	ug/kg
CARBON TETRACHLORIDE	16U	ug/kg
CHLOROBENZENE	16U	ug/kg
ETHYL ACETATE	16UJ	ug/kg
ETHYL ETHER	16U	ug/kg
ETHYLBENZENE	16U	ug/kg
METHYLENE CHLORIDE	16UJ	ug/kg
TETRACHLOROETHENE	830J	ug/kg
TOLUENE	16U	ug/kg
TRICHLOROETHENE	16U	ug/kg
TRICHLOROFUOROMETHANE	16UJ	ug/kg
XYLENE (total)	49U	ug/kg

***** SEMI-VOLATILES *****

1,2,4-TRICHLOROBENZENE	1000U	ug/kg
1,2-DICHLOROBENZENE	1000U	ug/kg
1,4-DICHLOROBENZENE	1000U	ug/kg
2,4-DINITROTOLUENE	1000U	ug/kg
2-NITROPROPANE	1000UJ	ug/kg
ACENAPHTHENE	1000U	ug/kg
CYCLOHEXANONE	1000U	ug/kg
N-NITROSO-DI-N-PROPYLAMINE	1000U	ug/kg
PYRENE	1000U	ug/kg
PYRIDINE	1000UJ	ug/kg

***** ALCOHOLS *****

2-ETHOXYETHANOL	500U	mg/kg
ISOBUTANOL	10U	mg/kg
METHANOL	10U	mg/kg
N-BUTYL ALCOHOL	10U	mg/kg

SAMPLE ID NUMBER:
SAMPLE TYPE:

CS-003

***** INORGANICS *****

ARSENIC	12.50J	mg/kg
BARIUM	207J	mg/kg
BORON	1380J	mg/kg
CADMIUM	4280J	mg/kg
CALCIUM		
CHROMIUM	2900J	mg/kg
LEAD	187J	mg/kg
MAGNESIUM	24100J	mg/kg
MERCURY	14	mg/kg
NICKEL	822J	mg/kg
POTASSIUM	67100J	mg/kg
SELENIUM	1870J	mg/kg
SILVER	166J	mg/kg
SODIUM	96300J	mg/kg

***** MISCELLANEOUS *****

AMMONIA	71	mg/kg
ATTERBERG - LIQUID LIMIT		
ATTERBERG - PLASTIC INDEX		
ATTERBERG - PLASTIC LIMIT		
BULK DENSITY (DRIED SOLIDS)		
CYANIDE - AMENABLE		
CYANIDE - TOTAL	110J	mg/kg
GROSS ALPHA	4700+-500	pCi/g
GROSS BETA	600+-60	pCi/g
MOISTURE - GRAVIMETRIC	67.9J	%
MOISTURE - KARL FISHER		
PH	9.8	
SPECIFIC GRAVITY		
SWELL TEST		
TOC (Total Organic Carbon)	6400J	mg/kg

***** ASTM LEACH *****

CHLORIDE	170	mg/L
NITRATE	420	mg/L
PERCENT RECOVERY OF SOLIDS	21.4	%
PHOSPHORUS, TOTAL (AS P)	47	mg/L
SULFATE	280	mg/L
TDS (Total Dissolved Solids)	5400	mg/L

SAMPLE ID NUMBER:
SAMPLE TYPE:

CS-003

***** TCLP LEACH *****

ARSENIC	231J	ug/L
BARIUM	291U	ug/L
CADMIUM	24500J	ug/L
CHROMIUM	425J	ug/L
LEAD	34.0	ug/L
MERCURY	4.9	ug/L
NICKEL	7300J	ug/L
pH	4.7	
SELENIUM	60.00UJ	ug/L
SILVER	10.0	ug/L

APPENDIX B

DATA VALIDATION COVER LETTERS



C-49-10-1-331

TO: RICH NINESTEEL

DATE: OCTOBER 28, 1991

FROM: KENT WEAVER ^{Kew}

COPIES: D. A. SCHEIB

SUBJECT: ORGANIC DATA VALIDATION - VOA/BNAs
ROCKY FLATS
CASE NO. RFP1, SDG PKG1

SAMPLES:

Volatiles:

13/soil/PS207BC-NE, PS207BC-NW, PS207BC-SE, PS207BC-SW
PS207BN-NE, PS207BN-NW, PS207BN-SE, PS207BN-SW,
PS207BS-NE, PS207BS-NW, PS207BS-NWD, PS207BS-SE,
PS207BS-SW

23/aqueous/PS207BC-T, PS207BN-T, PS207BS-B, PS207BS-F,
PS207BS-T, PW207BC-NE, PW207BC-NW, PW207BC-SE,
PW207BC-SW, PW207BC-T, PW207BN-NE, PW207BN-NW,
PW207BN-SE, PW207BN-SW, PW207BN-T, PW207BS-B,
PW207BS-F, PW207BS-NE, PW207BS-NW, PW207BS-NWD,
PW207BS-SE, PW207BS-SW, PW207BS-T

Semivolatiles:

13/soil/PS207BC-NE, PS207BC-NW, PS207BC-SE, PS207BC-SW,
PS207BN-NE, PS207BN-NW, PS207BN-SE, PS207BN-SW,
PS207BS-NE, PS207BS-NW, PS207BS-NWD, PS207BS-SE,
PS207BS-SW

17/aqueous/PS207BS-B, PS207BS-F, PW207BC-NE, PW207BC-NW,
PW207BC-SE, PW207BC-SW, PW207BN-NE, PW207BN-NW,
PW207BN-SE, PW207BN-SW, PW207BS-F, PW207BS-NE,
PW207BS-NW, PW207BS-NWD, PW207BS-SE, PW207BS-SW,
PW207BS-B

A validation was performed on the organic analytical data from the volatile and semivolatile fractions of Case No. RFP 1, SDG PKG 1, low level soil and aqueous samples collected by HALLIBURTON NUS Environmental Corporation at the Rocky Flats site. The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Organic Analyses" as applied for use within Region VIII and were evaluated based on the following parameters:

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- * • Data Completeness
- * • Holding Times
- * • GC/MS Tuning
- Calibrations
- Blanks
- Surrogate Spike Recoveries
- * • Matrix Spike/Matrix Spike Duplicate Results
- * • Field Duplicate Performance
- Internal Standard Precision
- * • Compound Identification
- * • Compound Quantification

* - All quality control criteria were met for this parameter.

The attached Table I summarizes the validation recommendations which were based on the following information:

CALIBRATIONS

The following tables summarize calibration non-compliances and corresponding actions. The key associated with these tables is presented on page six of this memorandum.

Volatiles

<u>Compound</u>	<u>IC</u> <u>08/21/91</u>
trichlorofluoromethane	XX
1,1,2-trichloro-1,2,2-trifluoroethane (a.k.a. freon-113)	XX
acetone	X
trichloroethene	X

Associated Samples: PS207BC-(NE,NW,SE,SW), PS207BN-T,
PS207BS-(B,F,NW,NWD,SW,T), PW207BS-
(B,F,NE,NW,SE,SW,T)

Nondetects for trichlorofluoromethane and freon-113 in these samples are qualified as estimated, "UJ". Positive results for trichloroethene in sample PS207BS-NW and acetone in four samples are qualified as estimated, "J". No other qualifications were made as either no positive results were reported for the other compounds in affected samples or affected positive results are qualified due to blank contamination.

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<u>Compound</u>	CC <u>08/19/91</u>
acetone	X
4-methyl-2-pentanone	X

Associated Samples: PW207BN-(NW,NE,SE)

No qualifications were made because no positive results were reported for these compounds in affected samples.

<u>Compound</u>	CC <u>08/20/91</u>
acetone	XX
carbon disulfide	XX
trichlorofluoromethane	XX
freon-113	XX
ethyl ether	XX
1,1,1-trichloroethane	X
carbon tetrachloride	X
trichloroethene	X
1,1,2-trichloroethane	X

Associated Samples: PS207BN-(NW,NE,SW,SE)

Nondetects for acetone, carbon disulfide, trichlorofluoromethane, freon-113, and ethyl ether in these samples are qualified as estimated, "UJ". No other qualifications were made as no positive results were reported for the other compounds in affected samples.

<u>Compound</u>	CC <u>08/20/91</u>
acetone	XX
carbon disulfide	XX
4-methyl-2-pentanone	XX
1,1,1-trichloroethane	X
carbon tetrachloride	X
benzene	X
trichlorofluoromethane	X
ethyl ether	X
ethyl acetate	X

Associated Samples: PS207BC-T, PW207BC-(T,NW,NE,SW,SE),
PW207BN-(T,SW), PW207BS-NWD.

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Nondetects for acetone, carbon disulfide, and 4-methyl-2-pentanone (not qualified for blank contamination) are qualified as estimated, "UJ", in affected samples. No other qualifications were made as no positive results were reported for the other compounds in affected samples.

<u>Compound</u>	CC <u>08/21/91</u>
trichloroethene	X
4-methyl-2-pentanone	X
ethyl acetate	X

Associated Samples: PS207BS-SW

No actions were required as no positive results were reported for these compounds in the affected samples.

<u>Compound</u>	CC <u>08/21/91</u>
freon-113	X

Associated Samples: PS207BC-(NW,NE,SW,SE), PS207BS-(NW,NWD)

No actions were required as no positive results were reported for this compound in the affected samples.

<u>Compound</u>	CC <u>08/22/91</u>
acetone	X
4-methyl-2-pentanone	X
ethyl acetate	X

Associated Samples: PS207BN-T, PW207BS-(NW,NE,SE,SW,B)

The positive result for acetone in sample PS207BN-T is qualified as estimated, "J". No other qualifications were made because no positive results were reported for these compounds in affected samples which were not qualified due to blank contamination.

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<u>Compound</u>	CC <u>08/26/91</u>
acetone	XX
carbon disulfide	X
trichlorofluoromethane	X
ethyl acetate	X

Associated Samples: PS207BS-(NE,SE)

Nondetects for acetone are qualified as estimated, "UJ", in these samples. No other qualifications were made as no positive results were reported for the other compounds in the affected samples.

<u>Compound</u>	CC <u>08/27/91</u>
1,1,1-trichloroethane	X

Associated Samples: PS207BS-(T,B,F), PW207BS-(T,F)

No actions were required as no positive results were reported for this compound in the affected samples.

Semivolatiles

<u>Compound</u>	CC <u>08/30/91</u>
pyridine	XX
2-fluorobiphenyl	X
1,2,4-trichlorobenzene	X

Associated Samples: PW207BN-(NW,NE,SW,SE), PW207BC-(NW,NE,SW,SE)

Nondetects for pyridine in these samples are qualified as estimated, "UJ". No other qualifications were made as no positive results were reported for the other compound in affected samples.

<u>Compound</u>	CC <u>08/30/91</u>
pyridine	XX
1,2,4-trichlorobenzene	X

Associated samples: PS207BN-(NW,NE,SW,SE), PS207BC-(NW,NE,SW,SE)

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Nondetects for pyridine in these samples are qualified as estimated, "UJ". No other qualifications were made as no positive results were reported for the other compound in affected samples.

<u>Compound</u>	<u>CC</u> <u>09/01/91</u>
pyridine	XX
2-fluorobiphenyl	X
1,2,4,-trichlorobenzene	X

Associated Samples: PW207BS-(NW,NWD,NE,SW,SE,B,F), PS207BS-B

Nondetects for pyridine are qualified as estimated, "UJ", in these samples. No other qualifications were made as no positive results were reported for the other compounds in affected samples.

<u>Compound</u>	<u>CC</u> <u>09/06/91</u>
pyridine	XX

Associated Samples: PS207BS-F

The nondetect for pyridine in the associated sample is qualified as estimated, "UJ".

<u>Compound</u>	<u>CC</u> <u>09/10/91</u>
pyridine	XX
pyrene	X

Associated Samples: PS207BS-(NW,NWD,NE,SW,SE)

Nondetects for pyridine are qualified as estimated, "UJ", in these samples. No other qualifications were made as no positive results were reported for pyrene in affected samples.

<u>Compound</u>	<u>CC</u> <u>09/12/91</u>
pyridine	XX
1,2,4-trichlorobenzene	X
2,4-dinitrotoluene	X

Associated Samples: PS207BS-FRE

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The nondetect for pyridine in the associated sample is qualified as estimated, "UJ". No other qualifications were made as no positive results were reported for the other compounds in affected samples.

Calibration Key:

- X - Percent RSD > 30; percent D > 25; Estimate (J) positive results.
- XX - Percent RSD > 50; percent D > 50; Estimate (J) positive results and estimate (UJ) nondetects.

BLANKS

Volatiles

Laboratory method rinsate, field, and trip blanks contained the following contaminants in the maximum amounts indicated below:

Waters:

<u>Compound</u>	<u>Maximum Concentration</u>
methylene chloride	6 ug/kg
acetone	15 ug/l
2-butanone	5 ug/kg
freon-113	25 ug/kg
ethylbenzene	3 ug/l
total xylenes	9 ug/l
4-methyl-2-pentanone	5 ug/kg

Associated Samples: All waters

Soils:

<u>Compound</u>	<u>Maximum Concentration</u>
acetone	33 ug/l
toluene	4 ug/l
total xylenes	4 ug/l

Associated Samples: All soils

Action levels of ten times the maximum amount of common contaminants and five times the maximum amount of the other contaminants were used to evaluate the data.

Blank Actions:

- o Value < CRQL; report CRQL followed by a U.
- o Value > CRQL and < action level; report value followed by a U.
- o Value > CRQL and > action level; report value unqualified.

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No actions were taken for 2-butanone, freon, ethylbenzene, and 4-methyl-2-pentanone in affected samples as no positive results were reported for these compounds.

SURROGATE SPIKE RECOVERIES

The percent recoveries of the following surrogates do not meet the Contract Required Recovery (CRR) range:

<u>Sample</u>	<u>Compound</u>	<u>Percent Recovery</u>	<u>QC Limits</u>
PW207BS-NW	1,2-Dichloroethane-d4	118	76-114
PS207BS-F	2-Fluorobiphenyl	38	43-116
	Terphenyl	32	33-141

Surrogate Recovery Actions:

- Percent Recovery < 10%; Estimate (J) positive results and Reject (R) all nondetects.
- Percent Recovery 10% - CRR; Estimate, (J) positive results and (UJ) all nondetects.
- Percent Recovery > CRR; Estimate (J) positive results and (UJ) all nondetects.

Associated nondetects for samples PW207BS-NW and PS207BS-F are qualified as estimated, "UJ". Associated positive results are qualified due to blank contamination, therefore, no further actions were required.

Internal Standards

The internal standard areas for the following samples were outside the quality control (QC) limits:

Volatiles

<u>Sample</u>	<u>Internal Standard</u>	<u>Area</u>	<u>QC Limits</u>
PS207BN-NE	BCM	58100	58500-234000
	DFB	254000	258000-1032000
	CBZ	83500	122000-488000
PS207BN-SE	BCM	51900	58500-234000
	DFB	255000	258000-1032000
	CBZ	88700	122000-488000
PS207BN-SW	CBZ	91600	122000-488000

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BCM - Bromochloromethane
DFB - 1,4-difluorobenzene
CBZ - Chlorobenzene

Semivolatiles

<u>Sample</u>	<u>Internal Standard</u>	<u>Area</u>	<u>QC Limits</u>
PS207BC-NE	ANT	20200	21750-87000
PS207BC-SE	NPT	38900	39800-159200
	ANT	17100	21750-87000
	PHN	23000	26000-104000
PS207BC-SW	ANT	19200	21750-87000
	PHN	22900	26000-104000
PS207BN-NW	PHN	25100	26000-104000
PS207BS-NWD	PRY	64100	16000-64000
PS207BS-B	CRY	7180	9750-39000
PW207BS-B	CRY	7670	9750-39000
PW207BS-F	CRY	8080	9750-39000
PW207BS-SW	CRY	9430	9750-39000

ANT - Acenaphthene
NPT - Naphthalene-d8
PHN - Phenanthrene-d10
CRY - Chrysene-d12
PRY - Perylene-d12

Internal Standards Actions:

- Internal standard area outside QC limits; (J) positive results and (UJ) all associated nondetects.
- Reject (R) data if internal standards are extremely poor.

Associated nondetects in samples PS207BN-NE, PS207BN-SE, PS207BN-SW, PS207BC-NE, PS207BC-SE, PS207BS-B, PW207BS-B, PW207BS-F, and PW207BS-SW are qualified as estimated, "UJ".

No other problems were encountered in this case.

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ROCKY FLATS SITE
 CASE NO. RFP1, SDG PKG1

TABLE I - RECOMMENDATION SUMMARY

Sample	Volatile	Semivolatiles
PS207BC-NE	A ¹ , J ^{7,8}	J ^{13,14}
PS207BC-NW	J ^{7,8}	J ¹³
PS207BC-SE	J ^{7,8}	J ^{13,14}
PS207BC-SW	A ¹ , J ^{1,7,8}	J ¹³
PS207BC-T	J ^{1,2,3,9}	
PS207BN-NE	J ^{2,3,4,5,6,12}	J ¹³
PS207BN-NW	J ^{2,3,4,5,6}	J ¹³
PS207BN-SE	J ^{2,3,4,5,6,12}	J ¹³
PS207BN-SW	J ^{2,3,4,5,6,12}	J ¹³
PS207BN-T	A ² , J ^{7,8}	
PS207BS-B	A ² , J ^{7,8}	J ^{13,14}
PS207BS-F	A ² , J ^{7,8}	J ^{11,13}
PS207BS-NE	A ¹ , J ²	J ¹³
PS207BS-NW	J ^{7,8,10}	J ¹³
PS207BS-NWD	J ^{7,8}	J ¹³
PS207BS-SE	A ¹ , J ²	J ¹³
PS207BS-SW	J ^{1,7,8}	J ¹³
PS207BS-T	A ² , J ^{7,8}	
PW207BC-NE	A ³ , J ^{2,3,9}	J ¹³
PW207BC-NW	A ² , J ^{3,9}	J ¹³
PW207BC-SE	A ^{2,4} , J ^{3,9}	J ¹³
PW207BC-SW	J ^{2,3,9}	J ¹³
PW207BC-T	J ^{1,2,3,9}	
PW207BN-NE	A ⁴	J ¹³
PW207BN-NW	A ⁴	J ¹³
PW207BN-SE	A ⁴	J ¹³
PW207BN-SW	A ^{3,4} , J ^{2,3,9}	J ¹³
PW207BN-T	J ^{1,2,3,9}	
PW207BS-B	A ² , J ^{7,8}	J ^{13,14}
PW207BS-F	A ² , J ^{7,8}	J ^{13,14}
PW207BS-NE	A ² , J ^{7,8}	J ¹³
PW207BS-NW	A ² , J ^{7,8,11}	J ¹³
PW207BS-NWD	A ² , J ^{3,9}	J ¹³
PW207BS-SE	A ² , J ^{7,8}	J ¹³
PW207BS-SW	J ^{7,8}	J ^{13,14}
PW207BS-T	A ² , J ^{7,8}	

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- A¹- Change positive result for methylene chloride to a revised detection limit because of blank contamination.
- A²- Change positive result for acetone to a revised detection limit because of blank contamination.
- A³- Change positive result for total xylenes to a revised detection limit because of blank contamination.
- A⁴- Change positive result for toluene to a revised detection limit because of blank contamination.
- J¹- Estimate "J" positive results which are less than the CRQL.
- J²- Estimate "UJ" nondetect for acetone due to %D > 50.
- J³- Estimate "UJ" nondetect for carbon disulfide due to %D > 50.
- J⁴- Estimate "UJ" nondetect for trichlorofluoromethane due to %D > 50.
- J⁵- Estimate "UJ" nondetect for freon-113 due to %D > 50.
- J⁶- Estimate "UJ" nondetect for ethyl ether due to %D > 50.
- J⁷- Estimate "UJ" nondetect for trichlorofluoromethane due to %RSD > 50.
- J⁸- Estimate "UJ" nondetect for freon-113 due to %RSD > 50.
- J⁹- Estimate "UJ" nondetect for 4-methyl-2-pentanone due to %D > 50.
- J¹⁰- Estimate "J" positive result for trichloroethene due to %D > 25.
- J¹¹- Estimate "UJ" all nondetects due to poor surrogate recovery.
- J¹²- Estimate "UJ" associated nondetects due to poor internal standards.
- J¹³- Estimate "UJ" nondetect for pyridine due to %D > 50.
- J¹⁴- Estimate "UJ" associated nondetects due to poor internal standards.

C-49-11-1-216

TO: RICH NINESTEEL

DATE: NOVEMBER 19, 1991

FROM: DWAYNE S. MOCK

CC: D. A. SCHEIB

SUBJECT: INORGANIC DATA VALIDATION *DM*
ROCKY FLATS
CASE NO. RFP1, SDG PKG1

Selected TAL Metals:

17/waters/PS-207BS-B, PS-207BS-F, PW-207BC-NE
PW-207BC-NW, PW-207BC-SE, PW-207BC-SW
PW-207BN-NE, PW-207BN-NW, PW-207BN-SE
PW-207BN-SW, PW-207BS-B, PW-207BS-F
PW-207BS-NE, PW-207BS-NW, PW-207BS-SE
PW-207BS-SW, PW-207BS-NW-D

13/soil/PS-207BC-NE, PS-207BC-NW, PS-207BC-SE
PS-207BC-SW, PS-207BN-NE, PS-207BN-NW
PS-207BN-SE, PS-207BN-SW, PS-207BS-NE
PS-207BS-NW, PS-207BS-SE, PS-207BS-SW
PS-207BS-NW-D

A validation was performed on the inorganic analytical data from Case No. RFP1, SDG PKG1, water and sludge samples collected by HALLIBURTON NUS Environmental Corporation at the Rocky Flats site. The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Inorganic Analyses" as applied for use within Region VIII, and were evaluated based on the following parameters:

- * o Data Completeness
- * o Holding Times
- * o Calibration Verification
- o Laboratory and Field Blank Analyses
- * o ICP Interference Check Sample Results
- o Matrix Spike Recoveries
- o Laboratory Control Sample Results
- o Laboratory Duplicates
- o Field Duplicate Precision
- * o Detection Limits
- * o Sample Quantitation

* - All quality control criteria were met for this parameter.

An ICP serial dilution analysis was required by the analysis method. This analysis was not performed by the laboratory. Consequently, the sample data were not evaluated for this parameter.

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The attached Table 1 summarizes the validation recommendations which were based on the following information:

Blanks

Samples PS-207BS-B, PS-207BS-F, PW-207BS-B and PW-207BS-F are rinsate and field blanks and according to validation protocol are only qualified on the basis of laboratory method blank contamination.

Laboratory method, field and rinsate blank analyses yielded the following contaminants in the maximum concentrations indicated:

<u>Analyte</u>	<u>Maximum Concentration (ug/l)</u>	<u>Action Level (ug/l)</u>
boron	14.0	70.0
magnesium	41.0	205
potassium	1000	5000
silver	9.0	45.0
sodium	581	2900

Sample Affected: All

Blank Actions:

Value > IDL and < Action Level = Report value U.
Value > IDL and > Action Level = Report value unqualified.

Individual sample size, dilution factors and moisture content were considered prior to the application of all actions levels. No actions were taken for magnesium because all sample concentrations for this analyte are above the action level.

ICP Interference Check Sample Results

ICP interferences were noted for chromium during the Interference Check Sample (ICS) analysis. Suppression due to high calcium sample concentrations may exist for samples PS-207BN-SE and PS-207BN-SW. Estimated interferences were calculated for these samples. Positive results for chromium in these samples are qualified as estimated, (J), since estimated interferences were < 50% of the reported sample results.

Matrix Spike Recoveries

Matrix Spike (MS) Percent Recoveries (%Rs) for boron in both matrices were extremely low (< 30%). Positive results for this

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analyte in all samples (not qualified due to blank contamination) are qualified as estimated, (J); no nondetects were reported.

MS %Rs for arsenic, cadmium, selenium and silver in the sludge matrix were below the 75% quality control limit (yet > 30%). Positive results (not qualified on the basis of blank contamination) and nondetects for these analytes in sludge samples are qualified as estimated, (J) and (UJ), respectively; no positive results were reported for selenium and no nondetects were reported for cadmium.

MS %Rs for barium, chromium, lead and nickel exceeded the 125% upper quality control limit for the sludge matrix. Positive results for these analytes in affected samples are qualified as estimated, (J).

Laboratory Control Sample Results

Solid Laboratory Control Sample (LCS) concentrations for barium and selenium fell below the respective lower quality control limit. Positive barium results and nondetects for selenium in sludge samples are qualified as estimated, (J) and (UJ), respectively; no positive results were reported for selenium and no nondetects were reported for barium.

Laboratory Duplicates

The Relative Percent Difference (RPD) for chromium exceeded the 20% quality control criterion for the water matrix. Chromium sample data in waters (not qualified based on blank contamination) are qualified as estimated, (J) and (UJ).

The RPD for mercury exceeded the 35% quality control criterion for the sludge matrix. Sample data for mercury in sludges are qualified as estimated, (J) and (UJ).

Field Duplicate Precision

RPDs for lead, arsenic and mercury exceeded the 30% quality control criterion for the water field duplicate pair. Positive results and nondetects for these analytes in waters are qualified as estimated, (J) and (UJ), respectively.

The RPD for chromium in the sludge field duplicate pair was high (> 50%). Positive results (not qualified because of blank contamination) and nondetects for chromium in sludges are qualified as estimated, (J) and (UJ), respectively.

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Overall Assessment of the Data

The data are acceptable for use as qualified. Several analytes were detected as contaminants in the field, rinsate and/or laboratory method blanks. Matrix spike recoveries for several analytes were noncompliant resulting in the estimation of associated sample data. Chromium results in two samples were estimated because of ICP interferences due to high calcium sample concentrations. Some sample data for chromium, mercury, arsenic and lead were estimated due to laboratory and/or field duplicate imprecision. Sludge sample results for barium and selenium were also estimated due to low solid LCS concentrations. No other problems were encountered.

ROCKY FLATS
 CASE NO. RFP1, SDG PKG1

TABLE 1 - RECOMMENDATION SUMMARY

Arsenic	J ^{2,7}	Mercury	J ^{5,7}
Barium	J ^{3,4}	Nickel	J ³
Boron	A ¹ , J ¹	Potassium	A ¹
Cadmium	J ²	Selenium	J ^{2,4}
Chromium	J ^{3,6,8,9}	Silver	A ¹ , J ²
Lead	J ^{3,7}	Sodium	A ¹
Magnesium			

If the field is left blank, the qualifier is A - Accept all data.

- A¹ -- Accept data, but raise sample detection limit (where appropriate) to a revised detection limit due to blank contamination.
- J¹ - Estimate (J) positive results in all samples due to extremely low MS recovery for both matrices.
- J² - Estimate (J) positive results and (UJ) nondetects in soil samples due to MS %R < 75% but > 30%.
- J³ - Estimate (J) positive results in soils due to high MS recovery.
- J⁴ - Estimate (J) positive barium results and (UJ) selenium nondetects in soil samples due to low concentrations for the solid LCS.
- J⁵ - Estimate (J) positive results and (UJ) nondetects in soils because of poor laboratory duplicate precision.
- J⁶ - Estimate (J) positive results and (UJ) nondetects in waters because of laboratory duplicate RPD > 20%.
- J⁷ - Estimate (J) positive results and (UJ) nondetects in soils due to field duplicate imprecision.
- J⁸ - Estimate (J) positive results and (UJ) nondetects in waters due to poor field duplicate precision.
- J⁹ - Estimate (J) positive results in two samples due to ICP interferences caused by high calcium sample concentrations.

C-49-10-1-334

TO: RICH NINESTEEL
FROM: KAREN M. SMECKER *KMS*
SUBJECT: INORGANIC DATA VALIDATION
ROCKY FLATS
CASE NO. RFP1A, SDG PKG1A

DATE: OCTOBER 29, 1991

CC: D. A. SCHEIB

SAMPLES: 15/waters/PW-207BC-NE, PW-207BC-NW
PW-207BC-SE, PW-207BC-SW
PW-207BN-NE, PW-207BN-NW
PW-207BN-SE, PW-207BN-SW
PW-207BS-NE, PW-207BS-NW
PW-207BS-NW-D, PW-207BS-SE
PW-207BS-SW, PW-207BS-B
PW-207BS-F

15/sludges/PS-207BC-NE, PS-207BC-NW
PS-207BC-SE, PS-207BC-SW
PS-207BN-NE, PS-207BN-NW
PS-207BN-SE, PS-207BN-SW
PS-207BS-NE, PS-207BS-NW
PS-207BS-NW-D, PS-207BS-SE
PS-207BS-SW, PS-207BS-B
PS-207BS-F

A validation was performed on the inorganic analytical data from Case No. RFP1A, SDG PKG1A, pond water and pond sludge samples, collected by HALLIBURTON NUS Environmental Corporation at the Rocky Flats site. The water samples and the TCLP extracts from the sludge samples were analyzed for arsenic, barium, cadmium, chromium, lead, mercury, nickel, selenium and silver. The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Inorganic Analyses" as applied for use within Region VIII, and were evaluated based on the following parameters:

- o Data Completeness
- * o Holding Times
- * o Calibration Verification
- o Laboratory and Field Blank Analyses
- o ICP Interference Check Sample Results
- o Matrix Spike Recoveries
- o Laboratory Control Sample Results
- o Field Duplicate Precision
- * o Detection Limits
- * o Sample Quantitation

* - All quality control criteria were met for this parameter.

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Laboratory duplicate and ICP serial dilution analyses are required by the analysis method. These analyses were not performed by the laboratory, therefore, sample data were not evaluated for these parameters.

The attached Table 1 summarizes the validation recommendations which were based on the following information:

Data Completeness

The chromium result for sample PS-207BS-NW-D was inadvertently omitted from the Form I report for this sample. After a review of the raw data, the sample result was transcribed onto the Form I by the validator.

Blanks

Samples PW-207BS-B, PW-207BS-F, PS-207BS-B and PS-207BS-F are rinsate and field blanks and according to validation protocol are only qualified on the basis of laboratory method blank contamination.

Laboratory method, field and rinsate blank analyses yielded the following contaminants in the maximum concentrations indicated:

<u>Analyte</u>	<u>Maximum Concentration (ug/l)</u>	<u>Action Level (ug/l)</u>
silver	7.0	35.0
barium	41.0	205

Sample Affected: All

Blank Actions:

Value > IDL and < Action Level = Report value U.
Value > IDL and > Action Level = Report value unqualified.

Dilution factors were considered prior to the application of these actions levels.

ICP Interference Check Sample Results

ICP interferences were noted for cadmium during the Interference Check Sample (ICS) analysis. Suppression due to high calcium sample concentrations may exist; seven samples were affected. Estimated interferences were calculated for these samples. Positive cadmium results in samples PS-207BN-SW and PS-207BN-NE are

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considered unreliable and qualified as rejected, (R), because the estimated interference was > 50% of the reported sample result. Positive cadmium results in samples PS-207BN-NW, PS-207BN-SE, PS-207BC-NE, PS-207BC-SW and PS-207BC-SE are qualified as estimated, (J), since the estimated interference was < 50% of the reported sample result.

Matrix Spike Recoveries

Matrix Spike (MS) recoveries for barium in the water matrix and arsenic in both matrices were extremely low (< 30%). Positive results for these analytes in affected samples are qualified as estimated, (J). Nondetects for arsenic in all samples are considered unreliable and qualified as rejected, (R); no nondetects were reported for barium in water samples.

MS Percent Recoveries (%Rs) for lead in the water matrix and selenium and silver in both matrices were below the 75% quality control limit (yet > 30%). Nondetects for these analytes in affected samples are qualified as estimated, (UJ); no positive results were reported for selenium and positive silver results are qualified due to blank contamination.

Laboratory Control Sample Results

The Laboratory Control Sample (LCS) %R for selenium was low (< 80%). Only nondetects were reported for this analyte, and these results are qualified as estimated, (UJ).

Field Duplicate Precision

The Relative Percent Difference (RPD) for barium exceeded the 30% quality control criterion for the sludge field duplicate pair. No nondetects were reported for barium in sludges; positive results for this analyte in these samples are qualified as estimated, (J).

Overall Assessment of the Data

The data are acceptable for use as qualified. Silver and barium were identified as contaminants in the field, rinsate and/or laboratory method blanks. Matrix spike recoveries for several analytes were low resulting in the estimation or rejection of associated sample data. Several sample results for cadmium were estimated or rejected due to interferences stemming from high sample concentrations for calcium. All selenium results were estimated because of low LCS recovery. Field duplicate imprecision was noted for barium in the sludges. No other problems were encountered.

ROCKY FLATS
 CASE NO. RFP1A, SDG PKG1A

TABLE 1 - RECOMMENDATION SUMMARY

Arsenic	R ¹ , J ¹	Mercury	R ¹ , J ¹
Barium	A ¹ , J ¹ , J ⁴	Nickel	
Cadmium	R ² , J ⁵	Selenium	J ² , J ³
Chromium		Silver	A ¹ , J ²
Lead	J ²		

If the field is left blank, the qualifier is A - Accept all data.

- A¹ - Accept data, but raise sample detection limit (where appropriate) to a revised detection limit due to blank contamination.
- J¹ - Estimate (J) positive results in affected samples due to extremely low MS recovery.
- J² - Estimate (UJ) nondetects in affected samples due to MS %R < 75 but > 30.
- J³ - Estimate (UJ) nondetects in all samples due to low LCS recovery.
- J⁴ - Estimate (J) positive results in sludges due to poor field duplicate precision.
- J⁵ - Estimate (J) positive results in samples PS-207BN-NW, PS-207BN-SE, PS-207BC-NE, PS-207BC-SW and PS-207BC-SE due to ICP interferences caused by high calcium sample concentrations.
- R¹ - Reject (R) nondetects in all samples due to MS %R < 30.
- R² - Reject (R) positive results in samples PS-207BN-SW and PS-207BN-NE due to ICP interferences caused by high calcium sample concentrations.

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- * ● Internal Standards Performance
- * ● Compound Identification
- * ● Compound Quantification

* - All quality control criteria were met for this parameter.

The attached Table I summarizes the validation recommendations which were based on the following information:

CALIBRATIONS

The following tables summarize calibration non-compliances and corresponding actions. The key associated with these tables is presented on page six of this memorandum.

Volatiles

<u>Compound</u>	IC <u>08/22/91</u>
acetone	X
methylene chloride	X

Associated Samples: PS-207A-NE, PS-207C-(NW, NW-D, SW, C, CB)
CS-(001, 001-D, 002, 003)

No actions were taken in these samples as no positive results were reported for acetone and positive results for methylene chloride are qualified due to blank contamination.

<u>Compound</u>	CC <u>08/27/91</u>
4-methyl-2-pentanone	X
acetone	XX
carbon disulfide	X
methylene chloride	X
2-butanone	X
trichlorofluoromethane	X
1,1,2-trichloro-1,2,2-trifluoromethane	X
ethyl ether	X
ethyl acetate	X

Associated Samples: CS-(001, 001-D), PS-207A-NE

Nondetects for acetone in these samples are qualified as estimated, (UJ). Positive results for 2-butanone and 1,1,2-trichloro-1,2,2-trifluoromethane in these samples are qualified as estimated, (J). No other qualifications were made as either no positive results were reported for the other compounds in affected samples or

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affected positive results are qualified due to blank contamination.

<u>Compound</u>	CC <u>08/27/91</u>
1,1-dichloroethene	X
acetone	XX
methylene chloride	XX
2-butanone	X
trichlorofluoromethane	XX
1,1,2-trichloro-1,2,2-trifluoromethane	X
ethyl ether	X
ethyl acetate	XX

Associated Samples: CS-(002, 003), PS-207C-(NW, NW-D, SW, C, CB)

Nondetects for acetone, methylene chloride, trichlorofluoromethane and ethyl acetate are qualified as estimated, (UJ). No further action was taken for positive methylene chloride results in affected samples since they are qualified based on blank contamination. Positive results for 2-butanone and 1,1,2-trichloro-trifluoromethane in these samples are qualified as estimated, (J). No other qualifications were made because no positive results were reported for ethyl ether and 1,1-dichloroethene.

<u>Compound</u>	CC <u>08/27/91</u>
1,1,1-trichloroethane	X

Associated Samples: PW-207A-(NE, NW)

No qualifications were made because no positive results were reported for this compound in affected samples.

<u>Compound</u>	CC <u>08/30/91</u>
4-methyl-2-pentanone	X

Associated Samples: PW-207C-(B, F, T), PS-207C-(F, B), CS-000-T
CW-000-(B, F, T)

Only nondetect were reported for this compound in associated samples, therefore, no qualifications were necessary.

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Compound

CC
09/03/91

1,1,2-trichloro-1,2,2-trifluoromethane X

Associated Sample: CS-000-F

No qualification was made because no positive result was reported for this compound in this sample.

Semivolatiles

Compound
pyridine

IC
08/23/91
X

Associated Samples: PW-207A-NW, CW-(001, 001-D), PS-207A-NE
PW-207C-(NE, NW, SE, SW, B, F, NE-D)

Actions were not required because no positive results were reported for this compound in any associated sample.

Compound
pyridine

CC
09/06/91
XX

Associated Samples: PW-207C-(NE, NW, SE, SW, B, F, NE-D)
PW-207A-NW

Nondetects for pyridine in all of these samples, except PW-207C-NE-D, are qualified as estimated, (UJ). No further action was necessary for the pyridine nondetect in sample PW-207C-NE-D since it was rejected due to extremely low surrogate recovery.

Compound
2-nitropropane
cyclohexane

CC
09/07/91
XX
X

Associated Samples: PW-207C-(NE, NE-D, NW, SE, SW, B, F)
PW-207A-NW

Nondetects for 2-nitropropane in all of these samples, except PW-207C-NE-D, are qualified as estimated, (UJ). No further action was required for the 2-nitropropane nondetect in sample PW-207C-NE-D as it is qualified as rejected due to extremely low surrogate recovery. No other qualifications were made as no positive results

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were reported for the other compound in affected samples.

<u>Compound</u>	CC <u>09/10/91</u>
pyridine	XX
pyrene	X
2-nitropropane	XX

Associated samples: CW-(001, 001-D), PS-207A-NE

Nondetects for pyridine and 2-nitropropane in these samples are qualified as estimated, (UJ). No other qualifications were made as no positive results were reported for the other compounds in affected samples.

<u>Compound</u>	IC <u>09/11/91</u>
pyridine	XX

Associated Samples: PW-207A-(NERE, SERE), PS-207C-(F,B,SW,C,CB)
CW-(002,003,000-F, 000-B)
CS-(001, 001-D, 000-F, 000-B)

Nondetects for this compound in these samples are qualified as estimated, (UJ).

<u>Compound</u>	CC <u>09/12/91</u>
pyridine	XX
2-nitropropane	XX

Associated Samples: PW-207A-(NERE, SERE), CW-(002,003)

Nondetects for pyridine and 2-nitropropane are qualified as estimated, (UJ), in these samples.

<u>Compound</u>	CC <u>09/15/91</u>
pyridine	XX
n-nitroso-di-n-propylamine	X
pyrene	X
2-nitropropane	XX
cyclohexanone	X

Associated Samples: CS-(000-B, 000-F, 001 001-D), PS-207C-(F, B)
CW-(000-B, 000-F)

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Nondetects for pyridine and 2-nitropropane in the associated samples are qualified as estimated, (UJ).

<u>Compound</u>	CC <u>09/16/91</u>
pyridine	XX
2,4-dinitrotoluene	X
pyrene	X
2-nitropropane	XX
cyclohexanone	X

Associated Samples: CS-(002, 003), PS-207C-(NW, NW-D)

Nondetects for pyridine and 2-nitropropane are qualified as estimated, (UJ), in these samples. No other qualifications were made as no positive results were reported for any other compounds in affected samples.

<u>Compound</u>	CC <u>09/17/91</u>
pyridine	XX
pyrene	X
2-nitropropane	XX
cyclohexanone	X

Associated Samples: PS-207C-(SW, C, CB)

Nondetects for pyridine in associated samples are qualified as estimated, (UJ). Positive results for pyrene in these samples are qualified as estimated, (J). No other qualifications were made as no positive results were reported for the other compounds in affected samples.

Calibration Key:

- X - Percent RSD > 30; percent D > 25; Estimate (J) positive results.
- XX - Percent RSD > 50; percent D > 50; Estimate (J) positive results and estimate (UJ) nondetects.

BLANKS

Volatiles

Field, rinsate and trip blanks are only qualified on the basis of laboratory method blank contamination.

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Laboratory method, rinsate, field, and trip blanks contained the following contaminants in the maximum amounts indicated below:

<u>Compound</u>	<u>Maximum Concentration</u>
acetone	32 ug/l
toluene	3 ug/l
trichlorofluoromethane	3 ug/l
total xylenes	6 ug/l
methylene chloride	4 ug/kg
4-methyl-2-pentanone	5 ug/kg

Associated Samples: All

Methylene chloride and 4-methyl-2-pentanone were detected in a soil laboratory method blank. Qualifications for these compounds are limited to soil samples.

Action levels of ten times the maximum amount of common contaminants and five times the maximum amount of the other contaminants were used to evaluate the data.

Blank Actions:

- o Value < CRQL; report CRQL followed by a U.
- o Value > CRQL and < action level; report value followed by a U.
- o Value > CRQL and > action level; report value unqualified.

Individual sample size, dilution factors and moisture correction were considered prior to the application of all action levels.

SURROGATE SPIKE RECOVERIES

Volatiles

The percent recoveries of the following surrogates do not meet the Contract Required Recovery (CRR) range:

<u>Sample</u>	<u>Compound</u>	<u>Percent Recovery</u>	<u>QC Limits</u>
PS-207C-C	toluene-d8	136	81-117
	bromofluorobenzene	65	74-121

Surrogate Recovery Actions:

- Percent Recovery < 10%; Estimate (J) positive results and reject (R) all nondetects.

(continued)

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- Percent Recovery 10% - CRR; Estimate, (J) positive results and (UJ) all nondetects.
- Percent Recovery > CRR; Estimate (J) positive results and (UJ) all nondetects.

Positive results (not qualified due to blank contamination) and nondetects for this sample are qualified as estimated, (J) and (UJ), respectively.

Semivolatiles

The percent recoveries of the following surrogates do not meet the Contract Required Recovery (CRR) range:

<u>Sample</u>	<u>Compound</u>	<u>Percent Recovery</u>	<u>QC Limits</u>
PW-207C-NE	nitrobenzene-d5	29	35-114
	2-fluorobiphenyl	23	43-116
	terphenyl-d14	16	33-141
PW-207C-NE-D	nitrobenzene-d5	17	35-114
	2-fluorobiphenyl	12	43-116
	terphenyl-d14	9	33-141
PW-207C-NW	nitrobenzene-d5	29	35-114
	2-fluorobiphenyl	21	43-116
	terphenyl-d14	16	33-141
PW-207C-SE	nitrobenzene-d5	23	35-114
	2-fluorobiphenyl	15	43-116
	terphenyl-d14	11	33-141
PW-207C-SW	nitrobenzene-d5	29	35-114
	2-fluorobiphenyl	17	43-116
	terphenyl-d14	10	33-141

Surrogate Recovery Actions:

- Percent Recovery < 10%; Estimate (J) positive results and reject (R) all nondetects.
- Percent Recovery 10% - CRR; Estimate, (J) positive results and (UJ) all nondetects.
- Percent Recovery > CRR; Estimate (J) positive results and (UJ) all nondetects.

Nondetects in sample PW-207C-NE-D are considered unreliable and qualified as rejected, (R), due to extremely low surrogate recovery. Nondetects in the other affected samples are qualified as estimated, (UJ).

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MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Relative Percent Differences (RPDs) between percent recoveries of 1,4-dichlorobenzene, 1,2,4-trichlorobenzene, acenaphthaene and 2,4-dinitrotoluene exceeded quality control criteria. No positive results were reported in the spiked sample, therefore no qualifications were made.

In addition, the following compounds did not meet the Contract Required Recovery (CRR) range:

<u>Sample</u>	<u>Compound</u>	<u>Percent Recovery</u>	<u>QC Limits</u>
PW-207C-NE-DMS	1,4-dichlorobenzene	11	36-97
	n-nitroso-di-n-propylamine	22	41-116
	1,2,4-trichlorobenzene	12	39-98
	acenaphthene	19	46-118
	2,4-dinitrotoluene	19	24-96
PW-207C-NE-DMSD	pyrene	24	26-127
	1,4-dichlorobenzene	16	36-97
	n-nitroso-di-n-propylamine	30	41-116
	1,2,4-trichlorobenzene	18	39-98
	acenaphthene	26	46-118
	pyrene	23	26-127

Matrix Spike/Matrix Spike Duplicate Actions:

- Percent Recovery > CCR; Estimate (J) positive results and accept nondetects.
- Percent Recovery 10% - CRR; Estimate, (J) positive results and accept nondetects.
- Percent Recovery < 10%; Estimate (J) positive results and reject (R) nondetects.

No qualifications were needed since no positive results were reported for these compounds in the unspiked sample.

FIELD DUPLICATE PRECISION

The Relative Percent Difference (RPD) for 2-butanone was high (> 30%) for the aqueous field duplicate pair consisting of samples PW-207C-NE and PW-207C-NE-D. Positive results for this compound in these samples are qualified as estimated, (J).

RPDs for 2-butanone, 1,1,1-trichloroethane and tetrachloroethene in the soil field duplicate pair (samples CS-001 and CS-001-D)

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exceeded the 50% quality control limit. Positive results for these compounds in this sample pair are qualified as estimated, (J).

INTERNAL STANDARDS PERFORMANCE

The internal standard areas for the following samples were outside the quality control (QC) limits:

Volatiles

<u>Sample</u>	<u>Internal Standard</u>	<u>Area</u>	<u>QC Limits</u>
PS-207C-C	CBZ	131000	157000-628000

CBZ- Chlorobenzene

Semivolatiles

<u>Sample</u>	<u>Internal Standard</u>	<u>Area</u>	<u>QC Limits</u>
PS-207C-C	PRY	45900	8000-32000
PS-207C-CB	PRY	46800	8000-32000
PS-207C-SW	PRY	39000	8000-32000
PW-207C-F	DCB	9180	11750-47000
	NPT	27100	39050-156200
	ANT	14000	19350-77400
	PHN	17600	23900-95600
	CRY	15800	17600-70400
	PW-207C-NE-D	DCB	9970
NPT		32000	39050-156200
ANT		16500	19350-77400
PHN		19500	23900-95600
CW-003	ANT	16300	16700-66800
CS-000-B	CRY	37500	7350-29400
	PRY	30100	4640-18560
CS-000-F	CRY	38800	7350-29400
	PRY	31200	4640-18560
CS-001	CRY	42400	7350-29400
	PRY	44100	4640-18560
CS-001-D	CRY	46000	7350-29400
	PRY	43300	4640-18560
CW-000-B	CRY	40800	7350-29400
	PRY	34200	4640-18560
CW-000-F	CRY	40500	7350-29400
	PRY	32900	4640-18560

(continued)

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<u>Sample</u>	<u>Internal Standard</u>	<u>Area</u>	<u>QC Limits</u>
PS-207C-B	CRY	39300	7350-29400
	PRY	33000	4640-185602
PS-207C-F	CRY	38300	7350-29400
	PRY	31800	4640-18560
PW-207C-B	NPT	38300	39050-156200

DCB - 1,4-Dichlorobenzene
ANT - Acenaphthene
NPT - Naphthalene-d8
PHN - Phenanthrene-d10
CRY - Chrysene-d12
PRY - Perylene-d12

Internal Standards Actions:

- Internal standard area outside QC limits; (J) positive results and (UJ) all associated nondetects.
- Reject (R) data if internal standards are extremely poor.

Associated positive results (not qualified due to blank contamination) and associated nondetects in affected samples are qualified as estimated, (J) and (UJ), respectively. Internal standard areas for phenanthrene-d10 and perylene-d12 were not used for quantitating any compounds analyzed in this sample set, therefore, no actions were necessary for these non-compliant internal standard areas.

OVERALL DATA ASSESSMENT

The data are acceptable for use as qualified. Several volatile organic compounds were found as contaminants in the laboratory method and field quality control blanks. Many internal standard areas were below the lower quality control limits, thus, associated sample results were estimated. All data for one sample was rejected due to an extremely low surrogate recovery. Some calibration responses and surrogate recoveries were non-compliant resulting in the estimation of various sample results. Positive results for several compounds are estimated since they are below the CRQL. In addition, sample data for several compounds were estimated because of poor field duplicate precision.

No other problems were encountered in this case.

ROCKY FLATS SITE
 CASE NO. RFP1, SDG PKG1

TABLE I - RECOMMENDATION SUMMARY

Sample	Volatile	Semivolatiles
CW-001	A ²	J ^{3,4}
CW-001-D	A ²	J ^{3,4}
CW-002	A ²	J ^{3,4}
CW-003	A ²	J ^{3,4,15}
CS-001	A ^{1,3,5} , J ^{2,5,6,10,11}	J ^{3,4,15}
CS-001-D	A ^{1,3,5} , J ^{2,5,6,10,11}	J ^{3,4,15}
CS-002	A ³ , J ^{2,10,11,12,13}	J ^{3,4}
CS-003	A ^{1,3} , J ^{2,10,11,12,13}	J ^{3,4}
CW-000-F		J ^{3,4,15}
CW-000-B		J ^{3,4,15}
CS-000-F	A ²	J ^{3,4,15}
CW-000-T	A ²	
CS-000-T	A ²	
CS-000-B	A ²	J ^{3,4,15}
PW-207A-NE	A ²	J ³
PW-207A-NW	A ²	J ^{3,4}
PW-207A-SE	A ²	J ^{3,4}
PW-207C-NE	A ² , J ⁶	J ^{3,4,14}
PW-207C-NE-D	A ² , J ⁶	R ¹
PW-207C-NW	A ²	J ^{3,4,14}
PW-207C-SE	A ²	J ^{3,4,14}
PW-207C-SW	A ²	J ^{3,4,14}
PS-207C-F	A ²	J ^{3,4,15}
PS-207C-B	A ²	J ^{3,4,15}
PW-207C-B	A ²	J ^{3,4}
PW-207C-T		
PW-207C-F	A ²	J ^{3,4,15}
PW-207A-T	A ²	
PS-207C-T		
PS-207A-NE	A ³ , J ^{1,2,11}	J ^{3,4}
PS-207C-C	A ^{1,3,4} , J ^{1,2,8,9,10,13}	J ^{3,4,7}
PS-207C-CB	A ^{1,3,4} , J ^{2,10,11,13}	J ^{3,4,7}
PS-207C-NW	A ^{1,3,4,7} , J ^{1,2,10,12,13}	J ^{3,4}
PS-207C-NW-D	A ^{1,3,4,7} , J ^{1,2,10,12,13}	J ^{3,4}
PS-207C-SW	A ^{1,3,4} , J ^{1,2,10,13}	J ^{3,4}

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- A¹- Change positive result for toluene to a revised detection limit because of blank contamination.
- A²- Change positive result for acetone to a revised detection limit because of blank contamination.
- A³- Change positive result for total xylenes to a revised detection limit because of blank contamination.
- A⁴- Change positive result for methylene chloride to a revised detection limit because of blank contamination.
- A⁵- Change positive result for 4-methyl-2-pentanone to a revised detection limit because of blank contamination.
- J¹- Estimate (J) positive results which are less than the CRQL.
- J²- Estimate (UJ) nondetect for acetone due to %D > 50.
- J³- Estimate (UJ) nondetect for pyridine due to %RSD and/or %D > 50.
- J⁴- Estimate (UJ) nondetect for 2-nitropropane due to %D > 50.
- J⁵- Estimate (J) positive results for 1,1,1-trichloroethane and tetrachloroethene due to field duplicate imprecision.
- J⁶- Estimate (J) positive result for 2-butanone due to poor field duplicate precision.
- J⁷- Estimate (J) positive result for pyrene due to %D > 25.
- J⁸- Estimate (J) all positive results and (UJ) all nondetects due to poor surrogate recovery.
- J⁹- Estimate (J) positive result for tetrachloroethene and (UJ) nondetects for chlorobenzene and ethylbenzene due to low internal standard area.
- J¹⁰- Estimate (J) positive result for 2-butanone due to %D > 25%.
- J¹¹- Estimate (J) positive result for 1,1,2-trichloro-1,2,2-trifluoromethane due to %D > 25%.
- J¹²- Estimate (UJ) nondetect for methylene chloride due to %D > 50%.

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- J¹³- Estimate (UJ) nondetects for trichloromethane and ethyl acetate due to %D > 50%.
- J¹⁴- Estimate (UJ) all nondetects due to low surrogate spike recovery.
- J¹⁵- Estimate (UJ) associated nondetects due to low internal standard area.
- R¹- Reject (R) all nondetects due to extremely low surrogate recovery.



C-49-11-1-116

TO: RICH NINESTEEL
FROM: RICKY C. DEPAUL *RED*
SUBJECT: INORGANIC DATA VALIDATION
ROCKY FLATS
CASE NO. RFP2, SDG PKG2

DATE: NOVEMBER 8, 1991

CC: D. A. SCHEIB

SAMPLES: 12/waters/CW-001-D, CW-001, CW-002, CW-003
PW-207A-NE, PW-207A-NW, PW-207A-SE
PW-207C-NE, PW-207C-NW, PW-207C-SE
PW-207C-NE-D, PW-207C-SW

10/sludges/CS-001-D, CS-001, CS-002, CS-003
PS-207A-NE, PS-207C-CB, PS-207C-C
PS-207C-NW-D, PS-207C-NW, PS-207C-SW

A validation was performed on the inorganic analytical data from Case No. RFP2, SDG PKG2, pond water and pond sludge samples collected by HALLIBURTON NUS Environmental Corporation at the Rocky Flats site. These samples were analyzed for arsenic, barium, cadmium, chromium, lead, magnesium, mercury, nickel, potassium, selenium, silver, sodium and boron. The aqueous samples were also analyzed for calcium. The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Inorganic Analyses" as applied for use within Region VIII, and were evaluated based on the following parameters:

- * o Data Completeness
- * o Holding Times
- o Calibration Verification
- o Laboratory and Field Blank Analyses
- * o ICP Interference Check Sample Results
- o Matrix Spike Recoveries
- o Laboratory Duplicates
- o Laboratory Control Sample Results
- o Field Duplicate Precision
- * o Detection Limits
- * o Sample Quantitation

* - All quality control criteria were met for this parameter.

An ICP serial dilution analysis is required by the analysis method. This analysis was not performed by the laboratory, therefore, sample data were not evaluated for this parameter.

The attached Table 1 summarizes the validation recommendations which were based on the following information:

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MR. RICH NINESTEEL
NOVEMBER 8, 1991
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Blanks

Samples PW-207C-F, CS-000-F, CW-000-F, and PS-207C-F are field blanks. Samples PW-207C-B, PS-207C-B, CW-000-B and CS-000-B are rinsate blanks. According to validation protocol, such blanks are only qualified on the basis of laboratory method blank contamination.

Laboratory method, field and rinsate blank analyses yielded the following contaminants in the maximum concentration indicated:

<u>Analyte</u>	<u>Maximum Concentration (ug/l)</u>	<u>Action Level (ug/l)</u>
silver	7.0	35
magnesium	128	640
calcium	5930	29,650
potassium	1730	8650
sodium	357	1785

Samples Affected: All

Blank Actions:

Value > IDL and < Action Level = Report value U.
Value > IDL and > Action Level = Report value unqualified.

Dilution factors, individual sample size and moisture correction factors were considered prior to the application of these action levels. No actions were taken for potassium and sodium because either all positive results for these analytes were reported for field quality control blanks or sample concentrations were greater than the action levels.

Matrix Spike Recoveries

The soil matrix spike recovery for boron was < 30%. All sludge results for boron were positive, and these were qualified as estimated, (J). These results are biased very low. The aqueous matrix spike recovery for boron was also low, however, no actions are required since the initial sample result for this analyte exceeds 4X the amount spiked.

Matrix spike recoveries for mercury were high for the soil matrix and both high and low for the aqueous matrix. No action is required for soil matrix results since the unspiked initial sample result for mercury for the soil matrix is greater than 4X the

amount spiked. Positive results and nondetects for mercury in the C-49-11-1-116

MR. RICH NINESTEEL

NOVEMBER 8, 1991

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water samples are qualified as estimated, (J) and (UJ), respectively.

The soil matrix spike recovery for arsenic was low (< 75%). Positive results and nondetects for arsenic in sludges are qualified as estimated, (J) and (UJ), respectively.

Matrix Spike (MS) percent recoveries for cadmium, chromium, silver, potassium, and sodium were outside quality control limits for both matrices; however, no actions are required since all initial analysis sample results for these analytes are greater than 4X the amount spiked. Positive results and nondetects in aqueous samples are qualified as estimated (J) and (UJ), respectively for barium, calcium, lead, magnesium, selenium because all MS %Rs for these analytes were less than the 75% quality control limit.

Laboratory Duplicate Precision

Results for arsenic for the soil matrix laboratory duplicate analysis failed to meet the quality control criteria. Positive results and nondetects for arsenic are qualified as estimated, (J) and (UJ), respectively in all sludge samples.

Results for mercury, cadmium and silver failed to meet the quality control criteria for the aqueous laboratory duplicate analysis. Positive results and nondetects for these analytes in waters are qualified as estimated, (J) and (UJ), respectively.

Laboratory Control Sample Results

The aqueous Laboratory Control Sample (LCS) recovery for cadmium was less than the 80% lower quality control limit. Positive results and nondetects for cadmium in waters are qualified as estimated, (J) and (UJ), respectively.

Field Duplicate Precision

Results for silver, sodium, cadmium, chromium, mercury and nickel failed to meet the aqueous field duplicate quality control criteria. Positive results and nondetects for these analytes in waters are qualified as estimated, (J) and (UJ).

Results for barium, cadmium, chromium, lead, magnesium, nickel, potassium, selenium, silver, arsenic and sodium failed to meet the soil field duplicate quality control criteria. Sample data for these analytes in sludges are qualified as estimated (J) and (UJ).

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PAGE FOUR

Overall Data Assessment

Positive sample results for silver, magnesium and calcium are qualified due to laboratory method blank contamination.

Positive results for boron in the soil matrix are qualified as estimated due to extremely low matrix spike recovery. Both high and low matrix spike recoveries were reported for mercury in the aqueous matrix; hence positive and nondetected results are estimated. Positive and nondetected sample results for arsenic are estimated due to low soil matrix spike recovery. Positive and nondetected results for barium, calcium, lead, magnesium, and selenium, in aqueous samples are estimated due to low matrix spike recoveries.

Both positive and nondetected sample results for cadmium in waters are qualified as estimated due to low Laboratory Control Sample (LCS) recovery.

Results for numerous analytes failed to meet both aqueous and soil field duplicate quality control criteria. Positive and nondetected sample results are qualified as estimated.

Positive and nondetected soil sample results for arsenic are estimated for the laboratory duplicate analysis due to failed quality control criteria. Aqueous matrix laboratory duplicate analysis failed quality control limits for mercury, cadmium and silver. Positive and nondetected sample results are qualified as estimated.

ROCKY FLATS
CASE # RFP2, SDG PKG2

TABLE 1 - RECOMMENDATION SUMMARY

Arsenic	J ^{1,3,4}	Magnesium	A ¹ , J ^{1,3}
Barium	J ^{1,3}	Mercury	J ^{1,3,4}
Boron	J ¹	Nickel	J ³
Cadmium	J ^{1,2,3,4}	Potassium	J ³
Calcium	A ¹ , J ¹	Selenium	J ^{1,3}
Chromium	J ³	Silver	A ¹ , J ^{1,3,4}
Lead	J ^{1,3}	Sodium	J ³

If the field is left blank, the qualifier is A - Accept all data.

- A¹ - Accept data, but change positive result for silver to a revised detection limit because of blank contamination.
- J¹ - Estimate (J) positive results and (UJ) nondetected results due to MS (%R) outside quality control limits.
- J² - Estimate (J) positive results and (UJ) nondetects because of LCS recovery < the 80% lower quality control limit.
- J³ - Estimate (J) positive results and (UJ) nondetects due to field duplicate imprecision.
- J⁴ - Estimate (J) positive results and (UJ) nondetects due to laboratory duplicate imprecision.

C-49-11-1-149

TO: RICH NINESTEEL
FROM: KAREN M. SMECKER *MS*
SUBJECT: INORGANIC DATA VALIDATION
ROCKY FLATS
CASE NO. RFP2A, SDG PKG2A

DATE: NOVEMBER 13, 1991

CC: D. A. SCHEIB

SAMPLES: 15/waters/PW-207C-NE, PW-207C-NE-D, PW-207C-NW
PW-207C-SE, PW-207C-SW, PW-207A-NE
PW-207A-NW, PW-207A-SE, CW-001
CW-001-D, CW-002, CW-003, PW-207C-B
PW-207C-F, CW-000-B, CW-000-F

14/sludges/PS-207C-C, PS-207C-CB, PS-207C-NW
PS-207C-NW-D, PS-207C-SW, PS-207A-NE
CS-001, CS-001-D, CS-002, CS-003
PS-207C-B, PS-207C-F, CS-000-B
CS-000-F

A validation was performed on the inorganic analytical data from Case No. RFP2A, SDG PKG2A, pond water and pond sludge samples, collected by HALLIBURTON NUS Environmental Corporation at the Rocky Flats site. The TCLP extracts from the these samples were analyzed for arsenic, barium, cadmium, chromium, lead, mercury, nickel, selenium and silver. The data were reviewed with reference to the EPA "Functional Guidelines for Evaluating Inorganic Analyses" as applied for use within Region VIII, and were evaluated based on the following parameters:

- * o Data Completeness
- * o Holding Times
- * o Calibration Verification
- o Laboratory and Field Blank Analyses
- * o ICP Interference Check Sample Results
- o Matrix Spike Recoveries
- o Laboratory Control Sample Results
- o Field Duplicate Precision
- * o Detection Limits
- * o Sample Quantitation

* - All quality control criteria were met for this parameter.

Laboratory duplicate and ICP serial dilution analyses are required by the analysis method. These analyses were not performed by the laboratory, therefore, sample data were not evaluated for these parameters.

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The attached Table 1 summarizes the validation recommendations which were based on the following information:

Blanks

Samples PW-207C-B, PW-207C-F, CW-000-B, PS-207C-B, PS-207C-F, CS-000-B, CW-000-F and CS-000-F are rinsate and field blanks and according to validation protocol are only qualified on the basis of laboratory method blank contamination.

Laboratory method, field and rinsate blank analyses yielded the following contaminants in the maximum concentrations indicated:

<u>Analyte</u>	<u>Maximum Concentration (ug/l)</u>	<u>Action Level (ug/l)</u>
barium	81.0	405
cadmium	5.0	25.0
chromium	13.0	65.0
selenium	87.0	435

Sample Affected: All

Blank Actions:

Value > IDL and < Action Level = Report value U.
Value > IDL and > Action Level = Report value unqualified.

Dilution factors were considered prior to the application of these actions levels. Actions were not taken for selenium and cadmium because all sample concentrations for cadmium are above the action level and no positive results were reported for selenium.

Matrix Spike Recoveries

Matrix Spike (MS) recoveries for cadmium in both matrices, barium in the water matrix and arsenic in the sludge matrix were extremely low (< 30%). Positive results for these analytes in affected samples (not qualified due to blank contamination) are qualified as estimated, (J). Nondetects for these analytes in all samples are considered unreliable and are qualified as rejected, (R); no nondetects were reported for barium.

MS Percent Recoveries (%Rs) for lead in the water matrix, nickel in the sludge matrix and selenium and chromium in both matrices were below the 75% quality control limit (yet > 30%). Sample data (not qualified on the basis of blank contamination) for these analytes in affected samples are qualified as estimated, (J) and (UJ).

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The MS %R for silver exceeded the 125% upper quality control limit in the water matrix. Positive silver results in pond water samples are qualified as estimated, (J).

Laboratory Control Sample Results

The Laboratory Control Sample (LCS) %R for selenium was low (< 80%). Only nondetects were reported for this analyte, and these results are qualified as estimated, (UJ).

Field Duplicate Precision

Relative Percent Differences (RPDs) for chromium, nickel and silver exceeded the 30% quality control criterion for the water field duplicate pairs. Sample data for these analytes in pond waters (not qualified based on blank contamination) are qualified as estimated, (J) and (UJ).

RPDs for barium, chromium and cadmium exceeded the 30% quality control criterion for the sludge field duplicate pairs. Positive results for these analytes in sludges (not qualified because of blank contamination) are qualified as estimated, (J). Nondetects for these analytes in sludge samples (not qualified due to extremely low matrix spike recovery) are qualified as estimated, (UJ).

Overall Assessment of the Data

The data are acceptable for use as qualified. Barium, silver, chromium and selenium were detected as contaminants in the field, rinsate and/or laboratory method blanks. Matrix spike recoveries for several analytes were noncompliant resulting in the estimation or rejection of associated sample data. All selenium results were estimated due to low LCS recovery. Field duplicate imprecision was noted for several analytes in both matrices. No other problems were encountered.

ROCKY FLATS
 CASE NO. RFP2A, SDG PKG2A

TABLE 1 - RECOMMENDATION SUMMARY

Arsenic	R ¹ , J ¹	Mercury	
Barium	A ¹ , J ¹ , J ⁵	Nickel	J ² , J ⁵
Cadmium	R ¹ , J ¹ , J ⁵	Selenium	J ² , J ⁴
Chromium	A ¹ , J ² , J ⁵	Silver	J ³ , J ⁵
Lead	J ²		

If the field is left blank, the qualifier is A - Accept all data.

- A¹ - Accept data, but raise sample detection limit (where appropriate) to a revised detection limit due to blank contamination.
- J¹ - Estimate (J) positive results in affected samples due to extremely low MS recovery.
- J² - Estimate (J) positive results and (UJ) nondetects in affected samples due to MS %R < 75 but > 30.
- J³ - Estimate (J) positive results in pond waters due to high MS recovery.
- J⁴ - Estimate (UJ) nondetects in all samples due to low LCS recovery.
- J⁵ - Estimate (J) positive results and (UJ) nondetects in affected samples due to field duplicate imprecision.
- R¹ - Reject (R) nondetects in affected samples due to MS %R < 30.

APPENDIX C
FIELD LOG BOOK

ROCKY FLATS - SOLAR PONDS PROJECT

MONDAY, AUG 5 1991

HALLIBURTON NUS (H/NUS) - E. RODMAN

ER
3 2K68

1123

AM: SUNNY CLEAR

PM: CLOUDING OVER, T-STORMS.

0730 - MET JOHN SCHMIDT (H/NUS - PROJ. MANAG.) AT RAMADA INN - SUITE 101.
GOT DIRECTIONS TO SITE.

0815 - ARRIVE AT WEST GATE.

0830 - MET ERNIE LOMBARDI AT TRAILER T130C. ALSO MET DON FERRIER
(EG+G PROJ. MANAG.) BRIEFLY. LOMBARDI WALKED ME THROUGH GETTING
AN EG+G DOSIMETER; THEN THRU SECURITY INTO PROTECTED AREA.

0900 - BUILDING (AREA) INDOCTRINATION FOR BLDG + PAD 750 WITH STEVE
DEWITT.

- DISCUSSED SCHEDULE A LITTLE W/ LOMBARDI, DEWITT, + JOHN
GUADAGNOLI

0945 - TOURED 750 PAD W/ DEWITT. PONDCRETE + SALTCRATE BILLITS IN
5 TENTS (# 2-6) AND IN AN OUTSIDE STAGING AREA.

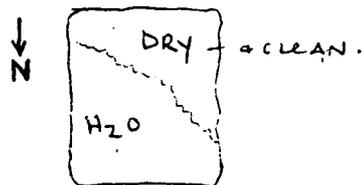
BLDG 750 APPEARS TO BE A CENTRAL MTG BLDG, WILL LEAVE
DOSIMETER BADGE THERE DAILY.

1030 - H+S MOVE IN BLDG 750.

11-12:00 LUNCH.

12:00 - BLDG INDOCTRINATION FOR BLDG 788 - SOLAR PONDS AREA - BY
RICHARD GARCIA (FOREMAN)

- TOURED AREA. POND 207A IS DRYING OUT; MAY BE DIFFICULT TO
LAUNCH/FLOAT A BOAT.



- POND 207B - CENTER IS ALSO QUITE LOW.

1400 - BACK AT T130C. JOHN GUADAGNOLI HAS SENT COPIES OF MY 40 HR
TRAINING CERTIFICATE, AND MEDICAL MONITORING LETTERS TO BRIAN
FIELDING (EG+G H+S). I MAY NOT HAVE TO GO THRU TOO MUCH OF
THEIR H+S TRAINING, IF MY PAPERS/CERTIFICATIONS ARE SUFFICIENT.

Elyse Rodman

8/5/91

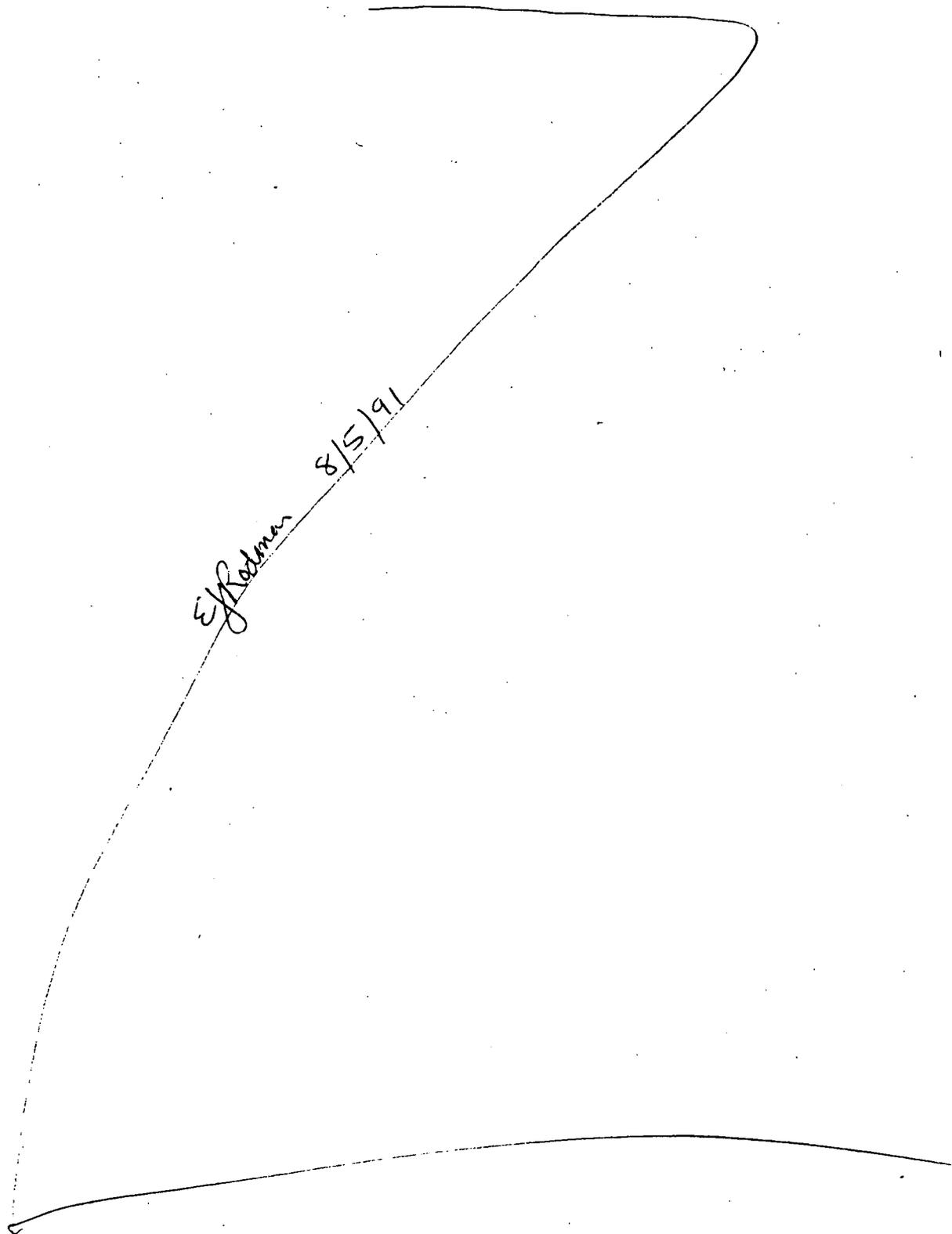
2 8-5-91

0230 - WILL TRY TO HAVE A MTG W/ ME, EG+G, + WESTON
TOMORROW AT 10 AM. WILL TALK SOP'S, + SCHEDULE.

1435 - LEFT SITE FOR RAMADA INN

1500 - AT SUITE 101 - LOOKED AT FINAL SOP'S BRIEFLY.

1530 - WORKED ON LOG BOOK, , END OF DAY



ROCKY FLATS-SOLAR PONDS PROJECT
TUESDAY, AUG 6, 1991

ZKB8

3

1123

E. RODMAN (H/NUS)

AM: CLOUDY
PM: "

0730 - IN SUITE 101 - REVIEWING SOPS PRIOR TO MEETING AT 10:00AM.
0945 - ARRIVE ON SITE - PROCEEDED TO T130C

1025 - MEETING WITH E. LOMBARDI
J. GUADAGNOLI } EG+G
M. SELMAN } WPOSTON
S. WILLIAMS

DISCUSSED SOPS + SCHEDULE. NEED TO FINALIZE PLANS FOR TREATABILITY SAMPLING THAT WILL ADDRESS LOW POND WATER LEVELS. ALSO NEED TO SMOOTH OUT QUESTION OF RESPONSIBILITY FOR CUSTODY OF SAMPLES - EG+G OR H/NUS.

1130 - CALLED PITTSBURGH H/NUS OFFICE. TALKED TO RICH NINESTEEL, DON BRENNEMAN, AND MARY SPECANZA. THEY WILL STUDY WATER LEVEL PROBLEM. I WILL DISCUSS CUSTODY QUESTION W/ J. SCHMIDT. RICH SUGGESTED THAT JOHN SHOULD TALK TO TED BITNER ABOUT THIS.

1215 - TALKED W/ E. LOMBARDI ABOUT FIELD NOTE TAKING AND CUSTODY OF SAMPLES.

1230 - LEFT SITE.

1300 - LUNCH

1330 - AT SUITE 101. DISCUSSED MTEI RESULTS WITH JOHN SCHMIDT AND L. MCDONALD. J SCHMIDT FEELS WE CAN RESOLVE THE CUSTODY QUESTION IN THE FIELD.

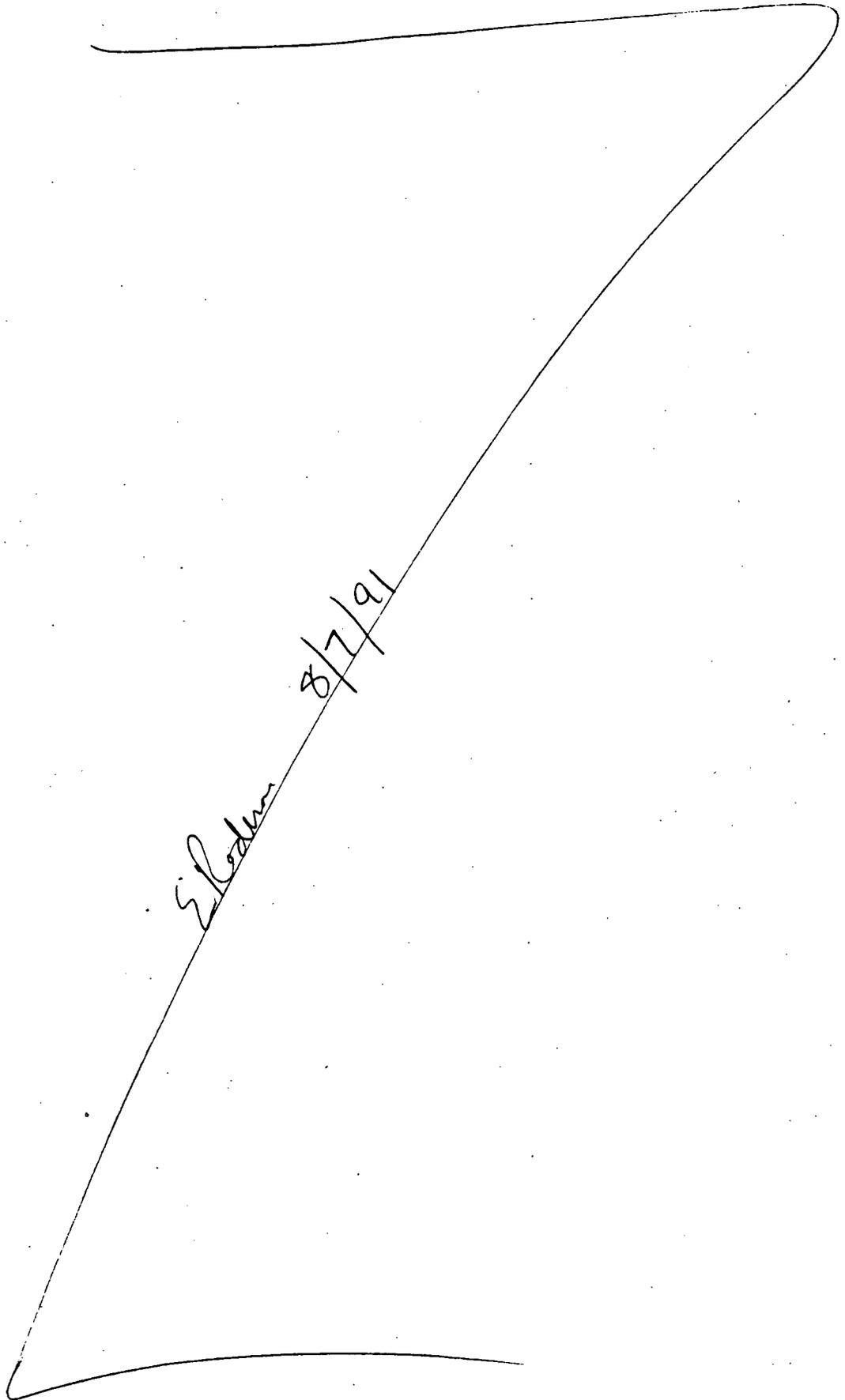
1430 - TO MY ROOM TO REVIEW/STUDY TREATABILITY SOPS, WILL MEET TOMORROW AT 7:30 W/ STEVE WILLIAMS TO CONDUCT AN INVENTORY OF BLDG 788.

1530 - END OF DAY

E. Rodman 8/6/91

E. Rodman

8/6/91



ROCKY FLATS - SOLAR PONDS

2K68

5

WEDNESDAY AUG. 7, 1991

1123

E. RODMAN (H/NUS)

AM: CLEAR WARM

PM: CLEAR HOT

- 0730 - MEETING w/ STEVE WILLIAMS - WESTON AT PORTAL - PROCEED TO 788
- 0830 - CONDUCTING BOTTLE INVENTORY IN BLDG 788 ALSO INVENTORIED MSC. STOCK.
- 1000 - SET OUT EQ. + SUPPLIES FOR TOMORROW AM.
- 1100 - PHONE CALLS TO EH+G PEOPLE - OBTAINING LOCKERS.
- 1200 - LUNCH
- 1230 - PHONE CALLS - PAUL FRANK (H/NUS LABS) LEFT MESSAGE. WILL TRY AGAIN
J. GUADAGNOLI - SET MEET. TIME FOR TOMORROW AT 7:00AM.
B. FIELDING - GAVE HIM PITTSBURGH #S TO CALL TO DISCUSS
MY #S REQUIREMENTS
- 1330 - PICKED UP PHOTO DOSIMETER BADGE AT BLDG 123.
E. LOMBARDO IS TRYING TO GET A PHOTO ACCESS BADGE FORME, THRU
D. FERRIER.
- 1400 - LEFT SITE FOR H/NUS SUITE 101
- 1530 - STILL IN SUITE 101. SORTING THRU FAXES FROM PITTSBURGH
CONCERNING RESPIRATOR TRAINING AND FIT TESTING.
- STUDIED LIST OF SUBJECTS FOR VIDEOTAPING. SOME OF BROWN + ROOTS
COMMENTS ARE UNCLEAR.
- ORGANIZING PAPERWORK FOR TOMORROW.
- 1600 - PREPARED SAMPLE LABELS
- 1630 - END DAY

E. Rodman

Elizabeth Rodman

8/7/91

6

8/8/91

POND 207B N WATERS

SAMPLE #	(DATE)(TIME)	PH	TEMP °C	SC	SAMPLE DESCRIPTION COLOR & TURBIDITY
PW-207BN-T	08-08-91 NA	-	-	-	TRIP BLANK
PW-207BN-NW	08-08-91 0858	NA			CLEAR & LOW
PW-207BN-NE	08-08-91 0904				CLEAR & LOW
PW-207BN-SE	08-08-91 0907				CLEAR & LOW
PW-207BN-SW	08-08-91 0909				CLEAR & LOW
PW-207BN-C	08-08-91 0933	▽		SP	CLEAR & LOW - RETURNED / TO POND. COMPOSITES TO BE COLLECTED DURING TREATABILITY STUDY.

- ⊕ DECONNED USING DRINKING WATER IN THE WASH, COMMERCIAL DISTILLED IN THE RINSE
- ⊕ WESTON WAS UNABLE TO PROVIDE A PH METER FOR TODAY'S ACTIVITIES, BUT WILL HAVE ONE AVAILABLE BY MONDAY'S SAMPLING

8/8-91

ROCKY FLATS - SOLAR PONDS

2K68

7

THURSDAY AUG 8 1991

1123

E. RODMAN (H/NU.S). STEVE WILLIAMS (WESTON)
 KARAN HOLLOWAY " , K. MILLER (WESTON)
 H. TRICKLE (EG+G FIREMAN)
 N. PROCHAZKA (EG+G OBSERVER)

AM: SUNNY/CLEAR

PM: PTLY SUNNY ~ 83°F

- 0645 - ARRIVE ONSITE. ORGANIZING BOX OF PAPERWORK TO TAKE INTO ZONE.
- 0720 - IN BLDG 750 FOR PRE-EVOLUTION MEETING
- 0810 - MOBING EQ. AT POND 207B NORTH
- 0815 - WAITING FOR WESTON PERSONNEL TO ARRIVE WITH EQUIPMENT
- 0835 - WESTON ARRIVED W/ GEAR. EG+G SETTING UP TO DECON EQUIPMENT. - DECONING EQ
- 0915 - COMPLETED WATER SAMPLES - I ASSISTED WITH BOTTLE LABELS
 - ORGANIZING FOR SLUDGE SAMPLING
- 0945 - THERE IS NOT ENOUGH WATER IN THE BUCKETS TO COMPLETE THE SAMPLING
 IN ONE BUCKET FULL. (SAMPLE + COMPOSITE)
 SAMPLERS WILL FOR POND 207BN:
 1) ONLY COLLECT SLUDGE FROM 2 QUADS (IN PROGRESS AREA)
 2) WILL COLLECT MORE WATER IN THE S.S. BUCKETS. IN UNSLUDGE
 SAMPLED QUADS FIRST TO ALLOW OTHER QUADS TO SETTLE.
 3) WILL COMPLETE SLUDGE SAMPLING.
- ④ WILL PURCHASE MORE BUCKETS (4) FOR FUTURE PONDS.
- 1015 - MORE H₂O COLLECTED
 - FINISHING SLUDGE SAMPLES
- 1055 - SLUDGE SAMPLES COMPLETED - STILL NEED TO COLLECT A SLUDGE COMPOSITE
 SAMPLE - I NEED TO CALL IN TO FIND THIS OUT! WILL DO SO AFTER LUNCH.
- 1105 - MOBING SAMPLES TO 788 FOR PACKAGING
- 1120 - BREAK FOR LUNCH. I AM CALLING THE LAB AND THE OFFICE:
 LAB - PAUL FRANK WILL SEND ADDITIONAL BOTTLES, LABELS, + CUSTODY SEALS
 OFFICE - COMPOSITE SAMPLES WILL BE COLLECTED DURING THE TREATABILITY
 & STUDY. WON'T NEED MORE BUCKETS (④). Composite water sample
 WILL BE RETURNED TO POND

8/8/91

POND 207BN SLUDGE

SAMPLE #	DATE + TIME	PH	NA ER		SC	SAMPLE DESCRIPTION COLOR + TURBIDITY
			TEMP °C	SEER		
PS-207BN-T	8/8/91 NA					TRIP BLANK
PS-207BN-NW	8/8/91 0920					} ALL BROWN (med) - VERY SATURATED & RUNNY, granular w/ small shrimps swimming in them.
PS-207BN-SW	8/8/91 934					
PS-207BN-NE	8/8/91 1016					
PS-207BN SE	8/8/91 1028					

FIELD DENSITY MEASUREMENTS - from colwasa sample

40Z JAR EMPTY	127 g	
207BN-SE	282 g	JAR + SAMPLE
207BN-SW	277 g	JAR + SAMPLE
207BN-NW	280 g	JAR + SAMPLE
207BN-NE	282 g	JAR + SAMPLE

SLUDGE DEPTH MEASUREMENTS

QUAD	DEPTH
NW	16 inches
NE	6 inches
SW	12 inches
SE	12 inches

8/8/91

1123

- * 1200 - I AM ACTUALLY ARRIVING LUNCH.
- 1240 - RETURNING TO BLDG 788.
 - INSTRUCTED EG+G PERSONNEL HOW TO APPLY CUSTODY SEALS TO BOTTLES. GOT ALL THE BOTTLES SEALED, IN BAGS, AND IN THE REFRIGERATOR.
 - ORGANIZED SAMPLE BOTTLES + SOME GEAR FOR MONDAY'S SAMPLING
 - DISCUSSED BRIEFLY W/ EG+G PEOPLE HOW TO MAKE SAMPLING RUN SMOOTHLY -
 - 1) WILL DO ALL LABELING + PRE PACKING (BAGS) AT POND.
 - 2) WILL HAVE PEOPLE ASSIGNED TO SPECIFIC TASKS (IE DECAN, LABELING)
- 1415 - DONE AT 788 FOR DAY.
- 1430 - LEFT FACILITY
- 1500 - AT SUITE 101 - DISCUSSED DAY'S ACTIVITIES W/ JOHN SCHMIOT.
- 1600 - PRESIGNING CUSTODY SEALS, FILLING OUT LABELS TO USE TO TRAIN EG+G.
- 1730 - END OF DAY

SUMMARY

- 1) REVOLUTION MTG - SIGNED WORK PERMIT
- 2) COLLECTED 4 WATER + 4 SLUDGE SAMPLES FROM 4 QUADS OF 207B - NORTH
- 3) PREPACKAGED ALL SAMPLES + TRIP BLANKS FOR SHIPPING
- 4) ORGANIZED NEXT ROUND OF SAMPLE BOTTLES
- 5) PREPARED LABELS + SEALS FOR NEXT ROUND OF SAMPLING

OBSERVATIONS

- 1) NEED TO GET EG+G MORE INVOLVED IN DOCUMENTATION (SAMPLE LABELS!) DURING SAMPLING TO PROVIDE ME MORE TIME TO OVERSEE FIELD ACTIVITIES.
- 2) NEED TO SLOW DOWN JUST A LITTLE SO WE DON'T GET ANY ONE STEP OF THE PROCESS BACKED UP.
- 3) M. PROCHAZKA WANTS TO KNOW ABOUT THE DOCUMENTATION FOR THE DISTURBED WATER.

CP 8/14/91

Elyse Plodun

8-8-91

SAMPLES SHIPPED 8-9-91

PW-207BN-NW



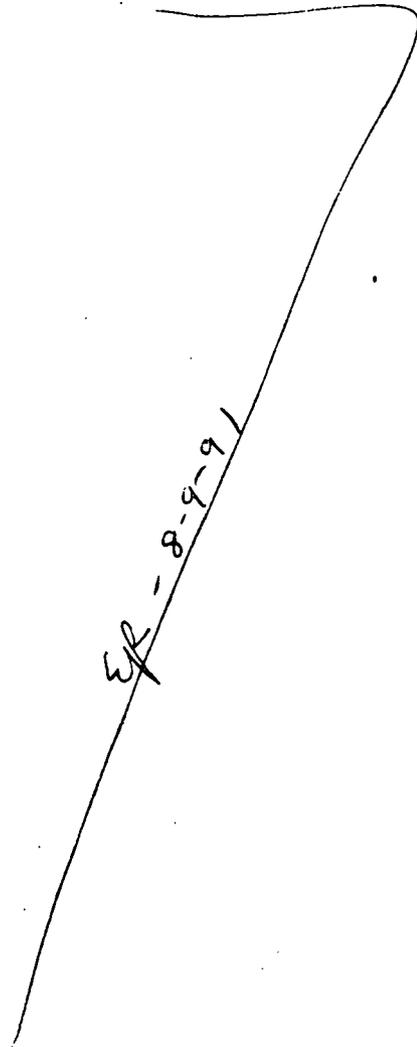
- NE
- SW
- SE
- T

PS-207BN-NW



- NE
- SW
- SE
- T

4 waters , 4 sludges , 2 trip blanks



ROCKY FLATS - SOLAR PONDS

2K68

FRI, AUG 9, 1991

1123

E. RODMAN (H/NMS)

K. HOLLWAY (WESTON)

S. WILLIAMS (")

R. GARCIA (FORMAN EG+G)

AM: SUNNY & CLEAR

PM: CLOUDING, NO RAIN

0700 - ARRIVE ONSITE

0710 - ARRIVE AT BLDG 750 FOR PRE EVAL. MTG

0730 - MOVING TO 788 TO PACKAGE & SHIP SAMPLES.

0800 - EG+G SHOWED UP AT 788 FOR PRE EVAL.

0820 - BEGIN PACKAGING AS PER SCPS. FOR ENVIRONMENTAL SAMPLES.

0955 - COMPLETED PACKAGES - 10 COOLERS

- GETTING COC'S XEROXED. - 1 COPY TO 788 FORMAN

1000 - WAITING FOR SHIPPING FORMS TO COME THRU.

- WEIGHING COOLERS & ORGANIZING SHIPPING MEMO, MATERIAL TRANSFER TAG, & COURIER RECEIPT.

- EG+G PERSONNEL BREAK

1040 - IN 788 BREAK ROOM - CHECKING OVER EG+G NOTE BOOK

1045 - COURIER PICKED UP SAMPLES & TRANSFERRED THEM TO SHIPPING.

1055 - TO 750 PAD w/ GARCIA TO MAKE SOME PHONE CALLS

1105 - CALLED PITTSBURGH

LAB - ORDERED MORE COOLERS, SHOULD GET MORE BOTTLES AND COOLERS TODAY.

OFFICE - NINESTEEL - JUST UPDATED HIM ON SAMPLING & SHIPPING

ORIENT - " " " " " " " "

1230 - LUNCH

1210 - RETURNING TO 788 BLDG. WILL TRAIN SAMPLERS TO FILL OUT SAMPLE LABELS.

1330 - LEFT FACILITY RETURNING TO SUITE 101

1410 - TRIED TO CALL J. TEMPLETON AT BROWN + ROOT TO DISCUSS VIDEOTAPING.

- CALLED L. COLLINS (EG+G) TO DISCUSS TRIWALL MAP UPDATING. HE WANTED TO KNOW WHAT WE WANT TO DO.

1500 - FILLED OUT A FEW MORE LABELS + CUSTODY SEALS.

1530 - END DAY

E. Rodman

Elysha John

12 08-12-91

POND 207 B CENTER

WATERS

SAMPLE #	DATE + TIME	PH	°TEMP °C	SC	DESCRIPTION COLOR + TURBIDITY
PW-207 BC-NW	8-12-91 0859	9.03	15.5	13,500	Blue, not cloudy, low turbidity
PW-207 BC-SW	8-12-91 0850	9.04	15.5	15,000	
PW-207 BC-SE	8-12-91 0907	9.04	15.5	15,000	
PW-207 BC-NE	8-12-91 0904	9.04	15.5	14,500	
PW-207 BC-T	FROM LAB	-	-	-	TRIP BLANK

SLUDGE

SAMPLE #	DATE + TIME	COLIWASA MEASUREMENT	DESCRIPTION
PS-207 BC-NW	8-12-91 0947	4 inches	Blue Green muddy - full of algae
PS-207 BC-SW	8-12-91 0924	2 inches	low % granular material
PS-207 BC-SE	8-12-91 1001	2 inches	VERY SATURATED.
PS-207 BC-NE	8-12-91 1025	3 inches	
PS-207 BC-T	FROM LAB	-	TRIP BLANK

FIELD DENSITY MEASUREMENTS

EMPTY JAR	WT IN grams	
207 BC-NW	sample + jar	sample
207 BC-SW	sample + jar	sample
207 BC-SE	sample + jar	sample
207 BC-NE	sample + jar	sample

GP 8/16/91

WT MEASUREMENTS not necessary because the sample in the jar is not a single coliwasa field.

Ⓢ STILL USING COMMERCIALY PRODUCED DISTILLED WATER IN THE DECON

ROCKY FLATS SOLAR PONDS

2K68

13

MON. AUG 12, 1991

1123

E. RODMAN (H/NUS) K. HOLLIWAY + S. WILLIAMS (WESTON)
R. GARCIA (EG+G) (FOODMAN)

A.M.: FOG EARLY w/ 7 mph wind
P.M.: FOG ALL DAY.

0645 - ARRIVE ON SITE

0710 - IN 750 WAITING TO HAVE PRE-EVALUATION MEETING.

0740 - STILL WAITING FOR EG+G PEOPLE TO ARRIVE.

0820 - SETTING UP EQUIP. AT POND 207 B CENTER

0850 - BEGIN SAMPLING WATER IN SW QUAD

0859 - " " " " NW QUAD

0904 - " " " " NE QUAD

0915 - TRANSFERRING WATER SAMPLES TO SHORE

0924 - SAMPLING SLUDGE IN SW QUAD

0947 - " " " " NW QUAD

0947 1001 - SAMPLING SE QUAD SLUDGES

- decon, labeling and prepackaging going along well.
- field measurements of pH, Temp and SC done by Weston. I will do them next time.

1025 - BEGIN SAMPLING SLUDGE IN NE QUAD

1045 - PULLING BOAT OFF POND. FINISHING DECON AND LABELING OF SAMPLES.

1055 - DECONNING EQUIPMENT + MOVING SAMPLES TO BLDG 788.

1130 - HEADING TO 750 PAD

1140 - LUNCH

1240 - WAITING FOR J. GUADAGNOLI TO RETURN w/ J. SCHMIDT.

- STILL TRYING TO RESOLVE THE QUESTIONS ABOUT DISTILLED WATER. WE DON'T HAVE THE DOCUMENTATION FOR THE 5 gal. JUGS OF DISTILLED WATER THAT WESTON PROCURED. EG+G QA/QC IS CONCERNED THAT WE MUST HAVE REAGENT GRADE WATER.

⊕ POND 207 B CENTER WAS DIFFICULT TO SAMPLE FOR SLUDGES, SINCE THE SLUDGE WAS ONLY 2-4 INCHES DEEP. THESE SAMPLES MAY HAVE A HIGHER PROPORTION OF WATER IN THEM.

1310 - RETURNED TO 788 - FILLED OUT CHAIN OF CUSTODY FORMS FOR 207 BC.

- J. GUADAGNOLI ARRIVED WITH J. TEMPLETON (BROWN + ROOT) TO LOOK AT THE SLUDGE SAMPLES.

Glynn

8/12/91

1515 - left Rocky Flats for Suite 101.

- HAD TALKED WITH J. TEMPLETON FOR NITR. ABOUT VIDEOTAPING SAMPLING ACTIVITIES

1630 - TALKED w/ H/NUS + TEMPLETON IN SUITE 101 ABOUT SAMPLING SCHEDULE, PROGRESS TO DATE, AND SAMPLING PROCEDURE.

1640 - FILLING OUT SAMPLE LABELS + C OF CUSTODY SEALS.

1800 - ORGANIZING PAPERWORK FOR TOMORROW. LABELS ETC..

1830 - END OF DAY

~~W.R. 8/12/91~~

ROCKY FLATS - SOLAR PONDS

2K68

15

TUES. AUG 13, 1991

1123

CLEAR ALL DAY

E. ROOMAN (H/NUS)

K. HOLLIMAN, ST. WILLIAMS (WESTON) J. TEMPLETON (BROWN + ROOT)

R. GARCIA (AREMAN EG+G)

0645 - ARRIVE ON SITE

0715 - PROBLEMS WITH @ 750 PAD. STILL TRYING TO RESOLVE THE DISTILLED WATER ISSUE.

⊛ WATER QUALITY ISSUE

- EG+G QA (M. PROCHAZKA) IDENTIFIED THAT WE ARE SUPPOSED TO BE USING LAB GRADE (?) / REAGENT WATER. FOR DECON + BLANKS. (GRADE 2 WATER)
- WESTON HAS BEEN PURCHASING BOTTLED DISTILLED WATER, BUT IT IS NOT LAB GRADE (G. 4)
- WASTP DOESN'T SPECIFY ANYTHING BUT DISTILLED / DIONIZED WATER.
- WESTON & EG+G ARE INVESTIGATING WHERE APPROVED WATER CAN BE HAD.
- WESTON WILL PURCHASE GRADE 2 WATER.

0745 - PRE EVOL. IN 788. CALLED R. NINESTEEL TO DISCUSS WATER SITUATION

0810 - SETTING UP PACKAGING GEAR + EQUIPMENT

0930 - FINISHED PACKAGING SAMPLES - WEIGHING THEM PRIOR TO SHIPMENT

- SIGNING OFF ON TRANSPORTATION FORMS

1000 - PREPARED BOTTLE SETS FOR POND 207B5, LOADED GEAR INTO WESTON VAN

1030 - RETURNED TO 750 PAD AND REDRESSED,

1055 - AT 750, WAITING TO TALK TO J. TEMPLETON. WESTON IS ARRANGING FOR GRADE 2 WATER.

SHIPPED 207BC NE, NW, SE, SW + T (WATERS)
207BC NE, NW, SE, SW + T (SLUDGES)

1110 - LOOKING AT SLUDGE SAMPLING EQUIPMENT W/ J. GUADAGNOLI AND J. TEMPLETON.

TEMPLETON WOULD LIKE TO OBSERVE THE COLIWASA SAMPLING BEFORE HE DECIDES IF WE NEED TO SEND THE COLIWASA SAMPLES TO THE LABS FOR ANALYSIS. IF THE COLIWASA SAMPLES ARE GOOD, REPRESENTATIVE CROSS SECTIONAL SAMPLES OF THE SLUDGE LAYER, HE WOULD LIKE TO SEND THEM FOR A BATTERY OF GEOTECHNICAL PARAMETERS. IF THE COLIWASA SAMPLES ARE NOT SUITABLE, WE WILL SEND ONLY THE DREDGE ACQUIRED SAMPLES.

TEMPLETON WILL ALSO BE ON HAND TO DIRECT THE VIDEO TAPING ACTIVITIES.

1130 - LEFT SITE - RETURNED TO SUITE 101.

E. Rooman

8/13/91

16 08-13-91

1200 - DISCUSSING SAMPLING SCHEDULE AND PROGRESS WITH J. SCHMIOT.

1315 - FILLING OUT SAMPLE LABELS FOR POND 207BS.

(A) WASP DOES NOT HAVE A QA DESIGNATOR FOR

FIELD BLANKS!

IE. { D = DUPLICATE
B = RINSATE
T = TRIP BLANK.

I HAVE SELECTED:

F = FIELD BLANK

1400 - PHONE CALLS BACK + FORTH WITH EG+G CONCERNING
SAMPLING, DECONT BLANK WATER, + SCHEDULE.

1500 - WILL NOT SAMPLE TOMORROW. GRADE 2 WATER NOT AVAILABLE
UNTIL THURSDAY. PROBABLY WILL RESUME SAMPLING ON
MONDAY. (EG+G DECISION)

1530 - END OF DAY

EP 8/13/91

WED AUG 14 1991

1123

E. RODMAN (H/NMS)
 R. GARCIA (750 FORMAN EG+G)
 D. KING (EG+G ESCORT)

AM: SUNNY & CLEAR

PM: " "

0705 - ARRIVE ONSITE - TRY TO GET PHOTO BADGE, NO PAPERWORK IN PLACE

0805 - PASSED PACS 1 INTO ZONE TO 750 PAD

⊙ NO SAMPLING TODAY: WESTON CANNOT GET GRADE 2 WATER UNTIL MIDDAY THURSDAY.
 SO WE CANT SAMPLE AGAIN UNTIL MONDAY. THE EG+G WATER SUPPLY MAY NOT BE
 GRADE 2 WATER. UNTIL WE GET DOCUMENTED ANALYSIS OF THE LAB'S WATER, WE
 CANNOT USE IT.

WILL ASK TRY TO COORDINATE A SCHEDULE W/ EG+G, BROWN + RITT + WESTON TODAY

0815 - WILL MAP TRIWALLS AT 750 PAD TODAY

0820 - ESCORTED BY D. KING. STARTED COUNTING TRIWALLS IN TENTS + ON
 THE PADS. N OF TENTS AT 750 PAD IS AN AREA OF METAL CONTAINERS +
 WOODEN 1/2 CRATES. CRATES CONTAIN ASPHALT + DIRT. METAL CONTAINERS
 CONTAIN 1-3 PONDCRETE TRIWALLS. THE MARKINGS ARE HIDDEN ON SOME OF
 THE METAL CONTAINERS, SO WE DONT KNOW HOW MANY TRIWALLS ARE IN
 SOME OF THE BOXES. ALMOST ALL THE METAL CRATES CONTAIN 3 TRIWALLS. SOME
 CONTAIN 2.

1110 - COMPLETED THE INVENTORY FOR N OF TENT AREA, TENT 2, TENT 3, ^{and} TENT 4.
 TENT 2 MAPS WERE NOT AS ACCURATE AS TENTS 3+4. THERE WERE
 ALSO SOME MORE WOODEN 1/2 CRATES TO THE W. OF TENT 3.

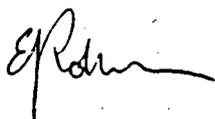
11-15 - BREAK FOR LUNCH.

~~1200~~^{ERR}

1200 - RETURNING TO MAPPING OF 750 PAD.

1230 - COMPLETED MAPPING 750 PAD. - TENT 6 + S LAYDOWN AREA.

1245 - LEFT ZONE. CANT GO TO 904 PAD, BECAUSE THERE IS NO ONE THERE TO
 CONDUCT A BLM INDOCTRINATION. I WILL DO IT TOMORROW. HEADING TO T130C



8-14-91

08-14-91

- TO TALK TO E. LOMBARDI ABOUT A PHOTO BADGE
- NEED TO GET THE MOST RECENT TRIWALL COUNTS FROM 750 + 904 PADS. I WILL COMPARE THESE TO WHAT I MAP.
 - ALSO STILL WAITING TO RESOLVE THE POND SAMPLING SCHEDULE

1345 - BACK AT SUITE 101.

- ERNIE LOMBARDI HAD NOT STARTED THE PAPERWORK FOR A PHOTO BADGE. SINCE WE ARE WORKING UNDER AN AUTHORIZATION, NOT A CONTRACT, I DON'T THINK I CAN GET A PHOTO BADGE (RED), SO I'LL CONTINUE TO WORK ON A VISITOR'S BADGE.
- MAKING PHONE CALLS.

ERNIE LOMBARDI - NOT IN - WANTED TO CHECK ON JUSTIFICATION EXTENSION.

JEFF ORIENT - NOT IN - JUST WANTED TO CHECK IN

PAUL FRANK - " " - NEED TO DISCUSS SAMPLE SHIPPING SCHEDULE

RICH NINESTEEL - DISCUSSED SCHEDULE + PROGRESS.

1450 - DISCUSSED SAMPLING W/ J. TEMPLETON.

- E. LOMBARDI CALLED: WE WILL SAMPLE 207B "SOUTH TOMORROW, USING THE GRADE 4 DISTILLED H₂O. EG+G HAS DECIDED THAT THE RISK IS ACCEPTABLE. WE WILL USE GRADE 2 WATER ONCE IT ARRIVES.
- J. GUADAGNOLI CALLED TO CONFIRM THAT WE WILL SAMPLE TOMORROW. HE WILL HAVE VIDEO TAPING AVAILABLE FOR J. TEMPLETON.

1530 - END OF DAY.

SUMMARY

- 1) MAPPED 750 PAD TRIWALLS
- 2) RESOLVED WATER ISSUE, WILL USE GRADE 4 UNTIL GRADE 2 IS AVAILABLE.

ef Radin 8/14/91

ROCKY FLATS - SOLAR PONDS
THURS AUG 15 1991

2K68
1123

19

E. RODMAN (H/NUS) S. WILLIAMS (WESTON)
R. GARCIA (ELECT FOREMAN) J. TEMPLETON (RAWN + REST)
B.

AM: PTLY. CLOUDY / WARM. - RAIN @ 9:00
PM: CLOUDY w/ T-STORMS.

0645 - ARRIVE ON SITE - DISSEOUT
0715 - IN 750 BREAKROOM FOR PRELIMINARY MTG

④ RICHARD RODENBUGH - INDUST. HYGIENE X 6626 PG 3058
RE. SEE FOR RESPIRATORY FIT CARD.
- OTHERS SHOULD SEND THEIR DOCUMENTATION TO HIM TO OBTAIN A RESP. FIT. CARD.

④ KEITH ANDERSON X 5151 - RADIATION ENGINEER
- TALK TO HIM FOR INFORMATION CONCERNING RAD SCREENING OF
SAMPLE BOTTLES + CONTAINERS.

0730 - MTG IN 750 PAD. - DISCUSSED HHS → CAN PROBABLY DOWNGRADE THE
RESPIRATORY REQUIREMENTS

0805 - MOVING GEAR TO 207 B SOUTH.

0845 - WIND IS GREATER THAN 15 MPH. WILL CEASE ACTIVITIES UNTIL
WIND DIES DOWN - NO SAMPLING YET

0905 - SHUTTING DOWN SAMPLING ACTIVITIES (STILL SHUT DOWN BY WIND) DUE TO
RAIN AS WELL AS WIND.

- WILL TAKE A 1/2 HR BREAK IN HOPE THAT WIND + RAIN WILL DIE DOWN,

0950 - REMOVING AT 207BS

1005 - CALIBRATED SC METER
to 1,000 μ mols/cm

(YSI MODEL 33 S-C-T METER)
D8016398

1015 - LAUNCHING THE BOAT.

- CALIBRATED PH METER TO 7.0 + 10.0 STANDARDS

(ORION SA 250 ph Meter)
7864

Elizabeth Rodman

08-15-91

POND 207BS.

WATERS

SAMPLE #	DATE + TIME	PH	SC	TEMP	DESCRIPTION
PW-207BS-NW	8/15/91 1037	9.07	17000	25.0	BLUE, CLEAR - LOW TURBIDITY ↓
PW-207BS-NE	8/15/91 1054	9.04	17,000	25.0	
PW-207BS-SE	8/15 1120	18,000 ← 9.08		25.0	
PW-207BS-SW	8/15 1108	9.03	17000	25.1	
PW-207BS-T	08/15/91 FROM LAB	-	-	-	TRIP BLANK.
PW-207BS-NE-D	8/15/91 1037	9.07	17000	25.0	
PW-207BS-B	8/15 1109	-	-	-	RINSEATE BLANK (THRU FUNNEL)
PW-207BS-F	8/15 1130	-	-	-	FIELD BLANK.

up 8-15-91

COLIWASA SAMPLE LENGTHS.

NW QUAD ER	TOTAL	LIQUID	SLUDGE
NW QUAD -	63'		7"
NE QUAD	X		8' 1"
SW QUAD	X		3"
SE QUAD	X		1"

NOT TAKEN

08-15-91

1123

1030 - PREPARED TRIPBLANK

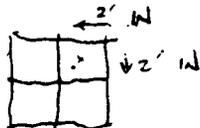
- HAVING DIFFICULTY W/ THE COLIWASA. - WILL PULL BOAT TO THE EDGE TO SHOW THEM HOW TO DO IT.

1037 - COLLECTING PW-207BS-NW + PW-207BS-NW-D

1054 - COLLECTING PW-207BS-NE. THE COLIWASA DOESN'T SEEM TO BE WORKING WELL. I CAN'T TELL IF ITS THE INSTRUMENT OR THE OPERATORS

1100 - OFF LOADING NW, DUP(NW), + NE QUAD WATER + COLIWASA SAMPLES.

- Ⓐ - ALL ^{WATER} SAMPLES IN 207BS ARE TAKEN 2' IN TOWARDS CENTER OF POND FOR PURPOSES OF GETTING BETTER SLUDGE MEASUREMENTS. J. TEMPLETON HAS REQUESTED THIS + I DON'T THINK IT WILL SIGNIFICANTLY EFFECT THE WATER SAMPLES. WATER SAMPLES WILL BE COLLECTED ON THE SIDE OF THE BOAT NEAREST THE ORIGINAL LOCATION, HOWEVER. THE 2' MOVE



WILL ACCOMODATE THE SLOPE OF THE BERMS.

1109 - PREPARING THE FIELD BLANK PW-207BS-F

- LABELING IT. (FIELD BLANK)
- DECONING BOTTLES OF WATER SAMPLES (NW + NE SAMPLES)

1108 - TOOK SW QUAD SAMPLES

- ASSEMBLY LINE FOR PACKAGING MOVING RIGHT ALONG. COLIWASA STILL GIVING QUESTIONABLE INFO. IT MAY BE DUE TO THE SEEMINGLY THIN SLUDGE LAYER

1125 - TAKING SE QUAD SAMPLES

1130 - TAKING RINSE/TC BLANK

1215 - SW QUAD - ONLY FILLED 1 1/2 gallons in the plastic jugs. COULDN'T RETURN TO THE POND FOR MORE, DUE TO HEAT STRESS. THERE IS BARELY ENOUGH SAMPLE IN 1 BUCKETFULL, + WE DIDN'T GET A REALLY FULL BUCKET FROM SW QUAD

- TOOK PH, TEMP, + SC MEASUREMENTS - 25°C → THEY SAT IN THE BUCKETS FOR A LITTLE WHILE. (10 MIN?)

1230 - WATER SAMPLES TAKEN, BLANKS TAKEN, TRANSPORTED TO 788 + STORED IN FRIDGE + COOLER

1255 - BREAK FOR LUNCH. RAIN BEGINS - INTERMITTENT @ 1230

Elizabeth Johnson

08-15-91

08-15-91

- 1335 - LOOKING OVER INVENTORY + HASHING OUT A WORKABLE SCHEDULE w/ J. GUADAGNOLI
- 1350 - SWILLIAMS, J. TEMPLETON, + I TRIED TO USE THE COLIWASA UNDER IDEAL CONDITIONS - WE TRIED TO TAKE A WATER SAMPLE IN BLDG 788 - WE COULD NOT GET A WATER SAMPLE. J. TEMPLETON FEELS THAT THE COLIWASA IS NOT A SUITABLE INSTRUMENT, AS IT IS NOW
- 1425 - INVENTORIED STOCKS OF DISPOSABLES. LOOKS ALLRIGHT ON EVERYTHING.
- 1430 - RETURNED TO 750 PAD + SHOWERED OUT
- 1530 - AT SUITE 101 - SORTED THRU ALL PAPERWORK.
- 1630 - END OF DAY.

OBSERVATIONS

- 1) NEED TO COORDINATE w/ BROWN + ROOT (+ WESTON) ABOUT THE COLIWASA SAMPLES.
- 2) NEED TO INVOLVE PGH IN THE SCHEDULLING.

SUMMARY

- 1) SAMPLED PWD - 207BS - NE, NW, SE, SW, T, B, F, + NW-D.
- 2) UNABLE TO SAMPLE SLUDGE DUE TO DELAYS CAUSED BY WIND + RAIN
- 3) MODIFIED COLIWASA TO OBTAIN A BETTER SAMPLE. THE CENTER ROD WILL FUNCTION AS A PLUG IN THE BOTTOM. WE WILL MEASURE THE PLUG STICKING OUT THE BOTTOM AND ADD THAT TO THE TOTAL SLUDGE DEPTH. J. TEMPLETON (BROWN + ROOT) REDESIGNED THE COLIWASA IN THIS MANNER.
- 4) TENTATIVELY PLANNED SCHEDULE FOR TOMORROW. WILL TRY TO SAMPLE SLUDGE, BUT WILL GIVE PRIORITY TO SHIPPING WATERS.

WJR
8-15-91

ROCKY FLATS - SOLAR PONDS

2K68

23

FRI. AUG 16, 1991

1123

E. RODMAN (H/NUS)

S. WILLIAMS (WESTON)

R. GARCIA (EGTG FOLLOWS)

AM: SUNNY CLEAR

PM: CLOUDY OVER

0645 - ARRIVE ON SITE

0715 - IN 750 BLDG FOR PREV. MTG.

0820 - IN 788 - BEGINNING TO PACKAGE 207BS WATERS

0850 - COMPLETED PACKAGING - WEIGHING SAMPLES/COILERS NOW, FILLING OUT PAPERWORK.

0905 - PW - 207BS - NW, NW-D, NE, SW, SE, T, B, F SHIPPED!

~~0910 - PRE-LOADING EG. FOR MONDAY - ER~~

0915 - EGTG BREAK

0930 - ORGANIZED BOTTLES AND LOADED EGAR INTO THE WESTON VAN FOR MONDAY.

- CONTACTED RICH GARCIA ABOUT GETTING THE GRADE 2 WATER FROM THE WAREHOUSE TO BLDG 788.

1100 - AT 750 BREAK ROOM.

• MET w/ D. FERRIER, J. GUARDAGNOLI, + S. WILLIAMS. D. FERRIER IS CONCERNED ABOUT THE USE OF DISTILLED WATER DURING SAMPLING AND THE DETAIL OF WESTON, EG+G, + H/NUS FIELD NOTES. M. PROCHAZKA FILED A DEFICIENCY REPORT THAT NEEDS TO BE ADDRESSED. I WILL SET H/NUS - PITTSBURGH ON THIS PROBLEM. WHAT IS REQUIRED FOR WATER? I WILL ALSO REVIEW FIELD NOTES FOR DEFICIENCY, AND CORRECT AS NECESSARY.

RESULT OF WATER INVESTIGATION

- 1) SHOULD FOLLOW SW-846 VERSION 1986. 1991 VERSIONS ARE NOT PROMULGATED + DO NOT APPLY.
- 2) M. PROCHAZKA WAS USING THE 1991 VERSIONS OF SW-846, AND HE WAS LOOKING AT STANDARDS FOR LAB BLANKS NOT FIELD BLANKS
- 3) SW-846, 1986 SAYS WE MAY USE DISTILLED, ^{or} DEIONIZED OR GRADE II WATER
- 4) REPORTED THESE FINDINGS TO EG+G

ANALYSIS - WE DON'T HAVE A PROBLEM CONCERNING WATER; THE DISTILLED WATER USED TO DATE IS ACCEPTABLE UNDER SW-846, 1986.

Elyse J. New

E-16-91

08-16-91

SUMMARY

- 1) PACKAGED 207BS WATER SAMPLES + DUP + FIELD BLANK,
+ RINSATE. BLANK.
- 2) MEETING W/ DON FERRIER, J. GUADAGNOLI, + S. WILLIAMS.
- 3) INVESTIGATED AND RESOLVED THE QUESTION OF WATER
FOR DECON AND BLANKS.

(*) COLIWASA MODIFICATION OF METHOD + EQUIPMENT.

- 1) METHOD: NO LONGER TAKING ^{COLIWASA} SAMPLES AS PER SOP. J. TEMPLETON REQUIRES SAMPLES FROM EACH QUAD; TAKEN FROM THE COLIWASA, COMPOSITED AND SPLIT TO 4 TO TEST FOR FLOCCULATION CAPABILITIES. SAMPLES WILL BE REDEPOSITED INTO PENS AFTER FIELD FLOCCULATION TESTING. NO FIELD MEASUREMENT OF WEIGHT NECESSARY NOW.
- 2) EQUIPMENT: J. TEMPLETON MODIFIED THE COLIWASA:



- WILL BE USED AS A STRAW / WITH A
PLUG IN THE BOTTOM. WILL ADD THE
LENGTH OF THE PLUG TO THE TOTAL
LENGTH OF SLUDGE AND SLUDGE PLUS LIQUID.

Spahn 8-16-91

ROCKY FLATS - SOLAR PONDS

2K68

25

MON. AUG 19, 1991

1123

E. RODMAN (H/NUS)	X. HOLLIMAN (WESTON), STEVE WILLIAMS (WESTON)
R. GARCIA (FIREMAN)	J. SCHMIDT } (H/NUS)
J. TEMPLETON (WESTON)	R. HILL }

AM: CLOUDY

PM: MORE CLOUDS (TOTAL) STORMY TO THE SOUTH

0645 - ARRIVE ON SITE

0715 - IN 750 BREAK ROOM FOR PRESENTATION MEET.

0800 - AT 207BS WAITING FOR EG+G PERSONNEL TO ARRIVE. J. QUADAGNOLI IS CONTACTING LOMBARDI TO RESOLVE FINALLY WHICH WATER TYPE WE WANT TO USE (DISTILLED OR GRACE II) TODAY.

0815 - SETTING UP ON BERM OF 207BS TO SAMPLE THE SLUDGE.

0830 - EG+G HAS LOST THE DRAIN PLUG FOR THE BOAT. WORK CANNOT BEGIN UNTIL IT IS FOUND.

0845 - DRAIN IS PLUGGED - BOAT IN WATER. - READY TO LOAD BOAT.

0900 - THE MODIFIED COLIWASA IS NOT WORKING THE PLUG LOOSE SEAT.

0910 - EG+G HAS DECIDED TO GO AHEAD AND USE THE DISTILLED WATER WE HAVE BEEN USING! THIS WILL MAINTAIN CONSISTENCY IN METHODS.

0903 - TAKING SLUDGE SAMPLE (+ DUPLICATE) FROM NW QUAD.

0916 - " " " " FROM NE QUAD.

0940 - NE + NW QUAD BOTTLES UNLOADED - DECON BEGINNING. SE + SW QUAD SAMPLING UNDERWAY

0941 - BEGIN TAKING SW SLUDGE SAMPLES

0956 - " " SE " "

1010 - PULLING BOAT ON SHORE. DECONTAMINATING SE + SW SLUDGE SAMPLES.

1015 - POURING FIELD BLANK

1030 - POURED RINSEATE BLANK AT 0930, SAMPLING OF SLUDGE COMPLETED

1045 - DEMOBING FROM 207BS. MOVING EQUIPMENT TO 207A

1050 - BREAKING FOR LUNCH.

- THE COLIWASA DID NOT WORK. THE PLUG WOULD NOT SEAT, THUS IT JUST PULLED THROUGH THE COLIWASA. J. TEMPLETON SUGGESTED WE JUST USE DRUDGE SAMPLE FOR THE FLOCCULATION SAMPLES.

- SLUDGE SAMPLING WENT VERY WELL.

- BIG STORM HEADING TOWARDS US. AWAITING A DECISION ABOUT SAMPLING 207A.

1230 - REMOBING AT N. END OF 207A, CALIBRATED PH + SE METER (SEE PG 19 FOR MODELS)

1254 - TAKING WATER SAMPLE FROM NE QUAD

1302 - " " " " " " NW QUAD

E. Rodman

8-19-91

8-19-91

POND 207BS = 207A207BS
SLUDGES

SAMPLE #	DATE & TIME	DESCRIPTION
PS-207BS-NW	8/19/91 0903	BLUE/GREEN, ALGAE RICH w/ SILT + SAND
PS-207BS-NW-D	8/19/91 0903	SOME LARGE (<2cm) WHITE FLECKS
PS-207BS-NE	08/19/91 0916	HIGHLY SATURATED (4% H ₂ O)
PS-207BS-SW	08/19/91 0941 0944 ETC	
PS-207BS-SE	08/19/91 0956	
PS-207BS-T	08/19/91 FROM LAB	TRIP BLANK
PS-207BS-B	08/19/91 0930	RINSEATE (in 55 GAL)
PS-207BS-F	08/19/91 1015	FIELD BLANK

POND 207A

WATERS	DATE / TIME	PIT	SC.	T	DESCRIPTION	COLOR - TURBIDITY
PW-207A-NE	08/19/91 1254	9.73	9500	25	YELLOW CLEAR	LOW
PW-207A-NW	1302	9.82	8,500	25	" "	" "
PW-207A-SE	1307	9.85	9,000	25	YELLOW CLEAR	LOW
PW-207A-T	FROM LAB	-	-	-	TRIP BLANK	

SLUDGE	DATE	TIME	DESCRIPTION
PS-207A-NE	08/19/91	1345	BROWN SILTY SAND w/ BLACK FLECKS VERY SATURATED

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- TOOK VOAS OFF CENTER (1/2 QUAD) FOR NE + NW QUADS. BULK OF THESE H₂O SAMPLES WERE TAKEN ON CENTER, THOUGH.

1307 - SAMPLING WATER FROM SE QUAD

1325 - LABELING + DECONTAMINATING WATER SAMPLES, SHIFTING SLUDGE GEAR TO BOAT

- CHECKED WIND SPEED (9 mph sustained)

- COLWAGA IS NOT ABLE TO OBTAIN SAMPLE. WE HAVE NO WAY TO MEASURE SLUDGE DEPTH.

1340 - ATTEMPTING TO GET SLUDGE FROM NE QUAD ^{207A} SAMPLING IN THE EXTREME CORNER. THERE IS ALMOST NO SLUDGE (1"?) ANYWHERE ELSE. SAMPLING IN A DEEP (4') HOLE BUILT FOR A SUMP PUMP. SLUDGE IS MIXED IN W/ TRASH (CARDBOARD), LOTS OF FINES IN THIS SLUDGE THAT ARE WASHING OUT. NOTHING WE CAN DO ABOUT THAT THOUGH. WE TRIED TO OBTAIN SAMPLE AT 2 POINTS BETWEEN THE CENTER OF THE QUAD + THE SUMP HOLE

1345 - TAKING SLUDGE SAMPLE FROM NE QUAD

1410 - NO SLUDGE IN SE OR NW QUADS THEREFORE WE TOOK NO SAMPLES FROM THESE TWO QUADS

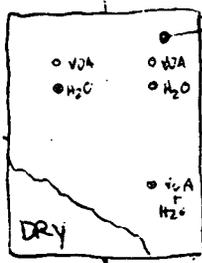
1415 - DECONTAMINATING SAMPLE BOTTLES, PACKAGING, CLEANING UP DECON AREA, DECONTAMINATING BOAT

1420 - UNLOADING SAMPLES INTO THE REFRIGERATOR + AFFIXED CUSTODY SEALS.

1445 - LEFT SITE, RETURNED TO SUITE 101.

WATER - EG+G HAS DECIDED TO MAINTAIN CONSISTENCY BY CONTINUING TO USE THE DISTILLED WATER RATHER THAN THE GRADE 2 WATER.

POND 207A - SAMPLING LOCATION SKETCH



SLUDGE - at SUMP HOLE.

⊕ VOAS WERE COLLECTED FROM ~4' OFF-CENTER. THIS WAS REALIZED AND THE BOAT WAS MOVED, THE BUCKETS WERE DUMPED AND NEW SAMPLE WAS COLLECTED FROM THE CENTER OF THE QUAD. THE OFF CENTER VOAS WERE RETAINED TO REDUCE CROSS CONTAMINATION OF THE BOTTLES, HOWEVER.

Elysha Madin

8-19-91

8-19-91

1715 - WORKING OVER FIELD NOTES. DISCUSSED PROJECT + PROGRESS WITH J. SCHMIDT. J. TEMPLETON IS WORKING ON A CLARIFIER SAMPLING METHOD. HE WILL ALSO CONDUCT FLOCCULATION TESTS ON THE A + B SERIES POND SLUDGES.

1800 - PREPARED CUSTODY SEALS FOR TOMORROW.

- END OF DAY

ef 8-19-91

SUMMARY

- 1) COLLECTED SLUDGE SAMPLES (4 QUADS) FROM 207B.
- 2) COLLECTED 3 WATERS (NOT SW QUAD) AND 1 SLUDGE SAMPLE (NE QUAD) FROM 207A.
- 3) ALSO COLLECTED A SLUDGE FIELD BLANK AND RINSATE AT 207B.
- 4) SAMPLES ARE READY TO BE PACKAGED AND SHIPPED TOMORROW.
- 5) CANNOT MEASURE SLUDGE DEPTHS IN PONDS WITH THE COLWASA.

ef 8-19-91

ROCKY FLATS - SOLAR PONDS

2K63

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TUES. AUG 20 1991

1123

E. RODMAN (HNUS) S. WILLIAMS (WESTON)
 J. GUADAGNOLI (EG+G)
 B. MORALES (EG+G NOTETAKER)

AM: PTLY CLOUDY, COOL
 PM: " HOT

- 0700 - ARRIVE ON SITE, MTG IN 750 BREAK ROOM
- 0800 - IN 788 BLDG AWAITING ENOUGH EG+G PERSONNEL TO PACKAGE SAMPLES FOR SHIPPING.
- 0815 - S. WILLIAMS + J. GUADAGNOLI ARRIVE w/ VAN (WESTON) AT 788. BEGIN TO MOBILIZE PACKING AREA
- 0825 - SEVERAL MORE EG+G PERSONNEL ARRIVE
- 0830 - BEGIN PACKAGING SAMPLES
- 0950 - FINISHED PACKAGING SAMPLES. TAKING AN EG+G BREAK PRIOR TO WEIGHING AND HANDING OFF TO TRANSPORT DEPARTMENT

SHIPPED 2-20-91

PW - 207A-NE, NW, SE, + T

PS - 207A-NE

PS - 20763-NE, NW, NW-D, SW, SE, T, F, + B.

} 13 COOLERS!

- 1030 - WEIGHED SAMPLES AND FILLED OUT TRANSFER TAG, COURIER RECEIPT, AND SHIPPING MEMO.
- 1040 - TO 750 PAD TO MAKE XEROXES OF THE CHAIN OF CUSTODY FORM AND ABOVE LISTED PAPERWORK
- 1100 - LUNCH
- 1200 - TRANSPORTATION PICKED UP COOLERS.
 - GETTING GEAR READY FOR TOMORROW.
- 1245 - LOADED AND LOCKED THE WESTON VAN
 - WORKING ON EG+G SAMPLE TRACKING FORMS.
- 1320 - FILLED OUT EG+G ACCOUNTABILITY (SAMPLE) LOG SHEETS.
- 1410 - LEFT SITE, RETURNED TO SUITE 101.
 - DISCUSSED ACTIVITIES w/ HNUS PERSONNEL.
- EVENING - PREPARED SAMPLE LABELS.

Elyse Johnson

08-20-91

W. John
8-20-91

ROCKY FLATS - SOLAR PONDS

ER 2K68
H23

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WED. AUG 21, 1991

1123

E. RODMAN (H/NRS) S. WILLIAMS (WESTON) J. TEMPLETON (BROWN+REED)
(EG+G) R. GARCIA, J. GUADAGNOLI
C. TURNER

AM: CLEAR + SUNNY - HOT.

PM: " " " 88°F

0630 - ARRIVE ON SITE, DRESSED OUT

0700 - IN 750 PAD FOR PREEVOLUTION MTG

0820 - CREW IS DRESSING OUT FOR SAMPLING ZOTC (WATERS)

- AFTER CONFERRING W/ WESTON, WE AGREE THAT DUE TO A LIMITED # OF COOLERS AND LIMITED TIME, WE SHOULD ONLY SAMPLE POND ZOTC WATER. CLEARIER WATER COULD BE SAMPLED ON FRIDAY. J. GUADAGNOLI FEELS WE NEED TO TRY TO DO BOTH TODAY. WE WILL PLAY IT BY EAR → SEE HOW IT GOES.

0845 - POURED FIELD BLANK SAMPLE

0855 - POSITIONING PONTON BOAT IN NE QUAD.

0856 - BEGAN SAMPLING PW-ZOTC-NE AND NE-D.

0919 - SAMPLED SE QUAD. CALIBRATED PH/α METERS (SEE PG 14 FOR MODEL #S)

0923 - " SW QUAD

0935 - " NW QUAD

0942 - PULLING SAMPLES OFF THE BOAT.

0950 - NOT ENOUGH SAMPLE WAS COLLECTED FROM NE QUAD TO FULFILL SAMPLE REQUIREMENT. WILL HAVE TO GO BACK TO COLLECT MORE.

1020 - DECON TEAM GOT SOME OF THE SAMPLE BOTTLES MIXED UP DURING THE DECON PROCESS, THEY WERE MOVING BOTTLES THRU TOO FAST. I BELIEVE WE GOT THEM STRAIGHTENED OUT THOUGH. SEVERAL OF THE VOA VIALS HAVE AIR BUBBLES IN THEM - ALMOST ALL OF THEM; SAMPLERS INFORMED AGAIN OF SAMPLING METHOD.

1025 - CREW GETTING READY TO GO COLLECT ADDITIONAL DUPLICATE SAMPLE VOLUME

- LABELING CREW ~~SE~~ MISLABELED VOAS AND SELECTED ALCOHOLS, SO I PROVIDED NEW LABELS AND THE BOTTLES WERE PROPERLY RELABELED.

1045 - COMPLETING SAMPLE & LABELING OF WATER SAMPLES AS PER SOPS (SEE PG 32)

1130 - COMPLETED PACKAGING OF SAMPLES (9 COOLERS)

PW-ZOTC-NE, NE-D, SE, SW, NW, B, T, & F

- WAITING FOR TRAFFIC DEPT TO COMPUTE INTERNAL ROUTING PAPERWORK AND PICKUP THE SAMPLES.

Elyot Mord

08-21-91

08-21-91

POND 207C

WATER SAMPLES

SAMPLE #	DATE	TIME	PH	TEMP	SC	DESCRIPTION
PW-207C-NE	8/21/91	0854	(*)	(*)	(*)	GOLDEN BROWN - CLEAR + LOW
PW-207C-NE-D	"	0856				" JUST LIKE APPLE CIDER w/ a few black flecks
PW-207C-F	"	0845	-	-	-	FIELD BLANK
PW-207C-SE	"	0919	10.19	25.0	>50,000	"
PW-207C-SW	"	0923	10.24	25.0	>50,000	"
PW-207C-NW	"	0935	10.22	25.0	>50,000	"
PW-207C-B	8/21/91	1155	-	-	-	RINSE
PW-207C-T	8/21/91	FROM LAB	-	-	-	TRIP BLANK

(*) UNABLE TO OBTAIN PH/SC OR TEMP ON 207C -NE, NE-D DUE TO CONFUSION DURING DECON AND SAMPLE LABELING. THE SAMPLE FOR PH/SC ETC. WAS DUMPED BEFORE THE MEASUREMENTS COULD BE TAKEN. DUE TO CONSISTENCY OF REMAINING 3 QUADS, I DON'T SEE THIS AS A PROBLEM, HOWEVER

OBSERVED PROBLEMS (DEVIATIONS + PROBLEMS)

- 1) NE QUAD - VOA SAMPLES NOT COLLECTED FIRST. THIS WAS RECTIFIED ON SITE, FOR FUTURE QUADS, WITH VERBAL DIRECTIONS.
- 2) PEOPLE HURRING SAMPLES THRU DECON AND LABELING. BOTTLES GOT MIXED UP IN DECON & HAD TO BE RE-SORTED OUT. BOTTLES GOT MISLABELED WHEN LABELERS DIDN'T CAREFULLY READ WHICH LABELS WENT ON WHICH BOTTLES. ADDITIONAL LABELS HAD TO BE MADE, + BOTTLES RELABELED
- 3) VOA SAMPLES WERE COLLECTED WITH AIR BUBBLES. WATER SAMPLERS FOR THE CLARIFIER WILL BE GIVEN MORE DIRECT, CAREFUL INSTRUCTIONS.
- 4) DUE TO LACK OF INITIAL SAMPLE AND HURRING DURING COLLECTION, NO SAMPLE WAS AVAILABLE FOR PH/SC OR TEMP. MEASUREMENT IN NE QUAD. (MINOR PROBLEM)

Rocky Flats Solar Ponds
Elizabeth Rook

2K68

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08-21-91

1123

- ⊕ - CALIBRATED PH, TEMP + SC AS PER MANUALS.
 - PH TO 7.0 + 10.0
 - SC TO 1000.

1230 - TRANSPORT COLLECTED SAMPLES FOR SHIPPING

1235 - SHOWED SLUDGE SAMPLES TO J. TEMPLETON SO HE COULD RUN FLOCCULATION TESTS THIS AFTERNOON, THEN RETURN SAMPLES TO APPROPRIATE PONDS.

1300 - REVIEWED C. OF CUSTODY'S w/ EG+G PERSONNEL (B. MORALES), ASSISTED HIM IN COMPLETING EG+G FORM → SAMPLE LOG ACCOUNTABILITY. IT IS USED TO CHECK MATERIAL OUT OF AND BACK INTO THE FACILITY.

1400 - LEFT SITE. RETURNED TO SUITE 101

- PREPARED SAMPLE LABELS + ASSOC. PAPERWORK FOR TOMORROW.

Elizabeth Rook

Elizabeth Rook

08-21-91

POND 207C SLUDGE

SAMPLE #	DATE + TIME	DESCRIPTION
PS-207C-NE	8/23/91 0915	} NOT COLLECTED - COULD NOT OBTAIN SAMPLE.
PS-207C-NE-D	8/23/91 20	
PS-207C-SE		
PS-207C-SW	8/23/91 0914	green/brown w/ crystalline material, large crusts. (ALGAE?)
PS-207C-NW	8/22/91 2015	Brown w/ some crystalline material <u>greenish-brown</u>
PS-207C-NW-D	8/22/91 2015	" " " " "
PS-207C-T	8/23/91 From Lab	TRIP BLANK
PS-207C-B	8/23/91 0940	RINSATE BLANK (SS. BUCKET)
PS-207C-F	8/23/91 0900	Field blank
PS-207C-C	8/23/91 0919	POND INTERIOR COMPOSITE - green/brown w/ large x/line chunks.
PS-207C-CB	8/23/91 0921	POND BERM COMPOSITE - BROWN SILTS
	0904	
	0901	

CLARIFIER

WATER					
SAMPLE #	DATE + TIME	PH	SC	OT	DESCRIPTION
CW-001-	8/22/91 1605	10.22	33,000	27.9	Yellow/Green w/ a few black flecks.
CW-001-D	8/22/91 1605	"	"	"	family clean, low turbidity
CW-002	8/22/91 1700	4.98	40,000	27.9	
CW-003	8/22/91 1725	10.19	30,000	27.9	↓
CW-000-T	8/23/91 From Lab	-	-	-	TRIP BLANK
CW-000-B	" 2220	-	-	-	RINSATE (BAILER)
CW-000-F	" 2225	-	-	-	FIELD BLANK

SLUDGE

SAMPLE #	DATE + TIME	DESCRIPTION
CS-001-	8/22/91 1815	Mostly all Fines, Brown, highly saturated
CS-001-D	" 1815	↓
CS-002	" 1925	⊛ RADIOACTIVE!
CS-003	" 1955	↓
CS-000-B	" 2250-2240	Field blank RINSATE (S.S. BOWL)
CS-000-F	" 2240-2250	FIELD BLANK
CS-00T	" From LAB	TRIP BLANK

ROCKY PLATS - SOLAR PONDS

ZK68

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THURS. AUG 22 1991

1123

ERODIAN, RAN HILL (H/NUS) S WILLIAMS K HOLLOWAY (WESTON)
 J. SCHMIDT (H/NUS) J. TEMPLETON (B+R)

R. GARCIA + J. GUADAGNOLI (EG+G)

AM. HOT, SUNNY

PM: CLOUDY (T. STORMS) VERY HOT (N90°)

0645 - ARRIVE ON SITE

0830 - MOVING EQUIPMENT FROM 788 - TO VAN

0845 - BEGIN SETTING UP DECON AREA ON BERM OF 207C

0920 - ATTEMPTING TO GET SAMPLE FROM NE QUAD. DIFFICULTY ENCOUNTERED - IT ISN'T CLEAR WHETHER THE SALTY DEPOSITS ARE SO HARD THAT WE CAN'T BREAK THROUGH, OR IF THERE SIMPLY ^{EX} ISN'T ANY SLUDGE PRESENT NEAR THE CENTER OF THE QUADS.

- MOVED THE BOAT EAST (TOWARDS CENTER) AND N (TOWARDS BERM) ~ 8'
- STILL NOT GETTING ANY SIGNIFICANT SAMPLE.

0950 - HAVE OBTAINED ~ 1 CUP OF CRYSTALLINE MATERIAL FROM NE QUAD.

- TRYING TO ~~MOVE~~ SE QUAD (CENTER) TO SEE IF THERE IS ANY MATERIAL THERE.

1000 - SHUT DOWN OPERATION: NEED TO IMPROVE RPT + DECON CONTROLS. EG+G PERSONNEL REQUIRED, AND ARE NOW WORKING ON IT. HEAT STRESS HAZARD, AS WELL.

- NEED TO CONSULT WITH PITTSBURGH TO RESOLVE OUR PROBLEMS WITH SAMPLING.

1115 - TALKED TO M. SPERANZA IN PITTSBURGH.

HE AGREES THAT WE SHOULD:

- 1) TRY SW + NW QUADS - SAMPLE IF POSSIBLE
- 2) COLLECT 1 COMPOSITE SAMPLE FROM 4 QUADS (center pond area)
- 3) " " " " " the berm sludges.

- I ADVISED EG+G (J. GUADAGNOLI) OF THIS SCENARIO.

- J. TEMPLETON ALSO AGREES WITH THIS SCENARIO. HE IS TRYING TO ARRANGE A DEVICE THAT WILL ALLOW THE SAMPLERS TO SEE THE BOTTOM. WESTON ALSO AGREES

- SAMPLING STRATEGY: IN POND 207C

- USE HOE + RAKE TO BREAK UP A LARGE AREA (10' CIRCLE) THEN USE THE DREDGE +/OR S.S. SLOPP TO TAKE THE SAMPLE.

⊕ MATERIAL AT WATERLINE (BERM) IS DIFFERENT FROM SLUDGE IN INTERIOR OF POND → SEPARATE!! SAMPLE!!

⊗ POND C SAMPLERS REPORT

NE QUAD - CRUST LAYER WITH < 2" OF MATERIAL BENEATH IT. SE QUAD. - CRUST W/ UP TO 4" OF SLUDGE MATERIAL BENEATH IT.

THIS UNDERNEATH SLUDGE IS MOSTLY FINES - MOST OF THE MATERIAL BILLOWED OUT OF THE DREDGE AS IT WAS PULLED THRU THE WATER. BELOW CRUST IS SILTY WATER; THEN ACTUAL SLUDGE.

Elysha

8-22-91

1220 - READY TO RESTART, BUT IT IS NOW TOO HOT TO WORK.

INDUSTRIAL HYGIENE SAYS 15^{MIN} ON / 45^{MIN} OFF FOR PEOPLE IN RESPIRATORS. IT IS TOO HOT TO WEAR SARANEX AT ALL, SO WE CANNOT SAMPLE

1300 - STILL WAITING FOR TEMP TO DROP (BELOW 21.1°C). IT IS 24°C ON THE BERM.

- KAREN IS DIRECTING EG+G IN DRUM LABELING

1415 - DRUMS ARE LABELED + READY TO GO.

- CLARIFIER AREA IS SET UP + BOTTLES ARE MOBILIZED SO WE CAN START AS SOON AS HQS SAYS WE CAN BEGIN.

1445 - BEGINS TO RAIN w/ THUNDER + LIGHTENING

1500 - WAITING FOR THE RAIN TO STOP AND THE TEMP TO CONTINUE TO DROP.

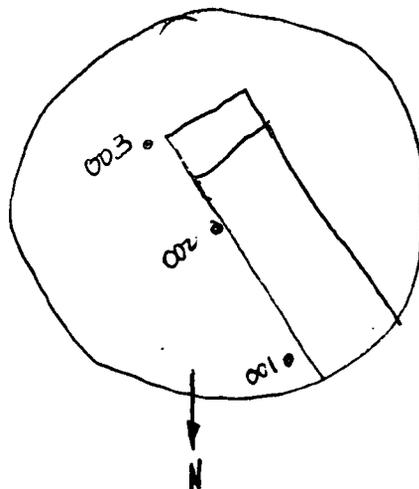
1530 - WILL BEGIN CLARIFIER SAMPLING, THEN COMPLETE POND ZOTC SLUDGES.

1555 - MOVING GEAR UP ONTO CLARIFIER BRIDGE

1605 - BEGIN TAKING CW-001 and CW-001-D

1625 - STILL TAKING CW-001 + CW-001-D. THE VOAS TOOK A LONG TIME.

- THE WATER LAYER IS LESS THAN 1 BAILER LENGTH DEEP, SO SOME SEDIMENT HAS BEEN INCORPORATED INTO THE SAMPLE



Clarifier
Sketch.
water + Sludge

1650 - CHANGING TEAMS FOR SAMPLING THE CLARIFIER WATER.

1700 - TAKING CW-002

1725 - TAKING CW-003

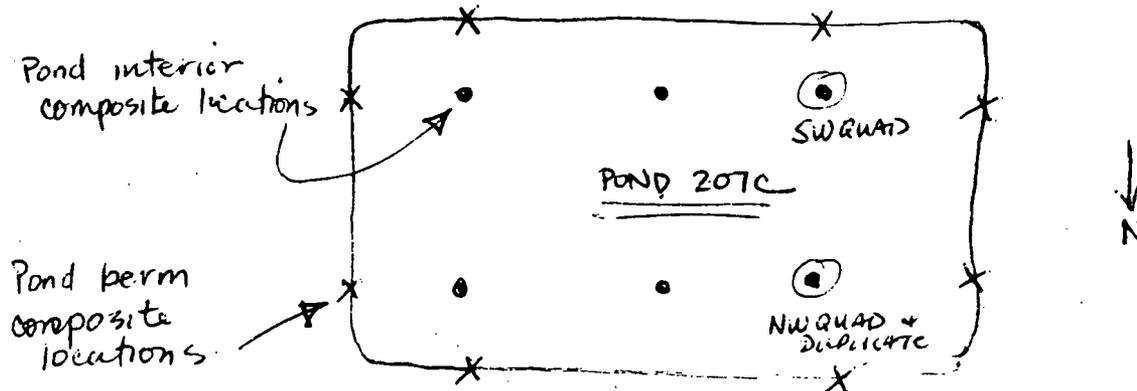
8-22-91

1123

- 1745 - COMPLETED WATER SAMPLING IN CLARIFIER
- BOTTLES ARE BEING PRE-PACKAGED FOR SHIPPING
- 1815 - COLLECTING THE FIRST ~~H₂O~~ SLUDGE SAMPLE FROM THE CLARIFIER
CS-001 + 001-D
- 1850 - EG+G WANTS TO GET POND 207C SAMPLING GOING AT THE SAME TIME IN AN EFFORT
TO GET ALL THE SAMPLING COMPLETED TONIGHT.
- INDUSTRIAL HYGINE DECIDED THAT LIFE PRESERVERS WOULD BE REQUIRED IN THE BOAT
BECAUSE A PERSON COULD JUST STAND UP. NOT USING A LIFE PRESERVER WILL BE A
CHANGE TO THE H+S PLAN (MODIFICATION)
- 1925 - MOVING TO GO OUT ON THE BOAT. WAITING FOR AN RPT, AT 207C
- 1928 - MOVING CREW ONTO BOAT. ON 207C, KAREN HOLLOWAY OVERSEEING CLARIFIER SAMPLING.
- 1943 - STILL COLLECTING NW SAMPLE (INTO ^{S.S.} BUCKETS) USING THE S.S. CONICAL DREDGE/SCOOP.
PS-207C-NW + PS-207C-NW-1D
- 1955 - STEVE WILLIAMS IS DUMPING OUT THE ~~SAMPLE~~ FROM 207C SLUDGE FROM
THIS MORNING. SAMPLE CANNOT BE USED (FROM EASTERN QUAD) AS IT HAS VOLATILIZED.
- 2015 - GETTING NW + NW-D SAMPLES INTO JARS + GROSS DECON CARRIED OUT IN
THE DARK ON THE BERM. H+S JUST NOW SETTING UP A LIGHT.
JOHN GUADAGNOLI WANTS TO SET UP A DECON ZONE IN BLDG 788
SO WE CAN DECON INSIDE THE BLDG, THEN PACKAGE SAMPLES.
- 2035 - DRUMS AND SAMPLE CONTAINERS READY TO LOAD UP. A DECON ZONE HAS BEEN
SET UP ON THE LOADING DOCK.
- 2100 - ONE 32 OZ JAR OF CS-001-D BROKE DURING DECONTAMINATION. DECONTAMINATION
LINE IS BEING REWORKED + CLEANED UP.
- ① SAMPLING AT POND 207C IS INCOMPLETE AS PER WHAT WAS AGREED UPON BETWEEN
H/NKS, BROWN + ROOT, WESTON, + EG+G. IT IS NOT CLEAR YET AS TO WHETHER OR
NOT J. GUADAGNOLI PLANS TO SEND ANYONE ELSE OUT ONTO PONDS ^(207C) IN THE
AM FOR ADDITIONAL SAMPLE.
- WE COLLECTED A NW QUAD SAMPLE + A NW QUAD DUPLICATE. WE HAVE NOT
GOTTEN TO THE SW QUAD, A POND COMPOSITE, OR A BERM COMPOSITE YET.
- 2300 - CS-002 (MOISTURE) AND PS-207C-NW (MOISTURE) GOT THE
LABELS SWITCHED. I WAS ABLE TO CORRECT THE CLARIFIER,
BUT NOT THE POND SLUDGE LABEL. IT WAS NOTED WITH THE → pg 40

8-22-91 ^{ER}DEVIATIONS FROM SOPS AND WASP - 207C SLUDGES.

SAMPLING IN POND 207C: UNABLE TO COLLECT 4 QUADRANT SPECIFIC SAMPLES. NOT ENOUGH MATERIAL IN EASTERN QUADS. ALSO NOTED MATERIAL AT THE WATERLINE (WINDBLOWN MATERIAL) THAT IS DIFFERENT FROM OTHER POND DEPOSITS. COLLECTED QUAD-SPECIFIC SAMPLES FROM NW + SW QUADS; A DUPLICATE FROM THE NW QUAD, AND A COMPOSITE OF THE EDGE MATERIAL AS WELL AS A COMPOSITE OF THE OVERALL POND INTERIOR MATERIAL:



- COLLECTED SLUDGE SAMPLES IN 5.5 BUCKETS ON THE BOAT, AND FILLED SAMPLE JARS ON SHORE. THIS PROVED TO BE A MORE EFFICIENT USE OF THE CREW'S TIME. DUE TO HEAT STRESS CONSTRAINTS (15 MIN AT A TIME IN A RESPIRATOR) WE WERE ABLE TO COLLECT THE SAMPLES USING ONE SAMPLING CREW, IF WE FILLED BUCKETS, NOT JARS ON THE BOAT.
- DID NOT COLLECT 5 gallons OF SLUDGE FOR GEOTECHNICAL PARAMETER ANALYSIS. THERE WASN'T ENOUGH MATERIAL AVAILABLE IN A REASONABLE AMOUNT OF SAMPLING TIME.
- DID COLLECT ADDITIONAL (1 GAL. EXTRA) OF THE BERM COMPOSITE FOR GEOTECHNICAL PARAMETERS - AT J. TEMPLETON'S REQUEST.

8-28-91
Elizabeth Polun

8-28-91 sp

8-22-91

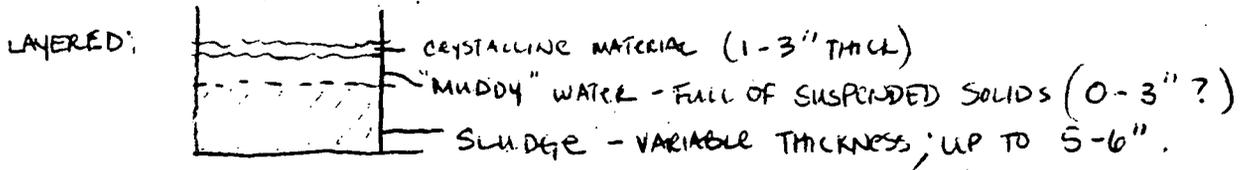
1123

LSA SHIPMENT

DRUM #	CONTENTS	
D-77688	CLAIRIFIER SLUDGE	8 bottles (Rinsate + Field Blanks for Clairifier) 6 CANS 5 CANS
D-77684	CLAIR. SLUDGE + WATER BLANKS	~ 5 cans/layer x 3 layers
D-77687	POND SLUDGE 207C	~ 5 cans/layer x 3 layers
D-77690	207C SLUDGE + BLANKS	4 BOTTLES (Rinsate + Field blank for 207C Sludge) ~ 5 cans/layer x 2 layers.

+ 3 COOLERS OF ENVIRONMENTAL SAMPLES
- CLAIRIFIER WATER SAMPLES

POND 207C DESCRIPTION



SLUDGE APPEARS THICKER IN WESTERN 1/2 OF 207C. SALT LAYER IS ALSO THICKER IN THE WESTERN 1/2. SALT LAYER IS LUMPY AND UNEVEN. SLUDGE IS GREENISH BROWN WITH A LARGE PROPORTION OF FINES.

wp 8-28-91
↑
(sludge description 8-28 only)

[Handwritten signature]

40 08-22-91

corrected sample. I will also call the lab and notify them.

2330 - MET MIDNIGHT SHIFT COMING ON.

KAREN HOLLISWAY + STEVE WILLIAMS + I GOT ALL THE

~~CLARIFIER~~ ~~SAMPLES~~ + SLUDGE SAMPLES INTO

DRUMS. CLARIFIER WATER IS IN THE REFRIGERATOR.

- POURED CLARIFIER (SLUDGE + WATER) BLANKS (TYPE II H₂O.)

2400 - SHOWERED + READY TO LEAVE. HIT WITH A 45 MINUTE
LOCKDOWN.

2420 - LEFT SITE. (LOCKDOWN ONLY 20 MIN.)

ep
8-22-91

ROCKY FLATS - SOLAR PONDS

2K68

41

FRI AUG 23 1991

1123

E. RODMAN (H/NUS)
 K. HOLLIMAN (WESTON)
 S. WILLIAMS (WESTON)
 J. GUADAGNOLI (EG+G)
 V. AMENT (SHIPPING EG+G)

AM: CLEAR + HOT
 PM: CLOUDY + HOT

0630 - ARRIVE ON SITE, CONGREGATED AT TSD PAD
 0750 - PREV. MTG AT TBB BLDG

(A) REFER TO TABLES ON PGS 34 and 39
 FOR SAMPLING + SHIPPING INFO FOR
 TODAY'S SHIPMENT.

- 0807 - MOBING AT BERM OF POND 207C TO COLLECT SW, COMPOSITE, + BERM COMPOSITES.
- 0845 - BOAT CREW HAS COLLECTED SW QUAD SAMPLE. PS-207C-SW
 - BERM CREW IS COLLECTING A BERM COMPOSITE PS-207C-CB
- 0850 - BOAT CREW COLLECTING COMPOSITE SAMPLE PS-207C-C
 - BERM CREW ALMOST DONE COLLECTING THE BERM COMPOSITE. COLLECTION METHOD → INTO S.S. BUCKETS, INTO JARS ON SHORE (USED S.S. CONICAL SCOOP)
- 0900 - Poured FIELD BLANK w/ REAGENT (TYPE II) H₂O. OUT OF DISTILLED.
- 0901 - TRANSFERRED BERM COMPOSITE SAMPLE TO BOTTLES, PRE PACKAGED
- 0914 - " SW QUAD " " " " "
- 0921 - " POND COMPOSITE SAMPLES TO BOTTLES, "
 - RARED HOLLIMAN IS PACKAGING CLARIFIED WATER SAMPLES INTO COOLERS AND WORKING ON DRUMS
 - BOTTLE DECAN + LABELING ON GOING
- 0940 - Poured RINSE BLANK FOR 207C SLUDGE. (S.S. BUCKET) (TYPE II H₂O)
- 1000 - IN TBB PACKAGING SLUDGE SAMPLES INTO DRUMS AND COMPLETING PAPERWORK FOR LSA + ENVIRONMENTAL SHIPMENT. I COMPLETED THE CHAIN OF CUSTODY, + INCLUDED THEM IN THE DRUMS/COOLERS
- 1200 - PACKAGING COMPLETE AS PER SOPS AND EG+G REQUIREMENTS. SAMPLES ARE IN 4 DRUMS AND 3 COOLERS WHICH WILL BE SHIPPED BY TRUCK (TOGETHER.)

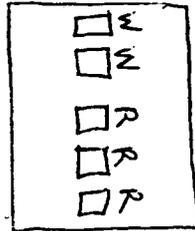


08-23-91

DESCRIPTION OF DECONTAMINATION PROCEDURE

1-2 people; SARANEX
+ RESPIRATORS

TABLE 1 - plastic covered. TRANSFER SAMPLES TO CONTAINERS, SPRAY DOWN BOTTLES IN A LARGE TUB TO REMOVE GROSS CONTAMINATION. USE BOTTLED DRINKING WATER.

2 people MINIMUM,
TYVEK, NO
RESPIRATOR,
gloves (NITRILE) +
boot covers

ON GROUND - ON PLASTIC - 2 WASH, 3 RINSE. DISTILLED OR TYPE II H₂O IN RINSES. SPECIAL ATTENTION TO UNDER EDGES OF BOTTLE CAPS.

2 RPT'S



TABLE 2 - PLASTIC COVERED. - DRY SAMPLES + GET RPT'S TO SMEAR BOTTLES.

2 people, tyvek
NO RESPIRATORS.
SURGICAL GLOVES

TABLE 3 - PLASTIC COVERED. CLEARED (COLD) SAMPLE BOTTLES LABELED, TAPED, CUSTODY SEALS, + ZIPLOCK BAGS.

WR 8-23-91

TYPE II H₂O USED FOR FINAL DECON AT ZOTC (RINSE ONLY) ON 8-23-91, AND FOR FIELD AND RINSE BLANKS AT CLARIFIER (SLUDGE AND WATER) AND POND ZOTC (SLUDGE ONLY). USED TYPE II H₂O WHEN WE EXHAUSTED THE SUPPLY OF DISTILLED WATER.

8-23-91

1123

SAMPLES SHIPPED: 08-23-91

PS-207C - NW

NW-D DUPLICATE

SW

C COMPOSITE

C.B BERM COMPOSITE

F FIELD BLANK

T TRIP BLANK

B RINSATE BLANK (S.S. BUCKET)

L.S.A.

CW-001 (at wall)

001-D DUPLICATE

002 CENTER

003 N 3/4 across tank

000-B RINSATE (BAILER)

000-F FIELD BLANK

000-T TRIP BLANK

ENVIRONMENTAL
SAMPLES

CS-001

001-D DUPLICATE - 1 32oz jar broken

002

003

000-B RINSATE - (S.S. BOWL)

000-F FIELD BLANK

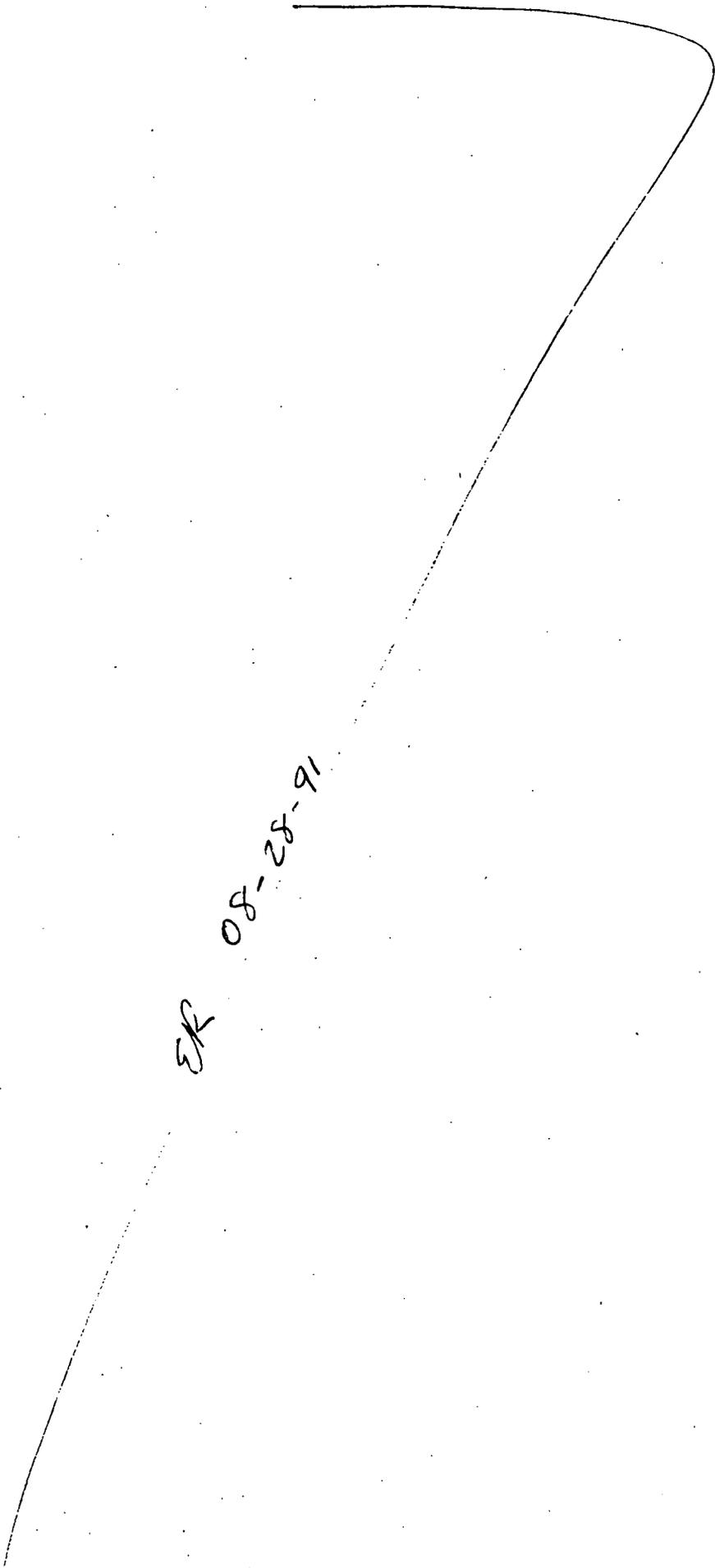
000-T TRIP BLANK

L.S.A.

~~1440~~ 1440 - LEFT FACILITY AFTER SAMPLES WERE SHIPPED OFFSITE (N1415)
RETURNED TO SUITE 101. REPORTED ACTIVITIES TO J. SCHMIDT.

8-23-91

ER 08-28-91



ROCKY FLATS - SOLAR PONDS

ZK68

45

MON. AUG 26 1991

1123

E RODMAN (H/NUS)

G. OSTDIK (904 FOREMAN EG+G)

AM: SUNNY + CLEAR

PM: " "

0630 - ARRIVE ONSITE.

0700 - BLDG INDOCTRINATION AND REVOLUTION MTG AT 904 PAD.

0730 - BEHIND CHECKING MAPS OF TENTS (TRIWALLS) AT 904 PAD

0830 - COMPLETED TENTS 8 + 9. PHONE CALL FROM J GUADAGNOLI → E LOMBARDI IS GOING TO COME DOWN TO SEE MY NOTES FROM POND C AND CLARIFIER SAMPLING.

- BROKE TO WORK ON FIELD NOTES. THERE ARE SEVERAL SUMMARY SECTIONS CONCERNING VARIATION FROM WASP + DECON THAT I HAVE NOT COMPLETED. PLANNED TO COMPLETE THEM IN PITTSBURGH WHEN I HAVE A PLACE TO SIT DOWN AND WORK.

0845 - RETURNING TO 904 PAD TO CONTINUE MAPPING.

0855 - COMPLETED $\approx 1/2$ OF TENT 10. TIME FOR EG+G BREAK.

1012 - MET W/ E. LOMBARDI - WENT OVER FIELD NOTES.

- RETURNING TO PAD 904 TO FINISH TRIWALL MAPS.

1030 - COMPLETED TRIWALL MAPPING

1050 - LEFT FACILITY - RETURNED TO SUITE 101

- DISCUSSED ACTIVITIES

- RETURNED TO PITTSBURGH PA.

ef 8-26-91

Elytiyflou

08-26-91

46

MONDAY 9/23/91

ROCKY FLATS SOLAR PADS

0900 MET WITH JOHN SCHMIDT (HALLIBURTON NUS DENVER)
HE GAVE ME DIRECTIONS TO ROCKY FLATS

1000 MET WITH ERNIE LOMBARDI (EG+G)

HE LED ME THROUGH INDOCTRINATION. DUE TO COMPLICATIONS
I WAS UNABLE TO GET THROUGH THE PORTAL TO GO TO PAD
788. ERNIE MADE THE NECESSARY ARRANGEMENTS AND I
SHOULD BE ABLE TO GAIN ACCESS TOMORROW.

~~09~~
1400 DROVE BACK TO HALLIBURTON NUS
MADE CALLS TO PITTSBURGH

1500 LEFT NUS

TUESDAY 9/24/91

1123

7298 ⁴⁰¹
DP
01120730
~~0800~~MET WITH ERNIE LOMBARDO (EG+6) TO GO TO PORTAL 1
ENTRANCE TO PROTECTED AREA

0800 WALKED TO SOLAR PONDS AND TO BUILDING 728

MET WITH RICH GARCIA AND STEVE WILLIAMS (WESTON)

GOING TO SAMPLE AT POND 207 BN. (GEOTECH PARAMETERS)
WILL BEGIN SAMPLING AT NW CORNER. THEY HAVE TO SAMPLE
SLUDGE FIRST BECAUSE DRUMS FOR H₂O SAMPLING HAVE NOT ARRIVED

0845 BEGAN SAMPLING PS-207BN-NW (TOTAL VOL. 4-1 GALLON CONTAINERS)

DECON TUBS ARE SET UP AS TWO WASH TUBS + THREE RINSE TUBS.

SAMPLE ARE BEING COLLECTED USING A CLAM SHELL SAMPLER. SAMPLE
IS DEPOSITED INTO STAINLESS STEEL BOWL + TRANSFERRED TO 1 GALLON
CONTAINERS

0914 COMPLETED SAMPLING OF 207BN-NW

BOAT WAS BROUGHT TO SHORE AND SAMPLES WERE TAKEN FROM
SAMPLERS AND MOVED THROUGH DECON. 2 WASHES AND 3 RINSES
TOWEL DRIED AND LABELED. SAMPLE WERE ALSO SCANNED FOR RADIATION0930 BEGAN SAMPLING @ 207BN-SW (GEOTECH)
SAMPLE # PS-207BN-SW

1000 COMPLETED SAMPLING OF 207BN-SW

BOAT CAME TO SHORE AND SAMPLERS HANDED BOTTLES TO DECON
PERSONNEL. SAMPLES WENT THROUGH DECON PROCEDURE AND WERE
LABELED.

Mark H. Mengel

9/24/91

9/24/91

- 1010 Began SAMPLING 207 BN-SE (6cotech) 4-1gal comp
- 1030 COMPLETED SAMPLING of 207 BN-SE
DID NOT COME TO SHORE BECAUSE THEY HAD THE BOTTLES TO
SAMPLE THE REMAINING QUADRANT.
- 1035 Began SAMPLING 207-BN-NE
- 1055 COMPLETED SAMPLING OF 207-BN-NE
BROUGHT BOAT TO SHORE WITH SAMPLES FROM NE + SE
QUADRANTS. DECOR PERSONNEL DECORATED SAMPLE BOTTLES AND
THEN SAMPLING EQUIPMENT.

SAMPLE NUMBERS AND TIMES FOR 207 BN SLUDGE FOR
Geotechnical ANALYSIS.

PS-207BN-nw @ 0845
PS-207BN-SW @ 0930
PS-207BN-SE @ 1015
PS-207BN-NE @ 1040

1130 The crew is breaking for lunch.

Called ERNIE LOMBARDO to DISCUSS some of the SAMPLE
BOTTLE REQUIREMENTS REGARDING SHIPPING THROUGH FED EX.

WILL HAVE TO CALL MARK SPERANZA

1230 DISCUSSED WITH MARK SPERANZA HOW THE WATER SAMPLES WILL
BE COLLECTED FOR THE FLOCCULATION + CLARIFICATION SAMPLES.

- H₂O WILL BE COLLECTED IN 4 15 GALLON PLASTIC CONTAINERS
FOR EACH QUADRANT.
- SLUDGE FOR FLOCCULATION WILL BE COLLECTED IN 1 15 GAL PLASTIC
1 GALLON CONTAINERS WILL BE SHIPPED IN COOLERS INSTEAD OF
DRUMS.

MET BACK WITH CREW AND DISCUSSED THESE POINTS WITH RICH
GARCIA. CREW IS PREPARING TO GO BACK OUT ONTO POND 207 BN
TO COLLECT SLUDGE FOR CLARIFICATION.

1250 SAMPLERS ON WATER

WILL COLLECT 2 1/2 GALLONS FROM EACH QUADRANT TO PRODUCE A
10 GALLON COMPOSITE

1310 MOVE FROM NW QUADRANT TO SW QUADRANT

1325 MOVE FROM SW QUADRANT TO SE QUADRANT

Mark A. Mungil 9/24/91

9-24-91

1123

1335 MOVED FROM SE QUADRANT TO NE QUADRANT. THIS WILL COMPLETE COMPOSITE SAMPLE FOR FLOCCULATION/CLARIFICATION.

SAMPLE # PS-207BN-C @ 1345

1345 RICH GARCIA CHECKED WIND SPEED. WIND GUST @ MAXIMUM 10 MPH.

Finished collecting sludge

1348 A SECOND WORK CREW IS SAMPLING H₂O FOR FLOCCULATION/CLARIFICATION. A FIELD CHANGE WAS MADE TO USE 4 - 15 GAL CONTAINERS TO COLLECT THE WATER FOR ANALYSIS. THIS IS BEING DONE TO ACCOMMODATE FCO-EN.

Beginning in NW CORNER. SAMPLE IS BEING COLLECTED FROM THE SIDE OF THE BERM. SAFETY HARNESSES ARE BEING UTILIZED FOR THE SAMPLERS.

1350 SAMPLE # PW-207BN-NW collected

NEXT SAMPLE WILL BE COLLECTED FROM NE QUADRANT. SAME SAMPLE PROCEDURE. WATER TO BE COLLECTED FROM BERM

1355 SAMPLE # PW-207BN-NE collected

1400 SAMPLE # PW-207BN-SE collected

1405 SAMPLE # PW-207BN-SW collected

THIS COMPLETES THE SAMPLING FROM POND 207BN

ALL OF THE 15 GAL CONTAINERS WERE DECONNED AND SMEARED.

ALL EQUIPMENT WAS DECONNED & SMEARED. CREW IS PREPARING TO LEAVE FOR DAY.

1500 LEFT SITE

Mark L. Mengel

9-24-91

4-25-91 WEDNESDAY

- 0700 ARRIVED AT ROCKY FLATS. ESCORTED THROUGH PORTAL
MET @ BLDG. 750 FOR MORNING BRIEFING. THEN WORK GROUPS
WENT TO BLDG 788.
- 0755 IT WAS DISCUSSED THE TECHNIQUE TO BE USED FOR COLLECTING THE
SLUDGE FROM POND 207BC DUE TO THE LOW AMOUNT OF SLUDGE
CONTAINED IN THE POND. INSTEAD OF THE CLAMSHLL SAMPLER, THE
TEFLON SCOOP IS GOING TO BE UTILIZED TO COLLECT THE SLUDGE -
THIS WILL ENABLE THE SAMPLERS TO COLLECT SUFFICIENT SAMPLE
IN A TIMELY MANNER. WATER SAMPLE WILL AGAIN BE COLLECTED
FROM THE SHORE ALONG THE BERM.
- WORK IS BEING DELAYED CURRENTLY DUE TO THE LACK OF A WORK
PERMIT FOR CONDUCTING ACTIVITIES AT THE POND. THIS ISSUE
IS BEING RESOLVED.
- 0800 CREW BEGAN MOBING FOR SAMPLING ACTIVITIES AT POND 207BC
THEY ARE GOING TO COLLECT H₂O AND SLUDGE SIMULTANEOUSLY.
SEVERAL MEMBERS OF THE CREW ARE GOING TO COLLECT H₂O FROM
THE SIDES OF THE POND IN EACH CORNER OF THE QUADRANTS. FULL
BODY HARNESSSES WILL BE USED. AT THE SAME TIME 2 OTHER
CREW MEMBERS ARE GOING TO COLLECT SLUDGE FROM THE BOAT.
DECON AREA HAS BEEN SET UP AND CONSISTS OF GROUND PLASTIC
AND 2 WASH TUBS AND THREE RINSE
- WATER SAMPLE ARE GOING TO BE COLLECTED AND LABELED AS FOLLOWS:
- PW-207BC-NW @ 0835
PW-207BC-NE @ 0840
PW-207BC-SE @ 0845
PW-207BC-SW @ 0850
- 0845 CREW MEMBERS BEGAN SAMPLING SLUDGE IN NW QUADRANT. SAMPLES
WILL BE COLLECTED FOR CLARIFICATION/FLOCCULATION AND GEOTECHNICAL.
- 0900 SAMPLE FOR GEOTECH (SAMPLE # PS-207BC-NW) COLLECTED
MOVING TO SW QUADRANT.
- 0915 COLLECTED SAMPLE FROM SW QUADRANT PS-207BC-SW
- 0920 CREW CAME TO SHORE AND HANDED BOTTLES OVER TO DECON PEOPLE
OBTAINED BOTTLES FOR NE AND SE QUADRANT. WENT BACK OUT ATTO
WATER TO COLLECT SAMPLES.
- DECON PERSONNEL DECONNING LARGE 15 GAL CONTAINER USED FOR
H₂O SAMPLING AND SLUDGE SAMPLE BOTTLES FROM NW + SW QUAD.
- 0930 COLLECTED NE QUADRANT SAMPLE PS-207BC-NE
MOVED TO SE QUADRANT

Mark H. Mungel

9-25-9

0940 SE QUADRANT SAMPLE COLLECTED

BOAT RETURNING TO SHORE WITH SAMPLES COLLECTED FROM NW + NE QUADRANT SAMPLES

Decon People will take samples from samplers and Decon. Samplers will now go back out onto pond and collect composite sludge sample for clarification / flocculation.

1005 FINISH NE QUADRANT + MOVED TO SE QUADRANT

1015 FINISHED SE QUADRANT + MOVED TO SW QUADRANT

1030 COMPLETED SAMPLING OF COMPOSITE SLUDGE SAMPLE

SAMPLE NO. PS-207BL-C

All sample containers + sampling equipment is being decontaminated using two washes + three rinses. BOAT is decontaminated removing gross contamination, then rinsed with clean DI water.
~~BSA~~

1055 crew is going to rehab AT Pond 207BS And then break for lunch

1230 Began moving necessary equip. to Pond 207BS.

We are only doing 1/2^o sampling due to wind gusts exceeding 15 MPH. 1/2 gal from each quadrant will be collected and placed in 15 gal containers. Sample numbers will be as follows:

PW-207BS-NW @ 1245

PW-207BS-NE @ 1250

PW-207BS-SE @ 1255

PW-207BS-SW @ 1310

Mark A. Mengel

9-25-91

52

ROCKY FLATS SOLAR POND
9-25-91

- 1315 ~~15~~ 15 GALLON CONTAINERS WERE DECONNED & SMEARED
THE RPT'S RESULTS INDICATED THAT THE DRUMS WERE HOT, SO
A HALF HOUR WAS ELAPSED AND SMEARED AGAIN.
- 1345 SMEARS THIS TIME INDICATED DRUMS TO BE OKAY.
CREW MOVED SAMPLES TO LOADING DOCK AREA WHERE SAMPLES
LABELS AND CHAIN OF CUSTODY LABELS WERE APPLIED.
- 1430 LEFT RESTRICTED AREA AND STOPPED TO SEE ERNIE LOMBARDI
AT BUILDING T130 C. WE DISCUSSED THE ISSUE OF SHIPPING
THE SAMPLES. EB+6 WOULD LIKE TO HOLD ALL OF THE SAMPLES
UNTIL MONDAY AND SEND THEM ALL BY TRUCK.
I WILL HAVE TO DISCUSS THIS WITH MARK SPERANZA TOMORROW.
- 1530 STOPPED @ NUS (OWNER) AND TALKED WITH JOHN SCHMIDT. UPDATED
HIM ON THE PROGRESS.

9-25-91

Mark & Mungl
VOID

ROCKY FLATS SOLAR PONDS

9-26-91

2K68

1123

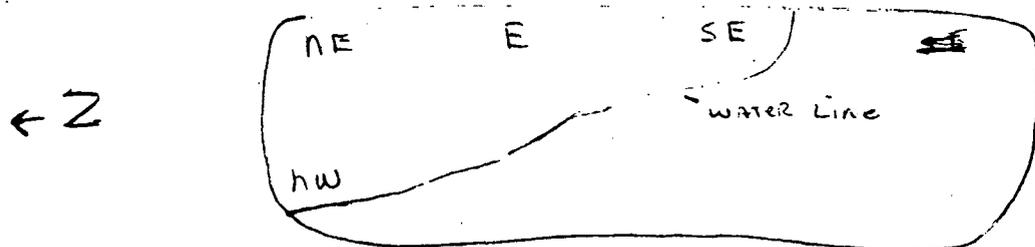
53

0700 ARRIVE @ ROCKY FLATS. ENTER THROUGH PORTAL 1.
WENT TO BLDG 750 FOR MORNING BRIEFING. STRATEGY FOR THE DAY INCLUDES COMPLETING THE SLUDGE SAMPLING AT POND 207BS AND THEN SAMPLING WATER + SLUDGE FROM ~~A~~ 207A POND.

0730 WENT TO BLDG 782 FOR MOBING ACTIVITIES FOR THE DAY - WENT OUT TO POND 207BS AND PREPARED DECON AREA - DECON AREA CONSISTS OF 2 WASHES + 3 RINSES

~~0830~~ 0830 SAMPLERS IN THE BOAT ARE ON THE POND AND WILL START SAMPLING IN THE NW QUADRANT.

A 2ND ACTIVITY IS ONGOING - OTHER WORK CREW MEMBER ARE GOING TO SAMPLE H₂O FROM POND 207A. SAMPLE LOCATIONS WILL BE DESIGNATED AS FOLLOWS:



SAMPLE WILL ONCE AGAIN BE COLLECTED FROM THE BERM. SAMPLING IS BEGINNING AT THE SE QUADRANT.

SAMPLE NUMBERS ARE AS FOLLOWS:

PW-207A-SE	@ 0845	0840
PW-207A-E	@	0845
PW-207A-NE	@	0848
PW-207A-NW	@	0855

0850 FINISHED NW QUADRANT MOVED TO SW QUADRANT - (SLUDGE SAMPLING)

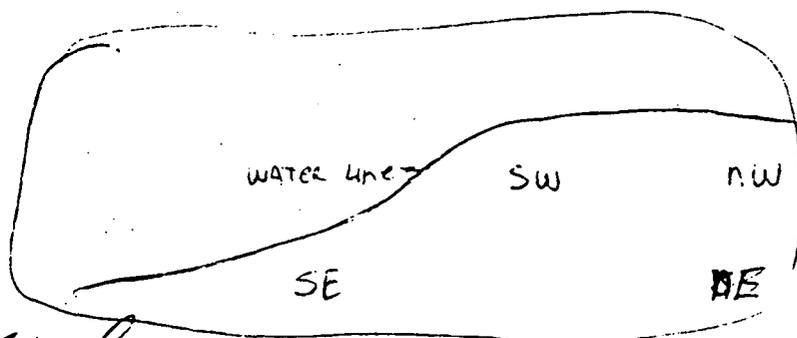
Mark A. Mangel

9/26/91

ROCKY FLATS SOLAR Ponds

54 4-26-91

- 0915 FINISHED SW QUADRANT AND RETURNED TO SHORE - DECCA PERSONNEL TAKE SAMPLES THROUGH DECCA. SAMPLERS TAKE 2 MORE SETS OF BOTTLES AND ARE GOING BACK OUT TO COLLECT SAMPLES FROM THE NE + SE QUADRANT.
- SAMPLES ARE DRIED AND SMEARED. AFTER THE RESULTS FROM THE SMEARS RETURN THE BOTTLES WILL BE LABELED AND C/O.C. LABEL WILL BE APPLIED.
- 1000 COMPLETED NE QUADRANT AND MOVED TO SE QUADRANT
- 1005 JOHN GADEGNOLE AND ERIC LOMBARDI SHOW UP ON SITE TO DISCUSS THE SHIPPING MATTER. THE FOLLOWING ITEM WERE ADDRESSED:
THE ORIGINAL PLAN WAS TO SAMPLE THE 40 GAL. OF WATER AND PUT IT IN A 05 GAL DRUM. THIS WAS CHANGED TO ACCOMODATE FED EX. IT NOW APPEARS THAT EGTB WANTS TO SHIP ALL SAMPLE VIA GROUND TRANS. THEY HAVE TOLD ME TO CONTACT JOHN SCHMIDT (NUS) AND INFORM HIM OF THIS. THE SAMPLE WILL BE PACKAGED ON MONDAY AND GO OUT TUESDAY THE 10/1/91. SAMPLES WILL BE IN PITTSBURGH ON THUESDAY.
- 1030 COMPLETED SE QUADRANT. THIS COMPLETS THE GEOTECH SAMPLING BOAT IS COMING IN AND SAMPLES WILL BE DECCAED. SAMPLES ARE SLANNED TO BE SURE NOTHING IS HOT. SAMPLES ARE SMEARED LABELED AND CHAIN OF CUSTODY APPLIED.
- 1050 CREW IS GOING TO BREAK AND RETURN BY 1200
- 1200 CREW IS BACK AT POND 207BS AND IS GOING TO MOB FOR COMPOSITE SLUDGE SAMPLING. SAMPLE PS-207BS - C
- 1220 SAMPLERS BEGINNING IN NW QUADRANT
- 1225 ACCEPTABLE VOLUME IS OBTAINED FROM QUADRANT NW, MOVING TO SW QUADRANT.
- 1230 COMPLETED SAMPLING OF SW QUADRANT. MOVING TO SE QUADRANT.
- 1240 COMPLETED SAMPLING OF SE QUADRANT MOVING TO NE QUADRANT
- 1250 SAMPLING COMPLETED. SAMPLERS COLLECTED $\frac{1}{2}$ gal of sludge from each QUADRANT TO = 10 GAL COMPOSITE.
- THE SAMPLE CONTAINER IS MOVED THROUGH THE DECCA. THE BURT IS DECCAED USING A WASH + RINSE TO REMOVE ANY GROSS CONTAMINATION
- WE ARE GOING TO MOVE TO POND 207A TO SAMPLE SLUDGE.
- 1305 SAMPLERS ARE ON POND 207A. SAMPLING BEGINNING IN SE QUADRANT



Mark L. Mineral

9/26/91

1123

- 1315 completed SE QUADRANT. Brought ^{Geotech} SAMPLES TO shore AND picked up the 15 gal CONTAINER to collect the 2.5 gal sludge sample for the composite for flocculation / clarification.
- 1330 COMPLETED SAMPLING OF SE QUADRANT. MOVING TO SW QUADRANT. WILL collect Geotech samples (4-1gal PE's) AND 2nd 2.5 gal for composite
- 1345 COMPLETED SAMPLING OF SW QUADRANT. BROUGHT SAMPLES TO shore, PICKED UP bottles for NW QUADRANT AND CONTINUED SAMPLING. DECON PERSONNEL took bottle through decon. smearing + counting.
- 1400 COMPLETED SAMPLING OF NW QUADRANT. MOVING NE QUADRANT. They could not obtain ANY ANY SAMPLE FROM NE QUADRANT because the sludge was too silty, AND would not stay in the clam shell. MOVED BACK TO NW QUADRANT.
- 1425 COMPLETED sludge sampling. DECON personnel take samples AND decon. ALL sampling equipment is deconned. All equipment AND samples ARE smeared AND counted.
- 1500 ALL WORK AREAS ARE cleaned UP AND crew left 788 to go to 750
- 1515 OFF SITE

VOID

Mark H. Mangel

9-26-91

ROCKY FLATS SOLAR PONDS

9-27-91

- 0700 ARRIVED AT E6+6. GET ESCORT AND GO TO 750
- 0730 ATTENDED MEETING AT 750 THEN DEPARTED FOR 788.
- 0800 CREW DRESSING OUT TO BEGIN SAMPLING @ POND 207C
- 0825 DISCUSSED SAMPLING STRATEGY WITH THE SAMPLING CREW. AT EACH QUADRANT A 1 GALLON COMPOSITE WILL BE COLLECTED ~~FROM~~ ~~AREA~~ OF THE CRYSTAL SLUDGE AND THE UNDERLYING SLUDGE. IN ADDITION 4-1 GALLON SAMPLES WILL BE COLLECTED FOR GEOTECH ANALYSIS. H₂O SAMPLES WILL BE OBTAINED FROM EACH QUADRANT 1 GALLON EACH. ALL SAMPLING WILL BE CONDUCTED FROM THE BOAT.
- 0840 SAMPLERS ON WATER. WILL BEGIN IN NE QUADRANT AND WILL SAMPLE WATER FIRST.
- 0845 SAMPLE NO PW-207C-NE @ 0845 ~~NO~~
- 0850 NEXT WILL BE CRYSTAL SLUDGE COMPOSITE
- 0850 CRYSTAL SLUDGE COMPOSITE COLLECTED (PS-207C-C) PARTIAL
- 0855 NO UNDERLYING SLUDGE COMPOSITE COLLECTED (PS-207C-C²) PARTIAL
- 0855 WILL NO COLLECT 4-1 GAL SAMPLES FOR GEOTECH.
- 0900 SAMPLE COLLECTED @ 0900.
- SAMPLERS BROUGHT SAMPLE TO SHORE. DECON ACCEPTED SAMPLES AND MOVE THE BOTTLES THROUGH THE DECON AREA. DECON IS MADE UP OF 2 WASHES + 3 RINSES. SAMPLE WILL BE DRIED SKANNED FOR RADIATION, SMEARED AND COUNTED BEFORE SAMPLE LABELS ARE APPLIED.
- 0910 BACK ON THE H₂O IN THE SE QUADRANT
- 0912 WATER SAMPLE COLLECTED (PW-207C-SE)
- 0914 CRYSTAL SLUDGE COLLECTED (PS-207C-SEC) PARTIAL
- 0917 UNDERLYING SLUDGE COLLECTED (PS-207C-C²) PARTIAL
- 0920 4-1 GALLONS OF SLUDGE COLLECTED (PS-207C-SE)
- BROUGHT SAMPLES TO SHORE AND WENT BACK OUT TO SW QUADRANT.
- 0930 COLLECTED H₂O (PW-207C-SW)
- 0931 COLLECTED CRYSTAL SLUDGE (PS-207C-C) PARTIAL
- 0933 COLLECTED UNDERLYING SLUDGE (PS-207C-C²) PARTIAL
- 0935 COLLECTED 4-1 GALLON BOTTLES FOR GEOTECH (PS-207C-SW)
- MOVED TO SE QUADRANT
- 0937 COLLECTED H₂O (PW-207C-SW)
- 0938 COLLECTED CRYSTAL SLUDGE (PS-207C-C) COMPLETED
- 0939 COLLECTED UNDERLYING SLUDGE (PS-207C-C²) COMPLETED
- 0945 FINISHED 4-1 GAL SAMPLES (PS-207C-HW)
- BOAT COMING IN WITH ALL SAMPLES. SAMPLERS PASS SAMPLES TO DECON PERSONNEL. THREADS OF BOTTLES ARE CLEANED TO ASSURE TIGHT FIT.

M. J. M.

9/27/91

1123

0945 SAMPLES ARE decontaminated and SKANNED, smeared and counted before labels are applied

SAMPLERS ~~are~~ discard all PPE and are SKANNED as they discard clothing.

This completes all of the sampling activities. samples will be moved to loading dock

1030 completed all decon and demob. went back to 288 pad

several of the 1 gal sample from previous days sampling are leaking due to the expansion within the containers. We are going to have to open some of the containers and remove some of the material to allow for expansion. The material that is removed will be taken back to the ponds where it came from.

1800 crew went to lunch

1200 crew is removing to take the excess out of the leaking sample containers.

crew removed excess out of the bottles from 3 of the ponds. the remainder of the bottles will be done on Monday. Steve Williams of Weston will over see that activity and also the packaging & shipping.

I have left sufficient C.O.C. stickers for the TRAFFIC DEPT.

1430 crew finishes for day

Frank H. Mergel

9-27-91

APPENDIX D

CHAIN OF CUSTODY FORMS

NUS CORPORATION

CHAIN OF CUSTODY RECORD

PROJECT NO.: 2K68		SITE NAME: ROCKY FLATS - SOLAR PONDS				NO. OF CONTAINERS	ANALYTES						REMARKS
SAMPLERS (SIGNATURE): <i>Joseph H. Moore, Donald</i>							VOA	SEMI VOA	ALCOHOLS	CYANIDE, METALS	NITRATE, METALS	TOC, TCLP, AMMONIA	
STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION								
207BN	08/08/11	0858		X	PW-207BN-NW	6	2	1	1		2		POND WATER
207BN	"	0904		X	PW-207BN-NE	6	2	1	1		2		"
207BN	"	0907		X	PW-207BN-SE	6	2	1	1		2		"
207BN	"	0909		X	PW-207BN-SW	6	2	1	1		2		"
207BN	08/08/11	FROM LAB		X	PW-207BN-T	2	2						TRIP BLANK
RELINQUISHED BY (SIGNATURE): <i>Elizabeth Johnson</i>		DATE/TIME: 08-09-11 0930		RECEIVED BY (SIGNATURE):		RELINQUISHED BY (SIGNATURE):		DATE/TIME:		RECEIVED BY (SIGNATURE):			
RELINQUISHED BY (SIGNATURE):		DATE/TIME:		RECEIVED BY (SIGNATURE):		RELINQUISHED BY (SIGNATURE):		DATE/TIME:		RECEIVED BY (SIGNATURE):			
RELINQUISHED BY (SIGNATURE):		DATE/TIME:		RECEIVED FOR LABORATORY BY (SIGNATURE):		DATE/TIME:		REMARKS: SHIP TO HULLINGTON NUS LABS - PITTSBURGH					

NUS CORPORATION

CHAIN OF CUSTODY RECORD

PROJECT NO.: 2K68					SITE NAME: ROCK FLATS - SOLAR PONDS					NO. OF CON-TAINERS	VOAs	ALCOHOLS	32 OZ	MOISTURE	BULK DENSITY SPEC GRAN BULKING SPEC CONTAINERS LABEL	PARTICLE SIZE	REMARKS
SAMPLERS (SIGNATURE): <i>Lloyd H Mac Donald</i>																	
STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION												
207BN	08/10/91	0920		X	PS-207BN - NW	9	1	1	4	1	1	1				POND SLUDGE	
207BN	"	0934		X	PS-207BN - SW	9	1	1	4	1	1	1				"	
207BN	"	1016		X	PS-207BN - NE	9	1	1	4	1	1	1				"	
207BN	"	1028		X	PS-207BN - SE	9	1	1	4	1	1	1				"	
207BN	08/10/91	FROM LAB		X	PS-207BN - T	2	2									TRIP BLANK	
(X) ANALYSIS: SEMI VOA, METALS, PH, TCLP METALS, ASTM LEACH, TOC, AMMONIA, RADS																	

RELINQUISHED BY (SIGNATURE): <i>Lloyd H Mac Donald</i>	DATE/TIME: 08-09-91 0930	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE/TIME:	REMARKS: SHIP TO NUS LABS PITTSBURGH	

NUS CORPORATION

CHAIN OF CUSTODY RECORD

PROJECT NO.: ZK68		SITE NAME: ROCKY FLATS - SOLAR PONDS				NO. OF CON-TAINERS	ANALYSIS PARAMETERS						REMARKS
SAMPLERS (SIGNATURE): <i>Thomas J. Kelly</i>							VOA	ALCOHOLS	32oz glass	MOISTURE	BULK DENSITY, PLANK	SPEC GRAVITY, PLANK	
STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION								
207BC	02/12/01			X	PS-207BC-NW	9	1	1	4	1	1	1	POND SLUDGE
207BC	"			X	PS-207BC-NE	9	1	1	4	1	1	1	"
207BC	"			X	PS-207BC-SW	9	1	1	4	1	1	1	"
207BC	"			X	PS-207BC-SE	9	1	1	4	1	1	1	"
207BC	02/12/01	FROM LAB		X	PS-207BC-T	2	2						TRIP BLANK
						(A) ANALYSIS: SEMI-VOA, METALS, PH, TCLP METALS, ASTM LEACH, TOC, AMMONIA, RADIS							

RELINQUISHED BY (SIGNATURE): <i>[Signature]</i>	DATE/TIME: 02/13/01 09:05	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE/TIME:	REMARKS: SHIP TO HALLIBURTON NUS - PGH FOR ANALYSIS	

NUS CORPORATION

CHAIN OF CUSTODY RECORD

PROJECT NO.: 2K68		SITE NAME: ROCKY FLATS - SOLAR PONDS				NO. OF CONTAINERS	ANALYSES						REMARKS
SAMPLERS (SIGNATURE): <i>[Signature]</i>							VOA	SEM/IVA	ALCOHOLS	(CYANIDE) METALS	W/TRACE AMMONIA	TD5 / TSS	
STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION								
207BC	08/12/91	0859		X	PW-207BC-NW	6	2	1	1	2			PONDWATER
207BC	"	0904		X	PW-207BC-NE	6	2	1	1	2			"
207BC	"	0850		X	PW-207BC-SW	6	2	1	1	2			"
207BC	"	0907		X	PW-207BC-SE	6	2	1	1	2			"
207BC	08/12/91	FROM LAB		X	^{EA} PW-207BC-T	2	2						TRIP BLANK

RELINQUISHED BY (SIGNATURE): <i>[Signature]</i>	DATE/TIME: 08 13 91 0145	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE/TIME:	REMARKS: SHIPPED TO HALLIBURTON NUS - PGH FOR ANALYSIS	

NUS CORPORATION

CHAIN OF CUSTODY RECORD

PROJECT NO.: 2K68		SITE NAME: ROCKY FLATS - SOLAR PONDS				NO. OF CONTAINERS	ANALYSIS PARAMETERS					REMARKS	
SAMPLERS (SIGNATURE): M. D. Agostini							VOA	SEMI-VOA	SEL. ALCOHOLS	CYANIDE, METALS, INDIATE, MANGANISE, TOC, TELP METALS, IDEALISS	INDEBRANDS, PPOS		
STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION								
207BS	08/15/91	1037		X	PW-207BS-NW	6	2	1	1	2	POND WATER		
207BS	08/15/91	1037		X	PW-207BS-NW-D	7	2	2	1	2	POND WATER (MS/MSD)		
207BS	"	1054		X	PW-207BS-NE	6	2	1	1	2	POND WATER		
207BS	"	1120		X	PW-207BS-SE	6	2	1	1	2	POND WATER		
207BS	"	1108		X	PW-207BS-SW	6	2	1	1	2	POND WATER * ONLY 1 1/2 GALS FOR THE METALS ETC... ANALYSIS		
207BS	08/15/91	From LAB		X	PW-207BS-T	2	2	+ 1	ER	+ 1	TRIP BLANK (VOAS ONLY)		
207BS	"	1109		X	PW-207BS-B	5	2	1	1	1	RINSEATE } CYANIDE, METALS, VOA		
207BS	"	1130		X	PW-207BS-F	5	2	1	1	1	FIELD BLANK } TELP METALS, SEMI-VOA AND, SEL. ALCOHOLS, RAD PARAMETERS ONLY		
RELINQUISHED BY (SIGNATURE): Elydylla			DATE/TIME: 08/16/91 0845		RECEIVED BY (SIGNATURE):			RELINQUISHED BY (SIGNATURE):		DATE/TIME:		RECEIVED BY (SIGNATURE):	
RELINQUISHED BY (SIGNATURE):			DATE/TIME:		RECEIVED BY (SIGNATURE):			RELINQUISHED BY (SIGNATURE):		DATE/TIME:		RECEIVED BY (SIGNATURE):	
RELINQUISHED BY (SIGNATURE):			DATE/TIME:		RECEIVED FOR LABORATORY BY (SIGNATURE):			DATE/TIME:		REMARKS: SHIP TO PMS LABS - 104			

NUS CORPORATION

CHAIN OF CUSTODY RECORD

PROJECT NO.:		SITE NAME:		NO. OF CONTAINERS	ANALYSIS PARAMETERS					REMARKS		
2K68		ROCKY FLATS - SOLAR PONDS			VOA	SEMI VOA	SEL. ALCOHOLS	CYANIDE, METALS	TR, TCLP METALS		INORGANICS, RADS	
SAMPLERS (SIGNATURE):				STATION LOCATION								
STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	VOA	SEMI VOA	SEL. ALCOHOLS	CYANIDE, METALS	TR, TCLP METALS	INORGANICS, RADS	REMARKS
207C	12/11	0856		X	PW-207C-NE	2	1	1	2			POND WATER
207C		0915		X	PW-207C-NW	2	1	1	2			
207C		0919		X	PW-207C-SE	2	1	1	2			
207C		0923		X	PW-207C-SW	2	1	1	2			
207C		0956		X	PW-207C- ^{ER} D NE-D	2	2	1	2			DUPLICATE MS/MSD
207C		FROM LAB		X	PW-207C-T	2						TRIP BLANK - VOAS ONLY
207C		1155		X	PW-207C-B	2	1	1	1			RINSATE } VOA, SEMI VOA, SEL. ALCOHOL, CYANIDE, METALS,
207C		0945		X	PW-207C-F	2	1	1	1			FIELD BLANK } TCLP METALS, RADS ONLY
000				X	CW-000-B	5	2	1	1	1		RINSATE } VOA, SEMI VOA, SEL. ALCOHOLS, CYANIDE, METALS, TCLP METALS, RADS
001				X	CW-001	6	2	1	1	2		
002				X	CW-002	6	2	1	1	2		
003				X	CW-003	6	2	1	1	2		
00					CW-00-D	7	2	2	1	2		DUPLICATE MS/MSD
000				X	PW-000-F	5	2	1	1	1		FIELD BLANK } VOA, SEMI VOA, SEL. ALCOHOLS, CYANIDE, METALS, TCLP METALS, RADS
RELINQUISHED BY (SIGNATURE):		DATE/TIME:		RECEIVED BY (SIGNATURE):		RELINQUISHED BY (SIGNATURE):		DATE/TIME:		RECEIVED BY (SIGNATURE):		
<i>Elyse Rodman</i>		06/21/41 1130										
RELINQUISHED BY (SIGNATURE):		DATE/TIME:		RECEIVED BY (SIGNATURE):		RELINQUISHED BY (SIGNATURE):		DATE/TIME:		RECEIVED BY (SIGNATURE):		
RELINQUISHED BY (SIGNATURE):		DATE/TIME:		RECEIVED FOR LABORATORY BY (SIGNATURE):		DATE/TIME:		REMARKS:				
								SHIP TO NUS LABS - PITTSBURGH FOR ANALYSIS				

IN DRUMS # D-77687 + D-77690

NUS CORPORATION

CHAIN OF CUSTODY RECORD

PROJECT NO.: 2K68		SITE NAME: ROCKY FLATS SOLAR PONDS				NO. OF CONTAINERS	VOA	SEL. ALCOHOL	32 OZ.	BULK DENSITY SPEC. GRAV. BLANK SUBSTRATE	MOISTURE	PARTICLE SIZE	REMARKS
SAMPLERS (SIGNATURE): <i>Elyot</i>													
STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION								
207C	8/22/91	0915		X	PS-207C - ^{ER} NE NW	9	1	1	4	1	1	1	POND SLUDGE
207C	8/22/91	0915		X	PS-207C - ^{UN} NE ^{ER} D	6	1	1	4				POND SLUDGE
207C	8/22/91	From LAB		X	PS-207C - T	2	2						TRIP BLANK - AQUEDUS VOA
207C	8/23/91	0914		X	PS-207C - SW	9	1	1	4	1	1	1	POND SLUDGE
207C	8/23/91	0921	X	XER	PS-207C - C	9	1	1	4	1	1	1	POND SLUDGE COMPOSITE
207C	8/23/91	0901	X		PS-207C - CB	11	1	1	4	1	2	2	^{ER} POND SLUDGE - BERM COMPOSITE
207C	8/23/91	0900		X	PS-207C - F	5	2	1	2				SLUDGE (POND) } AQUEDUS: FIELD BLANK } VOA, SEL. ALCOHOL
207C	8/23/91	0940		X	PS-207C - B	5	2	1	2				SLUDGE (POND) } SEMI VOA, RINSEATE BLANK } CYANIDE, METALS,
207C													
000	8/22/91	2220		X	CW-000-B	5	2	1	2				CLARIFIER H ₂ O } TCLP METALS, RINSEATE } AND
000	8/22/91	2225		X	CW-000-F	5	2	1	2				CLARIFIER H ₂ O } RAPS FIELD BLANK } ONLY
													Ⓢ THE CLARIFIER RINSEATE & FIELD BLANK GO WITH CLARIFIER WATER SAMPLES SHIPPED W/ THESE DRUMS, BUT SHIPPED IN COOLERS
RELINQUISHED BY (SIGNATURE): <i>Elyot</i>		DATE/TIME: 08-29-91 0959		RECEIVED BY (SIGNATURE):		RELINQUISHED BY (SIGNATURE):		DATE/TIME:		RECEIVED BY (SIGNATURE):			
RELINQUISHED BY (SIGNATURE):		DATE/TIME:		RECEIVED BY (SIGNATURE):		RELINQUISHED BY (SIGNATURE):		DATE/TIME:		RECEIVED BY (SIGNATURE):			
RELINQUISHED BY (SIGNATURE):		DATE/TIME:		RECEIVED FOR LABORATORY BY (SIGNATURE):		DATE/TIME:		REMARKS: Ship to 11/NUS LABS PGH / FOR ANALYSIS					