



U.S. DEPARTMENT OF  
**ENERGY**

PNNL-SA-62527

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# Analytical Data Report of Water Samples Collected From BP-5 Operable Unit A Well (C5858)

Michael Lindberg

September 2008



**Pacific Northwest**  
NATIONAL LABORATORY

09/19/08 12:01

To: Dana Widrig

From: Michael J. Lindberg

A handwritten signature in black ink, appearing to read 'MJL', with a stylized flourish at the end.

Environmental Sciences Laboratory  
Energy and Environment Directorate, Pacific Northwest National Laboratory

Subject: Analytical Data Report of Water Samples Collected From BP-5 Operable Unit A Well (C5858), Sample Delivery Group ESL080006, SAF Number F08-034

This letter contains the following information for sample delivery group ESL080006

- Cover Sheet
- Narrative
- Analytical Results
- Quality Control
- Geologic Logs
- Geologic Photos
- Chain of Custodies

## **Introduction**

Between February 26, 2008 and March 11, 2008 groundwater samples were received from BP-5 Operable Unit A Well (C5858) for geochemical studies.

## **Analytical Results/Methodology**

The analyses for this project were performed at the 325 building located in the 300 Area of the Hanford Site. The analyses were performed according to Pacific Northwest National Laboratory (PNNL) approved procedures and/or nationally recognized test procedures. The data sets include the sample identification numbers, analytical results, estimated quantification limits (EQL), and quality control data.

## **Quality Control**

The preparatory and analytical quality control requirements, calibration requirements, acceptance criteria, and failure actions are defined in the on-line QA plan "Conducting Analytical Work in Support of Regulatory Programs" (CAW). This QA plan implements the Hanford Analytical Services Quality Assurance Requirements Documents (HASQARD) for PNNL.

## **Definitions**

Dup	Duplicate
RPD	Relative Percent Difference

## **Sample Receipt**

Samples were received with a chain of custody (COC) and were analyzed according to the sample identification numbers supplied by the client. All Samples were refrigerated upon receipt until prepared for analysis.

All samples were received with custody seals intact unless noted in the Case Narrative.

## **Holding Times**

Holding time is defined as the time from sample preparation to the time of analyses. The prescribed holding times were met for all analytes unless noted in the Case Narrative.

## **Analytical Results**

All reported analytical results meet the requirements of the CAW or client specified SOW unless noted in the case narrative.

## Case Narrative Report

### **Hold time:**

No discrepancies noted.

### **Preparation Blank (PB):**

No discrepancies noted.

### **Duplicate (DUP):**

No discrepancies noted.

### **Laboratory control samples (LCS):**

No discrepancies noted.

### **Post spike (PS) and post spike duplicate (PSD):**

No discrepancies noted.

### **Matrix spike (MS) and matrix spike duplicate (MSD):**

No discrepancies noted.

### **Other QC Criteria:**

No discrepancies noted.

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## SAMPLES INCLUDED IN THIS REPORT

### 200 BP 5 OU, C5858 A-Well VZ

HEIS No.	Laboratory ID	Matrix	Date Collected	Date Received
B1T1V7	0802035-01	WATER	2/22/08 13:20	2/26/08 13:50
B1TML2	0802035-02	WATER	3/10/08 14:00	3/11/08 11:30

The following analyses were performed on the following samples included in this report:

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Anions By Ion Chromatography

Alkalinity, Titrimetic (pH 4.5)

Metals Water by ICPMS

Metals Water by ICPOES

pH of Waters By Electrode

Specific Conductance

Tc\_U Water by ICPMS

### **SAMPLES ANALYZED IN THIS REPORT**

<b>HEIS No.</b>	<b>Laboratory ID</b>	<b>Matrix</b>	<b>Date Collected</b>	<b>Date Received</b>
B1T1V7	0802035-01	WATER	2/22/08 13:20	2/26/08 13:50
B1TML2	0802035-02	WATER	3/10/08 14:00	3/11/08 11:30

### Wet Chemistry

#### Alkalinity as CaCO<sub>3</sub> (ug/mL) by Standard Methods 2320B

Lab ID	HEIS No.	Results	EQL	Analyzed	Batch
0802035-01	B1T1V7	1.32E2	N/A	4/02/08	8D02001
0802035-02	B1TML2	1.25E2	N/A	4/02/08	8D02001

### Wet Chemistry

#### Specific Conductance (EC) (mS/cm) by EPA 120.1

Lab ID	HEIS No.	Results	EQL	Analyzed	Batch
0802035-01	B1T1V7	8.47E-1	5.00E-3	4/02/08	8D01001
0802035-02	B1TML2	9.71E-1	5.00E-3	4/02/08	8D01001

Wet Chemistry					
pH (pH Units) by AGG-pH-001					
Lab ID	HEIS No.	Results	EQL	Analyzed	Batch
0802035-01	B1T1V7	7.77E0	N/A	4/02/08	8D01001
0802035-02	B1TML2	7.99E0	N/A	4/02/08	8D01001



## Anions by Ion Chromatography

CAS #	Analyte	Results	Units	EQL	Analyzed	Batch	Method
<b>HEIS No.</b>	<b>B1T1V7</b>	<b>Lab ID: 0802035-01</b>					
16984-48-8	Fluoride	1.18E0	ug/mL	2.00E-1	4/03/08	8D02005	AGG-IC-001
16887-00-6	Chloride	2.25E1	ug/mL	5.00E-1	4/03/08	8D02005	AGG-IC-001
14797-65-0	Nitrite	2.02E1	ug/mL	1.00E0	4/03/08	8D02005	AGG-IC-001
24959-67-9	Bromide	<1.00E0	ug/mL	1.00E0	4/03/08	8D02005	AGG-IC-001
14797-55-8	Nitrate	8.04E1	ug/mL	1.00E0	4/03/08	8D02005	AGG-IC-001
14808-79-8	Sulfate	1.42E2	ug/mL	1.50E0	4/03/08	8D02005	AGG-IC-001
14265-44-2	Phosphate	<1.50E0	ug/mL	1.50E0	4/03/08	8D02005	AGG-IC-001
<b>HEIS No.</b>	<b>B1TML2</b>	<b>Lab ID: 0802035-02</b>					
16984-48-8	Fluoride	3.01E-1	ug/mL	2.00E-1	4/03/08	8D02005	AGG-IC-001
16887-00-6	Chloride	2.00E1	ug/mL	5.00E-1	4/03/08	8D02005	AGG-IC-001
14797-65-0	Nitrite	<1.00E0	ug/mL	1.00E0	4/03/08	8D02005	AGG-IC-001
24959-67-9	Bromide	<1.00E0	ug/mL	1.00E0	4/03/08	8D02005	AGG-IC-001
14797-55-8	Nitrate	2.06E2	ug/mL	1.00E1	4/04/08	8D02005	AGG-IC-001
14808-79-8	Sulfate	1.26E2	ug/mL	1.50E0	4/03/08	8D02005	AGG-IC-001
14265-44-2	Phosphate	<1.50E0	ug/mL	1.50E0	4/03/08	8D02005	AGG-IC-001

## Total Metals by PNNL-AGG-ICP-AES

CAS #	Analyte	Results	Units	EQL	Analyzed	Batch	Method
<b>HEIS No.</b>	<b>B1T1V7</b>	<b>Lab ID:</b>		<b>0802035-01</b>			
7429-90-5	Aluminum	<5.22E1	ug/L	5.22E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-39-3	Barium	6.87E1	ug/L	1.95E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-70-2	Calcium	5.55E4	ug/L	8.66E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-48-4	Cobalt	<2.31E1	ug/L	2.31E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-47-3	Chromium	<1.07E1	ug/L	1.07E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-50-8	Copper	<1.27E1	ug/L	1.27E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7439-89-6	Iron	<2.96E1	ug/L	2.96E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-09-7	Potassium	1.18E4	ug/L	1.52E3	5/01/08	8D11003	PNNL-AGG-ICP-AES
7439-95-4	Magnesium	2.05E4	ug/L	1.50E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7439-96-5	Manganese	6.19E2	ug/L	7.62E0	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-02-0	Nickel	<2.84E1	ug/L	2.84E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7782-49-2	Selenium	<7.70E2	ug/L	7.70E2	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-62-2	Vanadium	<1.48E2	ug/L	1.48E2	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-66-6	Zinc	<5.06E1	ug/L	5.06E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-23-5	Sodium	6.44E4	ug/L	6.48E2	5/01/08	8D11003	PNNL-AGG-ICP-AES
7704-34-9	Sulfur	5.10E4	ug/L	5.52E2	5/01/08	8D11003	PNNL-AGG-ICP-AES
<b>HEIS No.</b>	<b>B1TML2</b>	<b>Lab ID:</b>		<b>0802035-02</b>			
7429-90-5	Aluminum	<5.22E1	ug/L	5.22E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-39-3	Barium	1.01E2	ug/L	1.95E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-70-2	Calcium	9.41E4	ug/L	8.66E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-48-4	Cobalt	<2.31E1	ug/L	2.31E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-47-3	Chromium	<1.07E1	ug/L	1.07E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-50-8	Copper	<1.27E1	ug/L	1.27E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7439-89-6	Iron	<2.96E1	ug/L	2.96E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-09-7	Potassium	9.20E3	ug/L	1.52E3	5/01/08	8D11003	PNNL-AGG-ICP-AES
7439-95-4	Magnesium	2.80E4	ug/L	1.50E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7439-96-5	Manganese	3.70E1	ug/L	7.62E0	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-02-0	Nickel	<2.84E1	ug/L	2.84E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7782-49-2	Selenium	<7.70E2	ug/L	7.70E2	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-62-2	Vanadium	<1.48E2	ug/L	1.48E2	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-66-6	Zinc	1.94E2	ug/L	5.06E1	5/01/08	8D11003	PNNL-AGG-ICP-AES
7440-23-5	Sodium	2.91E4	ug/L	6.48E2	5/01/08	8D11003	PNNL-AGG-ICP-AES
7704-34-9	Sulfur	4.49E4	ug/L	5.52E2	5/01/08	8D11003	PNNL-AGG-ICP-AES

## Radionuclides By ICP-MS

CAS #	Analyte	Results	Units	EQL	Analyzed	Batch	Method
<b>HEIS No.</b>	<b>B1T1V7</b>	<b>Lab ID:</b>		<b>0802035-01</b>			
14133-76-7	Technetium-99	3.31E-2	ug/L	2.35E-2	4/16/08	8D16003	PNNL-AGG-415
	Uranium 238	2.35E2	ug/L	1.31E-1	4/16/08	8D16003	PNNL-AGG-415
<b>HEIS No.</b>	<b>B1TML2</b>	<b>Lab ID:</b>		<b>0802035-02</b>			
14133-76-7	Technetium-99	1.33E0	ug/L	4.70E-1	4/16/08	8D16003	PNNL-AGG-415
	Uranium 238	4.11E3	ug/L	2.62E0	4/16/08	8D16003	PNNL-AGG-415

## RCRA Metals By PNNL-AGG-415

CAS #	Analyte	Results	Units	EQL	Analyzed	Batch	Method
<b>HEIS No.</b>	<b>B1T1V7</b>	<b>Lab ID:</b>		<b>0802035-01</b>			
14378-38-2	Silver	1.78E-1	ug/L	7.40E-2	4/24/08	8D21002	PNNL-AGG-415
14336-64-2	Cadmium	6.15E-1	ug/L	1.65E-1	4/24/08	8D21002	PNNL-AGG-415
14265-72-6	Antimony	1.81E0	ug/L	1.20E-1	4/24/08	8D21002	PNNL-AGG-415
<b>HEIS No.</b>	<b>B1TML2</b>	<b>Lab ID:</b>		<b>0802035-02</b>			
14378-38-2	Silver	<7.40E-2	ug/L	7.40E-2	4/24/08	8D21002	PNNL-AGG-415
14336-64-2	Cadmium	2.09E-1	ug/L	1.65E-1	4/24/08	8D21002	PNNL-AGG-415
14265-72-6	Antimony	2.30E-1	ug/L	1.20E-1	4/24/08	8D21002	PNNL-AGG-415

COLLECTOR

NCO Sampler

SAMPLING LOCATION

CS838, 1-135

ICE CHEST NO.

SHIPPED TO

Environmental Sciences Laboratory

COMPANY CONTACT

TRENT, SJ

TELEPHONE NO.

373-5869

PROJECT COORDINATOR

TRENT, SJ

PRICE CODE

7N

DATA TURNAROUND

45 Days / 45 Days

PROJECT DESIGNATION

200-BP-5 OU Characterization for 299-E33-343 - Groundwater

SAF NO.

F08-034

AIR QUALITY

☐

FIELD LOGBOOK NO.

ACTUAL SAMPLE DEPTH

263'

COA

123511ES10

METHOD OF SHIPMENT

GOVERNMENT VEHICLE

OFFSITE PROPERTY NO.

N/A

BILL OF LADING/AIR BILL NO.

N/A

MATRIX\*

A=Air  
DL=Drum  
Liquids  
DS=Drum  
Solids  
L=Liquid  
O=Oil  
S=Soil  
SE=Sediment  
T=Tissue  
V=Vegetation  
W=Water  
WI=Wipe  
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS

Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

PRESERVATION

Cool~4C

None

TYPE OF CONTAINER

GP

P

NO. OF CONTAINER(S)

1

1

VOLUME

1000mL

1L

SAMPLE ANALYSIS

KD - Batch;  
SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SPECIAL HANDLING AND/OR STORAGE

Radioactive tie to BITML1

SAMPLE NO.

MATRIX\*

SAMPLE DATE

SAMPLE TIME

BITML2

WATER

3/10-08 1400

✓

✓

CHAIN OF POSSESSION

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

RELINQUISHED BY/REMOVED FROM

DATE/TIME

RECEIVED BY/STORED IN

DATE/TIME

(1)URANIUM ISOTOPIC RATIOS (Uranium-234/Uranium-238 ratio, Uranium-236/Uranium-238 Ratio, Uranium-238/Uranium-235 Ratio)

RELINQUISHED BY/REMOVED FROM

DATE/TIME

RECEIVED BY/STORED IN

DATE/TIME

RELINQUISHED BY/REMOVED FROM

DATE/TIME

RECEIVED BY/STORED IN

DATE/TIME

RELINQUISHED BY/REMOVED FROM

DATE/TIME

RECEIVED BY/STORED IN

DATE/TIME

RELINQUISHED BY/REMOVED FROM

DATE/TIME

RECEIVED BY/STORED IN

DATE/TIME

RELINQUISHED BY/REMOVED FROM

DATE/TIME

RECEIVED BY/STORED IN

DATE/TIME

RELINQUISHED BY/REMOVED FROM

DATE/TIME

RECEIVED BY/STORED IN

DATE/TIME

LABORATORY SECTION

RECEIVED BY

TITLE

DATE/TIME

FINAL SAMPLE DISPOSITION

DISPOSAL METHOD

DISPOSED BY

DATE/TIME

**COLLECTOR**  
NCO Sampler *K.J. Jones*  
**SAMPLING LOCATION**  
1-133 *C5858 256.5*  
**ICE CHEST NO.**

**COMPANY CONTACT**  
TRENT, SJ  
**TELEPHONE NO.**  
373-5869  
**PROJECT DESIGNATION**  
200-BP-5 OU Characterization for 299-E33-343 - Groundwater  
**FIELD LOGBOOK NO.**

**PROJECT COORDINATOR**  
TRENT, SJ  
**PRICE CODE**  
7N  
**AIR QUALITY**  
☐  
**SAF NO.**  
F08-034  
**COA**  
123511ES10

**DATA TURNAROUND**  
45 Days / 45 Days  
**METHOD OF SHIPMENT**  
GOVERNMENT VEHICLE  
**BILL OF LADING/AIR BILL NO.**  
N/A

**SHIPPED TO**  
Environmental Sciences Laboratory

**OFFSITE PROPERTY NO.**  
N/A

**MATRIX\* POSSIBLE SAMPLE HAZARDS/ REMARKS**

A=Air  
DL=Drum  
Liquids  
DS=Drum  
Solids  
L=Liquid  
O=Oil  
S=Soil  
SE=Sediment  
T=Tissue  
V=Vegetation  
W=Water  
WI=Wipe  
X=Other

Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

**PRESERVATION**  
None  
**TYPE OF CONTAINER**  
P  
**NO. OF CONTAINER(S)**  
1  
**VOLUME**  
1L

**SPECIAL HANDLING AND/OR STORAGE**

Radioactive tie to B1T1L5  
**SAMPLE ANALYSIS**  
SEE ITEM (1) IN SPECIAL INSTRUCTIONS

**SAMPLE NO.**  
B1T1V7  
**MATRIX\***  
WATER  
**SAMPLE DATE**  
2/22/08  
**SAMPLE TIME**  
1320

**CHAIN OF POSSESSION**

**SIGN/ PRINT NAMES**

**SPECIAL INSTRUCTIONS**

RELINQUISHED BY/REMOVED FROM  
*U. Parthen*  
DATE/TIME  
2-22-08  
RECEIVED BY/STORED IN  
U. Parthen  
DATE/TIME  
2-22-08

RELINQUISHED BY/REMOVED FROM  
DATE/TIME  
2-26-05  
RECEIVED BY/STORED IN  
U. Parthen  
DATE/TIME  
2-26-05

RELINQUISHED BY/REMOVED FROM

DATE/TIME  
RECEIVED BY/STORED IN

RELINQUISHED BY/REMOVED FROM

DATE/TIME  
RECEIVED BY/STORED IN

RELINQUISHED BY/REMOVED FROM

DATE/TIME  
RECEIVED BY/STORED IN

RELINQUISHED BY/REMOVED FROM

DATE/TIME  
RECEIVED BY/STORED IN

**LABORATORY SECTION**  
**RECEIVED BY**  
**FINAL SAMPLE DISPOSITION**  
**DISPOSAL METHOD**

**TITLE**  
**DATE/TIME**  
**DISPOSED BY**  
**DATE/TIME**