W02959-QES

Quanterra
Environmental Services

Quanterra Incorporated
13715 Rider Trail North
Earth City, Missouri 63045

314 298-8566 Telephone
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# CASE NARRATIVE

0052702

Bechtel Hanford Incorporated
3350 George Washington Way
Richland, Washington 99352

RECEIVED
MAR 20 2000
EDMC

January 24, 2000

JAN 2000
RECEIVED
Data
Log In

Attention: Joan Kessner

| | | |
|---|---|---|
| Project Number | : | 33617 |
| SDG | : | W02959 |
| Number of Samples | : | one (1) |
| Sample Matrix | : | Soil |
| Data Deliverable | : | Summary |
| Date SDG Closed | : | December 3, 1999 |

## II. Introduction

On December 3, 1999, nine (9) "solid" samples were received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. The samples were received at St. Louis on 12/06/99 at a temperature of 13 degrees C. See the attached Sample Summary sheet for the client and lab Ids for these samples.

## III. Analytical Results/ Methodology

The analytical results for this report are presented by analytical test. Each set of data includes sample identification information, analytical results and the appropriate detection limits.

Analyses requested: ICP Metals - 6010A (Supertrace+ add ons)
Hexavalent Chromium - 7196

Deviation from Request: There were no deviations.

IV. Definitions

The following codes are used to denote laboratory quality control samples and can be found in the data summary section of this report:

QCBLK- Quality Control Blank, Method Blank
QCLCS- Quality Control Laboratory Control Sample, Blank Spike
MS- Matrix Spike.
MSD- Matrix Spike Duplicate.

V. Comments

General: The term "Detection Limit" used in the analytical data reports refers to either the lab's standard reporting limits or contractually required reporting limits, whichever is applicable.

Please refer to the attached cross-reference table for the standard preparation methods used at Quanterra, St. Louis.

Metals: A Laboratory Control Sample, Method Blank, Matrix Spike and Matrix Spike Duplicate were analyzed with each preparation batch per the protocol for this analysis.

Several compounds have matrix spike/matrix spike duplicate recoveries outside QC limits. The LCS recoveries for all compounds are within control limits.

Hex. Cr: A Laboratory Control Sample, Method Blank, Matrix Spike and Matrix Spike Duplicate were analyzed with each preparation batch per the protocol for this analysis.

The recovery of the LCS and MSD associated with the Hexavalent Chromium data is slightly above the control limit of 120%, at 125% and 123% respectively. The data was reported with a non-conformance memo (# 6093) because the sample result was a non-detect.

I certify that this Data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Reviewed and approved:

Marti Ward

Marti Ward
St. Louis Project Manager

LOG #: 6093

# LABORATORY NONCONFORMANCE MEMO (NCM)

*Quanterra Incorporated*

Project ID/Client: 550.267 / HANFORD

NCM Initiated by/Date: Tibbress / 12-17-99 Project Manager: M. Ward

Sample Numbers/QC batch or lot numbers: 22502-001, 22514-001, 22598-001, F9L070147

Tests: CR6 / 7196 / Q4

**Analytical Area (check appropriate area):**

- ☐ Sample control
- ☐ Organic preparation
- ☐ Inorganic preparation
- ☐ GC
- ☐ HPLC
- ☐ GC/MS
- ☒ Wet chemistry
- ☐ Metals
- ☐ Reporting
- ☐ Data review
- ☐ Radiochemistry
- ☐ _____

**Nonconformance (check appropriate area):** *To be completed by analyst*

***Holding Time Violations (exceeded by _____ days)***

*Category I: Laboratory Independent*

- ☐ 1. Holding time expired in transit
- ☐ 2. Sample rec'd > 48 hrs after sampling. or ½ holding time has expired
- ☐ 3. Test added by client after expiration

*Category II: Laboratory Dependent*

- ☐ 4. Instrument failure
- ☐ 5. Analyst error
- ☐ 6. Log-in error
- ☐ 7. Miscommunication
- ☐ 8. Other (explanation required)_____

*Category III: Analysis Reruns (QA/QC)*

- ☐ 9. Surrogates
- ☐ 10. Internal standards
- ☐ 11. Spike recoveries
- ☐ 12. Blank contamination

*Category IV: Analysis Reruns (Confirmation)*

- ☐ 13. Second column
- ☐ 14. Contamination check
- ☐ 15. Confirmation of matrix effects
- ☐ 16. Other (explanation required)_____

*Category V: Analysis Reruns (Dilution)*

- ☐ 17. Over calibration
- ☐ 18. Under calibration
- ☐ 19. Other (explanation required)_____

***Quality Assurance/Quality Control***

- ☒ 20. QC data reported outside of controls
- ☐ 21. Incorrect procedure used
- ☐ 22. SOP intentionally modified with QA and tech approval
- ☐ 23. Invalid instrument calibration
- ☐ 24. Received insufficient sample for proper analysis

***Incorrect or Incomplete Client Deliverable***

- ☐ 25. Hardcopy deliverable error
- ☐ 26. Electronic deliverable error

***Reported Detection Limits Elevated Due to:***

- ☐ 27. Sample matrix: Does not include high analyte content
- ☐ 28. Insufficient sample volume
- ☐ 29. Other (explanation required)

***Miscellaneous***

- ☐ 30. Instrument/equipment Tag-out
- ☐ 31. Other (explanation required)

**Notification (check appropriate area):** ☒ Required ☐ Not Required *To be completed by project manager*

Client notified by (name and date): Mward 12/30/99

- ☒ In writing narrative
- ☐ By facsimile
- ☐ By telephone
- ☐ Other (explain)

Client's name and response: _____

- ☐ Process "as is"
- ☐ Re-sample
- ☐ On hold until _____
- ☐ Other (explain)

Project manager (signature and date): Mward 12/30/99



000005

QUANTERRA LABORATORY NONCONFORMANCE MEMO

LOG #: 6093

**Corrective Action:** *To be completed and reviewed by all associates involved*

***Problem Description/Root Cause*** Author's initials and date: TLK 12-17-99

CCVS at 120% Foutside QC limits of +/- 15%

LCS at 125% Foutside QC limits of +/- 20%

***Corrective Actions (Short Term)*** Author's initials and date: TLK 12-17-99

Talked to Supervisor and decided to report data on the basis that sample concentrations are non-detect. and based on QC data, data biased high.

***Corrective Actions to Prevent Reoccurrence (Long Term)***

Watch instrument for possible drifting from baseline. ~~TLK~~ TLK 12-17-99

Corrective Action approved by (Supervisor/Group Leader) and date: [signature] 12/20/99

***Additional Comments:***

Corrective Action to be completed by (if other than Supervisor/Group Leader):

Date Corrective Action is to be completed:

**Quality Assurance Review** *To be completed by a QA associate*

☐ Anomaly ☒ Deficiency ☐ Notified Ops/Sys Manager (Initials)

☐ Further action required:

Further action assigned to:

QA signature: [signature] Date: 12-30-99

**Corrective Action Verification:** *To be completed by a QA associate*

☐ Verification not required or requested

☐ Verified / CA completed on: by

☐ Cannot verify (specify reason)

Verified by: Date:

**Nonconformance Memo Closure:**

QA signature: Date:

*The Office of Quality Assurance maintains a copy of this NCM indicating its final status.*

# SAMPLE SUMMARY

**F9L070147**

| WO # | SAMPLE# | CLIENT SAMPLE ID | DATE | TIME |
|---|---|---|---|---|
| D5WCG | 001 | B0WN26 | 12/02/99 | 10:00 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# METHODS SUMMARY

**F9L070147**

| PARAMETER | ANALYTICAL METHOD | PREPARATION METHOD |
|---|---|---|
| Hexavalent Chromium | SW846 7196A | SW846 7196 |
| Mercury in Solid Waste (Manual Cold-Vapor) | SW846 7471A | SW846 7471A |
| Percent Moisture | MCAWW 160.3 MOD | MCAWW 160.3 MOD |
| Trace Inductively Coupled Plasma (ICP) Metals | SW846 6010B | SW846 3050B |

**References:**

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

QUANTERRA INCORPORATED
CLIENT ANALYSIS SUMMARY
Quanterra - St. Louis

Run Date: 12/07/99
Time: 16:29:26
User Id.: SMITHJE

CLIENT: 127642 BECHTEL HANFORD, INC.
PROJECT MANAGER: MARTI WARD
PROJECT #: GROUNDWATER
REPORT TO: Bechtel Hanford, Inc.
P.O. NUMBER: MRC-SBB-A-19981
SITE: B99-078
AMOUNT REC"D: 250G
STORAGE LOC: R16A
LOT COMMENTS:
MATRIX: SOLID
SAMPLE ID: B0WN26
QC PACKAGE: Special Report - see checklist
SAMPLE COMMENTS:

QUOTE/SAR #: 33617
LAB ID: F-9L070147-001
WORK ORDER: D5WCG
RECEIVING DATE: 12/03/99
SAMPLING DATE: 12/02/99
ANALYTICAL DUE DATE: 12/31/99N
REPORT DUE DATE: 1/14/00
PRIORITY: 28
SAMPLING TIME: 10:00
RECEIVING TIME: 12:05
SDG# : W02959

**Beginning Depth:** .00 **Ending Depth:** .00

| ***** ANALYSIS ***** | WRK LOC | REQUEST DATE | EXTRACTION EXP DATE | ANALYSIS EXP DATE |
|---|---|---|---|---|
| Moisture, Percent (160.3) | 06 | 12/07/99 | 0/00/00 | 3/10/00 |
| NO SAMPLE PREPARATION PERFORMED / DIRECT INJECTION | | | | |
| (A-88-WM-01) D5WCG-1-01 Protocol: A QC Program: STANDARD TEST SET | | | | |
| Inductively Coupled Plasma (6010B Trace) | 06 | 12/07/99 | 0/00/00 | 5/30/00 |
| METALS, TOTAL - Soils | | | | |
| MT6010_S AG,AS,BA,BE,CD,CR,CU,NI,PB,SB,SE,TL,VX,ZN | | | | |
| (A-46-QM-01) D5WCG Protocol: A QC Program: STANDARD TEST SET | | | | |
| Mercury (7471A, Cold Vapor) - Solids | 06 | 12/07/99 | 0/00/00 | 12/30/99 |
| METALS, TOTAL (Method Exclusive) - Solids | | | | |
| M7471_S HG | | | | |
| (A-70-09-01) D5WCG Protocol: A QC Program: STANDARD TEST SET | | | | |
| Chromium, Hexavalent (7196A) | 06 | 12/07/99 | 3/10/00 | 12/06/99 |
| LEACHATE, DI (Routine) | | | | |
| (A-82-EA-01) D5WCG-1-1J Protocol: A QC Program: STANDARD TEST SET | | | | |

QUANTERRA INCORPORATED
CLIENT ANALYSIS SUMMARY
Quanterra - St. Louis

Run Date: 12/07/99
Time: 16:29:26
User Id.: SMITHJE

CLIENT: 127642 BECHTEL HANFORD, INC.
PROJECT MANAGER: MARTI WARD
PROJECT #: GROUNDWATER
REPORT TO: Bechtel Hanford, Inc.
P.O. NUMBER: MRC-SBB-A-19981
SITE: B99-078
AMOUNT REC"D: 250G
STORAGE LOC: R16A
LOT COMMENTS:
MATRIX: SOLID
SAMPLE ID: B0WN26
QC PACKAGE: Special Report - see checklist
SAMPLE COMMENTS:

QUOTE/SAR #: 33617
LAB ID: F-9L070147-001-D
WORK ORDER: D5WCG MSD
RECEIVING DATE: 12/03/99
SAMPLING DATE: 12/02/99
ANALYTICAL DUE DATE: 12/31/99N
REPORT DUE DATE: 1/14/00
PRIORITY: 28
SAMPLING TIME: 10:00
RECEIVING TIME: 12:05
SDG# : W02959

**Beginning Depth:** .00 **Ending Depth:** .00

| ***** ANALYSIS ***** | WRK LOC | REQUEST DATE | EXTRACTION EXP DATE | ANALYSIS EXP DATE |
|---|---|---|---|---|
| Inductively Coupled Plasma (6010B Trace) | 06 | 12/07/99 | 0/00/00 | 5/30/00 |
| METALS, TOTAL - Soils | | | | |
| MT6010_S AG,AS,BA,BE,CD,CR,CU,NI,PB,SB,SE,TL,VX,ZN | | | | |
| (A-46-QM-01) D5WCG Protocol: A QC Program: STANDARD TEST SET | | | | |
| Mercury (7471A, Cold Vapor) - Solids | 06 | 12/07/99 | 0/00/00 | 12/30/99 |
| METALS, TOTAL (Method Exclusive) - Solids | | | | |
| M7471_S HG | | | | |
| (A-70-09-01) D5WCG Protocol: A QC Program: STANDARD TEST SET | | | | |
| Chromium, Hexavalent (7196A) | 06 | 12/07/99 | 3/10/00 | 12/06/99 |
| LEACHATE, DI (Routine) | | | | |
| (A-82-EA-01) D5WCG-1-1L Protocol: A QC Program: STANDARD TEST SET | | | | |

QUANTERRA INCORPORATED
CLIENT ANALYSIS SUMMARY
Quanterra - St. Louis

Run Date: 12/07/99
Time: 16:29:26
User Id.: SMITHJE

CLIENT: 127642 BECHTEL HANFORD, INC.
PROJECT MANAGER: MARTI WARD
PROJECT #: GROUNDWATER
REPORT TO: Bechtel Hanford, Inc.
P.O. NUMBER: MRC-SBB-A-19981
SITE: B99-078
AMOUNT REC"D: 250G
STORAGE LOC: R16A
LOT COMMENTS:
MATRIX: SOLID
SAMPLE ID: B0WN26
QC PACKAGE: Special Report - see checklist
SAMPLE COMMENTS:

QUOTE/SAR #: 33617
LAB ID: F-9L070147-001-S
WORK ORDER: D5WCG MS
RECEIVING DATE: 12/03/99
SAMPLING DATE: 12/02/99
ANALYTICAL DUE DATE: 12/31/99N
REPORT DUE DATE: 1/14/00
PRIORITY: 28
SAMPLING TIME: 10:00
RECEIVING TIME: 12:05
SDG# : W02959

**Beginning Depth:** .00 **Ending Depth:** .00

| ***** ANALYSIS ***** | WRK LOC | REQUEST DATE | EXTRACTION EXP DATE | ANALYSIS EXP DATE |
|---|---|---|---|---|
| Inductively Coupled Plasma (6010B Trace) | 06 | 12/07/99 | 0/00/00 | 5/30/00 |
| METALS, TOTAL - Soils | | | | |
| MT6010_S AG,AS,BA,BE,CD,CR,CU,NI,PB,SB,SE,TL,VX,ZN | | | | |
| (A-46-QM-01) D5WCG Protocol: A QC Program: STANDARD TEST SET | | | | |
| Mercury (7471A, Cold Vapor) - Solids | 06 | 12/07/99 | 0/00/00 | 12/30/99 |
| METALS, TOTAL (Method Exclusive) - Solids | | | | |
| M7471_S HG | | | | |
| (A-70-09-01) D5WCG Protocol: A QC Program: STANDARD TEST SET | | | | |
| Chromium, Hexavalent (7196A) | 06 | 12/07/99 | 3/10/00 | 12/06/99 |
| LEACHATE, DI (Routine) | | | | |
| (A-82-EA-01) D5WCG-1-1K Protocol: A QC Program: STANDARD TEST SET | | | | |

CUR 020337 139C

| Bechtel Hanford Inc. | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | B99-078-150 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: Bowers/Trice / C. Cearlock | Company Contact: Chris Cearlock — Telephone No.: 372-9574 | Project Coordinator: TRENT, SJ | Price Code: 8N — Data Turnaround: 45 Days |
| Project Designation: 200 Area Source characterization - 200-CW-1 OU | Sampling Location: ~~200 B pond~~ 99 B8757 | SAF No.: B99-078 | Air Quality ☐ |
| Ice Chest No. | Field Logbook No.: EL-1511-1 — COA: B20CW1671C | Method of Shipment: ~~Fed Ex~~ Airborne 4012558712 | |
| Shipped To: ~~TMA/RECRA~~ Richland ~~Quentaroppe~~ ~~St Louis~~ | Offsite Property No. | Bill of Lading/Air Bill No.: JRS 12-6-99 | |

B20 12-1-99 RAT 12-3-99 Per SJCL Trent

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

| Preservation | Cool 4C | None | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Type of Container | aG | aG | | | | | | | | |
| No. of Container(s) | 1 | 1 | | | | | | | | |
| Volume | 250mL | 250mL | | | | | | | | |

SDG W02959

SAMPLE ANALYSIS

| | | | | See item (1) in Special Instructions. 100% full | See item (2) in Special Instructions. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
| BOWN26 | Soil | 12/2/99 | 1600 | X | X | | | | ~~BOWN27~~ | 12-2-99 | BOWN27 | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | Date/Time | Received By | Sign/Print Names | Date/Time |
|---|---|---|---|---|---|
| Relinquished By | Chris Cearlock | 12-2-99/1155 | Received By | Doug Bowers | 12-2-99/1155 |
| Relinquished By | Doug Bowers | 12-2-99/1530 | Received By | RCF/A | 12-2-99/1530 |
| Relinquished By | RCF/A | 12-3-99/0700 | Received By | R. Thoren | 12-3-99/0700 |
| Relinquished By | R. Thoren | 12-3-99/1140 | Received By | R Nielsen | 12/3/99 1140 |
| Relinquished By | R Nielsen | 12/3/99 1200 | Received By | | 12-3-99 1205 |
| Relinquished By | | 12-3-99 1600 | Received By | J. Smith | 12-6-99 1020 |

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078.

(1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Antimony, Beryllium, Copper, Nickel, Thallium, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

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

| LABORATORY SECTION | Received By | Title | Date/Time |
|---|---|---|---|
| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |

BHI-EE-011 (10/99)

00012

# ERC Radiological Counting Facility Analysis Report

RCF Number RCF6864

Sample Date & Time 12/2/99 1000

Project ID: 200-CW-1 SAF Number: B99-078 Date Analyzed 12/2/99 2:57:4

Sample ID: B0WN27

Gamma Energy Analysis

| Nuclide | | Activity (pCi/g) | Error (pCi/g) | MDC (pCi/g) |
|---|---|---|---|---|
| K-40 | < | 9.9E+01 | | 9.9E+01 |
| Co-60 | < | 1.3E+01 | | 1.3E+01 |
| Cs-137 | < | 1.2E+01 | | 1.2E+01 |
| Eu-152 | < | 2.8E+01 | | 2.8E+01 |
| Eu-154 | < | 3.2E+01 | | 3.2E+01 |
| Eu-155 | < | 5.3E+01 | | 5.3E+01 |
| Th-232D | < | 3.2E+01 | | 3.2E+01 |
| Th-234 | < | 2.4E+02 | | 2.4E+02 |
| U-235 | < | 1.0E+02 | | 1.0E+02 |
| U-238 | < | 1.2E+03 | | 1.2E+03 |
| U-238D | < | 2.0E+01 | | 2.0E+01 |
| Am-241 | < | 3.1E+01 | | 3.1E+01 |

RAT 12.3.99
BOWN21
~~BOWN22~~

RAT 12.3.99
~~BOX488~~

BOWN26

Total GEA (pCi/g) +/-

| | Activity (pCi/g) | | Error (pCi/g) |
|---|---|---|---|
| Gross Alpha** | 2.8E+00 | +/- | 7.4E-01 |
| Gross Beta | 4.4E+01 | +/- | 2.3E+00 |

| Alpha MDC (pCi/g) |
|---|
| 1.2E+00 |
| **Beta MDC (pCi/g)** |
| 2.4E+01 |

**Definitions:**

All errors reported at 2 standard deviations.
N/R = no result or analysis not requested. <MDC = Less than detection limit.
All GEA results reported as "<" list the Minimum Detectable Concentration (MDC) value for that radionuclide.
Rounding error may result in the reported total GEA activity differing from the sum of the > MDC GEA values in the second significant digit.

**For soils and natural samples, the following applies:**

The analysis of U-238 is based on the activity of Pa-234m.
The analysis of Np-237 is based on the activity of Pa-233.
U-238dau is the activity of Pb-214 and Bi-214, short lived daughter products of U-238. Equilibrium between parent and daughter products probably does not exist in disturbed materials.
Th-232dau is the activity of Ac-228, Pb-212, and Tl-208, short lived daughter products of Th-232. Equilibrium between parent and daughter products may not exist in disturbed materials.
Other samples, not containing natural materials, may have inapplicable results for the Th, U, transuranics and daughter products. The results must then be balanced for the gross alpha analysis.
**The gross alpha results are not corrected for mass absorbtion
# No peaks for this radionuclide were visible above background in the spectrum. The result was reported as less than MDC.

Analyst T. J. Snider 12/3/99

Report To: Dave St. John, C CEARLOCK

Fax: 372-9487

Report Printed: Friday, December 03, 1999

COPY

000013

Figure 1

# SAMPLE CHECK-IN LIST

Date/Time Received: 12-3 1205 SG#: W02959

Work Order Number: _____ SAF #: B99-005 B00-012 B99-078

Shipping Container ID: SmL 341 Chain of Custody # B99-005-67 +68 B00-012-01 B99-078-150

1. Custody Seals on shipping container intact? Yes [] No [✓]
2. Custody Seals dated and signed? Yes [] No [✓]
3. Chain-of-Custody record present? Yes [✓] No []
4. Cooler temperature 3°
5. Vermiculite/packing materials is Wet [] Dry [✓] n/a
6. Number of samples in shipping container: 15
7. Sample holding times exceeded? Yes [] No [✓]

8. Samples have:
   - ✓ tape
   - ✓ custody seals
   - ____ hazard labels
   - ____ appropriate sample labels

9. Samples are:
   - ✓ in good condition
   - ____ broken
   - ____ leaking
   - ____ have air bubbles

10. Where any anomalies identified in sample receipt? Yes [] No [✓]
11. Description of anomalies (include sample numbers): _____

Sample Custodian/Laboratory: Heidelberg Date: 12-3-99

Telephoned To: _____ On _____ By _____

020337

Quanterra Environmental Services

Login No.: F9L070147 W02959

# Condition Upon Receipt Variance Report
## St. Louis Laboratory

Client: Richland - Bechtel Hanford
Date: 12-6-99 Time: 1020
Project No: 33617 (550.267)
Initiated by: J. Smith
Shipper/No: Airborne 4012558712
RFA/COC Numbers: B99-078-150

**Condition/Variance (Check all that apply):**

1. ☐ Sample received broken/leaking.
2. ☐ Sample received without proper preservative.
   - ☐ Cooler temperature not within 4°C ± 2°C
     Record temperature: _____
   - ☐ pH _____
   - ☐ other: _____
3. ☐ Sample received in improper container.
4. ☐ Sample received without proper paperwork. Explain: _____
5. ☐ Paperwork received without sample.
6. ☐ No sample ID on sample container.
7. ☐ Custody tape disturbed/broken/missing/not tamper evident type (circle all that apply).
8. ☐ Sample ID on container does not match sample ID on paperwork. Explain: _____
9. ☐ All coolers on airbill not received with shipment.
10. ☐ Other (explain below): _____

☐ No variances were noted during sample receipt. Cooler Temperature Upon Receipt: 13°C

Temperature Variance Does Not Affect the Following Analyses: blue ice packs NOT frozen

Notes: Shipped 12-3-99; received 12-6-99

**Corrective Action:**

☐ Client's Name: _____ Informed verbally on: _____ By: _____

☐ Client's Name: _____ Informed in writing on: _____ By: _____

☐ Sample(s) processed "as is".

Comments:

☐ Sample(s) on hold until: _____ If released, notify: _____

Sample Control Supervisor Review: (or designate) J. Smith Date: 12-6-99

Project Management Review: MWard Date: 12.7.99

SIGNED ORIGINAL MUST BE RETAINED IN THE PROJECT FILE

SL-ADMIN-0004, Revised 6/29/99

BECHTEL HANFORD, INC.

Client Sample ID: B0WN26

TOTAL Metals

Lot-Sample #...: F9L070147-001 Matrix.....: SOLID
Date Sampled...: 12/02/99 Date Received..: 12/03/99
% Moisture.....: 12

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|
| Prep Batch #...: 9362441 | | | | | | |
| Antimony | 1.4 | 1.1 | mg/kg | SW846 6010B | 12/28-12/29/99 | D5WCG102 |
| | | Dilution Factor: 1 | | | | |
| Arsenic | 2.2 | 1.1 | mg/kg | SW846 6010B | 12/28-12/29/99 | D5WCG105 |
| | | Dilution Factor: 1 | | | | |
| Barium | 74.6 | 22.6 | mg/kg | SW846 6010B | 12/28-12/29/99 | D5WCG108 |
| | | Dilution Factor: 1 | | | | |
| Beryllium | 0.27 B | 0.57 | mg/kg | SW846 6010B | 12/28-12/29/99 | D5WCG10C |
| | | Dilution Factor: 1 | | | | |
| Cadmium | ND | 0.23 | mg/kg | SW846 6010B | 12/28-12/29/99 | D5WCG10F |
| | | Dilution Factor: 1 | | | | |
| Chromium | 27.0 | 0.57 | mg/kg | SW846 6010B | 12/28-12/29/99 | D5WCG10J |
| | | Dilution Factor: 1 | | | | |
| Copper | 18.0 | 2.8 | mg/kg | SW846 6010B | 12/28-12/29/99 | D5WCG10M |
| | | Dilution Factor: 1 | | | | |
| Lead | 2.5 | 0.34 | mg/kg | SW846 6010B | 12/28-12/29/99 | D5WCG10Q |
| | | Dilution Factor: 1 | | | | |
| Nickel | 17.9 | 4.5 | mg/kg | SW846 6010B | 12/28-12/29/99 | D5WCG10U |
| | | Dilution Factor: 1 | | | | |
| Selenium | 0.93 | 0.57 | mg/kg | SW846 6010B | 12/28-12/29/99 | D5WCG10X |
| | | Dilution Factor: 1 | | | | |
| Silver | ND | 0.57 | mg/kg | SW846 6010B | 12/28-12/29/99 | D5WCG112 |
| | | Dilution Factor: 1 | | | | |
| Thallium | ND | 1.1 | mg/kg | SW846 6010B | 12/28-12/29/99 | D5WCG115 |
| | | Dilution Factor: 1 | | | | |
| Vanadium | 51.5 | 5.7 | mg/kg | SW846 6010B | 12/28-12/29/99 | D5WCG118 |
| | | Dilution Factor: 1 | | | | |
| Zinc | 38.2 | 2.3 | mg/kg | SW846 6010B | 12/28-12/29/99 | D5WCG11C |
| | | Dilution Factor: 1 | | | | |

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BECHTEL HANFORD, INC.

Client Sample ID: B0WN26

TOTAL Metals

**Lot-Sample #...:** F9L070147-001 **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|
| **Prep Batch #...:** 9363254 | | | | | | |
| Mercury | ND | 0.038 | mg/kg | SW846 7471A | 12/29/99 | D5WCG11F |
| | | Dilution Factor: 1 | | | | |

**NOTE(S):**

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

## METHOD BLANK REPORT

### TOTAL Metals

**Client Lot #...:** F9L070147 **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|
| **MB Lot-Sample #:** F9L290000-254 **Prep Batch #...:** 9363254 | | | | | | |
| Mercury | ND | 0.033 | mg/kg | SW846 7471A | 12/29/99 | D6XTG101 |
| | | Dilution Factor: 1 | | | | |
| **MB Lot-Sample #:** F9L280000-441 **Prep Batch #...:** 9362441 | | | | | | |
| Antimony | ND | 1.0 | mg/kg | SW846 6010B | 12/28-12/29/99 | D6X4D139 |
| | | Dilution Factor: 1 | | | | |
| Arsenic | ND | 1.0 | mg/kg | SW846 6010B | 12/28-12/29/99 | D6X4D13A |
| | | Dilution Factor: 1 | | | | |
| Barium | ND | 20.0 | mg/kg | SW846 6010B | 12/28-12/29/99 | D6X4D131 |
| | | Dilution Factor: 1 | | | | |
| Beryllium | ND | 0.50 | mg/kg | SW846 6010B | 12/28-12/29/99 | D6X4D132 |
| | | Dilution Factor: 1 | | | | |
| Cadmium | ND | 0.20 | mg/kg | SW846 6010B | 12/28-12/29/99 | D6X4D133 |
| | | Dilution Factor: 1 | | | | |
| Chromium | ND | 0.50 | mg/kg | SW846 6010B | 12/28-12/29/99 | D6X4D134 |
| | | Dilution Factor: 1 | | | | |
| Copper | ND | 2.5 | mg/kg | SW846 6010B | 12/28-12/29/99 | D6X4D135 |
| | | Dilution Factor: 1 | | | | |
| Lead | ND | 0.30 | mg/kg | SW846 6010B | 12/28-12/29/99 | D6X4D136 |
| | | Dilution Factor: 1 | | | | |
| Nickel | ND | 4.0 | mg/kg | SW846 6010B | 12/28-12/29/99 | D6X4D137 |
| | | Dilution Factor: 1 | | | | |
| Selenium | ND | 0.50 | mg/kg | SW846 6010B | 12/28-12/29/99 | D6X4D138 |
| | | Dilution Factor: 1 | | | | |
| Silver | ND | 0.50 | mg/kg | SW846 6010B | 12/28-12/29/99 | D6X4D13E |
| | | Dilution Factor: 1 | | | | |
| Thallium | ND | 1.0 | mg/kg | SW846 6010B | 12/28-12/29/99 | D6X4D13F |
| | | Dilution Factor: 1 | | | | |
| Vanadium | ND | 5.0 | mg/kg | SW846 6010B | 12/28-12/29/99 | D6X4D13C |
| | | Dilution Factor: 1 | | | | |

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## METHOD BLANK REPORT

### TOTAL Metals

**Client Lot #...:** F9L070147 **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|
| Zinc | ND | 2.0 | mg/kg | SW846 6010B | 12/28-12/29/99 | D6X4D13D |

Dilution Factor: 1

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

### TOTAL Metals

**Lot-Sample #...:** F9L070147 **Matrix.....:** SOLID

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS | METHOD | PREPARATION-ANALYSIS DATE | PREP-BATCH # |
|---|---|---|---|---|---|---|---|
| Antimony | 119 | (18 - 182) | | | SW846 6010B | 12/28-12/29/99 | 9362441 |
| | | (18 - 182) | 200 | (0-20) | SW846 6010B | 12/28- | 9362441 |
| | | Dilution Factor: 1 | | | | | |
| Arsenic | 111 | (74 - 126) | | | SW846 6010B | 12/28-12/29/99 | 9362441 |
| | | (74 - 126) | 200 | (0-20) | SW846 6010B | 12/28- | 9362441 |
| | | Dilution Factor: 1 | | | | | |
| Barium | 102 | (77 - 123) | | | SW846 6010B | 12/28-12/29/99 | 9362441 |
| | | (77 - 123) | 200 | (0-20) | SW846 6010B | 12/28- | 9362441 |
| | | Dilution Factor: 1 | | | | | |
| Beryllium | 110 | (78 - 122) | | | SW846 6010B | 12/28-12/29/99 | 9362441 |
| | | (78 - 122) | 200 | (0-20) | SW846 6010B | 12/28- | 9362441 |
| | | Dilution Factor: 1 | | | | | |
| Cadmium | 107 | (77 - 123) | | | SW846 6010B | 12/28-12/29/99 | 9362441 |
| | | (77 - 123) | 200 | (0-20) | SW846 6010B | 12/28- | 9362441 |
| | | Dilution Factor: 1 | | | | | |
| Chromium | 106 | (77 - 123) | | | SW846 6010B | 12/28-12/29/99 | 9362441 |
| | | (77 - 123) | 200 | (0-20) | SW846 6010B | 12/28- | 9362441 |
| | | Dilution Factor: 1 | | | | | |
| Copper | 110 | (82 - 118) | | | SW846 6010B | 12/28-12/29/99 | 9362441 |
| | | (82 - 118) | 200 | (0-20) | SW846 6010B | 12/28- | 9362441 |
| | | Dilution Factor: 1 | | | | | |
| Lead | 96 | (76 - 124) | | | SW846 6010B | 12/28-12/29/99 | 9362441 |
| | | (76 - 124) | 200 | (0-20) | SW846 6010B | 12/28- | 9362441 |
| | | Dilution Factor: 1 | | | | | |
| Nickel | 93 | (78 - 122) | | | SW846 6010B | 12/28-12/29/99 | 9362441 |
| | | (78 - 122) | 200 | (0-20) | SW846 6010B | 12/28- | 9362441 |
| | | Dilution Factor: 1 | | | | | |
| Selenium | 108 | (74 - 126) | | | SW846 6010B | 12/28-12/29/99 | 9362441 |
| | | (74 - 126) | 200 | (0-20) | SW846 6010B | 12/28- | 9362441 |
| | | Dilution Factor: 1 | | | | | |

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## LABORATORY CONTROL SAMPLE EVALUATION REPORT

### TOTAL Metals

**Lot-Sample #...:** F9L070147 **Matrix.....:** SOLID

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS | METHOD | PREPARATION-ANALYSIS DATE | PREP-BATCH # |
|---|---|---|---|---|---|---|---|
| Silver | 111 | (75 - 125) | | | SW846 6010B | 12/28-12/29/99 | 9362441 |
| | | (75 - 125) | 200 | (0-20) | SW846 6010B | 12/28- | 9362441 |
| | | Dilution Factor: 1 | | | | | |
| Thallium | 109 | (51 - 149) | | | SW846 6010B | 12/28-12/29/99 | 9362441 |
| | | (51 - 149) | 200 | (0-20) | SW846 6010B | 12/28- | 9362441 |
| | | Dilution Factor: 1 | | | | | |
| Vanadium | 101 | (68 - 132) | | | SW846 6010B | 12/28-12/29/99 | 9362441 |
| | | (68 - 132) | 200 | (0-20) | SW846 6010B | 12/28- | 9362441 |
| | | Dilution Factor: 1 | | | | | |
| Zinc | 101 | (77 - 123) | | | SW846 6010B | 12/28-12/29/99 | 9362441 |
| | | (77 - 123) | 200 | (0-20) | SW846 6010B | 12/28- | 9362441 |
| | | Dilution Factor: 1 | | | | | |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

### TOTAL Metals

**Client Lot #...:** F9L070147 **Matrix.....:** SOLID

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|
| **LCS Lot-Sample#:** | F9L290000-254 | **Prep Batch #...:** 9363254 | | | |
| Mercury | 93 | (80 - 120) | SW846 7471A | 12/29/99 | D6XTG102 |
| | | Dilution Factor: 1 | | | |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

## MATRIX SPIKE SAMPLE EVALUATION REPORT

### TOTAL Metals

**Client Lot #...:** F9L070147 **Matrix.....:** SOLID
**Date Sampled...:** 12/02/99 **Date Received..:** 12/03/99

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|---|
| **MS Lot-Sample #:** F9L070147-001 **Prep Batch #...:** 9362441 | | | | | | | |
| Antimony | 63 N | (75 - 125) | | | SW846 6010B | 12/28-12/29/99 | D5WCG103 |
| | 61 N | (75 - 125) | 2.2 | (0-20) | SW846 6010B | 12/28-12/29/99 | D5WCG104 |
| | | Dilution Factor: 1 | | | | | |
| Arsenic | 104 | (75 - 125) | | | SW846 6010B | 12/28-12/29/99 | D5WCG106 |
| | 104 | (75 - 125) | 0.77 | (0-20) | SW846 6010B | 12/28-12/29/99 | D5WCG107 |
| | | Dilution Factor: 1 | | | | | |
| Barium | 107 | (75 - 125) | | | SW846 6010B | 12/28-12/29/99 | D5WCG109 |
| | 110 | (75 - 125) | 2.4 | (0-20) | SW846 6010B | 12/28-12/29/99 | D5WCG10A |
| | | Dilution Factor: 1 | | | | | |
| Beryllium | 109 | (75 - 125) | | | SW846 6010B | 12/28-12/29/99 | D5WCG10D |
| | 108 | (75 - 125) | 0.70 | (0-20) | SW846 6010B | 12/28-12/29/99 | D5WCG10E |
| | | Dilution Factor: 1 | | | | | |
| Cadmium | 87 | (75 - 125) | | | SW846 6010B | 12/28-12/29/99 | D5WCG10G |
| | 86 | (75 - 125) | 0.25 | (0-20) | SW846 6010B | 12/28-12/29/99 | D5WCG10H |
| | | Dilution Factor: 1 | | | | | |
| Chromium | 84 | (75 - 125) | | | SW846 6010B | 12/28-12/29/99 | D5WCG10K |
| | 160 N,* | (75 - 125) | 31 | (0-20) | SW846 6010B | 12/28-12/29/99 | D5WCG10L |
| | | Dilution Factor: 1 | | | | | |
| Copper | 89 | (75 - 125) | | | SW846 6010B | 12/28-12/29/99 | D5WCG10N |
| | 86 | (75 - 125) | 1.9 | (0-20) | SW846 6010B | 12/28-12/29/99 | D5WCG10P |
| | | Dilution Factor: 1 | | | | | |
| Lead | 100 | (75 - 125) | | | SW846 6010B | 12/28-12/29/99 | D5WCG10R |
| | 100 | (75 - 125) | 0.46 | (0-20) | SW846 6010B | 12/28-12/29/99 | D5WCG10T |
| | | Dilution Factor: 1 | | | | | |
| Nickel | 97 | (75 - 125) | | | SW846 6010B | 12/28-12/29/99 | D5WCG10V |
| | 113 | (75 - 125) | 11 | (0-20) | SW846 6010B | 12/28-12/29/99 | D5WCG10W |
| | | Dilution Factor: 1 | | | | | |
| Selenium | 100 | (75 - 125) | | | SW846 6010B | 12/28-12/29/99 | D5WCG110 |
| | 99 | (75 - 125) | 0.41 | (0-20) | SW846 6010B | 12/28-12/29/99 | D5WCG111 |
| | | Dilution Factor: 1 | | | | | |
| Silver | 97 | (75 - 125) | | | SW846 6010B | 12/28-12/29/99 | D5WCG113 |
| | 96 | (75 - 125) | 0.87 | (0-20) | SW846 6010B | 12/28-12/29/99 | D5WCG114 |
| | | Dilution Factor: 1 | | | | | |

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## MATRIX SPIKE SAMPLE EVALUATION REPORT

### TOTAL Metals

**Client Lot #...:** F9L070147 **Matrix.....:** SOLID
**Date Sampled...:** 12/02/99 **Date Received..:** 12/03/99

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS | METHOD | PREPARATION-ANALYSIS DATE | WORK ORDER # |
|---|---|---|---|---|---|---|---|
| Thallium | 99 | (75 - 125) | | | SW846 6010B | 12/28-12/29/99 | D5WCG116 |
| | 99 | (75 - 125) | 0.51 | (0-20) | SW846 6010B | 12/28-12/29/99 | D5WCG117 |
| | | Dilution Factor: 1 | | | | | |
| Vanadium | 99 | (75 - 125) | | | SW846 6010B | 12/28-12/29/99 | D5WCG119 |
| | 96 | (75 - 125) | 1.6 | (0-20) | SW846 6010B | 12/28-12/29/99 | D5WCG11A |
| | | Dilution Factor: 1 | | | | | |
| Zinc | 100 | (75 - 125) | | | SW846 6010B | 12/28-12/29/99 | D5WCG11D |
| | 107 | (75 - 125) | 3.8 | (0-20) | SW846 6010B | 12/28-12/29/99 | D5WCG11E |
| | | Dilution Factor: 1 | | | | | |

**MS Lot-Sample #:** F9L070147-001 **Prep Batch #...:** 9363254

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mercury | 101 | (75 - 125) | | | SW846 7471A | 12/29/99 | D5WCG11G |
| | 100 | (75 - 125) | 1.3 | (0-20) | SW846 7471A | 12/29/99 | D5WCG11H |
| | | Dilution Factor: 1 | | | | | |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

N Spiked analyte recovery is outside stated control limits.

* Relative percent difference (RPD) is outside stated control limits.

## METHOD BLANK REPORT

### General Chemistry

**Client Lot #...:** F9L070147 **Matrix.....:** SOLID

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | METHOD | PREPARATION-ANALYSIS DATE | PREP BATCH # |
|---|---|---|---|---|---|---|
| Hexavalent Chromium | | Work Order #: D6JDL101 | | MB Lot-Sample #: | F9L170000-442 | |
| | ND | 0.10 | mg/kg | SW846 7196A | 12/17/99 | 9351442 |
| | | Dilution Factor: 1 | | | | |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

## LABORATORY CONTROL SAMPLE EVALUATION REPORT

### General Chemistry

**Client Lot #...:** F9L070147 **Matrix.....:** SOLID

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | METHOD | PREPARATION-ANALYSIS DATE | PREP BATCH # |
|---|---|---|---|---|---|
| Hexavalent Chromium | | Work Order #: D6JDL102 | LCS Lot-Sample#: F9L170000-442 | | |
| | 125 | (80 - 120) | SW846 7196A | 12/17/99 | 9351442 |
| | | Dilution Factor: 1 | | | |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

## MATRIX SPIKE SAMPLE EVALUATION REPORT

### General Chemistry

**Client Lot #...:** F9L070147 **Matrix.....:** SOLID
**Date Sampled...:** 12/02/99 **Date Received..:** 12/03/99

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS | METHOD | PREPARATION-ANALYSIS DATE | PREP BATCH # |
|---|---|---|---|---|---|---|---|
| Hexavalent Chromium | | WO#: D5WCG11K-MS/D5WCG11L-MSD | | | | MS Lot-Sample #: F9L070147-001 | |
| | 113 | (75 - 125) | | | SW846 7196A | 12/17/99 | 9351442 |
| | 127 N | (75 - 125) | 12 | (0-35) | SW846 7196A | 12/17/99 | 9351442 |

Dilution Factor: 1

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

N Spiked analyte recovery is outside stated control limits.

Results and reporting limits have been adjusted for dry weight.