W0764-QES

0043545

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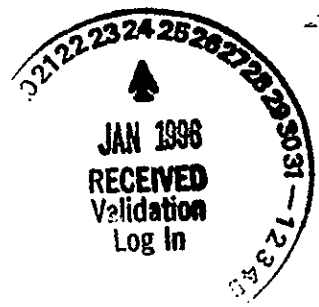

24 January 1996

Ms. Joan Kessner
Bechtel Hanford Incorporated
Post Office Box 969 MSIN H4-23
Richland, Washington 99352

Dear Ms. Kessner:

Enclosed is the data validation summary report for the 100-BC-5 Round 9 Groundwater data.

Sincerely,

R. Bruce Christian
Consultant

cc: J. Duncan - CH2
R. Stringer - ATK
J. Goode - ATK
C. Reyes - ATK

Validation Reports 100-BC-5

DATA VALIDATION SUMMARY REPORT FOR THE 100-BC-5 OPERABLE UNIT ROUND 9 GROUNDWATER SAMPLING

Submitted To:

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In Response To:

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DISCLAIMER

This report is designated as Revision 0. The report addresses the validation of the 100-BC-5 Operable Unit Round 9 Groundwater Sampling data. The report addresses only those samples that have been provided for data validation review.

All related quality assurance samples, including all field quality control samples, were reviewed and validated to verify that reported sample results were of sufficient quality to meet quality control objectives specified by Bechtel Hanford, Inc.

ACRONYMS

%D	Percent difference
AA	Atomic absorption
BFB	Bromofluorobenzene
BNA	Base/neutral and acid
CCB	Continuing calibration blank
CV	Coefficient of variation
CCV	Continuing calibration verification
CLP	Contract laboratory program
CRA	CRDL standard for AA
CRDL	Contract Required Detection Limit
CRI	CRDL standard for ICP
CRII	CRDL standard for ICP initial
CRIF	CRDL standard for ICP final
CRQL	Contract required quantitation limit
CVAA	Cold vapor atomic absorption
DBC	Dibutylchlorendate
DFTPP	Decafluorotriphenylphosphine
DQO	Data quality objectives
EPA	U.S. Environmental Protection Agency
GC/MS	Gas chromatography/mass spectrometry
GC	Gas chromatography
GFAA	Graphite furnace atomic absorption
GPC	Gel permeation chromatography
ICB	Initial calibration blank
ICP	Inductively coupled plasma emission spectrometry
ICS	ICP interference check sample
ICV	Initial calibration verification
IDL	Instrument detection limit
LCS	Laboratory control sample
LCSS	Laboratory control sample soil
LCSW	Laboratory control sample water
MDA	Minimum detectable activity
MSA	Method of standard addition
MS/MSD	Matrix spike/matrix spike duplicate
PBW	Preparation blank water
PCB	Polychlorinated biphenyl
PEM	Performance evaluation mixture
QA	Quality assurance
QC	Quality control
RDL	Required detection limit
RF	Response factor

RIC	Reconstructed ion chromatogram
RPD	Relative percent difference
RRF	Relative response factor
RRT	Relative retention time
RSD	Relative standard deviation
RT	Retention time
SDG	Sample delivery group
SOW	Statement of work
TAL	Target analyte list
TCL	Target compound list
TIC	Tentatively identified compounds
TOC	Total organic carbon
TOX	Total organic halogen
V	Validated
VOC	Volatile organic compounds

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Appendix B - Metals Validated Laboratory Report Forms

Appendix C - General Chemistry Data Summary Tables

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Appendix E - Radiochemistry Summary Tables

Appendix F - Radiochemistry Validated Laboratory Report Forms

1.0 INTRODUCTION

The information provided in this validation summary report includes data from the chemical analyses of samples from the 100-BC-5 Operable Unit Round 9 Groundwater. Data from this sampling event and their related quality assurance samples were reviewed and validated in accordance with WHC guidelines at the requested level.

Sample analyses included metals, general chemistry and radiochemistry. Sixty (60) metals samples were analyzed by Quanterra Environmental Services (QES) and Lockheed Analytical Services (LAS). The metals samples were validated using Westinghouse-Hanford protocols specified in *Data Validation Procedures for Chemical Analyses*, (WHC 1992a). All qualifiers assigned to the metals data were based on this guidance. The table below lists the metals SDGs that were validated for this sampling event.

SDG No.	Matrix	No. of Samples Analyzed	Level of Validation	Parameters
W0764	W	20	A	Metals
W0769	W	16	C	Metals
W0771	W	20	A	Metals
LK5628	W	4	C	Metals

Thirty (30) samples were analyzed for general chemistry parameters by QES and LAS laboratories. General chemistry sample analyses included the following parameters:

- Fluoride
- Sulfate
- Specific Conductivity
- pH

The general chemistry samples were validated using the Westinghouse Hanford protocols specified in *Data Validation Procedures for Chemical Analyses,* (WHC 1992b). All qualifiers assigned to general chemistry data were based on this guidance. The table below lists the general chemistry SDGs that were validated for this sampling event.

SDG No.	Matrix	No. of Samples Analyzed	Level of Validation	Parameters
W0764	W	10	A	General Chem
W0769	W	8	C	General Chem
W0771	W	10	A	General Chem
LK5628	W	2	C	General Chem

Thirty (30) samples were analyzed for radiochemical parameters by QES and LAS laboratories. Radiochemistry sample analyses included the following parameters:

- Gross alpha and gross beta
- Strontium-90
- Technetium-99
- Carbon-14
- Tritium

The radiochemical samples were validated using the Westinghouse-Hanford protocols specified in *Data Validation Procedures for Radiochemical Analyses,* (WHC 1992a). All qualifiers assigned to radiochemical data were based on this guidance. The table below lists the radiochemistry SDGs that were validated for this sampling event.

SDG No.	Matrix	No. of Samples Analyzed	Level of Validation	Parameters
W0764	W	10	A	Radiochemistry
W0769	W	8	C	Radiochemistry
W0771	W	10	A	Radiochemistry
LK5628	W	2	C	Radiochemistry

Quality Control Samples

Included with the samples within this report are the following QC samples: Split samples, field duplicate samples and equipment blanks.

Split Samples

A field split sample is used to assess precision. A field split sample is a duplicate of a representative sample(s) from a sampling event that is sent to a third party (reference) laboratory for analysis. Four sets of split samples were submitted to QES and LAS as shown below:

Sample No.	Split Sample No.	Well Location
B0GNQ1(QES)	B0GNW7(LAS)	199-B2-12
B0GNQ2(QES)	B0GNW8(LAS)	199-B2-12
B0GNS3(QES)	B0GNW9(LAS)	199-B5-1
B0GNS4(QES)	B0GNX0(LAS)	199-B5-1

The results for the split samples were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All metal results fell within the required control limits with the exception of:

- Calcium in sample pair B0GNQ2/B0GNW8.

All general chemistry and radiochemistry results fell within the required control limits.

No qualifiers were assigned based on the split sample results, since under WHC validation guidelines, sample data are not qualified based on split samples results. All results for both well locations appear in the summary tables within this report.

Field Duplicates

A field duplicate sample is a sample that is split and submitted to a given laboratory as two discrete field samples without the laboratory knowing the duplicate identity. Two sets of field duplicate samples were submitted to QES as shown below:

Set 1:

Sample No.	Duplicate Sample No.	Well Location
B0GNQ1	B0GNW3	199-B2-12
B0GNQ2	B0GNW4	199-B2-12

Set 2:

Sample No.	Duplicate Sample No.	Well Location
B0GNS3	B0GNW5	199-B5-1
B0GNS4	B0GNW6	199-B5-1

The field duplicate results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All metals results fell within the required control limits with the exception of:

- Iron in sample pair B0GNS3/B0GNW5 (SDG No. W0769); and
- Zinc in sample pair B0GNQ2/B0GNW4 (SDG No. W0769).

All general chemistry results fell within the required control limits.

All radiochemistry results fell within the required control limits with the exception of:

- Gross Beta in sample pair B0GNS3/B0GNW5 (SDG No. W0769).

No qualifiers were assigned based on the duplicate sample results, since under WHC guidelines, sample data are not qualified based on field duplicate results. All results for both well locations appear in the summary tables within this report.

Equipment Blanks

Equipment blanks are water samples used to determine whether or not decontamination procedures were adequate or that contamination was not inherent in the equipment used. Four equipment blanks were submitted to QES as follows:

Sample Number	Well Location
B0GNV9	199-B2-12
B0GNW0	199-B2-12
B0GNW1	199-B5-1
B0GNW2	199-B5-1

The following metal analytes were detected in the equipment blanks:

- Barium, calcium, copper, iron, magnesium, manganese, sodium, vanadium and zinc in sample numbers B0GNV9 and B0GNW1;
- Barium, calcium, copper, iron, magnesium, manganese, sodium, thallium, vanadium and zinc in sample number B0GNW0; and
- Barium, beryllium, calcium, copper, iron, magnesium, manganese, sodium, vanadium and zinc in sample number B0GNW2.

The following general chemistry analytes were detected in the equipment blanks:

- Specific conductance in sample number B0GNW1.

No radiochemical analytes were detected in the equipment blanks.

No qualifiers were assigned based on the above detects since under WHC validation guidelines, sample data are not qualified based on field blank results.

The following report is broken down into sections for metals, general chemistry and radiochemical analyses. Each metals section includes:

- A general validation summary which addresses precision, accuracy, represenativeness, completeness, and comparability;
- Holding times;
- Calibrations;
- Blanks, including calibration, and preparation blanks;
- Analytical accuracy including matrix spike samples, laboratory control samples, GFAA analytical spikes and MSA results;
- Analytical precision including laboratory duplicates, ICP serial dilutions, field duplicates, field splits, and GFAA duplicate injections;
- Sample result quantitation, verification and reported detection limits; and
- System performance and overall assessment.

Each general chemistry section includes:

- A general validation summary which addresses precision, accuracy, represenativeness, completeness, and comparability;
- Holding times;
- Calibrations;
- Laboratory blanks;
- Analytical accuracy including matrix spike samples and laboratory control samples;
- Analytical precision including laboratory duplicates, field duplicates and field splits;
- Sample result quantitation, verification and reported detection limits; and
- System performance and overall assessment.

Each radiochemistry section includes:

- A general validation summary which addresses precision, accuracy, represenativeness, completeness, and comparability;
- Holding times;
- Calibrations;
- Laboratory blanks;
- Analytical accuracy including chemical recoveries, matrix spike samples and laboratory control samples;
- Analytical precision including laboratory duplicates, field duplicates and field splits;
- Sample result quantitation, verification and reported detection limits; and
- System performance and overall assessment.

In addition, the appendices include the data summary tables as well as the validated laboratory report forms for metals, general chemistry and radiochemistry analyses.

Data validation personnel assigned qualifiers to the reported data based on specified data quality objectives. Qualifiers which may be applied by data validators in compliance with WHC guidelines to organic, inorganic and general chemistry data are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in

the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Qualifiers which may be applied by data validators in compliance with WHC guidelines to radiochemistry data are as follows:

U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.

UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.

J - Indicates the compound or analyte was analyzed for and detected. Due to a QC deficiency identified during the data validation, the associated

concentration is an estimate, but the data are usable for decision-making purposes.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

1.1 OBJECTIVES AND SCOPE

Data validation is performed in order to determine the usability of analytical results to support programmatic decisions regarding the selection of cleanup remedies and investigative approach. Data validation is the process of reviewing a body of analytical data to determine if it meets the criteria defined in the WHC validation guidelines, and to assure that the data are acceptable for their intended use. The validation process, as required under the specified validation level, consists of:

- Verifying the data packages for completeness using validation Level A;
- Verifying compliance with quality assurance (QA) requirements;
- Checking quality control (QC) values against the defined limits; and
- Applying qualifiers to analytical results for the purpose of defining the limitations of the reviewed data;

The result of data validation is the completion of narrative reports, checklists, and summary forms. The validation will be used to determine whether the analytical data are acceptable for their intended use.

The objectives of this data validation project is to provide Bechtel Hanford Inc. with an assessment of environmental data regarding the 100-BC-5 Operable Unit Round 9 Groundwater Sampling Investigation.

1.2 SAMPLES AND ANALYSES

SAMPLES AND ANALYSES

Data Package No.	Sample Number	Sample Location	Sample Date	Sample Type[1]	Level of Validation	Analysis[2]
W0764-QES	B0GNQ3	199-B2-13	10/13/95	GW	A	1,2,3
W0764-QES	B0GNQ4	199-B2-13	10/13/95	GW	A	1
W0764-QES	B0GNQ5	199-B3-1	10/09/95	GW	A	1,2,3
W0764-QES	B0GNQ6	199-B3-1	10/09/95	GW	A	1
W0764-QES	B0GNQ7	199-B3-46	10/12/95	GW	A	1,2,3

SAMPLES AND ANALYSES						
Data Package No.	Sample Number	Sample Location	Sample Date	Sample Type[1]	Level of Validation	Analysis[2]
W0764-QES	B0GNQ8	199-B3-46	10/12/95	GW	A	1
W0764-QES	B0GNQ9	199-B3-47	10/09/95	GW	A	1,2,3
W0764-QES	B0GNR0	199-B3-47	10/09/95	GW	A	1
W0764-QES	B0GNR1	199-B4-1	10/09/95	GW	A	1,2,3
W0764-QES	B0GNR2	199-B4-1	10/09/95	GW	A	1
W0764-QES	B0GNR5	199-B4-5	10/12/95	GW	A	1,2,3
W0764-QES	B0GNR6	199-B4-5	10/12/95	GW	A	1
W0764-QES	B0GNR7	199-B4-7	10/12/95	GW	A	1,2,3
W0764-QES	B0GNR8	199-B4-7	10/12/95	GW	A	1
W0764-QES	B0GNS5	199-B5-2	10/09/95	GW	A	1,2,3
W0764-QES	B0GNS6	199-B5-2	10/09/95	GW	A	1
W0764-QES	B0GNS7	199-B8-6	10/13/95	GW	A	1,2,3
W0764-QES	B0GNS8	199-B8-6	10/13/95	GW	A	1
W0764-QES	B0GNT3	199-B9-3	10/12/95	GW	A	1,2,3
W0764-QES	B0GNT4	199-B9-3	10/12/95	GW	A	1
W0769-QES	B0GNQ1	199-B2-12	10/16/95	GW	C	1,2,3
W0769-QES	B0GNQ2	199-B2-12	10/16/95	GW	C	1
W0769-QES	B0GNR3	199-B4-4	10/17/95	GW	C	1,2,3
W0769-QES	B0GNR4	199-B4-4	10/17/95	GW	C	1
W0769-QES	B0GNS3	199-B5-1	10/17/95	GW	C	1,2,3
W0769-QES	B0GNS4	199-B5-1	10/17/95	GW	C	1
W0769-QES	B0GNT5	699-63-90	10/16/95	GW	C	1,2,3
W0769-QES	B0GNT6	699-63-90	10/16/95	GW	C	1
W0769-QES	B0GNV9	199-B2-12	10/16/95	GW,EB	C	1,2,3

SAMPLES AND ANALYSES

Data Package No.	Sample Number	Sample Location	Sample Date	Sample Type[1]	Level of Validation	Analysis[2]
W0769-QES	B0GNW0	199-B2-12	10/16/95	GW,EB	C	1
W0769-QES	B0GNW1	199-B5-1	10/17/95	GW,EB	C	1,2,3
W0769-QES	B0GNW2	199-B5-1	10/17/95	GW,EB	C	1
W0769-QES	B0GNW3	199-B2-12	10/16/95	GW,DUP	C	1,2,3
W0769-QES	B0GNW4	199-B2-12	10/16/95	GW,DUP	C	1
W0769-QES	B0GNW5	199-B5-1	10/17/95	GW,DUP	C	1,2,3
W0769-QES	B0GNW6	199-B5-1	10/17/95	GW,DUP	C	1
W0771-QES	B0GNR9	199-B4-8	10/18/95	GW	A	1,2,3
W0771-QES	B0GNS0	199-B4-8	10/18/95	GW	A	1
W0771-QES	B0GNS1	199-B4-9	10/18/95	GW	A	1,2,3
W0771-QES	B0GNS2	199-B4-9	10/18/95	GW	A	1
W0771-QES	B0GNS9	199-B9-1	10/18/95	GW	A	1,2,3
W0771-QES	B0GNT0	199-B9-1	10/18/95	GW	A	1
W0771-QES	B0GNT1	199-B9-2	10/18/95	GW	A	1,2,3
W0771-QES	B0GNT2	199-B9-2	10/18/95	GW	A	1
W0771-QES	B0GNT7	699-65-72	10/19/95	GW	A	1,2,3
W0771-QES	B0GNT8	699-65-72	10/19/95	GW	A	1
W0771-QES	B0GNT9	699-65-83	10/20/95	GW	A	1,2,3
W0771-QES	B0GNV0	699-65-83	10/20/95	GW	A	1
W0771-QES	B0GNV1	699-66-64	10/19/95	GW	A	1,2,3
W0771-QES	B0GNV2	699-66-64	10/19/95	GW	A	1
W0771-QES	B0GNV3	699-71-77	10/20/95	GW	A	1,2,3
W0771-QES	B0GNV4	699-71-77	10/20/95	GW	A	1
W0771-QES	B0GNV5	699-72-73	10/19/95	GW	A	1,2,3

SAMPLES AND ANALYSES						
Data Package No.	Sample Number	Sample Location	Sample Date	Sample Type[1]	Level of Validation	Analysis[2]
W0771-QES	B0GNV6	699-72-73	10/19/95	GW	A	1
W0771-QES	B0GNV7	699-72-92	10/20/95	GW	A	1,2,3
W0771-QES	B0GNV8	699-72-92	10/20/95	GW	A	1
LK5628-LAS	B0GNW7	199-B2-12	10/16/95	GW,SPLIT	C	1,2,3
LK5628-LAS	B0GNW8	199-B2-12	10/16/95	GW,SPLIT	C	1
LK5628-LAS	B0GNW9	199-B5-1	10/17/95	GW,SPLIT	C	1,2,3
LK5628-LAS	B0GNX0	199-B5-1	10/17/95	GW,SPLIT	C	1

[1] GW = Ground Water EB = Equipment Blank DUP = Duplicate SPLIT = Split Sample
[2] 1 = Inorganics, 2 = General Chemistry, 3 = Radiochemistry

2.0 METALS DATA VALIDATION SUMMARY

2.1 SUMMARY

Positive and negative preparation blank contamination was detected in numerous samples in SDG Nos. W0769 and LK5628. The matrix spike recovery for lead was outside QC limits in SDG No. W0769. All associated results were flagged accordingly.

With the exceptions noted above, the project-specific data quality objectives in terms of precision, accuracy, completeness, represenativeness, and comparability have been met.

2.2 HOLDING TIMES

Analytical holding times for ICP metals, GFAA Metals and mercury analyses were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be analyzed within six months for all ICP and GFAA metals and within 28 days for mercury.

Holding times were met for all samples.

2.3 CALIBRATIONS

Performance of specific instrument quality assurance and quality control procedures, including deficiencies noted during the quality assurance review, are outlined below.

The calibrations are each immediately verified with an ICV standard and a calibration blank. The ICV is prepared from a source independent of the calibration standards, at a mid-calibration range concentration. The ICV percent recovery must fall within the control limits of 90% to 110% for metals analyzed by ICP. Calibration linearity near the detection limit is verified with a standard prepared at a concentration near the CRDL.

The calibrations are subsequently verified at regular intervals using a CCV standard. The control windows for percent recovery of CCV standards are the same as the ICV windows described above.

Calibrations are not reviewed under Level C validation.

2.3.1 ICP Calibration

An ICS is analyzed at the beginning and end of each ICP sample run to verify the laboratory interelement and background correction factors. Results for the ICS solution must fall within the control limit of plus or minus 20% of the true value.

ICP calibration is not reviewed under Level C validation.

2.3.2 Atomic Absorption Calibrations

Duplicate injections are required for all GFAA analyses. The duplicate injections establish the precision of the individual analytical determinations. For sample concentrations greater than the CRDL, duplicate injections must agree within plus or minus 20% RSD or CV.

Duplicate injections are not reviewed under Level C validation.

2.4 BLANKS

2.4.1 Calibration Blanks

A calibration blank must be analyzed at each wavelength used for analysis immediately after every initial and continuing calibration verification, at a frequency of 10% or every two hours during the run. The blank must be analyzed at the beginning of the run and after the last analytical sample. A CCB must be run after the last CCV following the last analytical sample of the run. In the case of positive blank results, samples with results (in ug/L) less than five times the highest amount found in any of the associated blanks have had their associated values qualified as non-detected and flagged "U". Samples with concentrations greater than five times the highest blank value do not require qualification.

If the absolute value of any negative calibration blank exceeds the IDL, all non-detects are qualified as estimates and flagged "UJ". All associated positive results within two times the absolute blank value are qualified as estimates and flagged "J". The qualification applies only to results generated between the associated calibration blank and the nearest acceptable calibration blank.

Calibration results are not reviewed under Level C validation.

2.4.2 Preparation Blanks

At least one preparation blank, consisting of deionized distilled water must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with results (in ug/L) of less than 5 times the preparation blank value have their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

If the absolute value of the negative preparation blank exceeds the CRDL, all associated undetected results are rejected and flagged "UR". All associated detects that are less than ten times the absolute value of the preparation blank result are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary. If the absolute value of the negative preparation blank is greater than the IDL and less than or equal to the CRDL, all associated non-detected sample results are qualified as estimates and flagged "UJ". All associated detects less than ten times the absolute value of the preparation blank are qualified as estimates and flagged "J".

Due to the presence of a positive preparation blank result, beryllium results in SDG No. W0769 sample numbers B0GNQ1, B0GNR3, B0GNR4, B0GNS3, B0GNS4, B0GNT6, B0GNW3 and B0GNW4 have been flagged "U".

Due to the presence of a negative preparation blank result, chromium results in SDG No. W0769 sample numbers B0GNQ1, B0GNQ2, B0GNT5, B0GNT6, B0GNV9, B0GNW0, B0GNW1, B0GNW2, B0GNW3 and B0GNW4 have been flagged "UJ".

Due to the presence of a negative preparation blank result, chromium results in SDG No. W0769 sample numbers B0GNR3 and B0GNR4 have been flagged "J".

Due to the presence of a positive preparation blank result, copper results in SDG No. W0769 sample numbers B0GNQ1, B0GNQ2, B0GNR3, B0GNR4, B0GNS3, B0GNS4, B0GNT5, B0GNT6, B0GNW3, B0GNW4, B0GNW5 and B0GNW6 have been flagged "U".

Due to the presence of a positive preparation blank result, iron results in SDG No. W0769 sample numbers B0GNQ1, B0GNQ2, B0GNR4, B0GNS4, B0GNT6, B0GNW3, B0GNW4 and B0GNW6 have been flagged "U".

Due to the presence of a negative preparation blank result, lead results in SDG No. W0769 sample numbers B0GNQ1, B0GNQ2, B0GNR3, B0GNR4, B0GNS3, B0GNS4, B0GNT5, B0GNT6, B0GNV9, B0GNW0, B0GNW1, B0GNW2,

B0GNW3, B0GNW4, B0GNW5 and B0GNW6 have been flagged "UJ".

Due to the presence of a positive preparation blank result, manganese results in SDG No. W0769 sample numbers B0GNR3, B0GNR4, B0GNS3, B0GNS4, B0GNT5, B0GNT6, B0GNW5 and B0GNW6 have been flagged "U".

Due to the presence of a negative preparation blank result, thallium results in SDG No. W0769 sample numbers B0GNQ1, B0GNR3, B0GNR4, B0GNS3, B0GNS4, B0GNT5, B0GNT6, B0GNV9, B0GNW1, B0GNW2, B0GNW3, B0GNW4, B0GNW5 and B0GNW6 have been flagged "UJ".

Due to the presence of a negative preparation blank result, thallium results in SDG No. W0769 sample numbers B0GNQ2 and B0GNW0 have been flagged "J".

Due to the presence of a positive preparation blank result, vanadium results in SDG No. W0769 sample numbers B0GNR3, B0GNR4, B0GNS3, B0GNS4, B0GNT5, B0GNT6, B0GNW5 and B0GNW6 have been flagged "U".

Due to the presence of a positive preparation blank result, zinc results in SDG No. W0769 sample numbers B0GNQ1, B0GNQ2, B0GNR3, B0GNR4, B0GNS3, B0GNS4, B0GNT5, B0GNT6, B0GNW3, B0GNW5 and B0GNW6 have been flagged "U".

Due to the presence of a positive preparation blank result, an aluminum result in SDG No. LK5628 sample number B0GNW9 has been flagged "U".

Due to the presence of a positive preparation blank result, iron results in SDG No. LK5628 sample numbers B0GNW7 and B0GNW9 have been flagged "U".

To avoid masking potential sources of contamination, professional judgement was used to determine that the equipment blank results reported in SDG No. W0769 would not be qualified based on positive method blank results.

All other preparation blank results were acceptable.

2.5 ACCURACY

2.5.1 Matrix Spike Samples

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 75% to 125%. Samples with a spike recovery of less than 30% and a sample value

below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 74% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 125% or less than 75% and a sample result greater than the IDL are qualified "J". All samples with a spike recovery greater than 125% and a sample result less than the IDL require no qualification.

The matrix spike recovery for lead in SDG No. W0769 was 72.6%, slightly below the established QC limits. The lead results for all samples in this SDG were qualified as estimates and flagged "UJ".

All other matrix spike recovery results were acceptable.

2.5.2 Laboratory Control Samples

The LCS monitors the overall performance of the analysis, including the sample preparation. An LCS should be digested or distilled and analyzed with every group of samples which have been prepared together. Non-detected sample results with a LCS recovery between 50% and 79% are qualified as estimates and flagged "UJ". Detected sample results with a LCS recovery between 50% to 79% or greater than 120% are qualified as estimates and flagged "J". Associated sample results with a LCS recovery less than 50% are rejected and flagged "R".

LCS results are not considered under Level C validation.

2.5.3 GFAA Analytical Spikes

The post-digestion analytical spike is analyzed to determine the extent of interference in the sample matrix. The analytical spike recoveries establish the accuracy of the individual GFAA determinations.

Positive sample results whose analytical spike results are outside the 85% to 115% control limit, but whose absorbances are less than 50% of the analytical spike absorbance, are qualified as estimates and flagged "J". In cases where the analytical spike recovery was less than 10%, all non-detects are rejected and flagged "UR".

GFAA analytical spike results are not reviewed under Level C validation

2.5.4 Method of Standard Addition (MSA) Results

For all samples whose analytical spike results are outside the 85% to 115%

control limit and whose absorbances are greater than 50% of the analytical spike absorbance, an MSA is required. In cases where the MSA correlation coefficient was less than 0.995, the MSA analysis is repeated once. If the correlation coefficient was still less than 0.995, samples are qualified as estimates and flagged "J". If a sample required MSA analysis but was not analyzed, all associated data must be qualified as estimates and flagged "J".

MSA results are not reviewed under Level C validation.

2.6 ANALYTICAL PRECISION

2.6.1 Laboratory Duplicate Samples

The laboratory duplicate results are used to assess the precision of the method by measuring a second aliquot of the sample that is treated the same way as the original. For aqueous samples, if the RPD of the original sample and its duplicate is greater than 20% and the positive sample result is greater than five times the CRDL, the associated sample result is qualified as an estimate and flagged "J". Also, the associated sample result is qualified as an estimate and flagged "J" if the positive sample result is less than five times the CRDL and the difference between the duplicate samples is greater than plus or minus the CRDL.

All laboratory duplicate results were acceptable.

2.6.2 ICP Serial Dilution

The ICP serial dilution is used to determine whether significant physical or chemical interferences exist due to sample matrix. If a sample concentration is less than or equal to fifty times the IDL for an analyte and the %D is outside the plus or minus 10% control limits the associated data are qualified as estimates and flagged "J".

Serial dilution results are not reviewed under Level C validation.

2.6.3 Field Duplicates

Field duplicate results are compared using the same guidelines for determining the RPD between a sample and its duplicate as described above. According to WHC validation guidelines, qualifiers are not assigned based on field duplicate results. Field duplicate results are discussed in section 1.0 of this report.

2.6.4 Field Split Samples

A field split sample is a representative sample from a sampling event that is sent to a third party laboratory. The field split sample results are evaluated by comparing the corresponding sample results to the reference laboratory sample results. According to WHC validation guidelines, qualifiers are not assigned based on field split results. Field split sample results are discussed in section 1.0 of this report.

2.6.5 GFAA Duplicate Injections

Each GFAA analysis requires a minimum of two injections (burns), except for full MSAs. The RSD for the duplicate injections must be within the control limits of plus or minus 20% for samples with concentrations greater than the CRQL. If these requirements are not met, the analytical sample must be rerun once (i.e., two additional burns). If the readings are then still outside the QC limits, the result is qualified as an estimate and flagged "J".

GFAA duplicate injections are not reviewed under Level C validation.

2.7 SAMPLE DETECTION LIMITS

The objective of reviewing detection limits is to verify that reported detection limits are less than or equal to the CRDL. All reported detection limits were acceptable.

2.8 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

Positive and negative preparation blank contamination was reported in both SDGs validated. Associated sample results were flagged accordingly. The matrix spike recovery for lead was slightly below QC limits, resulting in all lead results in SDG No. W0769 being qualified as estimates and flagged "UJ". Data flagged "J" indicates that the associated concentration is an estimate, but per WHC guidelines, the data are usable for decision making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All metals data packages submitted for validation were found to be 100% complete.

3.0 GENERAL CHEMISTRY DATA VALIDATION SUMMARY

3.1 SUMMARY

The holding time for pH was exceeded for all samples in all SDGs. All associated sample results were qualified as estimates and flagged "J".

With the above noted exceptions, the project-specific data quality objectives in terms of precision, accuracy, completeness, represenativeness, and comparability have been met.

3.2 HOLDING TIMES

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: 28 days for fluoride, sulfate and specific conductivity and immediately for pH.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

The holding time for pH was exceeded for all samples in all SDGs (including SDGs W0764 and W0771). Therefore, the associated results were qualified as estimates and flagged "J".

Holding times for all other analytes met QC requirements.

3.3 CALIBRATIONS

3.3.1 Initial Calibration

The following calibration procedures must be conducted:

- At least one blank and three standards are used to establish the ion chromatography, ion selective electrode, and spectrophotometer calibrations with a correlation greater than or equal to 0.995 prior to sample analysis.
- At least two reference buffers or standards at a high and low concentration

were used to calibrate the pH and conductivity meters.

If any of these initial calibration requirements are not met, all associated data are qualified "J" for detects and "UJ" for non-detects.

Initial calibration results are not reviewed under Level C validation.

3.3.2 Continuing Calibration Verification

All CCV standards must be analyzed at the required frequency. The percent recoveries must fall within the 90%-110% acceptance window. If the recoveries fall outside this window, all associated detects are qualified as estimates and flagged "J" and all non-detects are flagged "UJ".

Continuing calibration results are not considered under Level C validation.

3.4 BLANKS

3.4.1 Laboratory Blanks

At least one laboratory preparation blank must be analyzed with each sample batch. At least one initial calibration blank must be analyzed for every 20 samples. As per WHC guidelines, no qualification of data based on blank contamination is required for general chemistry parameters.

All laboratory blank results were acceptable.

3.5 ACCURACY

3.5.1 Matrix Spike Recovery

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 75% to 125%. Samples with a spike recovery less than 30% and a sample value below the IDL are rejected and flagged "UR". Samples with a spike recovery between 30% and 74% and a sample value below the IDL are qualified as estimates and flagged "UJ". Samples with a spike recovery of less than 75% or greater than 125% and a sample value greater than the IDL are qualified as "J". Finally, samples with a spike recovery of greater than 125% and a sample value less than the IDL are acceptable and do not require qualification.

All matrix spike recovery results were acceptable.

3.5.2 Laboratory Control Sample Recovery

The LCS monitors the overall performance of all steps in the analysis, including the sample preparation. An LCS should be prepared (e.g., digested or distilled) and analyzed with every group of samples which have been prepared together. The performance criteria for aqueous LCS percent recovery is 80% to 120%. The performance criteria for solid LCS samples are established by the manufacturer or the laboratory.

LCS results are not reviewed under Level C validation.

3.6 PRECISION

3.6.1 Laboratory Duplicates

The laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Laboratory duplicate RPDs must fall below 20% for waters and 35% for soils. If an RPD for an aqueous sample is greater than 20% and the sample result is less than five times the CRDL, all associated detects are qualified as estimates and flagged "J". If the range between duplicate aqueous samples is greater than plus or minus the CRDL and the sample result is less than five times the CRDL, all associated detects are qualified as estimates and flagged "J". If an RPD for soil samples is greater than 35% and the sample result is greater than five times the CRDL, all associated detects are flagged "J". If the range between duplicate soil samples is greater than plus or minus two times the CRDL and the sample result is less than five times the CRDL, then all detects are flagged "J".

All laboratory duplicate results were acceptable.

3.6.2 Field Duplicates

Field duplicate sample analyses are used to measure both the lab and field sampling procedure precision. Field duplicate results are compared using the same guidelines for determining the precision between a sample and its duplicate. Under WHC validation guidelines, data are not qualified based on field duplicate results. Results of the field duplicate samples are discussed in section 1.0 of this report.

3.6.3 Field Split Samples

A field split sample is a representative sample from a sampling event that is sent to a third party laboratory. Field split sample results are evaluated by comparing the corresponding sample results to the reference laboratory sample results. Under WHC validation guidelines, data qualification is not required based on field split results. Results of the field split samples are discussed in section 1.0.

3.7 SAMPLE DETECTION LIMITS

The sample detection limits were evaluated to ensure that all analytes were analyzed for at or below the CRDL. The laboratory detection level for all sulfate results in SDG No. W0769 were above the CRDL. Under WHC guidelines, no qualification is required. All other sample detection limits were acceptable.

3.8 OVERALL ASSESSMENT AND SUMMARY

Holding time for pH was exceeded for all samples in all SDGs. All results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under WHC guidelines, the data are considered usable for decision making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All general chemistry packages submitted for validation were found to be 100% complete.

4.0 RADIOCHEMISTRY DATA VALIDATION SUMMARY

4.1 SUMMARY

Due to the lack of a matrix spike analysis, all carbon-14 and tritium results in SDG No. W0769 and all technetium-99 results in SDG No. LK5628 were qualified as estimates and flagged "J/UJ".

With the exceptions noted above, the project-specific data quality objectives in terms of precision, accuracy, completeness, represenativeness, and comparability have been met.

4.2 HOLDING TIMES AND SAMPLE PREPARATION

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analyses is six months. Tritium sample preparation requires distillation. Tritium samples must be analyzed within seven days of distillation.

All holding times and sample preparation measures were acceptable. Tritium distillation is not reviewed under Level C validation.

4.3 CALIBRATIONS

Instrument calibration is performed to establish that the counters used to determine radionuclide activities are capable of producing acceptable and reliable analytical data. Each counting system must be factory calibrated at installation and after any maintenance or repair. Calibration consists of an instrument efficiency determination for each applicable radionuclide. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible.

Calibration results, including efficiency checks and background counts, are not reviewed under Level C validation.

4.4 LABORATORY BLANKS

Laboratory blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the MDA, the following qualifiers were applied: All positive sample results less than five times the highest blank concentration are qualified as estimates; sample results below the MDA are

elevated to the MDA and qualified as undetected; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All laboratory blank results were acceptable.

4.5 ACCURACY

4.5.1 Laboratory Control and Matrix Spike Samples

Accuracy was evaluated by analyzing soil or distilled water samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample recovery range is 70% to 130%, while that for a matrix spike is 60% to 140%. Spike sample results outside the above ranges resulted in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

Due to the lack of a matrix spike analysis, all carbon-14 and tritium results in SDG No. W0769 were qualified as estimates and flagged "J/UJ".

Due to the lack of a matrix spike analysis, all technetium-99 results in SDG No. LK5628 were qualified as estimates and flagged "J/UJ".

All other laboratory control and matrix spike sample results were acceptable.

4.6 PRECISION

4.6.1 Laboratory Duplicates

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. Precision is also be assessed using unspiked duplicate sample analyses. If both sample and replicate activities are greater than five times the CRDL and the RPD is less than 35% for soil samples and less than 20% for water samples, the results are acceptable. If either activities are less than five times the CRDL, a control limit of less than or equal to two times the CRDL is used for soil samples and less than or equal to the CRDL for water samples. If the RPD is outside the applicable control limit, associated results are qualified as estimates and flagged "J/UJ".

All laboratory duplicate results were acceptable.

4.6.2 Field Duplicates

Field duplicate results are compared using the same guidelines for determining the RPD between a sample and its duplicate. Under WHC validation guidelines, data qualification is not required based on field duplicate results. Results of the field duplicate samples are discussed in section 1.0.

4.6.3 Field Split Samples

A field split sample is a representative sample from a sampling event that is sent to a third party laboratory. The field split sample results are evaluated by comparing the corresponding sample results to the reference laboratory sample results. Under WHC validation guidelines, data qualification is not required based on field split results. Results of the field split samples are discussed in section 1.0.

4.7 SAMPLE DETECTION LIMITS

The MDA for each analyte was assessed to ensure that it met the CRDL. The reviewer verified that the reported detection limits were at or below the CRDL.

4.8 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

Due to the lack of a matrix spike analysis, all carbon-14 and tritium results in SDG No. W0769 and all technetium-99 results in SDG No. LK5628 were qualified as estimates and flagged "J/UJ". Data flagged "J" indicate the associated concentration is an estimate, but under WHC guidelines, the data are considered usable for decision making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All radiochemical data packages submitted for validation were found to be 100% complete.

5.0 REFERENCES

EPA, 1987, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition, Environmental Protection Agency, Washington, D.C.

EPA, 1988a, *EPA Contract Laboratory Program Statement of Work for Organics Analyses, Multi-Media, Multi-Concentration*, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1988b, *Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses*, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1988c, *EPA Contract Laboratory Program Statement of Work for Inorganics Analyses, Multi-Media, Multi-Concentration*, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1988d, *Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1990, *EPA Contract Laboratory Program Statement of Work for Inorganic Analyses, Multi-media, Multi-Concentration*, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1991, *EPA Contract Laboratory Program Statement of Work for Organics Analyses, Multi-Media, Multi-Concentration*, Environmental Protection Agency, Washington, D.C.

WHC, 1992a, *Data Validation Procedures for Chemical Analyses*, WHC-SD-EN-SPP-002, Rev. 2, Westinghouse Hanford Company, October 1993.

WHC, 1992b, *Data Validation Procedure for Radiological Analyses*, WHC-SD-EN-SPP-001, Rev. 2, Westinghouse Hanford Company, 1993.

EPA, 1994, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, U.S. Environmental Protection Agency, Washington, D.C.

APPENDICES

APPENDIX A

METALS DATA SUMMARY TABLES

Project: BECHTEL-HANFORD																							
Laboratory: Quanterra																							
Case	SDG: W0769																						
Sample Number		B0GNQ1			B0GNQ2			B0GNR3			B0GNR4			B0GNS3			B0GNS4			B0GNT5			B0GNT6			B0GNV9			B0GNW0	
Location		199-B2-1			199-B2-12			199-B4-4			199-B4-4			199-B5-1			199-B5-1			699-63-90			699-63-90			199-B2-12			199-B2-12	
Remarks																										EB			EB	
Sample Date		10/16/95			10/16/95			10/17/95			10/17/95			10/17/95			10/17/95			10/16/95			10/16/95			10/16/95			10/16/95	
Inorganic Analytes	CRDL	Result		Q	Result		Q	Result		Q	Result		Q	Result		Q	Result		Q	Result		Q	Result		Q	Result		Q	Result		Q
Aluminum	200	22.3		U	22.3		U	22.3		U	22.3		U	22.3		U	22.3		U	22.3		U	22.3		U	22.3		U	22.3		U
Antimony	60	27.6		U	27.6		U	27.6		U	27.6		U	27.6		U	27.6		U	27.6		U	27.6		U	27.6		U	27.6		U
Arsenic	10	2.8			2.9			2.4			2.2			1.8			1.2			1.5			1.2			1.1		U	1.1		U
Barium	200	60.9			56.9			27.2			27.1			32.8			31.8			16.2			16.2			4.0			4.0		
Beryllium	5	0.87		U	0.60		U	0.67		U	0.87		U	0.87		U	0.68		U	0.60		U	0.87		U	0.60		U	0.60		U
Cadmium	5	2.3		U	3.6			2.3		U	2.7			2.3		U	2.3		U	2.3		U	2.3		U	2.3		U	2.3		U
Calcium	5000	26900			25000			54000			54000			45200			43600			37100			35900			1700			1760		
Chromium	10	3.7		UJ	3.7		UJ	10		J	11.9		J	69.0			67.6			3.7		UJ	3.7		UJ	3.7		UJ	3.7		UJ
Cobalt	50	4.2		U	4.2		U	4.2		U	4.2		U	4.2		U	4.2		U	4.2		U	4.2		U	4.2		U	4.2		U
Copper	25	13.1		U	16.2		U	12.9		U	14.0		U	12.8		U	12.7		U	9.9		U	12.6		U	12.2			8.8		
Iron	100	44.9		U	23.7		U	64.0			33.6		U	198			36.7		U	293			31.6		U	20.7			20.7		
Lead	3	1.2		UJ	1.2		UJ	1.2		UJ	1.2		UJ	1.2		UJ	1.2		UJ	1.2		UJ	1.2		UJ	1.2		UJ	1.2		UJ
Magnesium	5000	9670			9040			9070			9060			9040			8740			13200			12900			415			405		
Manganese	15	9.7			8.7			6.3		U	4.8		U	5.4		U	3.8		U	5.3		U	4.5		U	2.2			2.3		
Mercury	0.2	0.10		U	0.10		U	0.10		U	0.10		U	0.10		U	0.10		U	0.10		U	0.10		U	0.10		U	0.10		U
Nickel	40	11.3		U	11.3		U	11.3		U	11.3		U	11.3		U	11.3		U	11.3		U	11.3		U	11.3		U	11.3		U
Potasssium	5000	3900			4390			4540			4810			4350			4350			3820			4040			1390		U	1390		U
Selenium	5	1.0		U	1.0		U	1.8			1.4			1.9			1.5			1.1			1.0		U	1.0		U	1.0		U
Silver	10	6.0		U	6.0		U	6.0		U	6.0		U	6.0		U	6.0		U	6.0		U	6.0		U	6.0		U	6.0		U
Sodium	5000	13200			12300			11900			11900			10100			9830			11700			11400			261			262		
Thallium	10	0.50		UJ	0.85		J	0.50		UJ	0.50		UJ	0.50		UJ	0.50		UJ	0.50		UJ	0.50		UJ	0.50		UJ	0.74		J
Vanadium	50	44.8			40.2			15.9		U	17.8		U	15.8		U	15.7		U	29.8		U	30.7		U	7.2			6.2		
Zinc	20	13.8		U	11.4		U	16.4		U	11.8		U	19.3		U	8.9		U	16.7		U	16.4		U	9.6			21.1		

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EB = Equipment Blank

Project: WESTINGHOUSE-HANFORD																					
Laboratory: Quanterra																					
Case	SDG: W0769																				
Sample Number		B0GNW1		B0GNW2		B0GNW3		B0GNW4		B0GNW5		B0GNW6									
Location		199-B5-1		199-B5-1		199-B2-12		199-B2-12		199-B5-1		199-B5-1									
Remarks		EB		EB		Duplicate		Duplicate		Duplicate		Duplicate									
Sample Date		10/17/95		10/17/95		10/16/95		10/16/95		10/17/95		10/17/95									
Inorganic Analytes	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	200	22.3	U	22.3	U	22.3	U	22.3	U	22.3	U	22.3	U								
Antimony	60	27.6	U	27.6	U	27.6	U	27.6	U	27.6	U	27.6	U								
Arsenic	10	1.1	U	1.1	U	3.0		3.1		1.7		2.3									
Barium	200	4.0		3.7		59.9		60.9		32.8		32.5									
Beryllium	5	0.60	U	0.77		0.87	U	0.77	U	0.60	U	0.60	U								
Cadmium	5	2.3	U	2.3	U	2.3	U	2.3	U	2.3	U	2.3	U								
Calcium	5000	1880		1710		26300		26500		45500		44600									
Chromium	10	3.7	UJ	3.7	UJ	3.7	UJ	3.7	UJ	72.5		69.0									
Cobalt	50	4.2	U	4.2	U	4.2	U	4.2	U	4.2	U	4.2	U								
Copper	25	9.9		9.6		14.0	U	10.2	U	11.0	U	11.3	U								
Iron	100	26.8		279		40.4	U	27.8	U	69.0		32.9	U								
Lead	3	1.2	UJ	1.2	UJ	1.2	UJ	1.2	UJ	1.2	UJ	1.2	UJ								
Magnesium	5000	419		401		9490		9570		9110		8920									
Manganese	15	2.9		2.7		9.2		8.5		4.5	U	3.8	U								
Mercury	0.2	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U								
Nickel	40	11.3	U	11.3	U	11.3	U	11.3	U	11.3	U	11.3	U								
Potassium	5000	1390	U	1390	U	5110		4600		4660		4380									
Selenium	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U								
Silver	10	6.0	U	6.0	U	6.0	U	6.0	U	6.0	U	6.0	U								
Sodium	5000	307		252		12900		13000		10200		10000									
Thallium	10	0.50	UJ	0.50	UJ	0.50	UJ	0.50	UJ	0.50	UJ	0.50	UJ								
Vanadium	50	7.3		5.6		44.8		41.5		15.4	U	14.8	U								
Zinc	20	27.4		15.8		15.4	U	32.4		17.8	U	18.7	U								

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EB = Equipment Blank

INORGANIC ANALYSIS, WATER MATRIX, (ug/L)

Project: BECHTEL-HANFORD																			
Laboratory: Lockheed																			
Case	SDG: LK5628																		
Sample Number		B0GNW7		B0GNW8		B0GNW9		B0GNX0											
Location		199-B2-12		199-B2-12		199-B5-1		199-B5-1											
Remarks		Split		Split		Split		Split											
Sample Date		10/16/95		10/16/95		10/17/95		10/17/95											
Inorganic Analytes	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	200	21.0	U	21.0	U	23.8	U	21.0	U										
Antimony	60	4.0	U	4.0	U	4.0	U	4.0	U										
Arsenic	10	4.6		10.3		4.6		5.5											
Barium	200	63.2		66.0		31.0		33.8											
Beryllium	5	1.0	U	1.0	U	1.0	U	1.0	U										
Cadmium	5	5.0	U	5.0	U	5.0	U	5.0	U										
Calcium	5000	27500		30600		46600		52800											
Chromium	10	8.8		4.0	U	80.7		88.6											
Cobalt	50	6.0	U	6.0	U	6.0	U	6.0	U										
Copper	25	3.0	U	3.0	U	3.0	U	3.0	U										
Iron	100	43.8	U	9.0	U	98.4	U	9.0	U										
Lead	3	2.0	U	2.0	U	2.0	U	2.0	U										
Magnesium	5000	10100		10900		8900		9960											
Manganese	15	7.0		7.4		2.0	U	2.0	U										
Mercury	0.2	0.20	U	0.20	U	0.20	U	0.20	U										
Nickel	40	14.0	U	14.0	U	14.0	U	14.0	U										
Potasssium	5000	4740		5020		5080		4890											
Selenium	5	4.0	U	4.0	U	4.0	U	4.0	U										
Silver	10	3.0	U	3.0	U	3.0	U	3.0	U										
Sodium	5000	13800		14600		10300		11400											
Thallium	10	4.9		4.6		5.9		3.0	U										
Vanadium	50	40.9		41.9		7.7		5.1											
Zinc	20	4.3		3.0	U	8.3		3.0	U										

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APPENDIX B

METALS VALIDATED LABORATORY REPORT FORMS

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNQ1

Lab Name: QUANTERRA_MO Contract: 550.107
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0769
Matrix (soil/water): WATER Lab Sample ID: 9590-001
Level (low/med): LOW Date Received: 10/17/95
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	22.3	U		P	
7440-36-0	Antimony	27.6	U		P	
7440-38-2	Arsenic	2.8	B		F	
7440-39-3	Barium	60.9	B		P	
7440-41-7	Beryllium	0.87	U		P	U
7440-43-9	Cadmium	2.3	U		P	
7440-70-2	Calcium	26900			P	
7440-47-3	Chromium	3.7	U		P	UJ
7440-48-4	Cobalt	4.2	U		P	
7440-50-8	Copper	13.1	U		P	U
7439-89-6	Iron	44.9	U		P	U
7439-92-1	Lead	1.2	U	WN	F	UJ
7439-95-4	Magnesium	9670			P	
7439-96-5	Manganese	9.7	B		P	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	11.3	U		P	
7440-09-7	Potassium	3900	B		P	
7782-49-2	Selenium	1.0	U		F	
7440-22-4	Silver	6.0	U		P	
7440-23-5	Sodium	13200			P	
7440-28-0	Thallium	0.50	U		F	UJ
7440-62-2	Vanadium	44.8	B		P	
7440-66-6	Zinc	13.8	U		P	U

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNQ2

Lab Name: QUANTERRA_MO Contract: 550.107
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0769
Matrix (soil/water): WATER Lab Sample ID: 9590-002
Level (low/med): LOW Date Received: 10/17/95
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	22.3	U		P	
7440-36-0	Antimony	27.6	U		P	
7440-38-2	Arsenic	2.9	B		F	
7440-39-3	Barium	56.9	B		P	
7440-41-7	Beryllium	0.60	U		P	
7440-43-9	Cadmium	3.6	B		P	
7440-70-2	Calcium	25000			P	
7440-47-3	Chromium	3.7	B		P	UJ
7440-48-4	Cobalt	4.2	U		P	
7440-50-8	Copper	16.2	B		P	UJ
7439-89-6	Iron	23.7	B		P	UJ
7439-92-1	Lead	1.2	U	WN	F	UJ
7439-95-4	Magnesium	9040			P	
7439-96-5	Manganese	8.7	B		P	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	11.3	U		P	
7440-09-7	Potassium	4390	B		P	
7782-49-2	Selenium	1.0	U	W	F	
7440-22-4	Silver	6.0	U		P	
7440-23-5	Sodium	12300			P	
7440-28-0	Thallium	0.85	B		F	J
7440-62-2	Vanadium	40.2	B		P	
7440-66-6	Zinc	11.4	B		P	UJ

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNR3

Lab Name: QUANTERRA_MO Contract: 550.107
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0769
Matrix (soil/water): WATER Lab Sample ID: 9606-003
Level (low/med): LOW Date Received: 10/18/95
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	22.3	U		P	
7440-36-0	Antimony	27.6	U		P	
7440-38-2	Arsenic	2.4	B		F	
7440-39-3	Barium	27.2	B		P	
7440-41-7	Beryllium	0.67	B		P	J
7440-43-9	Cadmium	2.3	U		P	
7440-70-2	Calcium	54000			P	
7440-47-3	Chromium	10	B		P	J
7440-48-4	Cobalt	4.2	U		P	
7440-50-8	Copper	12.9	B		P	J
7439-89-6	Iron	64.0	B		P	
7439-92-1	Lead	1.2	U	WN	F	UJ
7439-95-4	Magnesium	9070			P	
7439-96-5	Manganese	6.3	B		P	J
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	11.3	U		P	
7440-09-7	Potassium	4540	B		P	
7782-49-2	Selenium	1.8	B	W	F	
7440-22-4	Silver	6.0	U		P	
7440-23-5	Sodium	11900			P	
7440-28-0	Thallium	0.50	U		F	UJ
7440-62-2	Vanadium	15.9	B		P	
7440-66-6	Zinc	16.4	B		P	J

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNR4

Lab Name: QUANTERRA_MO_____ Contract: 550.107___
Lab Code: ITMO___ Case No.:_____ SAS No.:_____ SDG No.: W0769_____
Matrix (soil/water): WATER Lab Sample ID: 9606-004
Level (low/med): LOW Date Received: 10/18/95
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	22.3	U		P	
7440-36-0	Antimony	27.6	U		P	
7440-38-2	Arsenic	2.2	B		F	
7440-39-3	Barium	27.1	B		P	
7440-41-7	Beryllium	0.87	B		P	U
7440-43-9	Cadmium	2.7	B		P	
7440-70-2	Calcium	54000			P	
7440-47-3	Chromium	11.9			P	J
7440-48-4	Cobalt	4.2	U		P	
7440-50-8	Copper	14.0	B		P	UJ
7439-89-6	Iron	33.6	B		P	UJ
7439-92-1	Lead	1.2		WN	F	UJ
7439-95-4	Magnesium	9060			P	
7439-96-5	Manganese	4.8	B		P	U
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	11.3	U		P	
7440-09-7	Potassium	4810	B		P	
7782-49-2	Selenium	1.4	B		F	
7440-22-4	Silver	6.0	U		P	
7440-23-5	Sodium	11900			P	
7440-28-0	Thallium	0.50	B		F	UJ
7440-62-2	Vanadium	17.8	B		P	UJ
7440-66-6	Zinc	11.8	B		P	U

Color Before: COLORLESS Clarity Before: CLEAR Texture: _____
Color After: COLORLESS Clarity After: CLEAR Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNS3

Lab Name: QUANTERRA_MO Contract: 550.107

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0769

Matrix (soil/water): WATER Lab Sample ID: 9606-001

Level (low/med): LOW Date Received: 10/18/95

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	22.3	U		P	
7440-36-0	Antimony	27.6	U		P	
7440-38-2	Arsenic	1.8	B		F	
7440-39-3	Barium	32.8	B		P	
7440-41-7	Beryllium	0.87	~~B~~		P	U
7440-43-9	Cadmium	2.3	U		P	
7440-70-2	Calcium	45200			P	
7440-47-3	Chromium	69.0			P	
7440-48-4	Cobalt	4.2	U		P	
7440-50-8	Copper	12.8	~~B~~		P	U
7439-89-6	Iron	198			P	
7439-92-1	Lead	1.2	~~U~~	~~WN~~	F	UJ
7439-95-4	Magnesium	9040			P	
7439-96-5	Manganese	5.4	~~B~~		P	U
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	11.3	U		P	
7440-09-7	Potassium	4350	B		P	
7782-49-2	Selenium	1.9	B	W	F	
7440-22-4	Silver	6.0	U		P	
7440-23-5	Sodium	10100			P	
7440-28-0	Thallium	0.50	~~U~~		F	UJ
7440-62-2	Vanadium	15.8	~~B~~		P	U
7440-66-6	Zinc	19.3	~~B~~		P	U

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNS4

Lab Name: QUANTERRA_MO_____ Contract: 550.107___
Lab Code: ITMO__ Case No.:_____ SAS No.:_____ SDG No.: W0769_____
Matrix (soil/water): WATER Lab Sample ID: 9606-002
Level (low/med): LOW Date Received: 10/18/95
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	22.3	U		P	
7440-36-0	Antimony	27.6	U		P	
7440-38-2	Arsenic	1.2	B		F	
7440-39-3	Barium	31.8	B		P	
7440-41-7	Beryllium	0.68	B		P	U
7440-43-9	Cadmium	2.3	U		P	
7440-70-2	Calcium	43600			P	
7440-47-3	Chromium	67.6			P	
7440-48-4	Cobalt	4.2	U		P	
7440-50-8	Copper	12.7	B		P	U
7439-89-6	Iron	36.7	B		P	U
7439-92-1	Lead	1.2	U	WN	F	UJ
7439-95-4	Magnesium	8740			P	
7439-96-5	Manganese	3.8	B		P	U
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	11.3	U		P	
7440-09-7	Potassium	4350	B		P	
7782-49-2	Selenium	1.5	B		F	
7440-22-4	Silver	6.0	U		P	
7440-23-5	Sodium	9830			P	
7440-28-0	Thallium	0.50	U		F	UJ
7440-62-2	Vanadium	15.7	B		P	U
7440-66-6	Zinc	8.9	B		P	U

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNT5

Lab Name: QUANTERRA_MO_____ Contract: 550.107___
Lab Code: ITMO__ Case No.:_____ SAS No.:_____ SDG No.: W0769_____
Matrix (soil/water): WATER Lab Sample ID: 9590-005
Level (low/med): LOW__ Date Received: 10/17/95
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	22.3	U		P	
7440-36-0	Antimony	27.6	U		P	
7440-38-2	Arsenic	1.5	B		F	
7440-39-3	Barium	16.2	B		P	
7440-41-7	Beryllium	0.60	U		P	
7440-43-9	Cadmium	2.3	U		P	
7440-70-2	Calcium	37100			P	
7440-47-3	Chromium	3.7	U		P	UJ
7440-48-4	Cobalt	4.2	U		P	
7440-50-8	Copper	9.9	B		P	J
7439-89-6	Iron	293			P	
7439-92-1	Lead	1.2	U	WN	F	UJ
7439-95-4	Magnesium	13200			P	
7439-96-5	Manganese	5.3	B		P	J
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	11.3	U		P	
7440-09-7	Potassium	3820	B		P	
7782-49-2	Selenium	1.1	B	W	F	
7440-22-4	Silver	6.0	U		P	
7440-23-5	Sodium	11700			P	
7440-28-0	Thallium	0.50	U		F	UJ
7440-62-2	Vanadium	29.8	B		P	J
7440-66-6	Zinc	16.7	B		P	J

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNT6

Lab Name: QUANTERRA_MO_____ Contract: 550.107___
Lab Code: ITMO__ Case No.:_____ SAS No.:_____ SDG No.: W0769_____
Matrix (soil/water): WATER Lab Sample ID: 9590-006
Level (low/med): LOW__ Date Received: 10/17/95
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	22.3	U		P	
7440-36-0	Antimony	27.6	U		P	
7440-38-2	Arsenic	1.2	B		F	
7440-39-3	Barium	16.2	B		P	
7440-41-7	Beryllium	0.87	B		P	U
7440-43-9	Cadmium	2.3	U		P	
7440-70-2	Calcium	35900			P	
7440-47-3	Chromium	3.7	U		P	UJ
7440-48-4	Cobalt	4.2	U		P	
7440-50-8	Copper	12.6	B		P	U
7439-89-6	Iron	31.6	B		P	UJ
7439-92-1	Lead	1.2	U	WN	F	UJ
7439-95-4	Magnesium	12900			P	
7439-96-5	Manganese	4.5	B		P	U
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	11.3	U		P	
7440-09-7	Potassium	4040	B		P	
7782-49-2	Selenium	1.0	U		F	
7440-22-4	Silver	6.0	U		P	
7440-23-5	Sodium	11400			P	
7440-28-0	Thallium	0.50	U		F	UJ
7440-62-2	Vanadium	30.7	B		P	UJ
7440-66-6	Zinc	16.4	B		P	UJ

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNV9

Lab Name: QUANTERRA_MO Contract: 550.107
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0769
Matrix (soil/water): WATER Lab Sample ID: 9590-003
Level (low/med): LOW Date Received: 10/17/95
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	22.3	U		P	
7440-36-0	Antimony	27.6	U		P	
7440-38-2	Arsenic	1.1	U		F	
7440-39-3	Barium	4.0	B		P	
7440-41-7	Beryllium	0.60	U		P	
7440-43-9	Cadmium	2.3	U		P	
7440-70-2	Calcium	1700	B		P	
7440-47-3	Chromium	3.7	Ø		P	UJ
7440-48-4	Cobalt	4.2	U		P	
7440-50-8	Copper	12.2	B		P	
7439-89-6	Iron	20.7	B		P	
7439-92-1	Lead	1.2	Ø	W	F	UJ
7439-95-4	Magnesium	415	B		P	
7439-96-5	Manganese	2.2	B		P	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	11.3	U		P	
7440-09-7	Potassium	1390	U		P	
7782-49-2	Selenium	1.0	U		F	
7440-22-4	Silver	6.0	U		P	
7440-23-5	Sodium	261	B		P	
7440-28-0	Thallium	0.50	Ø	W	F	UJ
7440-62-2	Vanadium	7.2	B		P	
7440-66-6	Zinc	9.6	B		P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNW0

Lab Name: QUANTERRA_MO_____ Contract: 550.107___
Lab Code: ITMO___ Case No.:_____ SAS No.:_____ SDG No.: W0769_____
Matrix (soil/water): WATER Lab Sample ID: 9590-004
Level (low/med): LOW Date Received: 10/17/95
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	22.3	U		P	
7440-36-0	Antimony	27.6	U		P	
7440-38-2	Arsenic	1.1	U		F	
7440-39-3	Barium	4.0	B		P	
7440-41-7	Beryllium	0.60	U		P	
7440-43-9	Cadmium	2.3	U		P	
7440-70-2	Calcium	1760	B		P	
7440-47-3	Chromium	3.7	~~U~~		P	UJ
7440-48-4	Cobalt	4.2	U		P	
7440-50-8	Copper	8.8	B		P	
7439-89-6	Iron	20.7	B		P	
7439-92-1	Lead	1.2	~~U~~	~~N~~	F	UJ
7439-95-4	Magnesium	405	B		P	
7439-96-5	Manganese	2.3	B		P	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	11.3	U		P	
7440-09-7	Potassium	1390	U		P	
7782-49-2	Selenium	1.0	U		F	
7440-22-4	Silver	6.0	U		P	
7440-23-5	Sodium	262	B		P	
7440-28-0	Thallium	0.74	~~B~~		F	J
7440-62-2	Vanadium	6.2	B		P	
7440-66-6	Zinc	21.1			P	

Color Before: COLORLESS Clarity Before: CLEAR Texture: _____
Color After: COLORLESS Clarity After: CLEAR Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNW1

Lab Name: QUANTERRA_MO Contract: 550.107
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0769
Matrix (soil/water): WATER Lab Sample ID: 9606-007
Level (low/med): LOW Date Received: 10/18/95
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	22.3	U		P	
7440-36-0	Antimony	27.6	U		P	
7440-38-2	Arsenic	1.1	U		F	
7440-39-3	Barium	4.0	B		P	
7440-41-7	Beryllium	0.60	U		P	
7440-43-9	Cadmium	2.3	U		P	
7440-70-2	Calcium	1880	B		P	
7440-47-3	Chromium	3.7	U		P	UJ
7440-48-4	Cobalt	4.2	U		P	
7440-50-8	Copper	9.9	B		P	
7439-89-6	Iron	26.8	B		P	
7439-92-1	Lead	1.2	U	WN	F	UJ
7439-95-4	Magnesium	419	B		P	
7439-96-5	Manganese	2.9	B		P	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	11.3	U		P	
7440-09-7	Potassium	1390	U		P	
7782-49-2	Selenium	1.0	U		F	
7440-22-4	Silver	6.0	U		P	
7440-23-5	Sodium	307	B		P	
7440-28-0	Thallium	0.50	U		F	UJ
7440-62-2	Vanadium	7.3	B		P	
7440-66-6	Zinc	27.4			P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

RJS 12/27/95

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U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNW2

Lab Name: QUANTERRA_MO Contract: 550.107

Lab Code: ITMO Case No.: SAS No.: SDG No.: W0769

Matrix (soil/water): WATER Lab Sample ID: 9606-008

Level (low/med): LOW Date Received: 10/18/95

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	22.3	U		P	
7440-36-0	Antimony	27.6	U		P	
7440-38-2	Arsenic	1.1	U		F	
7440-39-3	Barium	3.7	B		P	
7440-41-7	Beryllium	0.77	B		P	
7440-43-9	Cadmium	2.3	U		P	
7440-70-2	Calcium	1710	B		P	
7440-47-3	Chromium	3.7	U		P	UJ
7440-48-4	Cobalt	4.2	U		P	
7440-50-8	Copper	9.6	B		P	
7439-89-6	Iron	279			P	
7439-92-1	Lead	1.2	U	N	F	UJ
7439-95-4	Magnesium	401	B		P	
7439-96-5	Manganese	2.7	B		P	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	11.3	U		P	
7440-09-7	Potassium	1390	U		P	
7782-49-2	Selenium	1.0	U		F	
7440-22-4	Silver	6.0	U		P	
7440-23-5	Sodium	252	B		P	
7440-28-0	Thallium	0.50	U		F	UJ
7440-62-2	Vanadium	5.6	B		P	
7440-66-6	Zinc	15.8	B		P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

RJS 12/27/95

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNW3

Lab Name: QUANTERRA_MO_____ Contract: 550.107___
Lab Code: ITMO__ Case No.:_____ SAS No.:_____ SDG No.: W0769_____
Matrix (soil/water): WATER Lab Sample ID: 9590-007
Level (low/med): LOW__ Date Received: 10/17/95
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	22.3	U		P	
7440-36-0	Antimony	27.6	U		P	
7440-38-2	Arsenic	3.0	B		F	
7440-39-3	Barium	59.9	B		P	
7440-41-7	Beryllium	0.87	U		P	J
7440-43-9	Cadmium	2.3	U		P	
7440-70-2	Calcium	26300			P	
7440-47-3	Chromium	3.7	U		P	UJ
7440-48-4	Cobalt	4.2	U		P	
7440-50-8	Copper	14.0	U		P	UJ
7439-89-6	Iron	40.4	U		P	UJ
7439-92-1	Lead	1.2	U	WN	F	UJ
7439-95-4	Magnesium	9490			P	
7439-96-5	Manganese	9.2	B		P	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	11.3	U		P	
7440-09-7	Potassium	5110			P	
7782-49-2	Selenium	1.0	U		F	
7440-22-4	Silver	6.0	U		P	
7440-23-5	Sodium	12900			P	
7440-28-0	Thallium	0.50	U		F	UJ
7440-62-2	Vanadium	44.8	B		P	
7440-66-6	Zinc	15.4	U		P	J

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNW4

Lab Name: QUANTERRA_MO_____ Contract: 550.107___
Lab Code: ITMO__ Case No.:_____ SAS No.:_____ SDG No.: W0769_____
Matrix (soil/water): WATER Lab Sample ID: 9590-008
Level (low/med): LOW__ Date Received: 10/17/95
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	22.3	U		P	
7440-36-0	Antimony	27.6	U		P	
7440-38-2	Arsenic	3.1	B		F	
7440-39-3	Barium	60.9	B		P	
7440-41-7	Beryllium	0.77	U		P	U
7440-43-9	Cadmium	2.3	U		P	
7440-70-2	Calcium	26500			P	
7440-47-3	Chromium	3.7	U		P	UJ
7440-48-4	Cobalt	4.2	U		P	
7440-50-8	Copper	10.2	B		P	J
7439-89-6	Iron	27.8	B		P	J
7439-92-1	Lead	1.2	U	WN	F	UJ
7439-95-4	Magnesium	9570			P	
7439-96-5	Manganese	8.5	B		P	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	11.3	U		P	
7440-09-7	Potassium	4600	B		P	
7782-49-2	Selenium	1.0	U		F	
7440-22-4	Silver	6.0	U		P	
7440-23-5	Sodium	13000			P	
7440-28-0	Thallium	0.50	U	W	F	UJ
7440-62-2	Vanadium	41.5	B		P	
7440-66-6	Zinc	32.4			P	

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNW5

Lab Name: QUANTERRA_MO_____ Contract: 550.107___
Lab Code: ITMO___ Case No.:_____ SAS No.:_____ SDG No.: W0769_____
Matrix (soil/water): WATER Lab Sample ID: 9606-005
Level (low/med): LOW_ Date Received: 10/18/95
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	22.3	U		P	
7440-36-0	Antimony	27.6	U		P	
7440-38-2	Arsenic	1.7	B		F	
7440-39-3	Barium	32.8	B		P	
7440-41-7	Beryllium	0.60	U		P	
7440-43-9	Cadmium	2.3	U		P	
7440-70-2	Calcium	45500			P	
7440-47-3	Chromium	72.5			P	
7440-48-4	Cobalt	4.2	U		P	
7440-50-8	Copper	11.0	B		P	J
7439-89-6	Iron	69.0	B		P	
7439-92-1	Lead	1.2	B	WN	F	UJ
7439-95-4	Magnesium	9110			P	
7439-96-5	Manganese	4.5	B		P	J
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	11.3	U		P	
7440-09-7	Potassium	4660	B		P	
7782-49-2	Selenium	1.0	U		F	
7440-22-4	Silver	6.0	U		P	
7440-23-5	Sodium	10200			P	
7440-28-0	Thallium	0.50	B		F	UJ
7440-62-2	Vanadium	15.4	B		P	J
7440-66-6	Zinc	17.8	B		P	J

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

B0GNW6

Lab Name: QUANTERRA_MO Contract: 550.107
Lab Code: ITMO Case No.: SAS No.: SDG No.: W0769
Matrix (soil/water): WATER Lab Sample ID: 9606-006
Level (low/med): LOW Date Received: 10/18/95
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	22.3	U		P	
7440-36-0	Antimony	27.6	U		P	
7440-38-2	Arsenic	2.3	B		F	
7440-39-3	Barium	32.5	B		P	
7440-41-7	Beryllium	0.60	U		P	
7440-43-9	Cadmium	2.3	U		P	
7440-70-2	Calcium	44600			P	
7440-47-3	Chromium	69.0			P	
7440-48-4	Cobalt	4.2	U		P	
7440-50-8	Copper	11.3	B		P	U
7439-89-6	Iron	32.9	B		P	UJ
7439-92-1	Lead	1.2	U	N	F	UJ
7439-95-4	Magnesium	8920			P	
7439-96-5	Manganese	3.8	B		P	U
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	11.3	U		P	
7440-09-7	Potassium	4380	B		P	
7782-49-2	Selenium	1.0	U		F	
7440-22-4	Silver	6.0	U		P	
7440-23-5	Sodium	10000			P	
7440-28-0	Thallium	0.50	U		F	UJ
7440-62-2	Vanadium	14.8	B		P	UJ
7440-66-6	Zinc	18.7	B		P	UJ

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.: B0GNW7

Lab Name: L.A.S. Contract: HANFORD

Lab Code: LOCK Case No.: B95-10 SAS No.: SDG No.: L5628W

Matrix (soil/water): WATER Lab Sample ID: L5628-2

Level (low/med): LOW Date Received: 10/18/95

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	21.0	U		P
7440-36-0	Antimony	4.0	U		P
7440-38-2	Arsenic	4.6	B		P
7440-39-3	Barium	63.2	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	27500			P
7440-47-3	Chromium	8.8	B		P
7440-48-4	Cobalt	6.0	U		P
7440-50-8	Copper	3.0	U		P
7439-89-6	Iron	43.8	B		P 4
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	10100			P
7439-96-5	Manganese	7.0	B		P
7439-97-6	Mercury				NR
7440-02-0	Nickel	14.0	U		P
7440-09-7	Potassium	4740	B		P
7782-49-2	Selenium	4.0	U		P
7440-22-4	Silver	3.0	U		P
7440-23-5	Sodium	13800			P
7440-28-0	Thallium	4.9	B		P
7440-62-2	Vanadium	40.9	B		P
7440-66-6	Zinc	4.3	B		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

RJS 12/28/95

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CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.: B0GNW7

Lab Name: L.A.S. Contract: HANFORD

Lab Code: LOCK Case No.: B95-10 SAS No.: SDG No.: L5628W

Matrix (soil/water): WATER Lab Sample ID: L5628-3

Level (low/med): LOW Date Received: 10/18/95

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.20	U		AV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.

B0GNW8

Lab Name: L.A.S. Contract: HANFORD

Lab Code: LOCK Case No.: SAF#B9 SAS No.: SDG No.: L5628F

Matrix (soil/water): WATER Lab Sample ID: L5628-16

Level (low/med): LOW Date Received: 10/18/95

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	21.0	U		P
7440-36-0	Antimony	4.0	U		P
7440-38-2	Arsenic	10.3			P
7440-39-3	Barium	66.0	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	30600			P
7440-47-3	Chromium	4.0	U		P
7440-48-4	Cobalt	6.0	U		P
7440-50-8	Copper	3.0	U		P
7439-89-6	Iron	9.0	U		P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	10900			P
7439-96-5	Manganese	7.4	B		P
7439-97-6	Mercury				NR
7440-02-0	Nickel	14.0	U		P
7440-09-7	Potassium	5020			P
7782-49-2	Selenium	4.0	U		P
7440-22-4	Silver	3.0	U		P
7440-23-5	Sodium	14600			P
7440-28-0	Thallium	4.6	B		P
7440-62-2	Vanadium	41.9	B		P
7440-66-6	Zinc	3.0	U		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

PJS 12/28/95

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063

CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.: B0GNW8

Lab Name: L.A.S. Contract: HANFORD

Lab Code: LOCK Case No.: SAF#B9 SAS No.: SDG No.: L5628F

Matrix (soil/water): WATER Lab Sample ID: L5628-17

Level (low/med): LOW Date Received: 10/18/95

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.20	U		AV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

RJS 12/28/95

FORM I - IN

064 RS

CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.: B0GNW9

Lab Name: L.A.S. Contract: HANFORD

Lab Code: LOCK Case No.: B95-10 SAS No.: SDG No.: L5628W

Matrix (soil/water): WATER Lab Sample ID: L5644-2

Level (low/med): LOW Date Received: 10/19/95

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	23.8	B		P	u
7440-36-0	Antimony	4.0	U		P	
7440-38-2	Arsenic	4.6	B		P	
7440-39-3	Barium	31.0	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	5.0	U		P	
7440-70-2	Calcium	46600			P	
7440-47-3	Chromium	80.7			P	
7440-48-4	Cobalt	6.0	U		P	
7440-50-8	Copper	3.0	U		P	
7439-89-6	Iron	98.4	B		P	u
7439-92-1	Lead	2.0	U		P	
7439-95-4	Magnesium	8900			P	
7439-96-5	Manganese	2.0	U		P	
7439-97-6	Mercury				NR	
7440-02-0	Nickel	14.0	U		P	
7440-09-7	Potassium	5080			P	
7782-49-2	Selenium	4.0	U		P	
7440-22-4	Silver	3.0	U		P	
7440-23-5	Sodium	10300			P	
7440-28-0	Thallium	5.9	B		P	
7440-62-2	Vanadium	7.7	B		P	
7440-66-6	Zinc	8.3	B		P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

RJS 12/28/95

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054 RS

CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.: B0GNW9

Lab Name: L.A.S. Contract: HANFORD

Lab Code: LOCK Case No.: B95-10 SAS No.: SDG No.: L5628W

Matrix (soil/water): WATER Lab Sample ID: L5644-3

Level (low/med): LOW Date Received: 10/19/95

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.20	U		AV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.

B0GNX0

Lab Name: L.A.S. Contract: HANFORD

Lab Code: LOCK Case No.: SAF#B9 SAS No.: SDG No.: L5628F

Matrix (soil/water): WATER Lab Sample ID: L5644-16

Level (low/med): LOW Date Received: 10/19/95

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	21.0	U		P
7440-36-0	Antimony	4.0	U		P
7440-38-2	Arsenic	5.5	B		P
7440-39-3	Barium	33.8	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	52800			P
7440-47-3	Chromium	88.6			P
7440-48-4	Cobalt	6.0	U		P
7440-50-8	Copper	3.0	U		P
7439-89-6	Iron	9.0	U		P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	9960			P
7439-96-5	Manganese	2.0	U		P
7439-97-6	Mercury				NR
7440-02-0	Nickel	14.0	U		P
7440-09-7	Potassium	4890	B		P
7782-49-2	Selenium	4.0	U		P
7440-22-4	Silver	3.0	U		P
7440-23-5	Sodium	11400			P
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	5.1	B		P
7440-66-6	Zinc	3.0	U		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

RJS 12/28/95

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0885

CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.

B0GNX0

Lab Name: L.A.S. Contract: HANFORD

Lab Code: LOCK Case No.: SAF#B9 SAS No.: SDG No.: L5628F

Matrix (soil/water): WATER Lab Sample ID: L5644-17

Level (low/med): LOW Date Received: 10/19/95

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.20	U		AV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

RJS 12/28/95

FORM I - IN

06 pages

APPENDIX C

GENERAL CHEMISTRY DATA SUMMARY TABLES

GENERAL CHEMISTRY ANALYSIS, WATER MATRIX, (mg/L)

Project: BECHTEL--HANFORD																					
Laboratory: Quanterra																					
Case	SDG: W0769																				
Sample Number		B0GNQ1		B0GNR3		B0GNS3		B0GNT5		B0GNV9		B0GNW1		B0GNW3		B0GNW5					
Location		199-B2-12		199-B4-4		199-B5-1		699-63-90		199-B2-12		199-B5-1		199-B2-12		199-B5-1					
Remarks										EB		EB		Duplicate		Duplicate					
Sample Date		10/16/95		10/17/95		10/17/95		10/16/95		10/16/95		10/17/95		10/16/95		10/17/95					
Inorganic Analytes	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Fluoride	0.1	0.40		0.28		0.25		0.30		0.10	U	0.10	U	0.41		0.28					
Sulfate	0.1	10.7		48.4		35.0		26.9		0.50	U	0.50	U	10.3		33.9					
Spec. Conductivity	5	255		394		343		323		1.00	U	29.4		256		343					
pH	+/-0.05	7.87	J	7.91	J	7.40	J	7.80	J	5.52	J	4.92	J	7.87	J	7.36	J				

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EB = Equipment Blank, Specific Conductivity (UMHOS/CM), pH (pH Units)

GENERAL CHEMISTRY ANALYSIS, WATER MATRIX, (mg/l)

Project: BECHTEL-HANFORD																					
Laboratory: Lockheed																					
Case	SDG: LK5628																				
Sample Number		B0GNW7		B0GNW9																	
Location		199-B2-12		199-B5-1																	
Remarks		Split		Split																	
Sample Date		10/16/95		10/17/95																	
General Chemistry	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Fluoride	0.1	0.42		0.24																	
Sulfate	0.1	11		39.																	
pH	+/-0.05	8.1	J	7.6	J																
Spec. Conductance	5	260		350																	

RBC 1/4/96

Specific Conductivity (umhos/cm), pH (pH units)

APPENDIX D

GENERAL CHEMISTRY VALIDATED LABORATORY REPORT FORMS

Quanterra-Richland
P.O. Box 1970
Richland, WA 99352

Project: 550.107

Category: Anions - F, SO4 EPA 300.0
Method: EPA 300.0
Matrix: LIQUID

Sample Date : 10/16/95
Receipt Date : 10/17/95
Report Date : 11/20/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0GNQ1	9590-001	Fluoride	16984-48-8	QCBLK82011-1	10/30/95	10/30/95	0.40	MG/L		0.10	1
B0GNQ1	9590-001DUP	Fluoride	16984-48-8	QCBLK82011-1	10/30/95	10/30/95	0.42	MG/L		0.10	1
B0GNQ1	9590-001MS	Fluoride	16984-48-8	QCBLK82011-1	10/30/95	10/30/95	94	%REC			1
B0GNV9	9590-003	Fluoride	16984-48-8	QCBLK82011-1	10/30/95	10/30/95	0.10	MG/L	U	0.10	1
B0GNT5	9590-005	Fluoride	16984-48-8	QCBLK82011-1	10/30/95	10/30/95	0.30	MG/L		0.10	1
B0GNW3	9590-007	Fluoride	16984-48-8	QCBLK82011-1	10/30/95	10/30/95	0.41	MG/L		0.10	1
B0GNS3	9606-001	Fluoride	16984-48-8	QCBLK82011-1	10/30/95	10/30/95	0.25	MG/L		0.10	1
B0GNR3	9606-003	Fluoride	16984-48-8	QCBLK82011-1	10/30/95	10/30/95	0.28	MG/L		0.10	1
B0GNW5	9606-005	Fluoride	16984-48-8	QCBLK82011-1	10/30/95	10/30/95	0.28	MG/L		0.10	1
B0GNW1	9606-007	Fluoride	16984-48-8	QCBLK82011-1	10/30/95	10/30/95	0.10	MG/L	U	0.10	1
NA	QCBLK82011-1	Fluoride	16984-48-8	QCBLK82011-1	10/30/95	10/30/95	0.10	MG/L	U	0.10	1
NA	QCLCS82011-1	Fluoride	16984-48-8	QCBLK82011-1	10/30/95	10/30/95	101	%REC			1

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11/8/95

Quanterra-Richland
P.O. Box 1970
Richland, WA 99352

Project: 550.107

Category: Anions IC - SO4
Method: EPA 300.0
Matrix: LIQUID

Sample Date : 10/16/95
Receipt Date : 10/17/95
Report Date : 11/20/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGNQ1	9590-001	Sulfate	14808-79-8	QCBLK82096-1	10/31/95	10/31/95	10.7	MG/L		0.50	1
BOGNQ1	9590-001DUP	Sulfate	14808-79-8	QCBLK82096-1	10/31/95	10/31/95	10.1	MG/L		0.50	1
BOGNQ1	9590-001MS	Sulfate	14808-79-8	QCBLK82096-1	10/31/95	10/31/95	98	%REC			2
BOGNV9	9590-003	Sulfate	14808-79-8	QCBLK82011-1	10/30/95	10/30/95	0.50	MG/L	U	0.50	1
BOGNT5	9590-005	Sulfate	14808-79-8	QCBLK82096-1	10/31/95	10/31/95	26.9	MG/L		1.00	2
BOGNW3	9590-007	Sulfate	14808-79-8	QCBLK82011-1	10/30/95	10/30/95	10.3	MG/L		0.50	1
BOGNS3	9606-001	Sulfate	14808-79-8	QCBLK82096-1	10/31/95	10/31/95	35.0	MG/L		2.50	5
BOGNR3	9606-003	Sulfate	14808-79-8	QCBLK82096-1	10/31/95	10/31/95	48.4	MG/L		2.50	5
BOGNW5	9606-005	Sulfate	14808-79-8	QCBLK82096-1	10/31/95	10/31/95	33.9	MG/L		2.50	5
BOGNW1	9606-007	Sulfate	14808-79-8	QCBLK82011-1	10/30/95	10/30/95	0.50	MG/L	U	0.50	1
NA	QCBLK82011-1	Sulfate	14808-79-8	QCBLK82011-1	10/30/95	10/30/95	0.50	MG/L	U	0.50	1
NA	QCBLK82096-1	Sulfate	14808-79-8	QCBLK82096-1	10/31/95	10/31/95	0.50	MG/L	U	0.50	1
NA	QCLCS82011-1	Sulfate	14808-79-8	QCBLK82011-1	10/30/95	10/30/95	93	%REC			1
NA	QCLCS82096-1	Sulfate	14808-79-8	QCBLK82096-1	10/31/95	10/31/95	93	%REC			1

JLVSC
1/8/95

Quanterra-Richland
P.O. Box 1970
Richland, WA 99352

Project: 550.107

Category: Conductivity
Method: EPA 9050
Matrix: LIQUID

Sample Date : 10/16/95
Receipt Date : 10/17/95
Report Date : 11/20/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
B0GNQ1	9590-001	Specific Conduc	C-011	QCBLK80912-1	10/19/95	10/19/95	255	UMHOS/CM		1.00	1
B0GNQ1	9590-001DUP	Specific Conduc	C-011	QCBLK80912-1	10/19/95	10/19/95	255	UMHOS/CM		1.00	1
B0GNV9	9590-003	Specific Conduc	C-011	QCBLK80912-1	10/19/95	10/19/95	1.00	UMHOS/CM	U	1.00	1
B0GNT5	9590-005	Specific Conduc	C-011	QCBLK80912-1	10/19/95	10/19/95	323	UMHOS/CM		1.00	1
B0GNW3	9590-007	Specific Conduc	C-011	QCBLK80912-1	10/19/95	10/19/95	256	UMHOS/CM		1.00	1
B0GNS3	9606-001	Specific Conduc	C-011	QCBLK81322-1	10/24/95	10/24/95	343	UMHOS/CM		1.00	1
B0GNR3	9606-003	Specific Conduc	C-011	QCBLK81322-1	10/24/95	10/24/95	394	UMHOS/CM		1.00	1
B0GNW5	9606-005	Specific Conduc	C-011	QCBLK81322-1	10/24/95	10/24/95	343	UMHOS/CM		1.00	1
B0GNW1	9606-007	Specific Conduc	C-011	QCBLK81322-1	10/24/95	10/24/95	29.4	UMHOS/CM		1.00	1
NA	QCBLK80912-1	Specific Conduc	C-011	QCBLK80912-1	10/19/95	10/19/95	1.00	UMHOS/CM	U	1.00	1
NA	QCBLK81322-1	Specific Conduc	C-011	QCBLK81322-1	10/24/95	10/24/95	1.00	UMHOS/CM	U	1.00	1

JCVSC
1/8/95

Quanterra-Richland
P.O. Box 1970
Richland, WA 99352

Project: 550.107

Category: pH EPA 9040
Method: EPA 9040
Matrix: LIQUID

Sample Date : 10/16/95
Receipt Date : 10/17/95
Report Date : 11/20/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BOGNQ1	9590-001	pH	C-006	QCBLK81229-1	10/23/95	10/23/95	7.87	PH	J		1
BOGNQ1	9590-001DUP	pH	C-006	QCBLK81229-1	10/23/95	10/23/95	7.89	PH			1
BOGNV9	9590-003	pH	C-006	QCBLK81229-1	10/23/95	10/23/95	5.52	PH	J		1
BOGNT5	9590-005	pH	C-006	QCBLK81229-1	10/23/95	10/23/95	7.80	PH			1
BOGNW3	9590-007	pH	C-006	QCBLK81229-1	10/23/95	10/23/95	7.87	PH			1
BOGNS3	9606-001	pH	C-006	QCBLK81229-1	10/23/95	10/23/95	7.40	PH			1
BOGNR3	9606-003	pH	C-006	QCBLK81229-1	10/23/95	10/23/95	7.91	PH			1
BOGNW5	9606-005	pH	C-006	QCBLK81229-1	10/23/95	10/23/95	7.36	PH			1
BOGNW1	9606-007	pH	C-006	QCBLK81229-1	10/23/95	10/23/95	4.92	PH			1
NA	QCBLK81229-1	pH	C-006	QCBLK81229-1	10/23/95	10/23/95	5.21	PH			1

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LOCKHEED ANALYTICAL SERVICES

Sample Results

Client Sample ID: BOGNW7	Date Collected: 16-OCT-95
Matrix: Water	Date Received: 18-OCT-95
Percent Solids: N/A	

Constituent	Units	Method	Result	Project Reporting Limit	Data Qualifier(s)	Date Analyzed	LAS Batch ID	LAS Sample ID
Fluoride	mg/L	300.0	0.42	0.10		23-OCT-95	28989	L5628-4
Sulfate	mg/L	300.0	11.	0.10		20-OCT-95	28990	L5628-4
pH	pH Units	9040	8.1	0.10	J	23-OCT-95	28953	L5628-4
Conductivity	uS/cm	9050	260	1.0		06-NOV-95	28991	L5628-5

12/28/95

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LOCKHEED ANALYTICAL SERVICES

Sample Results

Client Sample ID: BOGNW9	Date Collected: 17-OCT-95
Matrix: Water	Date Received: 19-OCT-95
Percent Solids: N/A	

Constituent	Units	Method	Result	Project Reporting Limit	Data Qualifier(s)	Date Analyzed	LAS Batch ID	LAS Sample ID
Fluoride	mg/L	300.0	0.24	0.10		23-OCT-95	28989	L5644-4
Sulfate	mg/L	300.0	39.	0.10		20-OCT-95	28990	L5644-4
pH	pH Units	9040	7.6	0.10	J	23-OCT-95	28953	L5644-4
Conductivity	uS/cm	9050	350	1.0		06-NOV-95	28991	L5644-5

RVC 12/28/95

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APPENDIX E

RADIOCHEMISTRY DATA SUMMARY TABLES

RADIOCHEMISTRY ANALYSIS, WATER MATRIX (pCi/l)

Project: BECHTEL-HANFORD																			
Laboratory: Quanterra																			
Case	SDG: W0769																		
Sample Number		B0GNQ1		B0GNR3		B0GNS3		B0GNT5		B0GNV9		B0GNW1		B0GNW3		B0GNW5			
Location		199-B2-12		199-B4-4		199-B5-1		699-63-90		199-B2-12		199-B5-1		199-B2-12		199-B5-1			
Remarks										EB		EB		Duplicate		Duplicate			
Sample Date		10/16/95		10/17/95		10/17/95		10/16/95		10/16/95		10/17/95		10/16/95		10/17/95			
Radiochemistry Analysis	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Gross Alpha	3	1.58		0.789	U	1.41		1.20		0.0905	U	0.276	U	1.26		2.29					
Gross Beta	4	6.93		76.2		15.2		5.42		1.36	U	0.536	U	5.69		76.6					
Strontium-90	2	0.376	U	21.1		0.859		0.166	U	0.163	U	0.287	U	0.189	U	1.28					
Carbon-14	200	-0.158	UJ	0.608	UJ	-0.541	UJ	-2.34	UJ	-0.225	UJ	0.518	UJ	-1.37	UJ	1.19	UJ				
Technetium-99	15	-1.63	U	50.5		35.2		-1.92	U	-2.34	U	-1.28	U	-2.38	U	40.5					
Tritium	400	133	UJ	3140	J	2080	J	-50.7	UJ	15.9	UJ	60.5	UJ	29.7	UJ	2000	J				

RBC 1/4/96

EB = Equipment Blank

RADIOCHEMISTRY ANALYSIS, WATER MATRIX (pCi/l)

Project: BECHTEL-HANFORD																					
Laboratory: Lockheed																					
Case	SDG: LK5268																				
Sample Number		B0GNW7		B0GNW9																	
Location		199-B2-12		199-B5-1																	
Remarks		Split		Split																	
Sample Date		10/16/95		10/17/95																	
Radiochemistry Analysis	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Gross Alpha	3	1.1	U	1.2	U																
Gross Beta	4	3.8		34.5																	
Strontium-90	2	0.02	U	1.44																	
Technetium-99	15	-3.9	UJ	38.7	J																
Carbon-14	200	-31.	U	34.	U																
Tritium	400	-120	U	2210																	

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RBC 1/4/96

APPENDIX F

RADIOCHEMISTRY VALIDATED LABORATORY REPORT FORMS

Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0769
LAB SAMPLE ID:	51023201	MATRIX:	WATER
CLIENT ID:	B0GNQ1	DATE RECEIVED:	10/17/95 10:10:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
ALPHA	1.58E+00	8.4E-01	8.7E-01	1.06E+00	pCi/L	100.00%	RD3214
BETA	6.93E+00	1.8E+00	1.9E+00	2.83E+00	pCi/L	100.00%	RD3214
STRONTIUM	3.76E-01 U	2.3E-01	2.6E-01	7.79E-01	pCi/L	100.00%	RD3204
C-14	-1.58E-01 UJ	1.5E+00	3.1E+00	3.50E+00	pCi/L	100.00%	RD3263
TC-99	-1.63E+00 U	1.6E+00	4.5E+00	3.83E+00	pCi/L	95.10%	ITAS-IT-RS-0001
TRITIUM	1.33E+02 UJ	1.4E+02	2.1E+02	3.09E+02	pCi/L	88.10%	RD3205

Number of Results: 6

JBC 1/4/96

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Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0769
LAB SAMPLE ID:	51024602	MATRIX:	WATER
CLIENT ID:	B0GNR3	DATE RECEIVED:	10/18/95 10:00:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
ALPHA	7.98E-01 U	7.1E-01	7.2E-01	1.20E+00	pCi/L	100.00%	RD3214
BETA	7.62E+01	4.4E+00	7.0E+00	2.87E+00	pCi/L	100.00%	RD3214
STRONTIUM	2.11E+01	1.2E+00	6.1E+00	9.51E-01	pCi/L	77.20%	RD3204
C-14	6.08E-01 UJ	1.5E+00	3.1E+00	3.50E+00	pCi/L	100.00%	RD3263
TC-99	5.05E+01	2.8E+00	9.3E+00	3.83E+00	pCi/L	95.10%	ITAS-IT-RS-0001
TRITIUM	3.14E+03 J	2.7E+02	4.2E+02	3.09E+02	pCi/L	88.10%	RD3205

Number of Results: 6

1/4/96

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Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0769
LAB SAMPLE ID:	51024601	MATRIX:	WATER
CLIENT ID:	B0GNS3	DATE RECEIVED:	10/18/95 10:00:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
ALPHA	1.41E+00	7.7E-01	7.9E-01	8.31E-01	pCi/L	100.00%	RD3214
BETA	1.52E+01	2.3E+00	2.5E+00	2.87E+00	pCi/L	100.00%	RD3214
STRONTIUM	8.59E-01	2.7E-01	3.8E-01	7.65E-01	pCi/L	100.00%	RD3204
C-14	-5.41E-01 U J	1.5E+00	3.1E+00	3.50E+00	pCi/L	100.00%	RD3263
TC-99	3.52E+01	2.5E+00	7.8E+00	3.83E+00	pCi/L	95.10%	ITAS-IT-RS-0001
TRITIUM	2.08E+03 J	2.3E+02	3.4E+02	3.09E+02	pCi/L	88.10%	RD3205

Number of Results: 6

1/4/96

0009

Quanterra
Environmental
Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0769
LAB SAMPLE ID:	51023203	MATRIX:	WATER
CLIENT ID:	B0GNT5	DATE RECEIVED:	10/17/95 10:10:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
ALPHA	1.20E+00	7.5E-01	7.7E-01	1.03E+00	pCi/L	100.00%	RD3214
BETA	5.42E+00	1.7E+00	1.7E+00	2.72E+00	pCi/L	100.00%	RD3214
STRONTIUM	1.66E-01 U	2.0E-01	2.1E-01	7.67E-01	pCi/L	100.00%	RD3204
C-14	-2.34E+00 UJ	1.5E+00	3.0E+00	3.50E+00	pCi/L	100.00%	RD3263
TC-99	-1.92E+00 U	1.6E+00	4.5E+00	3.83E+00	pCi/L	95.10%	ITAS-IT-RS-0001
TRITIUM	-5.07E+01 UJ	1.3E+02	2.0E+02	3.09E+02	pCi/L	88.10%	RD3205

Number of Results: 6

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1/4/96

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Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	**SDG:**	W0769
LAB SAMPLE ID:	51023202	**MATRIX:**	WATER
CLIENT ID:	B0GNV9	**DATE RECEIVED:**	10/17/95 10:10:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
ALPHA	9.05E-02 U	2.6E-01	2.6E-01	6.15E-01	pCi/L	100.00%	RD3214
BETA	1.36E+00 U	1.3E+00	1.3E+00	2.63E+00	pCi/L	100.00%	RD3214
STRONTIUM	1.63E-01 U	2.1E-01	2.1E-01	7.90E-01	pCi/L	100.00%	RD3204
C-14	-2.25E-01 UJ	1.5E+00	3.1E+00	3.50E+00	pCi/L	100.00%	RD3263
TC-99	-2.34E+00 U	1.6E+00	4.5E+00	3.83E+00	pCi/L	95.10%	ITAS-IT-RS-0001
TRITIUM	1.59E+01 UJ	1.3E+02	2.0E+02	3.09E+02	pCi/L	88.10%	RD3205

Number of Results: 6

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Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	**SDG:**	W0769
LAB SAMPLE ID:	51024604	**MATRIX:**	WATER
CLIENT ID:	B0GNW1	**DATE RECEIVED:**	10/18/95 10:00:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
ALPHA	2.76E-01 U	3.4E-01	3.4E-01	6.47E-01	pCi/L	100.00%	RD3214
BETA	5.36E-01 U	1.2E+00	1.2E+00	2.63E+00	pCi/L	100.00%	RD3214
STRONTIUM	2.87E-01 U	2.5E-01	2.6E-01	8.97E-01	pCi/L	79.30%	RD3204
C-14	5.18E-01 UJ	1.5E+00	3.1E+00	3.50E+00	pCi/L	100.00%	RD3263
TC-99	-1.28E+00 U	1.6E+00	4.5E+00	3.83E+00	pCi/L	95.10%	ITAS-IT-RS-0001
TRITIUM	6.05E+01 UJ	1.3E+02	2.0E+02	3.09E+02	pCi/L	88.10%	RD3205

Number of Results: 6

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Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	**SDG:**	W0769
LAB SAMPLE ID:	51023204	**MATRIX:**	WATER
CLIENT ID:	B0GNW3	**DATE RECEIVED:**	10/17/95 10:10:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
ALPHA	1.26E+00	7.4E-01	7.6E-01	9.29E-01	pCi/L	100.00%	RD3214
BETA	5.69E+00	1.7E+00	1.8E+00	2.84E+00	pCi/L	100.00%	RD3214
STRONTIUM	1.89E-01 U	2.1E-01	2.2E-01	8.07E-01	pCi/L	100.00%	RD3204
C-14	-1.37E+00 UJ	1.5E+00	3.0E+00	3.50E+00	pCi/L	100.00%	RD3263
TC-99	-2.38E+00 U	1.6E+00	4.5E+00	3.83E+00	pCi/L	95.10%	ITAS-IT-RS-0001
TRITIUM	2.97E+01 UJ	1.3E+02	2.0E+02	3.09E+02	pCi/L	88.10%	RD3205

Number of Results: 6

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Quanterra
Environmental Services

SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0769
LAB SAMPLE ID:	51024603	MATRIX:	WATER
CLIENT ID:	B0GNW5	DATE RECEIVED:	10/18/95 10:00:00 AM

ISOTOPE	RESULT	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
ALPHA	2.29E+00	1.0E+00	1.1E+00	1.15E+00	pCi/L	100.00%	RD3214
BETA	7.66E+01	4.4E+00	7.0E+00	2.89E+00	pCi/L	100.00%	RD3214
STRONTIUM	1.28E+00	3.1E-01	5.0E-01	7.97E-01	pCi/L	100.00%	RD3204
C-14	1.19E+00 UJ	1.5E+00	3.1E+00	3.50E+00	pCi/L	100.00%	RD3263
TC-99	4.05E+01	2.6E+00	8.3E+00	3.83E+00	pCi/L	95.10%	ITAS-IT-RS-0001
TRITIUM	2.00E+03 J	2.3E+02	3.4E+02	3.09E+02	pCi/L	88.10%	RD3205

Number of Results: 6

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LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. * Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: BOGNW7 — LAL Sample ID: L5628-6

Date Collected: 16-OCT-95 — Date Received: 18-OCT-95

Matrix: Water — Login Number: L5628

SDG: LK5628

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Gross Alpha	02-NOV-95	GR ALP/BETA LAL-0060_29082	1.1	1.3	2.1	U	pCi/L
Gross Beta	02-NOV-95	GR ALP/BETA LAL-0060_29082	3.8	1.5	2.2		pCi/L
Total radio-strontium	13-NOV-95	SR-90 LAL-0196_29083	0.02	0.57	0.99	U	pCi/L

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LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. * Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: BOGNW7 LAL Sample ID: L5628-11

Date Collected: 16-OCT-95 Date Received: 18-OCT-95

Matrix: Water Login Number: L5628

SDG: LK5628

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Tc-99	17-NOV-95	TC-99 LAL-0169_30338	-3.9	4.3	7.8	UJ	pCi/L

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LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. * Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: BOGNW7 LAL Sample ID: L5628-15

Date Collected: 16-OCT-95 Date Received: 18-OCT-95

Matrix: Water Login Number: L5628

SDG: LK5628

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
C-14	27-OCT-95	C-14 LAL-0209_29087	-31.	82.	110	U	pCi/L
H-3	21-NOV-95	TRITIUM(H3) LAL-0066_29086	-120	210	280	U	pCi/L

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LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. * Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: B0GNW9 LAL Sample ID: L5644-6

Date Collected: 17-OCT-95 Date Received: 19-OCT-95

Matrix: Water Login Number: L5644

Constituent	Analyzed	Batch	Activity	Error	MDA	Data Qual	Units
Gross Alpha	02-NOV-95	GR ALP/BETA LAL-0060_29082	1.2	1.5	2.5	< U	pCi/L
Gross Beta	02-NOV-95	GR ALP/BETA LAL-0060_29082	34.5	3.2	2.2		pCi/L
Total radio-strontium	13-NOV-95	SR-90 LAL-0196_29083	1.44	0.67	1.0		pCi/L

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LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. * Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: B0GNW9
Date Collected: 17-OCT-95
Matrix: Water
SDG: LK5628

LAL Sample ID: L5644-11
Date Received: 19-OCT-95
Login Number: L5644

Constituent	Analyzed	Batch	Activity	Error	MDA	Datacat	Units
Tc-99	17-NOV-95	TC-99 LAL-0169_30338	38.7	7.1	8.3	J	pCi/L

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LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. * Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: B0GNW9 — LAL Sample ID: L5644-15

Date Collected: 17-OCT-95 — Date Received: 19-OCT-95

Matrix: Water — Login Number: L5644

Constituent	Analyzed	Batch	Activity	Error	MDA	Datagual	Units
C-14	27-OCT-95	C-14 LAL-0209_29087	34.	87.	110	U	pCi/L
H-3	21-NOV-95	TRITIUM(H3) LAL-0066_29086	2210	400	280		pCi/L

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