308 - - - Q200610020006

Scientific Notebook No. 733: Cation Analyses of Experimental Solutions from Sorption Experiments CAL Series 7 and 8, Continuation from Scientific Notebook No. 711 (08/30/2005 through 08/31/2006)

LABORATORY NOTEBOOK

LABORATORY NOTEBOOK

NOTEBOOK NO. 733

CONTINUED FROM NOTEBOOK NO. 711

CONTINUED TO NOTEBOOK NO.

RADIONUCLIDE TRANSPORT < SZ 20.06002.01.242 / UZ 20.06002.01.232

ASSIGNED TO:

NAME BRADLEY WERLING

SIGNATURE

DATE 8-30-05

DATE ISSUED

BY

PHONE (210) 522-6565

EMAIL

ORGANISATION

DEPARTMENT

ADDRESS

CITY

PROVINCE/REGION

COUNTRY

POSTAL CODE

DATE NOTEBOOK COMPLETED

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NOTES:

CNWRA
CONTROLLED
COPY 733

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LABORATORY NOTEBOOK GUIDELINES†

LABORATORY NOTEBOOK INTRODUCTION

Using a Laboratory Notebook to record ideas, inventions, experimentation records, observations and all work details is a vital part of any laboratory process. Careful attention to how you keep your Laboratory Notebook can have a positive impact on the patent outcome of a pending discovery or invention.

Following are some overall recommendations to help you keep more efficient and accurate Laboratory Notebook entries. Remember, however, that these are simply a suggested set of guidelines. Only your attorney can supply the exact guidelines he/she would like you to follow to satisfy specific legal requirements. That is why we recommend that you consult your legal counsel.

RECORDING DATA

Your Laboratory Notebook is a vital record of your work whether it is for patent purposes, legal records or documenting drug research under GLP guidelines. The Laboratory Notebook can help you prove:

a. Exact details and dates of conception
b. Details and dates of reduction to practice
c. Diligence in reducing your invention to practice
d. Details regarding the structure and operation of your invention
e. Experimentation observations and results
f. A chronological record of your work
g. Other work details

Follow a few simple guidelines

1. Always record entries legibly, neatly and in permanent ink.
2. Immediately enter into your notebook and date all original concepts, data and observations, using separate headings to differentiate each.
3. Record all concepts, results, references and other information in a systematic and orderly manner. (Language, charts and numbering systems should be maintained consistently throughout.)
4. It is acceptable to make your entries brief. Always, however, include enough details for someone else to successfully duplicate the work you have recorded.
5. Label all figures and calculations.
6. Never, under any circumstances, remove pages from your notebook.

Remember to treat your Laboratory Notebook as a legal document: It records the chronological history of your activities. The following guidelines should help you maintain the consistent and accurate entries needed for future legal purposes.

1. Start entries at the top of the first page, and always make successive, dated entries, working your way to the bottom of the last page.
2. After completing a page, sign it before continuing to the next page.
3. Make sure that you record the date of each entry clearly and unambiguously.
4. Never let anyone other than yourself write in your Notebook (excluding witness signatures, discussed later).
5. Never leave blank spaces, and never erase or remove material you have added. Simply draw lines through any blank spaces at the same time you are making your entries.
6. Do not erase errors. Just draw a single line through any erroneous entry, then add your initials. Enter the correct entry nearby.
7. You can supplement your entries with supporting material (e.g., test-result printouts and other documentation). But you must permanently affix the material onto a page in its proper chronological location.
8. Never rely solely on any supplemental attachment. Always include your own entry describing the attachment and add any conclusions that you might draw from its substance.
9. Occasionally, secondary sources might be too large or inappropriate to attach directly to your notebook. In this case, you can add all secondary sources to an ancillary record maintained precisely for this purpose. However, always remember to write a description of these secondary sources, clearly and unambiguously, in your notebook.

DOCUMENTING PATENT ACTIVITIES

A primary purpose of a Laboratory Notebook is the support of documenting work that may be patentable. To support patent activities, it is necessary to provide clear, concise, chronological entries with specific dates. To rely on these dates, you must have at least one non-inventor corroborate that the events actually happened and that he or she understood your invention by signing and dating the "Disclosed to and Understood by" signature blocks.

Your Laboratory Notebook should help you document and prove:

1. *Conception Date*—The date that you knew your invention would solve the problem.
2. *Date of reduction to practice*—The moment that you made a working embodiment of your invention.
3. *Diligence in reducing your invention to practice*—Diligence refers to your intent and conscious effort to make a working embodiment. You are not required to rush, or even to take the most efficient development strategy. But your Notebook must include details relating to your diligent activities. These are dates and facts that show what activities you have conducted to reduce the invention to practice, and when such activities were conducted. Since you may still be diligent despite periods of not working on reducing your invention to practice, always remember to provide reasonable excuses for these periods of inactivity by supplying facts relating to why there was no activity during the period in question. (e.g., unavailability of test conditions or equipment).
4. *How to make and use your invention*—provide documentation details sufficient to teach a colleague how to make and use your invention.
5. *The best mode of practicing your invention*—document the best way to practice your invention.

A non-inventor colleague should corroborate each of these events/facts by signing the "Disclosed to and Understood by" on the relevant pages.

† BookFactory provides these sample guidelines "AS IS" without any warranty.

TITLE **PROJECT**

Continued From Page

INVESTIGATOR	SIGNATURE	INITIALS
Bradley Werling	Bradley Werling	BAW
Marla Roberts	Marla Roberts	MR
Ron McGinnis	R McGinnis	RM
F. Paul Bertetti	Paul Bertetti	PB

The lower right corner of each page of this notebook has the phrase "Proprietary Information." This is part of the notebook preprinted format and has no relationship to the actual notebook contents.

This notebook contains work for Radionuclide Transport (RT) in both the saturated zone and unsaturated zone. RT is concerned with identification of key geochemical processes that may control radionuclide transport at Yucca Mountain. Radionuclide retardation is dependent on the hydrochemistry and mineralogy along the groundwater flow paths from the proposed repository. Typical activities associated with these investigations would include conducting laboratory batch sorption experiments, collecting field samples, and analyses of field samples.

Current experimental activities are focused on laboratory batch sorption experiments that incorporate materials (groundwater and sonic corings) from the Yucca Mountain region and materials (simulated groundwater) based on the chemistry of the Yucca Mountain region materials. The objective for a sorption experiment is to determine the sorption capability (Kd or sorption coefficient) for a particular radionuclide, solid material, and solution typically over a range of pH values. Tasks typically include the following:

- Preparation of reference solutions.
- Cation (Div 01), inorganic carbon (CNWRA) and pH analyses (CNWRA) of reference solutions.
- Preparation of experimental solutions
- Liquid Scintillation Analyses (CNWRA) of experimental solutions.

Further details of these tasks are recorded in initial and in-process entries.

This scientific notebook (SN) is a continuation of SN 711. The end of SN 711 contains the Div 01 cation analyses of experimental solutions from sorption experiments CAL series 7 and 8. SN 733 begins with a continuation of these results.

SIGNATURE		DATE
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TITLE 30 AUG 05 CONT PROJECT BAW

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Continuation of Div01 Cation Results for CAL Series 7+8 Exp Solns at conclusion of experiment

Initial Entry for cation results: 711/83

Initial Entry for sorption experiment: 711/9-10

Samples: 12 CAL series 7
12 CAL series 8
2 QA samples

Sample + QA Collection 711/50

Sample ID Legend 711/51

QA target conc 711/49

Delivery + Chain of Custody to Div01: 711/60-63

8-30-05 BAW

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PROPRIETARY INFORMATION

TITLE 30 Aug 05 cont BLO PROJECT

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID
CAL78-13

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 264796

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/11/05

Project No.: 06002.01.242

SRR: 27780

Task Order: 050711-1

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	9.99	0.5
Magnesium	9.50	0.5
Manganese	<0.0500	0.0500
Potassium	8.46	2.5
Silicon	<0.500	0.5
Sodium	11.2	2.5
Strontium	<0.0500	0.0500

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID
CAL78-14

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 264797

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/11/05

Project No.: 06002.01.242

SRR: 27780

Task Order: 050711-1

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	10.1	0.5
Magnesium	9.61	0.5
Manganese	<0.0500	0.0500
Potassium	10.2	2.5
Silicon	<0.500	0.5
Sodium	8.95	2.5
Strontium	<0.0500	0.0500

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SOUTHWEST RESEARCH INSTITUTE
DUPLICATE SUMMARY

Sample ID
CAL78-1

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 264792D

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/11/05

Project No.: 06002.01.242

SRR: 27780

Task Order: 050711-1

Analysis	Original Sample Result (mg/L)	Duplicate Result (mg/L)	RPD
Aluminum	<0.500	<0.500	0.00%
Calcium	10.3	10.3	0.00%
Magnesium	1.27	1.30	2.33%
Manganese	0.0877	0.0863	1.61%
Potassium	4.81	4.81	0.00%
Silicon	15.6	15.3	1.94%
Sodium	77.4	77.2	0.26%
Strontium	<0.0500	<0.0500	0.00%

SOUTHWEST RESEARCH INSTITUTE
MATRIX SPIKE SUMMARY

Sample ID
CAL78-1

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 264792S

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/11/05

Project No.: 06002.01.242

SRR: 27780

Task Order: 050711-1

Analysis	Original Sample Result (mg/L)	Spike Result (mg/L)	Spike Added (mg/L)	Recovery
Aluminum	<0.500	20.5	20	103%
Calcium	10.3	210	200	99.9%
Magnesium	1.27	201	200	99.9%
Manganese	0.0877	4.91	5	96.4%
Potassium	4.81	191	200	93.1%
Silicon	15.6	55.5	40	99.8%
Sodium	77.4	265	200	93.8%
Strontium	<0.0500	40.2	40	101%

TITLE 30 Acres CONT BAW PROJECT

Continued Fr

SOUTHWEST RESEARCH INSTITUTE

DUPLICATE SUMMARY

Sample ID
CAL78-10

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 264793D

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/11/05

Project No.: 06002.01.242

SRR: 27780

Task Order: 050711-1

Analysis	Original Sample Result (mg/L)	Duplicate Result (mg/L)	RPD
Aluminum	<0.500	<0.500	0.00%
Calcium	7.77	7.67	1.30%
Magnesium	0.856	0.873	1.97%
Manganese	<0.0500	<0.0500	0.00%
Potassium	3.65	4.13	12.3%
Silicon	13.6	13.5	0.74%
Sodium	76.5	74.9	2.11%
Strontium	<0.0500	<0.0500	0.00%

SOUTHWEST RESEARCH INSTITUTE

MATRIX SPIKE SUMMARY

Sample ID
CAL78-10

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 264793S

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/11/05

Project No.: 06002.01.242

SRR: 27780

Task Order: 050711-1

Analysis	Original Sample Result (mg/L)	Spike Result (mg/L)	Spike Added (mg/L)	Recovery
Aluminum	<0.500	20.6	20	103%
Calcium	7.77	206	200	99.1%
Magnesium	0.856	199	200	99.1%
Manganese	<0.0500	4.89	5	97.8%
Potassium	3.65	189	200	92.7%
Silicon	13.6	54.2	40	102%
Sodium	76.5	262	200	92.8%
Strontium	<0.0500	39.1	40	97.8%

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PROPRIETARY INFORMATION

SOUTHWEST RESEARCH INSTITUTE

LABORATORY CONTROL SAMPLE

Sample ID
LCSW - G19H3

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Water
Lab System ID: NA
Method: ICP SW846 6010B

Client: Division 20
Date Received: NA
Project No.: 06002.01.242
SRR: 27780
Task Order: 050711-1

Analysis	Sample Result (mg/L)	True Value (mg/L)	Recovery
Aluminum	20.3	20	102%
Calcium	207	200	104%
Magnesium	203	200	102%
Manganese	4.92	5	98.4%
Potassium	-----	-----	-----
Silicon	41.4	40	104%
Sodium	-----	-----	-----
Strontium	40.9	40	102%

SOUTHWEST RESEARCH INSTITUTE

LABORATORY CONTROL SAMPLE

Sample ID
LCSW - G19H4

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Water
Lab System ID: NA
Method: ICP SW846 6010B

Client: Division 20
Date Received: NA
Project No.: 06002.01.242
SRR: 27780
Task Order: 050711-1

Analysis	Sample Result (mg/L)	True Value (mg/L)	Recovery
Aluminum	20.5	20	103%
Calcium	203	200	102%
Magnesium	200	200	100%
Manganese	4.87	5	97.4%
Potassium	-----	-----	-----
Silicon	41.2	40	103%
Sodium	-----	-----	-----
Strontium	40.7	40	102%

TITLE 30 AUG05 CONT BAW PROJECT

Continued

SOUTHWEST RESEARCH INSTITUTE

LABORATORY CONTROL SAMPLE

Sample ID: LCSW - G19H5

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: NA

Method: ICP SW846 6010B

Client: Division 20

Date Received: NA

Project No.: 06002.01.242

SRR: 27780

Task Order: 050711-1

Analysis	Sample Result (mg/L)	True Value (mg/L)	Recovery
Aluminum	-----	-----	-----
Calcium	-----	-----	-----
Magnesium	-----	-----	-----
Manganese	-----	-----	-----
Potassium	189	200	94.5%
Silicon	-----	-----	-----
Sodium	191	200	95.5%
Strontium	-----	-----	-----

SOUTHWEST RESEARCH INSTITUTE

LABORATORY CONTROL SAMPLE

Sample ID: LCSW - G19H6

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: NA

Method: ICP SW846 6010B

Client: Division 20

Date Received: NA

Project No.: 06002.01.242

SRR: 27780

Task Order: 050711-1

Analysis	Sample Result (mg/L)	True Value (mg/L)	Recovery
Aluminum	-----	-----	-----
Calcium	-----	-----	-----
Magnesium	-----	-----	-----
Manganese	-----	-----	-----
Potassium	188	200	94.0%
Silicon	-----	-----	-----
Sodium	189	200	94.5%
Strontium	-----	-----	-----

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SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID
PBW - G19H3

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Water

Project No.: 06002.01.242

Lab System ID: NA

SRR: 27780

Method: ICP SW846 6010B

Task Order: 050711-1

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	<0.500	0.500
Magnesium	<0.500	0.500
Manganese	<0.0500	0.0500
Potassium	-----	-----
Silicon	<0.500	0.500
Sodium	-----	-----
Strontium	<0.0500	0.0500

SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID
PBW - G19H4

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Water

Project No.: 06002.01.242

Lab System ID: NA

SRR: 27780

Method: ICP SW846 6010B

Task Order: 050711-1

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	<0.500	0.500
Magnesium	<0.500	0.500
Manganese	<0.0500	0.0500
Potassium	-----	-----
Silicon	<0.500	0.500
Sodium	-----	-----
Strontium	<0.0500	0.0500

TITLE 30 Aug 05 cont BW PROJECT

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SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID: PBW - G19H5

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: NA

Method: ICP SW846 6010B

Client: Division 20

Date Received: NA

Project No.: 06002.01.242

SRR: 27780

Task Order: 050711-1

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	-----	-----
Calcium	-----	-----
Magnesium	-----	-----
Manganese	-----	-----
Potassium	<2.50	2.50
Silicon	-----	-----
Sodium	<2.50	2.50
Strontium	-----	-----

SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID: PBW - G19H6

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: NA

Method: ICP SW846 6010B

Client: Division 20

Date Received: NA

Project No.: 06002.01.242

SRR: 27780

Task Order: 050711-1

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	-----	-----
Calcium	-----	-----
Magnesium	-----	-----
Manganese	-----	-----
Potassium	<2.50	2.50
Silicon	-----	-----
Sodium	<2.50	2.50
Strontium	-----	-----

TITLE 31AUG05 BAW PROJECT

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Div01 Cation Results for M series 7 and CAL series 11 Exp Solns at conclusion of experiment

Initial Entry for Sorption Experiments: 711/52-53
Samples: 12 M series 7
12 CAL series 11
2 QAs
Sample + QA collection: 711/74
Sample ID Legend: ~~711/49~~ BW 8-31-05, 711/75
Delivery + Chain of Custody to Div01: 711/79-82
QA target conc 711/49

QA Results for Div 01 Cation Analyses of M series 7 and CAL series 11 Experimental Solutions

For Sample MC711-13

Analyte	Target Conc (mg/L)	Measured Conc (mg/L)	Percent Difference
Calcium	10	9.99	-0.10
Magnesium	10	9.59	-4.10
Potassium	10	7.89	-21.1
Sodium	10	9.99	-0.10
Iron	10	not analyzed	na

For Sample MC711-14

Analyte	Target Conc (mg/L)	Measured Conc (mg/L)	Percent Difference
Calcium	10	9.93	-0.70
Magnesium	10	9.63	-3.70
Potassium	10	8.39	-16.1
Sodium	10	9.38	-6.20
Iron	10	not analyzed	na

Source 733/23

Data in 733/11-29

8-31-05 BAW

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TITLE 31 AUG 05 CONT BAW PROJECT

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: MC711-1

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265477

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	50.4	0.500
Calcium	1.98	0.500
Magnesium	20.2	0.500
Manganese	0.139	0.0500
Potassium	3.19	2.50
Silicon	178	0.500
Sodium	108	2.50
Strontium	<0.0500	0.0500

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: MC711-2

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265488

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	21.8	0.500
Calcium	0.967	0.500
Magnesium	8.71	0.500
Manganese	0.0594	0.0500
Potassium	<2.50	2.50
Silicon	84.5	0.500
Sodium	97.9	2.50
Strontium	<0.0500	0.0500

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
MC711-3

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265496

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	29.2	0.500
Calcium	1.01	0.500
Magnesium	11.6	0.500
Manganese	0.0548	0.0500
Potassium	<2.50	2.50
Silicon	109	0.500
Sodium	98.7	2.50
Strontium	<0.0500	0.0500

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
MC711-4

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265497

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	29.0	0.500
Calcium	0.994	0.500
Magnesium	12.0	0.500
Manganese	0.0608	0.0500
Potassium	<2.50	2.50
Silicon	107	0.500
Sodium	99.4	2.50
Strontium	<0.0500	0.0500

TITLE 31 AUG 2005 CONT BAW PROJECT

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: MC711-5

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265498

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	28.5	0.500
Calcium	0.991	0.500
Magnesium	11.7	0.500
Manganese	0.0522	0.0500
Potassium	<2.50	2.50
Silicon	107	0.500
Sodium	101	2.50
Strontium	<0.0500	0.0500

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: MC711-6

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265499

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	29.7	0.500
Calcium	1.03	0.500
Magnesium	12.1	0.500
Manganese	0.0554	0.0500
Potassium	<2.50	2.50
Silicon	110	0.500
Sodium	99.6	2.50
Strontium	<0.0500	0.0500

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID: MC711-7

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265500

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	28.8	0.500
Calcium	1.07	0.500
Magnesium	11.6	0.500
Manganese	0.0534	0.0500
Potassium	<2.50	2.50
Silicon	108	0.500
Sodium	98.6	2.50
Strontium	<0.0500	0.0500

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID: MC711-8

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265501

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	28.8	0.500
Calcium	1.02	0.500
Magnesium	11.7	0.500
Manganese	0.0524	0.0500
Potassium	<2.50	2.50
Silicon	107	0.500
Sodium	95.8	2.50
Strontium	<0.0500	0.0500

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TITLE 31AUG05 CONT DAW PROJECT

Conti

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID
MC711-9

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265502

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	27.4	0.500
Calcium	0.977	0.500
Magnesium	11.0	0.500
Manganese	0.0504	0.0500
Potassium	<2.50	2.50
Silicon	102	0.500
Sodium	94.6	2.50
Strontium	<0.0500	0.0500

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID
MC711-10

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265478

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	27.3	0.500
Calcium	1.02	0.500
Magnesium	11.0	0.500
Manganese	0.0646	0.0500
Potassium	<2.50	2.50
Silicon	101	0.500
Sodium	96.1	2.50
Strontium	<0.0500	0.0500

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PROPRIETARY INFORMATION

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
MC711-11

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Water
Lab System ID: 265479
Method: ICP SW846 6010B

Client: Division 20
Date Received: 07/22/05
Project No.: 06002.01.242
SRR: 27844
Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	26.4	0.500
Calcium	0.896	0.500
Magnesium	10.6	0.500
Manganese	0.0644	0.0500
Potassium	<2.50	2.50
Silicon	98.1	0.500
Sodium	94.5	2.50
Strontium	<0.0500	0.0500

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
MC711-12

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Water
Lab System ID: 265480
Method: ICP SW846 6010B

Client: Division 20
Date Received: 07/22/05
Project No.: 06002.01.242
SRR: 27844
Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	26.0	0.500
Calcium	1.12	0.500
Magnesium	10.4	0.500
Manganese	0.0658	0.0500
Potassium	<2.50	2.50
Silicon	96.6	0.500
Sodium	129	2.50
Strontium	<0.0500	0.0500

TITLE 31 AUG05 CONT BAW PROJECT

Con

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
MC711-15

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265483

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	8.25	0.500
Magnesium	1.05	0.500
Manganese	<0.0500	0.0500
Potassium	5.11	2.50
Silicon	13.3	0.500
Sodium	74.9	2.50
Strontium	<0.0500	0.0500

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
MC711-16

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265484

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	8.05	0.500
Magnesium	0.811	0.500
Manganese	<0.0500	0.0500
Potassium	4.99	2.50
Silicon	13.0	0.500
Sodium	74.6	2.50
Strontium	<0.0500	0.0500

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
MC711-17

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265485

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	8.14	0.500
Magnesium	0.973	0.500
Manganese	<0.0500	0.0500
Potassium	4.42	2.50
Silicon	13.2	0.500
Sodium	77.2	2.50
Strontium	<0.0500	0.0500

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
MC711-18

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265486

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	7.90	0.500
Magnesium	0.947	0.500
Manganese	<0.0500	0.0500
Potassium	4.64	2.50
Silicon	13.3	0.500
Sodium	77.1	2.50
Strontium	<0.0500	0.0500

TITLE 31 AUG 05 CONT BAW PROJECT

Conti

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID
MC711-19

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265487

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	7.98	0.500
Magnesium	0.979	0.500
Manganese	<0.0500	0.0500
Potassium	3.76	2.50
Silicon	13.2	0.500
Sodium	76.7	2.50
Strontium	<0.0500	0.0500

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID
MC711-20

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265489

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	7.90	0.500
Magnesium	1.05	0.500
Manganese	<0.0500	0.0500
Potassium	4.67	2.50
Silicon	13.2	0.500
Sodium	76.7	2.50
Strontium	<0.0500	0.0500

TITLE 31 AUG 05 - CONT BHW PROJECT

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID
MC711-21

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265490

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	8.24	0.500
Magnesium	1.03	0.500
Manganese	<0.0500	0.0500
Potassium	3.86	2.50
Silicon	13.2	0.500
Sodium	77.1	2.50
Strontium	<0.0500	0.0500

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID
MC711-22

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265491

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	7.76	0.500
Magnesium	0.907	0.500
Manganese	<0.0500	0.0500
Potassium	3.62	2.50
Silicon	13.2	0.500
Sodium	77.9	2.50
Strontium	<0.0500	0.0500

TITLE 31 AUG 05 - CONT - BAW PROJECT

Con

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID: MC711-23

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265492

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	7.69	0.500
Magnesium	0.880	0.500
Manganese	<0.0500	0.0500
Potassium	3.39	2.50
Silicon	13.1	0.500
Sodium	78.0	2.50
Strontium	<0.0500	0.0500

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID: MC711-24

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265493

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	7.39	0.500
Magnesium	0.897	0.500
Manganese	<0.0500	0.0500
Potassium	3.86	2.50
Silicon	13.1	0.500
Sodium	76.1	2.50
Strontium	<0.0500	0.0500

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
MC711-25

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Water
Lab System ID: 265494
Method: ICP SW846 6010B

Client: Division 20
Date Received: 07/22/05
Project No.: 06002.01.242
SRR: 27844
Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	6.97	0.500
Magnesium	0.945	0.500
Manganese	<0.0500	0.0500
Potassium	3.15	2.50
Silicon	13.2	0.500
Sodium	78.5	2.50
Strontium	<0.0500	0.0500

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
MC711-26

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Water
Lab System ID: 265495
Method: ICP SW846 6010B

Client: Division 20
Date Received: 07/22/05
Project No.: 06002.01.242
SRR: 27844
Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	2.55	0.500
Magnesium	<0.500	0.500
Manganese	<0.0500	0.0500
Potassium	3.24	2.50
Silicon	13.8	0.500
Sodium	112	2.50
Strontium	<0.0500	0.0500

TITLE 31 AUG 05 CONT B.AW PROJECT

Cont

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID: MC711-13

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265481

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	9.99	0.500
Magnesium	9.59	0.500
Manganese	<0.0500	0.0500
Potassium	7.89	2.50
Silicon	<0.500	0.500
Sodium	9.99	2.50
Strontium	<0.0500	0.0500

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID: MC711-14

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265482

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	9.93	0.500
Magnesium	9.63	0.500
Manganese	<0.0500	0.0500
Potassium	8.39	2.50
Silicon	<0.500	0.500
Sodium	9.38	2.50
Strontium	<0.0500	0.0500

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PROPRIETARY INFORMATION

SOUTHWEST RESEARCH INSTITUTE
DUPLICATE SUMMARY

Sample ID
MC711-1

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265477

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Original Sample Result (mg/L)	Duplicate Result (mg/L)	RPD
Aluminum	-----	-----	-----
Calcium	-----	-----	-----
Magnesium	-----	-----	-----
Manganese	-----	-----	-----
Potassium	3.19	2.57	21.5%
Silicon	-----	-----	-----
Sodium	-----	-----	-----
Strontium	-----	-----	-----

SOUTHWEST RESEARCH INSTITUTE
MATRIX SPIKE SUMMARY

Sample ID
MC711-1

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265477

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

Analysis	Original Sample Result (mg/L)	Spike Result (mg/L)	Spike Added (mg/L)	Recovery
Aluminum	-----	-----	-----	-----
Calcium	-----	-----	-----	-----
Magnesium	-----	-----	-----	-----
Manganese	-----	-----	-----	-----
Potassium	3.19	195	200	95.9%
Silicon	-----	-----	-----	-----
Sodium	-----	-----	-----	-----
Strontium	-----	-----	-----	-----

TITLE 31 AUG05 - CONT - BAW PROJECT

Contin

SOUTHWEST RESEARCH INSTITUTE
DUPLICATE SUMMARY

Sample ID
MC711-10

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265478

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

Analysis	Original Sample Result (mg/L)	Duplicate Result (mg/L)	RPD
Aluminum	27.3	27.9	2.17%
Calcium	1.02	1.11	8.45%
Magnesium	11.0	11.1	0.90%
Manganese	0.0646	0.0652	0.92%
Potassium	-----	-----	-----
Silicon	101	103	1.96%
Sodium	96.1	93.3	2.96%
Strontium	<0.0500	<0.0500	0.00%

SOUTHWEST RESEARCH INSTITUTE
MATRIX SPIKE SUMMARY

Sample ID
MC711-10

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265478

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

Analysis	Original Sample Result (mg/L)	Spike Result (mg/L)	Spike Added (mg/L)	Recovery
Aluminum	27.3	66.1	40.0	97.0%
Calcium	1.02	391	400	97.5%
Magnesium	11.0	398	400	96.8%
Manganese	0.0646	9.70	10.0	96.4%
Potassium	-----	-----	-----	-----
Silicon	101	181	80.0	100%
Sodium	96.1	477	400	95.2%
Strontium	<0.0500	77.3	80.0	96.6%

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SOUTHWEST RESEARCH INSTITUTE
DUPLICATE SUMMARY

Sample ID: MC711-21

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Water
Lab System ID: 265490
Method: ICP SW846 6010B

Client: Division 20
Date Received: 07/22/05
Project No.: 06002.01.242
SRR: 27844
Task Order: 050722-11

Analysis	Original Sample Result (mg/L)	Duplicate Result (mg/L)	RPD
Aluminum	-----	-----	-----
Calcium	-----	-----	-----
Magnesium	-----	-----	-----
Manganese	-----	-----	-----
Potassium	3.86	4.50	15.3%
Silicon	-----	-----	-----
Sodium	-----	-----	-----
Strontium	-----	-----	-----

SOUTHWEST RESEARCH INSTITUTE
MATRIX SPIKE SUMMARY

Sample ID: MC711-21

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Water
Lab System ID: 265490
Method: ICP SW846 6010B

Client: Division 20
Date Received: 07/22/05
Project No.: 06002.01.242
SRR: 27844
Task Order: 050722-11

Analysis	Original Sample Result (mg/L)	Spike Result (mg/L)	Spike Added (mg/L)	Recovery
Aluminum	-----	-----	-----	-----
Calcium	-----	-----	-----	-----
Magnesium	-----	-----	-----	-----
Manganese	-----	-----	-----	-----
Potassium	3.86	191	200	93.6%
Silicon	-----	-----	-----	-----
Sodium	-----	-----	-----	-----
Strontium	-----	-----	-----	-----

TITLE 31AUG05-CONT-BAW PROJECT

SOUTHWEST RESEARCH INSTITUTE
DUPLICATE SUMMARY

Sample ID: MC711-22

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265491

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

Analysis	Original Sample Result (mg/L)	Duplicate Result (mg/L)	RPD
Aluminum	<0.500	<0.500	0.00%
Calcium	7.76	7.67	1.17%
Magnesium	0.907	0.994	9.15%
Manganese	<0.0500	<0.0500	0.00%
Potassium	-----	-----	-----
Silicon	13.2	13.2	0.00%
Sodium	77.9	76.6	1.68%
Strontium	<0.0500	<0.0500	0.00%

SOUTHWEST RESEARCH INSTITUTE
MATRIX SPIKE SUMMARY

Sample ID: MC711-22

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265491

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

Analysis	Original Sample Result (mg/L)	Spike Result (mg/L)	Spike Added (mg/L)	Recovery
Aluminum	<0.500	38.8	40.0	97.0%
Calcium	7.76	404	400	99.1%
Magnesium	0.907	392	400	97.8%
Manganese	<0.0500	9.69	10.0	96.9%
Potassium	-----	-----	-----	-----
Silicon	13.2	92.4	80.0	99.0%
Sodium	77.9	456	400	94.5%
Strontium	<0.0500	78.2	80.0	97.8%

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID
LCSW - H15H1 / H17H1

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Water
Lab System ID: NA
Method: ICP SW846 6010B

Client: Division 20
Date Received: NA
Project No.: 06002.01.242
SRR: 27844
Task Order: 050722-11

Analysis	Sample Result (mg/L)	True Value (mg/L)	Recovery
Aluminum	38.5	40.0	96.3%
Calcium	395	400	98.8%
Magnesium	392	400	98.0%
Manganese	9.78	10.0	97.8%
Potassium	187	200	93.5%
Silicon	79.4	80.0	99.3%
Sodium	381	400	95.3%
Strontium	78.0	80.0	97.5%

SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID
LCSW - H15H2 / H17H2

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Water
Lab System ID: NA
Method: ICP SW846 6010B

Client: Division 20
Date Received: NA
Project No.: 06002.01.242
SRR: 27844
Task Order: 050722-11

Analysis	Sample Result (mg/L)	True Value (mg/L)	Recovery
Aluminum	38.9	40.0	97.3%
Calcium	399	400	99.8%
Magnesium	393	400	98.3%
Manganese	9.75	10.0	97.5%
Potassium	184	200	92.0%
Silicon	80.3	80.0	100%
Sodium	383	400	95.8%
Strontium	79.0	80.0	98.8%

TITLE 31AUG05 - CONT - BW PROJECT

Contin.

SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID
PBW - H15H1 / H17H1

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Water

Project No.: 06002.01.242

Lab System ID: NA

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	<0.500	0.500
Magnesium	<0.500	0.500
Manganese	<0.0500	0.0500
Potassium	<2.50	2.50
Silicon	<0.500	0.500
Sodium	<2.50	2.50
Strontium	<0.0500	0.0500

SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID
PBW - H15H2 / H17H2

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Water

Project No.: 06002.01.242

Lab System ID: NA

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Calcium	<0.500	0.500
Magnesium	<0.500	0.500
Manganese	<0.0500	0.0500
Potassium	<2.50	2.50
Silicon	<0.500	0.500
Sodium	<2.50	2.50
Strontium	<0.0500	0.0500

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PROPRIETARY INFORMATION

TITLE 14 Sept. 05 MR PROJECT

Continued From Page

1:1 Nitric Acid Solution for Sampling Trip September 2005

Task initially assigned to: Marla Roberts

Reagent: Nitric Acid - Trace Metal Grade
Fisher A509-212 Lot #11000040
Nanopure Type I water

Procedure: Added ~ ~~100~~ 50 mL water. Made a mark on bottle representing "double volume" on a 125 mL FEP bottle. Slowly, and in steps added conc. nitric acid until mark reached. 14 Sept 05 MR

Labeled: ~~1:1 Nitric Acid~~, 14 Sept 05 MR
1:1 Date
SN
initials.

14 Sept. 05 MR cont.

Preparation of Quinhydrone for field Sampling Trip September 2005

Task initially assigned to: Marla Roberts.

Reagent: Quinhydrone 98%
Acros Organics
Lot # A015118301

Procedure: Visually, about 1 gram of quinhydrone is plated on weighing paper. The gram is then poured into a 125 mL PP bottle. There are a total of 8 bottles each containing about 1 gram of Quinhydrone. All bottles are labeled, "Quin." 14 Sept 05 MR ~~polypro~~

Continued To Page

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TITLE 14 Sep 05 CONT BW PROJECT

Continued From Page

CALIBRATION OF In-Line Probe for EWDP Sampling trip - Sept 2005

Conductivity Calibration

Followed procedure in Users Manual (p 3-24 to 3-26)

Reagents: 1415 µS/cm std

Fisher 09-328-12 lot# 3330

Calibration successful

pH Calibration

Followed procedure in Users Manual (p 3-32 to 3-33)

Reagents: Fisher pH 7 - SB107 lot 038940

Fisher pH 10 - SB115 lot 038939

Calibration successful

ORP Calibration

Followed procedure in Users Manual (p 3-36 to 3-38)

Reagents: Quin bottle (733/30)

Type1 water (100 mL)

2 Buffer Powder Pillows

Hach 22269-66 lot A 5084

Calibration successful

DO Calibration

Followed procedure in Users Manual (p 3-14 to 3-16)

Reagent: Type1 water

Bar press = 736.5 mm Hg

Calibration successful

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Early Warning Drilling Program Groundwater Sampling Event September 2005

Personnel: Bradley Werling, Ron McGinnis, Paul Bertetti, and Miriam Jucket

Objectives: To characterize groundwater and collect aliquots for use in sorption experiments in the Yucca Mountain vicinity in order to investigate radionuclide transport issues.

Samples: Five wells are scheduled for the week GED personnel will attend. At each well, groundwater characterization will include field analyses of water temperature, air temperature, conductance, dissolved oxygen, oxidation-reduction potential, pH, and alkalinity. Sample aliquots will be collected for subsequent lab analyses for cations, anions, stable isotope (hydrogen and oxygen), and inorganic carbon. At two wells, an addition 10L of groundwater will be collected for use in sorption experiments.

Equipment:
Hydrolab miniSonde 4A Water Quality Multiprobe (sn 41080)
Hydrolab Surveyor 4A Water Qualtiy Data Display (sn S3123)
Fluke 52 II Thermometer (sn 85480050)
Fluke 80PK-1 bead probe [for air] (sn 10639)
Fluke 80PK-22 immersion temperature probe [for water] (sn 10637)
Masterflex E/S Model 07571-00 sample pump
Masterflex Easy-load L/S Model 7518-02 head
Other meters and probes were brought but will only be used if necessary and would be identified in the in-process entries.

Reagents:
1:1 nitric acid (733/30)
Quinhydrone in a bottle (733/30)
Type 1 water
Other reagents will be identified in the in-process entries.

Supplies:
Milipore GWSC04510 disposable groundwater sampling capsule 0.45 μm.
L/S 24 tygon tubing
4 Liter pp bottles
2 Liter pp bottles
1 Liter HDPE bottles (IChem N319-1000 certified 300 series)
500mL HDPE bottles (IChem N319-0500 certified 300 series)
250 mL glass amber bottles (IChem 349-0250 certified 300 series)
40ml glass amber VOA bottles (IChem T246-0040 certified 200 series)
Hach digital titrators with J-hooks
parafilm
labels
gloves

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squirt bottle
Sharpies
Pens
Pippetor and 5 mL tips
Disposable pipettes
Misc glassware and plastic ware
Scissors
Kim-wipes
Trash bags
Zip locks
Batteries for meters
Calculator
Flashlight
First aid kit
Ice chest
Blue ice
Duct tape

Procedure:

The primary source for pH, ORP, conductivity, and dissolved oxygen field data is the in-line probe. The probe was calibrated on 9/15/2005 (see 733/31). The probe will be challenged for pH, conductivity, and ORP at the start of each day. The probe will be calibrated each day for the dissolved oxygen since this requires the barometric pressure as an input. The challenging and calibration of the probe will be documented in the in-process entries. Other meters were brought only as a backup to the in-line probe. The plan is to collect in-line probe data from each well (during the sampling time window) for about 15 minutes at 30 second intervals. The data will be stored in the Surveyor 4 data unit for future download. Some readings from the in-line probe will also be recorded in the scientific notebook at this time. Groundwater samples were collected for the alkalinity field analyses, subsequent laboratory analyses, and when applicable, subsequent sorption experiments. Groundwater samples were collected in one 4 liter pp bottle and one 2 liter pp bottle. Each bottle was rinsed several times with sample water before being filled. Sample types, quantities, and treatments for subsequent laboratory analyses are listed in Table 1. The sample IDs will be documented in the in-process entries. The groundwater for the alkalinity titration was filtered (0.45 μm) before analyses. Other field analyses (if necessary) using backup meters (not the in-line probe) would be conducted using unfiltered groundwater.

Filtering was conducted using a sample pump, L/S 24 tygon tubing, and disposable Millipore groundwater filters. New tubing and filters were used for each zone. The bottles for sample collection for subsequent lab analyses were not rinsed with sample before filling because they were certified. Preservation consisted of 3mL (oxford pipet) of 1:1 nitric into 1 liter of solution. Samples were labeled, parafilmed, ziplocked, and placed in a cooler. The samples were transferred into a refrigerator once back at the motel as space permitted.

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Table 1. Sample Types and Volumes Collected for Each Groundwater Zone During the September 19-23, 2005 Early Warning Drilling Program Sampling Event.

Sample volume and container type	Filtration	Preservation	Analyses
Two 40mL, amber glass	filtered, 0.45 µm	none	Inorganic Carbon Analyses (in duplicate)
250 mL, amber glass	filtered, 0.45 µm	none	stable isotope ratio, (H/D and $^{16}O/^{18}O$)
500 mL, high density polyethylene	not filtered	none	anions, cations, trace metals
1 liter, high density polyethylene	filtered, 0.45 µm	none	anions, cations, trace metals
1 liter, high density polyethylene	filtered, 0.45 µm	1+1 HNO_3 (trace metal grade)	cations, trace metals
Ten 1 liter high density polyethylene*	filtered, 0.45 µm	none	Sorption experiments

* Two wells will have additional samples taken for sorption experiments.

Arrived at NC-EWDP-27P at 0945 with NYE COUNTY CREW: Kathy, Rocky, + Levi

Challanged the minisonde using the following procedure. Also in the procedure is the overall plan for the in-line probe sampling of each well. After that is the Digital Titration Procedure for the field alkalinity measurement

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MiniSonde and Surveyer4a Preparation Procedure:

Conductivity

- Rinse the probe with several portions of nanopure water (cap and shake).
- Rinse the probe with a small portion of 1000 uS conductivity standard (cap and shake). Empty.
- Add 1000 uS conductivity standard to the probe, covering the electrodes.
- Wait a few minutes for the reading to stabilize. If the reading is close to 1000 uS, (within a few percent), calibration is assumed good.
- If the reading is off, follow the calibration instructions for conductivity.

pH

- Rinse the probe with several portions of nanopure water (cap and shake).
- Rinse the probe with a small portion of pH 7 standard (cap and shake).
- Add pH 7 buffer standard to the probe, covering the electrodes.
- Wait a few minutes for the reading to stabilize. If the reading is close (within a few percent), calibration is assumed good. Additional confirmation can be achieved by repeating this procedure with pH 10 buffer.
- If the reading is off, follow the calibration instructions for pH.

Redox

- Prepare a fresh container of quinhydrone solution as follows:
  - Add two pH 4 powder pillows and 100 mL nanopure water to a pre-measured quinhydrone bottle.
  - Cap and shake until most of the powders are dissolved.
- Rinse the probe with several portions of nanopure water (cap and shake).
- Rinse the probe with a small portion of quinhydrone solution (cap and shake).
- Add quinhydrone solution to the probe, covering the electrodes.
- Wait a few minutes for the reading to stabilize. If the reading is close (within a few percent), calibration is assumed good. If the reading is off, follow the calibration instructions for Redox. (Save quinhydrone solution for calibration)

Dissolved Oxygen

- Rinse the probe with several portions of nanopure water (cap and shake).
- Fill probe to bottom of DO probe tip with nanopure water (to the bottom of the ring). Cap somewhat loosely. Do not turn on the rotator.
- Note the barometric pressure on the Surveyor.
- Go to the calibration menu and choose dissolved oxygen. Enter the new barometric pressure and hit calibrate.
- The Surveyor should say "calibration successful."

At the sampling event

- Contact Kathy Gilmore (or other head of Nye County crew) to determine where the in-line probe can be set up and how long you can sample.

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- Remove the travel/calibration cup and screw the flow-through cup onto the sonde.
- Attach tubing and fittings from the well head, using any adapters necessary.
- Rinse the probe and inside of tubing, where possible, with nanopure water prior to hooking up to well head.
- Prop the probe upright if possible. If it is upright, the in-tube should be at the bottom of the flow through cell with exit out the top (to force out the gases).
- If the probe must lie on the ground, either configuration of in/out tubing is okay.
- Shade the probe if possible.
- Turn on the circulator using the following Surveyor4a commands:
  - "Setup/Cal"
  - "Setup"
  - "Sonde"
  - "Circulator On/Off"
  - Change 0 to 1 (yes).
  - Go back to main display.
- Begin "collecting data" procedure.

Collecting data

- Observe the readings on the probe to be sure that the following settings are displayed and are taking readings: Time, battery life, pH, conductivity, ORP, dissolved oxygen, latitude, longitude, altitude, barometric pressure. Any other readings are ok, but not necessary.
- To store data, follow these steps:
  - Go to "Files"
  - Choose "Svr4a"
  - "create"
  - "time-trig"
  - Enter the name in the following format: well-zone-month-day-year (for example: "19PB-Deep-05-10-04" Eliminate hyphens if the name is too long, then "Done." (If there's no zone, then well-month-day-year.)
  - Enter start date in MMDDYY format, then "Done"
  - Enter start time (give yourself at least 2 minutes advance) in HHMMSS, then "Done"
  - Enter stop date (same as start date) in MMDDYY format, then "Done"
  - Enter stop time in HHMMSS format according to how long Nye County said we could sample with the inline probe, then "Done."
  - Enter warmup as "000030" then "Done"
  - Check parameters- "Done"
  - Press any key.
- Monitor the Surveyor4a periodically to be sure it is taking data and that the battery life does not drop below 5.0. If it starts to reach 5.0, contact Miriam to move car to use as a battery source.

After Data Collection

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TITLE 19 Sept 05 CONT PROJECT BW

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- Check that data is saved by briefly reviewing the file. ("Files" "Srv4a" "Review" and choose the file name you just created. Scroll down to verify, then "Go Back" to main display.
- Turn off the circulator by using the same procedure as to turn it on, except change "1" to "0." Then power down the Surveyor4a.
- Remove tubing from flow-through cell. Empty and remove the cell and rinse with nanopure water several times. Replace the calibration/storage cup on the probe and rinse several times with nanopure water (cap and shake). Leave some nanopure water in the cup to keep the probes moist.
- Dry and remove as much dirt from the sonde as possible, store in storage case.
- Charge battery for Surveyor4a every night.

Digital Titration Procedure

Pour a small amount of unfiltered sample on a Hach test strip in order to determine the alkalinity range.

Record value in logbook.

Use table 1 of the manual to determine the appropriate sample volume and normality of acid.

Rinse the 100 mL graduated cylinder and 125mL erlenmeyer flask several times with filtered sample water. Use filtered water for the analysis.

Follow steps 1 to 10 of Method 8203 in the manual with the following modifications:

Step 4 - use a 125mL flask, add a stir bar, and place on magnetic stirrer.

Steps 5 to 7 - only add the phenolphthalein indicator if the pH of the sample is at 8.3 or higher (more basic).

Step 8 - add two packets of BGM indicator instead of one.

Source: Hach Digital Ttitrator Model 16900 Manual

For initial entries see 733/32-37

9-21-05 BW

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Conductivity challenge of in-line ~~probe~~ Probe BW 9-19-05

Conductivity std. Fisher 09-328-8 lot# 3392

at 1003 µS/cm

Probe reading at 990.0 mS/cm

temp reading at 27.71 C°

PH challenge of in-line probe

Ph 7 challenge Fisher SB107-500 lot # 038940

probe reading at 7.05

temp reading at 27.42 C°

Ph at 27.42 C° should be 7.00

ORP challenge of in-line probe

Quin 733/30 Ph 7 powder pillows Hach 22270-66 lot # A5108

100 mL Nanopure

probe reading at 283 mV successful challenge

temp reading at 28.92 °C

~~Ph at reading at~~ ~~RM 09/19/05~~ RM 09/19/05

target ORP at 277 mV

DO calibration of in-line probe

Reagent was Nanopure H_2O

Barometric Pressure reading at ~~686.3~~ RM 09/19/05 686.3

Calibration Successful

GPS IV location of well 27P

NAD 83 UTM Zone 11

11 S 0544854 elevation = 904 m

4065472

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TITLE 19 Sep 05 cont PROJECT BAUV

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In line probe at 1322

Sample measurement Temp= 31.85°C

BP= 686.0

sp Cond= 517.9 µS/cm

pH= 8.23

ORP= 205 mV

DO= 3.04 mg/L

Cleared over 3 borehole before sampling started

Alkalinity Value strip test 120 ppm as $CaCO_3$

Titration* 176 mg/L as $CaCO_3$ for pH 4.8

178 mg/L as $CaCO_3$ for pH 4.5

* unfiltered sample

Time on in line probe wrong

Hotel rooms had no refridgerators so samples kept on ice in coolers

Other late arriving participants: UNLV, USGS, + Arend Meijer.

Portion of 6L collected not used for aliquots or field analyses was discarded

BW 9-21-05

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TITLE 19 Sept 05 CONT **PROJECT** BAW

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Local Well Number	Zone (if applicable)
NC-EWDP-27P	na

Time	Date	Sampled by
1322	9-19-2005	BAW + RM

State	District	County
NV	na	NYE

	Value		Value	Units
Yeild when sampling (GPM)	0.25	Water temperatrue	34.7	C
Minutes pumped before sampling	11:26 start pump 13:02 start sampling	Air temperature	36.5	C
Sampling method		Specific conductance	517.9	microS/cm
Sampling condition		Dissolved Oxygen	3.04	mg/L
Static water level (feet)	585.59' (top of PVC)	ORP	205	mV (Hydrogen)
Depth to top sample interval	580.7'	pH field	8.23	
Depth to bottom sample interval	620.6'	Alkalinity total field	176/178	mg/L as CaCO3
Finished well depth (feet)	631.0'		pH 4.8 / pH 4.5	
Hole depth (feet)	1900.0'	REMARKS:		

Sample ID *all prefix NC-EWDP	Volume
27P-0905-FA	1L
27P-0905-FUA	1L
27P-0905-UFUA	500mL
27P-0905-S-FUA	250mL
27P-0905-IC-FUA(F2)	2x 40mL

Sample Treatment/ID Key

F - filtered

A - acidifired

U - prefix "un"

S - stable isotope

IC - Inorganic Carbon

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TITLE 20 Sept 05 09/20/05 RM ~~cont~~ PROJECT

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Preparation for in-line probe for EWDP groundwater sampling on 20 Sept at 9:30 a.m

Initial entry 733/32-37
Procedure for challenging probe see 733/35-38
which includes id of standards

conductivity challenge
at 1003 ~~µS/cm~~ 09/20/05 RM ~~mS/cm~~ 09/21/05 RM µS/cm
probe reading at 986.3 ~~mS/cm~~ 09/21/05 RM µS/cm
temp reading at 24.90 °C

pH challenge o using pH 7.0
probe reading at 7.04
temp reading at 24.31 °C

recalibrated using pH 7.0
set point at 7.00
calibration successful
reading pH at 7.00

ORP challenge
probe reading at 288mV successful challenge
temp reading at 24.05 °C
target ORP at 287mV using pH 7.0

DO calibration calibration successful
Barometric pressure reading at 692.4

9/21/05 BW

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TITLE 20 Sept 05 cont **PROJECT**

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GPS III location of well 16P
NAD 83 UTM Zone 11

11 S 0545585 elevation = 877m
4064463

SAMPLING OF NC-EWDP-16P

Fluke meter temp readings at
Air = 20.6°C Water 24.8°C

In Line probe 1st reading
BP = 692.2
SpC = 472.1 ~~mS/m~~ BW 9-20-05 µS/cm
pH = 8.30
ORP = 259 mV
DO = 7.89 mg/L

Alkalinity -
Test strip 120-180 mg/L as $CaCO_3$
Titration* 168 (pH 4.8) 174 (pH 4.5) in
mg/L as $CaCO_3$
* unfiltered sample

BW
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1L-FUA very clean. Used two filters and pumping took about 15 minutes to fill the 1L bottle.

1L-FA very dirty. Used one filter and pumping took half as long as 1L-FUA to fill.

The filter's might be bad because another 1L-FUA was performed to test the filter's and it was also very dirty

The 1L-FUA very clean sample was then split into 2-500 mL HDPE bottles and one of the bottles has acid preservation and one bottle is not preserved. Labeled as follows:
500 mL FA-2-split for preserved sample (in HDPE)
500 mL FUA-2 split for unpreserved (in HDPE)

The NC-EWDP-16P-0905-FUA was completely consumed creating two samples indicated above. The only FUA sample in HDPE is the 500 mL NC-EWDP-16P-0905-FUA-2 split

Two FA HDPE exist:
the turbid NC-EWDP-16P-0905-FA-1 and
the clean NC-EWDP-16P-0905-FA-2 split.

Time on inline probe off
Samples stored in coolers (no refridgerators in room)
Participants: Nye County, UNLV, USGS, + Arend Meyer

Portion of 6L sample not used for aliquots or field analyses was discarded

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TITLE 20 Sept 05 CONT BAW PROJECT

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Local Well Number: NC-EWDP-16P

Zone (if applicable): na

Time: 11:45

Date: 9-20-05

Sampled by: BAW + RM

State: NV

District:

County: NYE

	Value		Value	Units
Yeild when sampling (GPM)	0.25	Water temperatrue	24.8	C
Minutes pumped before sampling	start pump 9:19 start sample 11:31	Air temperature	20.6	C
Sampling method		Specific conductance	472.1	microS/cm
Sampling condition		Dissolved Oxygen	7.89	mg/L
Static water level (feet)	498.65 top of PVC	ORP	259	mV (Hydrogen)
Depth to top sample interval	489.4'	pH field	8.30	
Depth to bottom sample interval	549.4'	Alkalinity total field	168/174	mg/L as CaCO3
Finished well depth (feet)	559.9'		pH 4.8 / pH 4.5	
Hole depth (feet)	2900.0'	REMARKS:	Water very turbid	

Sample ID	Volume
NC-EWDP-16P-0905-FA-1	1 L
NC-EWDP-16P-0905-FA-2-split	500mL
NC-EWDP-16P-0905-FUA-2 split	500mL
NC-EWDP-16-0905-S-FUA	250mL
NC-EWDP-16P-0905-IC-FUA(1-2)	2 x 40mL
NC-EWDP-16P-0905-UFUA	500mL

Sample Treatment/ID Key

F - filtered

A - acidifired

U - prefix "un"

S - stable isotope

IC - Inorganic Carbon

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TITLE 21 Sept 05 BAW PROJECT

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Preparation of in-line probe for EWDP ground water sampling on 21 Sept 05

Initial entry 733/32-37

Procedure for challanging probe - 733/35-37

CONDUCTIVITY CHALLANGE (and reagents)

std used = 1003 µS/cm

Probe measured 982.1 µS/cm at 22.6°C

challange successfully done

pH CHALLANGE

std used = pH 7

Target value for 22.21°C is 7.01

Probe Measured 6.93

Recalibrated

pH 7 setpt at 7.01 for 22.21°C

challenge w/ pH 10 ~~setpt~~ BW/9-21-05 at 10.03 for 22.21°C

pH 10 = Fisher cat # SB115

lot # 038939

pH 10 reading = 10.02 - challenge successfull

ORP challange

pH 7 powder pillows used

Target value at 22.89°C is 291 mV

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TITLE 21 Sept 05 BAW PROJECT CONT

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ORP measured at 294 mV
challange successful
DO calibration
Barometric pressure at 700.6
calibration successful

Well NC-EWDP-28P Sampling

Alkalinity - test strip 120 mg/L $CaCO_3$
Titration* -
added phenolphthalen and there was no color change
178 (pH 4.8) 190 (pH 4.5) mg/L $CaCO_3$
if one were to alter, it would be the 178 value
* unfiltered sample.

in-line probe readings
temp 29.99 °C
BP 691.1
SPC 438.7 mSm/cm
PH 8.53
ORP 244 mV
DO 3.98 mg/L

GPS III Location of well 28P
NAD 83 UTM zone 11
ITS 0545664 elevation = 840 m
4062591

Well ~~drg~~ BW dried up while people were sampling
9-21-05

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NYE CO. In-line probe values for 1st 3 days

Well	Temp °C	pH	EC µmhos/cm	Time
16P	24.53	8.26	475	11:02
28P	27.53	8.57	628	0932
27P	31.21	8.28	831	12:30

We intended to collect 10L (1L HDPE bottles) at NC-EWDP-28P for sorption experiments. The well started to dry while the groups were still sampling. As a result, we were only able to ~~gather~~ ~~BW~~ 9-21-05 gather enough for 1L for sorption exps (NC-EWDP-28P-0905-F4A-2).

For first 3 wells (27P, 16P, + 28P) a minimum of 3 borehole volumes were pumped before sampling started.

10-5-05
BW

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TITLE 7 Sept 05 BAW **PROJECT** CONT

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Local Well Number	Zone (if applicable)
NC-EWDP-28P	na

Time	Date	Sampled by
10:30	9-21-05	BAW + RM

State	District	County
NV	na	NYE

	Value		Value	Units
Yeild when sampling (GPM)	0.25 to 0.3	Water temperatrue	33.0	C
Minutes pumped before sampling	Start pump 5:50 " sample 9:56	Air temperature	29.8	C
Sampling method		Specific conductance	438.7	microS/cm
Sampling condition		Dissolved Oxygen	3.98	mg/L
Static water level (feet)	377.31' Top of pvc.	ORP	244	mV (Hydrogen)
Depth to top sample interval	370.0'	pH field	8.53	
Depth to bottom sample interval	449.0'	Alkalinity total field	178/190	mg/L as CaCO3
Finished well depth (feet)	459.3'		pH 4.8 / pH 4.5	
Hole depth (feet)	2080.0'	REMARKS:	Well dried up during sampling	

Sample ID NC-EWDP prefix*	Volume
28P-0905-FA	1L
28P-0905-FUA(1-2) BW 9-26	2x 1L
28P-0905-UFUA	500mL
28P-0905-S-FUA	250mL
28P-0905-IC-FUA(1-2)	2x 40mL

Sample Treatment/ID Key

F - filtered

A - acidifired

U - prefix "un"

S - stable isotope

IC - Inorganic Carbon

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TITLE 22 SEP 2005 PROJECT

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Collection of water samples and measurement of water chemistry at well NC-EWDP-24P

water level measured 406.49 feet
9/21/05 by Nye Co.
Pump set at 415.0 feet 9/22/05

pump flow rate at approx. 0.25 - 0.5 ~~L/min~~ gal/min

Probe preparation: Initial entry 733/32.37

Conductivity challenge: std used = 1003 µS/cm
probe read 952 µS/cm @ 22.49 °C

recalibrated probe for conductivity

dry calibration at 0.0 µS/cm
next cal point 1003 µS/cm } 2 point cal
calibration successful

pH challenge

std used: pH 7, target 7.01 @ 22.8 °C
reading 7.06 22.79 °C
challenge passed no recalibration needed

ORP challenge:

2 - pH 4 powder pillows w/ quinhydrone sat. soln.
Target value is approx 466 mV @ 22.5 °C
probe reads 463 @ 23.36 °C, challenge passed
no recal. needed

DO calibration:

Barometric pressure at 689.8 mm Hg
calibration successfully 9/22/05

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TITLE 22 Sep 2005 PB **PROJECT**

Local Well Number	Zone (if applicable)
NC-EWDP-24P	N/A

Time	Date	Sampled by
10:00 am Complete at 10:40am PDT	22 Sep 05	PB and MJ

State	District	County
Nevada	N/A	Nye

	Value		Value	Units
Yeild when sampling (GPM)	0.25 to 0.5 gal/min	Water temperatrue	30.38	C
Minutes pumped before sampling	N/A 3 borehole volumes	Air temperature	24.2°C	C
Sampling method	air driven pump	Specific conductance	320.8	microS/cm
Sampling condition	good	Dissolved Oxygen	4.73	mg/L
Static water level (feet)	406.49 ft	ORP	264	mV (Hydrogen)
Depth to top sample interval	400.0 ft	pH field	7.84	
Depth to bottom sample interval	440.0 ft	Alkalinity total field	109/113	mg/L as CaCO3
Finished well depth (feet)	784. ft	pump set at 415.0 ft	pH 4.8 / pH 4.5	
Hole depth (feet)	1260.0 ft but grouted to 784.0 ft	REMARKS:		

Sample ID NC-EWDP prefix*	Volume	Sample Treatment/ID Key
24P - 0905 - FA	1 L	
24P - 0905 - FUA	1 L	F - filtered
24P - 0905 - UFUA	500 mL	A - acidifired
24P - 0905 - S - FUA	250 mL	U - prefix "un"
24P - 0905 - IC - FUA1/2	2 x 40 mL	S - stable isotope
		IC - Inorganic Carbon

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TITLE 22 Sep 2005 PB PROJECT

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Sampling @ NC-EWDP-24P

Air temp reading: (Fluke) is 24.2°C

Inline Probe 1st Reading:

BP = 688.4

SpC = 320.8 µS/cm

pH = 7.84

ORP = 264 mV

DO = 4.73 mg/L 69.5%

Temp = 30.38°C

Alkalinity - test strip ~120 mg/L as $CaCO_3$

Titration - green/gray 97 mg/L as $CaCO_3$
purple 109 "
pink 113 "

10-5-05 BW

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TITLE 23 Sep 2005 PB PROJECT

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Collection of water samples and measurement of water chemistry at well NC-EWDP-29P

water level 348.1 feet - measured by Nye Co.

pump set at 358.3 feet

pump flow rate at 0.3 to 0.5 gal/min

Probe preparation - Initial entry 733/32-37

Conductivity challenge:

Target : 1003 µS/cm (1003 µS/cm standard)

probe read 1001 µS/cm 24.55 °C

challenge passed no recalibration needed

pH challenge:

Target : 7.00 buffer (7.0 standard)

probe read : 7.06 at 24.7 °C

challenge passed no recalibration needed

ORP challenge:

2 - pH 4 powder pillows, 100 mL nH_2O, with sat. soln. quinhydrone

Target ORP value : ~~466 @ 25.~~ 133 9/23/05

(mV)

: 460 @ 25.2 °C

probe reads - 457 mV @ 25.2 °C

DO calibration:

Barometric pressure at 686.6 mm Hg

calibration successful

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TITLE 23 Sep 2005 PB PROJECT:

Local Well Number	Zone (if applicable)
NC-EWDP-29P	N/A

Time	Date	Sampled by
9:00 am start PDT 9:22 am complete	23 Sep 2005	PB + MJ

State	District	County
Nevada	N/A	Nye

	Value		Value	Units
Yeild when sampling (GPM)	0.3 - 0.5 gal/min	Water temperatrue	26.06	C
Minutes pumped before sampling	N/A 3 borehole volumes	Air temperature	26.3	C
Sampling method	air driven pump	Specific conductance	303.0	microS/cm
Sampling condition		Dissolved Oxygen	5.65	mg/L
Static water level (feet)	348.1	ORP	260	mV (Hydrogen)
Depth to top sample interval	340.0 ft	pH field	7.96	
Depth to bottom sample interval	390.0 ft	Alkalinity total field	100 / 107	mg/L as CaCO3
Finished well depth (feet)	790.7 ft		pH 4.8 / pH 4.5	
Hole depth (feet)	790.7 ft	REMARKS: collapsed to 703.5 ft		

Sample ID NC-EWDP prefix*	Volume	Sample Treatment/ID Key
29P-0905-FA	1 L	
29P-0905-FUA	1 L	F - filtered
29P-0905-UFUA	500 mL	A - acidifired
29P-0905-S-FUA	250 mL	U - prefix "un"
29P-0905-IC-FUA 1/2	2 x 40 mL	S - stable isotope
		IC - Inorganic Carbon

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TITLE 23 Sep 2005 PB PROJECT

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~~29~~ PB 29p - cont'd
PB 9/23/05

Air temperature (Fluke) = 26.3°C

In-line probe readings

BP = 685.3 mmHg water temp : 26.06 °C

SC = 303.0 µS/cm

pH = 7.96

ORP = ~~260 mV~~ PB 9/23/05 260 mV

DO = 5.65 mg/L 77.2%

Alkalinity Test strip : ~ 80 mg/L as $CaCO_3$

Titration : 89 purple mg/L as $CaCO_3$
100 green / gray "
107 pink "

10-6-05
BAW

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TITLE 5 OCT 05 BAW PROJECT

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Creation of aliquots for stable isotope analyses of NC-EWDP groundwater samples from Sep 2005 event

Samples from NC-EWDP wells 27P (733/40) 16P (733/44), 28P (733/48), 24P (733/50), + 29P (733/53)

Samples were done in duplicate. Aliquots were poured into 60mL pp bottles that were prelabeled. Each bottle was then parafilmed. Below is the legend

CNWRA ID* (all prefixes NC-EWDP)	COASTAL SCIENCE ID
27P-0905-5-FUA	090551
27P-0905-5-FUA	090552
16P-0905-5-FUA	090553
16P-0905-5-FUA	090554
28P-0905-5-FUA	090555
28P-0905-5-FUA	090556
24P-0905-5-FUA	090557
24P-0905-5-FUA	090558
29P-0905-5-FUA	090559
29P-0905-5-FUA	0905510

Two blanks from lab tap water were also prepared, water from Bld 57 Lab 106 (1st room w/ exit door) cold water

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TITLE 5 OCT 05 CONT BAW PROJECT

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line. Tap water was run for 5 minutes. Each bottle was rinsed three times with this tap water. Each bottle was filled with tap water, sealed, and parafilmed. They were labeled 0905511 and 0905512

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TITLE 6 OCT 05 BAW PROJECT

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Preparation of Aliquots from Sept 2005 NC-EWDP Groundwater Samples for Div 01 Cation and Anion Analyses

Task initially assigned to: Marla Roberts and Bradley Werling

Objectives: To prepare aliquots for cation and anion analyses that are intended to help characterize the groundwater in the Yucca Mountain vicinity and aid in the investigation concerning radionuclide sorption.

Samples: Six cation aliquots from five different NC-EWDP wells (733/40-53). Two cation samples were collected from NC-EWDP-16P. Please see 733/43 for an explanation. Cation aliquots taken from FA samples

Five anion aliquots from five different NC-EWDP wells (733/40-53). Anion aliquots taken from FUA samples.

Legend with specific CNWRA Ids and the new Div 01 Ids included in this entry.

Supplies: 60 mL pp bottles
125 mL pp bottles
parafilm

Procedure:

Cation samples (FA = filtered, acidified) were decanted into 60 mL bottles and anion samples (FUA = filtered, unacidified) were decanted into 125 mL bottles. Aliquots were decanted into prelabled bottles, capped, and sealed with parafilm. Legend relating CNWRA Ids and the new Div 01 Ids in table below. The prefix for Div 01 cation and anion Ids was 0905 to indicate the month and year when the parent sample was collected. Cation sample Ids contained a "C" while anion sample Ids contained an "A".

Table: Legend relating CNWRA and Div 01 sample Ids for Sept 2005 NC-EWDP samples

CNWRA ID	DIV 01 ID
NC-EWDP-27P-0905-FA	0905C-1
NC-EWDP-16P-0905-FA-2 Split	0905C-2
NC-EWDP-28P-0905-FA	0905C-3
NC-EWDP-24P-0905-FA	0905C-4
NC-EWDP-29P-0905-FA	0905C-5
NC-EWDP-16P-0905-FA-1	0905C-6
NC-EWDP-27P-0905-FUA	0905A-1
NC-EWDP-16P-0905-FUA-2 Split	0905A-2
NC-EWDP-28P-0905-FUA-1	0905A-3
NC-EWDP-24P-0905-FUA	0905A-4
NC-EWDP-29P-0905-FUA	0905A-5

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TITLE 6 OCT 05 CONT BAW PROJECT

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Preparation of Cation and Anion QA Solutions.

Bradley Werling will be performing this task.

Objective: To prepare QA solutions to include with Sept 2005 NC-EWDP cation and anion samples sent to Div 01 for analyses..

Reagents
Spex Certiprep Instrument Calibration Standard 3 (cat # CL-CAL-3, lot # 12-71MS)
Spex Certiprep IC Instrument Check Standard 2 (cat # ICMIX2-100, lot # 28-138AS)
Type 1 water (Barnstead/Thermolyne model D11901 sn1190010979691)

Supplies:
Volumetric pipets
Volumetric flasks
HDPE bottles
Squirt bottle for water
Kimwipes

Procedure

Added 10 mL (volumetric pipet) of cation mix (Spex CL-CAL-3) into a 1000 mL volumetric flask and filled to mark with type 1 water and mixed thoroughly. Decanted into a 1 L HDPE bottle and labeled Cation Std for 0905 samples (date, initials, and SN ref also). The cation dilution factor is 100.

Added 10 mL (volumetric pipet) of anion mix (Spex ICMIX2-100) into a 500 mL volumetric flask and filled to mark with type 1 water and mixed thoroughly. Decanted into a 500 mL HDPE bottle and labeled Anion Std for 0905 samples (date, initials, and SN ref also). The anion dilution factor is 50.

Table of Target Conc (ppm) of QA standards for Sept 2005 Samples

Species	Conc (ppm) in Spex Standard	Dilution Factor	Target Conc (ppm) of QA Standard
Fe	1000	100	10
K	1000	100	10
Ca	1000	100	10
Na	1000	100	10
Mg	1000	100	10
HPO4	600	50	12
Br	400	50	8
NO3	400	50	8
SO4	400	50	8
Cl	200	50	4
F	100	50	2

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TITLE 06OCT05 cont BW PROJECT

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Preparation of QA stds for Sept 2005
NC-EWDP stds - Cont from 733/58

Cation aliquot collected in 60mL pp bottle from Cation Std for 0905 samples (733/58) and labeled 0905C-7.

Anion aliquot collected in 125mL pp bottle from Anion Std for 0905 samples (733/58) and labeled 0905A-6.

Target values for QA stds in table on 733/58

10-8-05 BW

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TITLE 8 OCT 05 BAW PROJECT

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Delivery of NC-EWDP Sept 2005 Groundwater Samples to Div 01 for Cation + Anion Analyses

Collection of samples in field - 733/32-53

SAMPLES: 6 Cation - 733/57

5 Anion - 733/57

2 QA (1 cation + 1 anion) 733/58-59

Sample ID legend - 733/57

QA ID legend - 733/59

QA target conc - 733/58

Chain of Custody - On following pages

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BW

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TITLE 8/OCT05 CAN BATCH PROJECT

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SAMPLE LIST/CHAIN OF CUSTODY

Southwest Research Institute®
Chemistry and Chemical Engineering Division
6220 Culebra Road
San Antonio, Texas 78238-5166

Shipper Name/Address: BRAD WERLING DIV 20 BLD 57

Client:

Client Purchase Order/Other ID:

Site/Zone ID:

Requested Turnaround:
- ☐ 2 Weeks
- ☐ 3 Weeks
- ☒ Other: 4 weeks

SwRI Contact: Mike Dammann

Analyses Requested

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers	Analyses of major + minor elements - ICP									REMARKS
0905C-1	10-6-05		W		1	X									Nuclear Safety related - use appropriate QA procedures,
0905C-2						X									
0905C-3						X									
0905C-4						X									
0905C-5						X									
0905C-6						X									POC- Brad Werling
0905C-7						X									phone - 6565
															fax - 5784

Preservation
- **a** = HCl to pH <2
- **b** = HNO_3 to pH <2
- **c** = H_2SO_4 to pH <2
- **d** = NaOH to pH >12
- **e** = Cool (4°C±2°C)
- **f** = Other (specify)

Matrix Types:
- **A** – Air
- **B** – Biota
- **D** - Dust
- **E** – Emission/Stack
- **L** - Liquid
- **P** – Product
- **Sd** - Solid
- **S** – Soil
- **SED** – Sediment
- **T** - Tissue
- **W** - Water
- **WP** - Wipe

Sample Types:
- **D** - Duplicate
- **ER** – Equipment Rinsate
- **ES** – Environmental Sample
- **FB** – Field Blank
- **FD** – Field Duplicate
- **MS** – Matrix Spike
- **MSD** – Matrix Spike Dup
- **TB** – Trip Blank

Temp: 22.0°C

Therm #: 027

Comments: 733/57-9 Reid Intact

Relinquished by (Print/Signature)	Date	Time
X Mark Robert	X 10/07/05	X 13:20
Received by (Print/Signature)	Date	Time
Relinquished by (Print/Signature)	Date	Time
Received by (Print/Signature)	Date	Time
Relinquished by (Print/Signature)	Date	Time

SwRI Project#: 20.06.02.242

Received by SwRI Lab: (Signature)

Date: 10/7/05 Time: 1320

Samples Disposed: Date: Time:

Samples Disposed by:

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TITLE 8 OCT 05 cont BW PROJECT

SAMPLE LIST/CHAIN OF CUSTODY

Southwest Research Institute®
Chemistry and Chemical Engineering Division
6220 Culebra Road
San Antonio, Texas 78238-5166

Shipper Name/Address: BRAD WERLING DIV 20 BLD 57

Client:

Client Purchase Order/Other ID:

Site/Zone ID:

Requested Turnaround:
- ☐ 2 Weeks
- ☐ 3 Weeks
- ☒ Other: 4 WEEKS

SwRI Contact: Mike Dammann

Analyses Requested

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers	Anions by IC except phosphate	Phosphate by 365.3								
0905A-1	10-6-05		W		1	X	X								
0905A-2						X	X								
0905A-3						X	X								
0905A-4						X	X								
0905A-5						X	X								
0905A-6						X	X								

REMARKS

Preservation
- a = HCl to pH <2
- b = HNO_3 to pH <2
- c = H_2SO_4 to pH <2
- d = NaOH to pH >12
- e = Cool (4°C±2°C)
- f = Other (specify) none

Nuclear Safety related - use appropriate QA procedures.

POC - Brad Werling
phone - 6565
fax - 5184

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Matrix Types:
- **A** – Air
- **B** – Biota
- **D** - Dust
- **E** – Emission/Stack
- **L** - Liquid
- **P** – Product
- **Sd** - Solid
- **S** – Soil
- **SED** – Sediment
- **T** - Tissue
- **W** - Water
- **WP** - Wipe

Sample Types:
- **D** - Duplicate
- **ER** – Equipment Rinsate
- **ES** – Environmental Sample
- **FB** – Field Blank
- **FD** – Field Duplicate
- **MS** – Matrix Spike
- **MSD** – Matrix Spike Dup
- **TB** – Trip Blank

Temp: 22.0°C Therm #: 027

Comments: 733/57-9 Rec'd Tuted

Relinquished by (Print/Signature)	Date	Time
+ Mario Ribera	10/7/05	13:20
Received by (Print/Signature)	Date	Time
Relinquished by (Print/Signature)	Date	Time
Received by (Print/Signature)	Date	Time
Relinquished by (Print/Signature)	Date	Time

SwRI Project#: 20.06002.242

Received by SwRI Lab: (Signature)

Date	Time
10/7/05	1320

Samples Disposed: Date | Time

Samples Disposed by:

Div 01 COC Form 01-01-001, Rev 8/02

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TITLE 14 OCT 05 BAW PROJECT

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Preparation of Sodium Persulfate Solution for Inorganic Carbon Analyses

Bradley Werling will perform this task

Objective

To prepare sodium sulfate solution needed for inorganic carbon analyses

Target Concentration: 10% persulfate and 5% phosphoric acid

Reagents

Type 1 water (Barnstead/Thermolyne model D11901 SN 1190010979691)
Sodium Persulfate (Acros 20202 lot # B0104212)
Phosphoric acid (Fisher A242-4 lot # 001815) ACS grade

Equipment

Mettler AE 240 balance (SN 101237)

Supplies

Weigh boat
10 mL and 250 mL graduated cylinders
Spatula
250mL pc bottle

Procedure

A weigh boat was tared on the balance. About 25g of sodium persulfate was carefully transferred to a weigh boat and the mass was recorded. The sodium persulfate was transferred into a 250mL pc square bottle. A quantity of 213mL of type 1 water (straight from the Barnstead unit) was measured in a 250mL graduated cylinder. Small aliquots of this water were used to rinse the weigh boat several times and the rinsate was added to the 250mL pc bottle. Then the entire remaining amount of the water was added to the pc bottle. The solution was swirled by hand to dissolve the sodium persulfate. A quantity of 9mL (10mL graduated cylinder) of phosphoric acid was added to the 250mL pc bottle. The solution was carefully mixed and labeled Sodium Persulfate Solution (with date, initials, and sn reference).

Source for procedure: Section 3.3 of Tekmar Dohrmann Phoenix 8000 User Manual Document Part Number 14-7045-074, Rev C, 1998.

Challenge of balance (Target = 20.0001g)

At start = 20.0001g At end = ~~25.0820g~~ 20.0001g BW 10-14-05

Mass (g) of sodium persulfate = 25.0820g

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TITLE 14 OCT 05 CONT BW PROJECT

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Preparation of 21% Phosphoric Acid Solution for Inorganic Carbon Analyses

Bradley Werling will perform this task

Objective

To prepare a 21% phosphoric acid solution needed for inorganic carbon analyses

Reagents

Type 1 water (Barnstead/Thermolyne model D11901 SN 1190010979691)
Phosphoric acid (Fisher A242-4 lot # 001815) ACS grade

Supplies

50 mL and 250 mL graduated cylinders
250mL pc bottle

Procedure

A quantity of 188mL of type 1 water (straight from the Barnstead unit) was measured in a 250mL graduated cylinder and transferred to a 250mL pc bottle. A quantity of 37mL (50mL graduated cylinder) of phosphoric acid was carefully added to the 250mL pc bottle. The solution carefully mixed was labeled 21% phosphoric acid (with date, initials, and sn reference).

Source for procedure: Section 3.3 of Tekmar Dohrmann Phoenix 8000 User Manual Document Part Number 14-7045-074, Rev C, 1998.

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TITLE 170ct05 BAW PROJECT

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Preparation of Inorganic Carbon (IC) Standards for Inorganic Carbon Analyses

Bradley Werling will perform this task

Objective

To prepare inorganic carbon standards needed for inorganic carbon analyses

Target Concentrations: 5, 10, 20, 50, 100, and 200 ppm IC standards

Reagents

Type 1 water (Barnstead/Thermolyne model D11901 SN 1190010979691)
Sodium Carbonate anhydrous (Na2CO3) Fisher cat # S263-500, lot # 006077

Equipment

Mettler AE 240 balance (SN 101237)

Supplies

Weigh boat
Spatula
Volumetric flasks and pipets
VOA bottles – 40mL

Procedure

A weigh boat was tared on the balance. About 1.7650 g of sodium carbonate was carefully transferred to a weigh boat and the mass was recorded. The sodium carbonate was transferred into a 1000mL volumetric flask partially filled with fresh (direct from unit) type I water. Small aliquots of fresh type I water were used to rinse the weigh boat several times and the rinsate was added to the 1000mL volumetric flask. Then the flask was filled to mark with fresh type I water and thoroughly mixed. The solution was labeled 200 ppm IC (also with date, initials, and sn reference). The other standards were created directly from this 200 ppm stock solution. The 100 ppm IC standard was prepared by transferring 50mL of 200 ppm stock solution into a 100mL volumetric flask, diluting to mark with fresh type I water, and thoroughly mixing. The other standards were prepared similarly (See table below for details). Aliquots of each of the standards were transferred (minimal headspace) into 40mL VOA bottles for use in the TOC autosampler. The number of 40mL bottles prepared for each calibration standard are identified in the table below.

IC Standard (ppm)	Vol (mL) of 200 ppm stock soln used	Final Vol (mL)	Number of 40mL VOA bottles prepared
200	na	na	2
100	50	100	2
50	25	100	2
20	20	200	3
10	10	200	2
5	5	200	2

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TITLE 17OCT05 CONT BAW PROJECT

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Challenge of Balance - Target mass = 20.0001g

At start = 20.0002g At End = 20.0003g

Mass of Sodium Carbonate = 1.7653

Stds placed in refridgerator in L106.

10-17-05

BAW

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TITLE 18 OCT 05 BW PROJECT

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Inorganic Carbon Analyses of Groundwater From Sept 2005 NC-EWDP Sampling Event

Bradley Werling and Marla Roberts will perform this task

Objective

To characterize by inorganic carbon analyses groundwater from NC-EWDP wells and aid in the investigation concerning radionuclide sorption.

Samples

NC-EWDP-27P-0905-IC-FUA-1 (733/40)
NC-EWDP-16P-0905-IC-FUA-1 (733/44)
NC-EWDP-28P-0905-IC-FUA-1 (733/48)
NC-EWDP-24P-0905-IC-FUA-1 (733/50)
NC-EWDP-29P-0905-IC-FUA-1 (733/53)

Reagents

Type 1 water (Barnstead/Thermolyne model D11901 SN 1190010979691)
Sodium persulfate solution – SN 733/63
Phosphoric acid solution– SN 733/64
Inorganic carbon calibration standards – SN 733/65-66

Equipment

Tekmar Dohrmann Phoenix 8000 TOC Analyzer 147045000 (sn 00343010)

Supplies

40mL amber glass vials

Conditions

Method - Inorganic carbon 20-200ppm standard method (not custom)
Calibration curve – from 5 to 200 ppm IC with 0ppm used

Procedure: followed Tekmar Dohrmann Phoenix 8000 User Manual
Document Part Number 14-7045-074, Rev C, 1998.

Calibration standards and samples removed from refrigerator and allowed to warm up before analyses. Fresh (straight from unit) type 1 water was used for 0ppm standards and reservoir bottle. Calibration points included 0, 5, 10, 20, 50, 100, and 200ppm IC. Standards run in triplicate from single vials. Blanks and cleaning procedures were typically run for six repetitions. A blank (3 reps) was run after the samples and before a 20ppm std (cal check).

The same NC-EWDP wells were sampled in the fall of 2003 and analyzed for inorganic carbon. See 610-172 for the results of those analyses.

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TITLE 19 OCT 2005 BW PROJECT

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Inorganic Carbon Analyses of NC-EWDP Groundwater From the Sept 2005 Sampling Event

Bradley Werling will perform this task

Objective

To characterize by inorganic carbon analyses groundwater from NC-EWDP wells and aid in the investigation concerning radionuclide sorption.

Analyses performed on 18 Oct 2005 (see 733/67)

Samples

NC-EWDP-27P-0905-IC-FUA-1 (733/40)
NC-EWDP-16P-0905-IC-FUA-1 (733/44)
NC-EWDP-28P-0905-IC-FUA-1 (733/48)
NC-EWDP-24P-0905-IC-FUA-1 (733/50)
NC-EWDP-29P-0905-IC-FUA-1 (733/53)

Results

Raw data from analyses is stored in a PRN file. PRN files contain 39 columns of information. The legend for the contents of the 39 columns is found in Table 1 of this entry. Sample Ids are found in column 8. Raw data area counts are found in column 30. A summary of the results from the Sept 2005 samples was provided after the PRN file. The same NC-EWDP wells were sampled in the fall of 2003 and analyzed for inorganic carbon. See 610-172 for the results of those analyses. Results from the two different sampling events will be compared.

PRN file legend – 733/69
PRN file – 733/70-72
Results summary – 733/73
Comparison of results from the two different sampling events – 733/74

10-19-05
BAW

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Table 1. Information contained in the PRN file

Column	Contents
1	Current PRN Version Header
2	Sample Type
3	Sample Introduction
4	Run Status
5	Message Number
6	Runtime Month, Day, Year, Hour, Minute
7	Operator Name
8	Sample ID
9	Method ID
10	Cal Curve
11	Mode
12	Range
13	Number of Reps
14	Rep Number
15	Vial Number
16	Rack ID
17	Injection Volume
18	Sparger Volume
19	Dilution Volume
20	Water Volume
21	Reagent Volume
22	Acid Volume
23	UV Presparge Time
24	IC Presparge Time
25	Mixing Time
26	Threshold
27	Baseline Volts
28	Endpoint Volts
29	Total Time
30	Initial Result
31	µg Carbon
32	ppm Carbon
33	Blank Value
34	Cal Factor
35	Caltime Month, Day, Year, Hour, Min
36	R2
37	Y-intercept
38	Data file
39	Stripchart Data File

Source: Tekmar Dohrmann Phoenix 8000 User Manual
7143 East Kemper Road, Cincinnati, Ohio
Document Part Number 14-7045-074 Rev C, 1998

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TITLE 19 OCT 05 CONT GW PROJECT

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PRN file for Sept 2005 Groundwater Samples

1	2	3	4	5	6	7	8	9	10
~~v2.0	3	1	Done	0	10/18/2005 12:44	USER1	0 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 12:47	USER1	0 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 12:50	USER1	0 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 12:54	USER1	5 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 12:57	USER1	5 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 13:00	USER1	5 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 13:04	USER1	10 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 13:08	USER1	10 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 13:11	USER1	10 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 13:15	USER1	20 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 13:19	USER1	20 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 13:22	USER1	20 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 13:27	USER1	50 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 13:31	USER1	50 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 13:34	USER1	50 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 13:39	USER1	100 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 13:43	USER1	100 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 13:47	USER1	100 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 13:52	USER1	200 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 13:56	USER1	200 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	3	1	Done	0	10/18/2005 14:01	USER1	200 ppm IC	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	10	1	Done	0	10/18/2005 14:04	USER1	Blank	Blank IC Ranges 3 4 & 5	IC20ppm5
~~v2.0	10	1	Done	0	10/18/2005 14:06	USER1	Blank	Blank IC Ranges 3 4 & 5	IC20ppm5
~~v2.0	10	1	Done	0	10/18/2005 14:08	USER1	Blank	Blank IC Ranges 3 4 & 5	IC20ppm5
~~v2.0	10	1	Done	0	10/18/2005 14:11	USER1	Blank	Blank IC Ranges 3 4 & 5	IC20ppm5
~~v2.0	10	1	Done	0	10/18/2005 14:13	USER1	Blank	Blank IC Ranges 3 4 & 5	IC20ppm5
~~v2.0	10	1	Done	0	10/18/2005 14:15	USER1	Blank	Blank IC Ranges 3 4 & 5	IC20ppm5
~~v2.0	0	1	Done	0	10/18/2005 14:19	USER1	24P	IC Range 20 - 200 ppm C	IC20ppm5
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~~v2.0	0	1	Done	0	10/18/2005 14:43	USER1	28P	IC Range 20 - 200 ppm C	IC20ppm5
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~~v2.0	0	1	Done	0	10/18/2005 15:13	USER1	16P	IC Range 20 - 200 ppm C	IC20ppm5
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~~v2.0	0	1	Done	0	10/18/2005 15:19	USER1	IC 0 ppm	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	0	1	Done	0	10/18/2005 15:22	USER1	IC 0 ppm	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	0	1	Done	0	10/18/2005 15:26	USER1	IC 20 ppm	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	0	1	Done	0	10/18/2005 15:30	USER1	IC 20 ppm	IC Range 20 - 200 ppm C	IC20ppm5
~~v2.0	0	1	Done	0	10/18/2005 15:34	USER1	IC 20 ppm	IC Range 20 - 200 ppm C	IC20ppm5

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11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
2	2	3	1	2	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.277	7.269
2	2	3	2	2	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.285	7.279
2	2	3	3	2	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.262	7.254
2	2	3	1	3	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.221	7.215
2	2	3	2	3	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.264	7.255
2	2	3	3	3	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.239	7.233
2	2	3	1	4	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.178	7.173
2	2	3	2	4	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.167	7.161
2	2	3	3	4	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.166	7.161
2	2	3	1	5	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.093	7.092
2	2	3	2	5	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.132	7.127
2	2	3	3	5	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.149	7.149
2	2	3	1	6	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.123	7.119
2	2	3	2	6	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.201	7.197
2	2	3	3	6	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.198	7.198
2	2	3	1	7	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.205	7.202
2	2	3	2	7	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.359	7.355
2	2	3	3	7	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.375	7.373
2	2	3	1	8	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.338	7.337
2	2	3	2	8	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.492	7.49
2	2	3	3	8	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.571	7.569
2	2	6	1	1001	101805B	0	0	0	5	0	0.5	0	10	0	0.5	6.423	6.92
2	2	6	2	1001	101805B	0	0	0	5	0	0.5	0	10	0	0.5	6.144	6.644
2	2	6	3	1001	101805B	0	0	0	5	0	0.5	0	10	0	0.5	6.066	6.563
2	2	6	4	1001	101805B	0	0	0	5	0	0.5	0	10	0	0.5	6.045	6.544
2	2	6	5	1001	101805B	0	0	0	5	0	0.5	0	10	0	0.5	6.049	6.545
2	2	6	6	1001	101805B	0	0	0	5	0	0.5	0	10	0	0.5	6.014	6.514
2	2	3	1	9	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.04	7.039
2	2	3	2	9	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.118	7.117
2	2	3	3	9	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.155	7.151
2	2	3	1	10	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.047	7.047
2	2	3	2	10	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.094	7.089
2	2	3	3	10	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.116	7.112
2	2	3	1	11	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.041	7.039
2	2	3	2	11	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.06	7.054
2	2	3	3	11	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.068	7.06
2	2	3	1	12	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.025	7.024
2	2	3	2	12	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.056	7.052
2	2	3	3	12	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.061	7.058
2	2	3	1	13	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.01	7.006
2	2	3	2	13	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.078	7.073
2	2	3	3	13	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.083	7.082
2	2	3	1	14	101805B	0.5	0	0	5	0	0.5	0	10	0	1	6.049	7.045
2	2	3	2	14	101805B	0.5	0	0	5	0	0.5	0	10	0	1	5.89	6.882
2	2	3	3	14	101805B	0.5	0	0	5	0	0.5	0	10	0	1	5.822	6.82
2	2	3	1	15	101805B	0.5	0	0	5	0	0.5	0	10	0	1	5.81	6.808
2	2	3	2	15	101805B	0.5	0	0	5	0	0.5	0	10	0	1	5.927	6.925
2	2	3	3	15	101805B	0.5	0	0	5	0	0.5	0	10	0	1	5.929	6.928

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29	30	31	32	33	34	35	36	37	38	39
62	78179	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181242
62	80922	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181245
62	83109	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181248
88	702268	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181252
87	698652	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181255
87	704317	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181258
95	1344521	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181302
95	1342414	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181305
94	1344870	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181309
104	2628950	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181313
103	2627522	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181316
104	2654439	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181320
119	6576828	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181324
117	6568220	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181328
117	6569286	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181332
132	13401602	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181336
130	13585035	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181340
129	13265513	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181344
151	28019133	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181349
153	28326149	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181353
144	28268076	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181358
66	164485	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181402
69	118509	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181405
70	108141	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181407
70	106350	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181409
70	104763	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181412
69	100289	0	0	0	0.00E+00	1/1/1970 0:00	0	0	10181223	10181414
109	3891454	15.7819	31.5638	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181417
107	3824340	15.5022	31.0045	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181420
105	3854719	15.6288	31.2577	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181424
114	5793081	23.7053	47.4107	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181428
112	5773006	23.6217	47.2434	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181432
111	5695098	23.2971	46.5942	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181436
112	5523501	22.5821	45.1642	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181440
110	5435048	22.2135	44.4271	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181444
110	5366957	21.9298	43.8596	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181447
105	3665848	14.8419	29.6837	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181452
105	3562510	14.4113	28.8226	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181455
105	3660273	14.8186	29.6373	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181459
113	5545151	22.6723	45.3446	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181503
111	5475443	22.3818	44.7637	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181507
111	5504599	22.5033	45.0067	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181510
66	162950	0.2465	0.4929	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181515
66	140809	0.1542	0.3084	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181518
67	142157	0.1598	0.3196	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181521
102	2631328	10.5314	21.0627	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181524
101	2648462	10.6028	21.2055	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181528
102	2696005	10.8009	21.6017	103800	2.40E+05	10/17/2005 16:54	0	0	10181223	10181531

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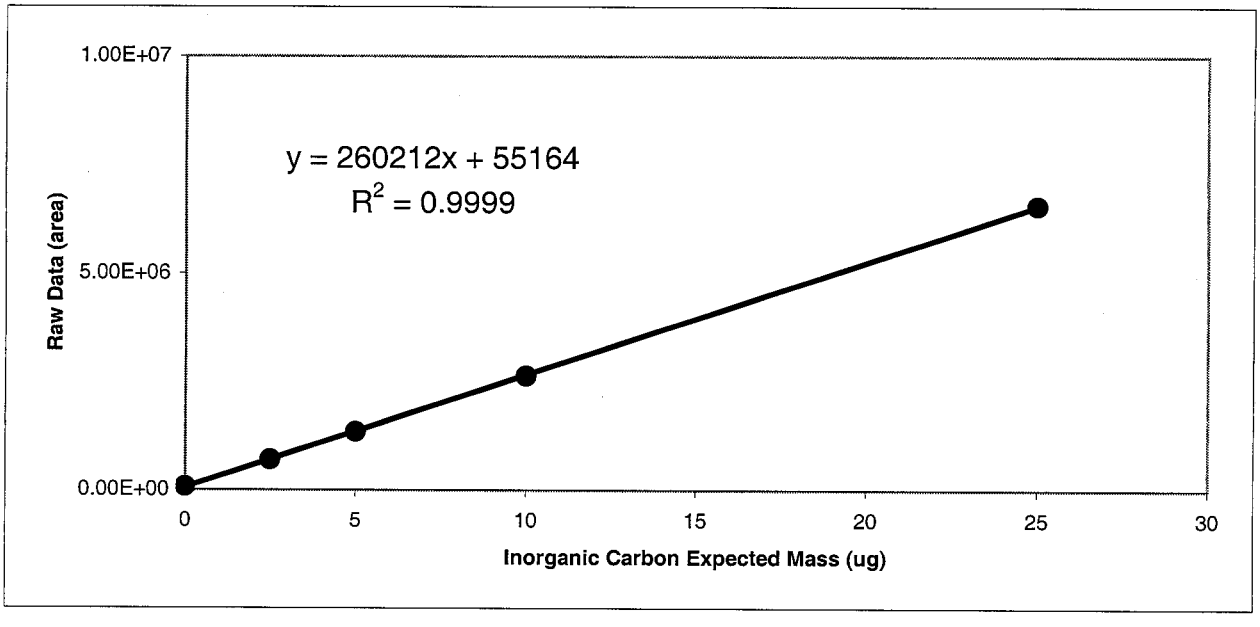
Inorganic Carbon (IC) Analysis
EWDP groundwater from Sep 2005 sampling event
Method - 20 ppm to 200 ppm IC (standard)

IC Standard Data

IC Std (ppm)	IC expected mass (ug)	Raw Data rep 1	rep 2	rep 3	Raw Data Ave
0	0	78179	80922	83109	80737
5	2.5	702268	698652	704317	701746
10	5	1344521	1342414	1344870	1343935
20	10	2628950	2627522	2654439	2636970
50	25	6576828	6568220	6569286	6571445
100*	50	13401602	13585035	13265513	13417383
200*	100	28019133	28326149	28268076	28204453
Blank (last 3)	0	106350	104763	100289	103801

*100 and 200 ppm not used since no sample ppm was greater than 50 ppm

IC Calibration Curve



IC Sample Data

Sample ID	Raw Data rep 1	rep 2	rep 3	Raw Data Ave	mass (ug) IC	conc # (ppm)
24P	3891454	3824340	3854719	3856838	14.4	28.8
27P	5793081	5773006	5695098	5753728	21.7	43.4
28P	5523501	5435048	5366957	5441835	20.5	41.0
29P	3665848	3562510	3660273	3629544	13.5	27.1
16P	5545151	5475443	5504599	5508398	20.8	41.5
20 ppm std*	2631328	2648462	2696005	2658598	10.0	20.0

* calculated using y-intercept instead of average of last 3 blanks
# Calculated by dividing the mass by the volume of sample (0.5mL)

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Comparison of inorganic carbon concentration in groundwater from NC EWDP wells collected during different sampling events.

Well	Fall 2003 Event Results IC (ppm)	Fall 2005 Event Results IC (ppm)	Percent Different
NC-EWDP-16P	37.4	41.5	-11.0
NC-EWDP-24P	31.9	28.8	9.7
NC-EWDP-27P	44.5	43.4	2.5
NC-EWDP-28P	41.9	41.0	2.1
NC-EWDP-29P	26.8	27.1	-1.1

Source for Fall 2003 Event Results - 610/172
Source for Fall 2005 Event Results - 733/73

21 NOV 2005 BAW

Stable Isotope Results from Sept 2005 NC-EWDP Groundwater Samples

Task initially assigned to: Bradley Werling

Objectives: To help characterize the groundwater in the Yucca Mountain vicinity and aid in the investigation concerning radionuclide sorption.

Samples: Twelve total samples (733/55-56)
Samples from five different NC-EWDP wells (Sept 2005) analyzed in duplicate (10) and one QA sample analyzed in duplicate (2)

Legend relating CNWRA Ids to Coastal Science Ids at 733/55.

Proc. Plan Attachment to Purchase requisition number 06000252 (PO #692001N)
± 5% for majority of H and O analyses on CNWRA duplicate samples

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COASTAL SCIENCE LABORATORIES, INC.
6000 Mountain Shadows Drive • Austin, Texas 78735 • (512) 288-5533

November 7, 2005

Dr. Bradley A. Werling
Southwest Research Institute
Center for Nuclear Waste Regulatory Analyses
6220 Culebra Road
San Antonio, TX 78238-5166

Dear Dr. Werling:

We have completed stable isotope analysis of your samples received recently. The hydrogen data are reported relative to the SMOW reference material and are believed accurate to ±5 per mil. The oxygen data are also reported relative to SMOW and are believed accurate to ±0.3 per mil.

Purchase Req.No. 06000252

SAMPLE	δD_{SMOW}	$\delta^{18}O_{SMOW}$
0905S1	-111, -111	-14.0, -13.9
0905S2	-110	-13.9, -13.9
0905S3	-111, -110	-13.9
0905S4	-109	-13.8, -13.8
0905S5	-111	-13.7, -13.8
0905S6	-111	-13.9
0905S7	-110, -109	-14.0
0905S8	-111	-14.0
0905S9	-108	-13.7, -13.8
0905S10	-108, -109	-13.8, -13.8
0905S11	-29, -27	-4.4, -4.4
0905S12	-29, -30	-4.3, -4.4

Yours truly,

Ken Winters

Kenneth Winters
Laboratory Manager

CSL Ref.#FG77

Coastal Science Laboratories Phone/Fax 512-288-5533 email: info@csl-sira.com

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Source: Data (733/75) and Legend (733/55)

Stable Isotope data with full legend

CNWRA Sample ID	Coastal Science Sample ID	Hydrogen	Hydrogen CSL dup	Oxygen	Oxygen CSL dup
27P-0905-S-FUA	0905S1	-111	-111	-14.0	-13.9
27P-0905-S-FUA	0905S2	-110	na	-13.9	-13.9
16P-0905-S-FUA	0905S3	-111	-110	-13.9	na
16P-0905-S-FUA	0905S4	-109	na	-13.8	-13.8
28P-0905-S-FUA	0905S5	-111	na	-13.7	-13.8
28P-0905-S-FUA	0905S6	-111	na	-13.9	na
24P-0905-S-FUA	0905S7	-110	-109	-14.0	na
24P-0905-S-FUA	0905S8	-111	na	-14.0	na
29P-0905-S-FUA	0905S9	-108	na	-13.7	-13.8
29P-0905-S-FUA	0905S10	-108	-109	-13.8	-13.8
Lab tap water blank	0905S11	-29	-27	-4.4	-4.4
Lab tap water blank	0905S12	-29	-30	-4.3	-4.4

CSL = Coastal Science Lab
na = not analyzed
CSL randomly performs duplicate analyses on samples sent to them (typically about 20%)

CNWRA Blind Suplicates - procument plan acceptance data

Well	Hydrogen			Oxygen		
	Sample	Duplicate	% Recovery	Sample	Duplicate	% Recovery
27P-0905-S-FUA	-111	-110	99	-14.0	-13.9	99
16P-0905-S-FUA	-111	-109	98	-13.9	-13.8	99
28P-0905-S-FUA	-111	-111	100	-13.7	-13.9	101
24P-0905-S-FUA	-110	-111	101	-14.0	-14.0	100
29P-0905-S-FUA	-108	-108	100	-13.7	-13.8	101
Lab tap water blank	-29	-29	100	-4.4	-4.3	98

100% (12/12) CNWRA dups within plus/minus 5%

Results accepted based on meeting criteria identified in procurement plan ~~attacte~~ BW 11-21-05 attached to purchase req # 06000252 (FDS electronic file). Completed procurement plan sent to division financial clerk per QAP-016.

Bradley Werkley 11-21-05

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Coastal Science Laboratory Duplicates

Sample ID	Hydrogen	Hydrogen duplicate	Percent Recovery	Oxygen	Oxygen duplicate	Percent Recovery
0905S1	-111	-111	100	-14.0	-13.9	99
0905S2	-110	na	na	-13.9	-13.9	100
0905S3	-111	-110	99	-13.9	na	na
0905S4	-109	na	na	-13.8	-13.8	100
0905S5	-111	na	na	-13.7	-13.8	101
0905S6	-111	na	na	-13.9	na	na
0905S7	-110	-109	99	-14.0	na	na
0905S8	-111	na	na	-14.0	na	na
0905S9	-108	na	na	-13.7	-13.8	101
0905S10	-108	-109	101	-13.8	-13.8	100
0905S11	-29	-27	93	-4.4	-4.4	100
0905S12	-29	-30	103	-4.3	-4.4	102

Div 01 Cation Results for Sept 2005 NC-EWDP Groundwater Samples

Initial entry for cation analyses: 733/57

Samples: Six cation samples from five wells (see 733/57)
One QA sample

Sample + QA collection - 733/57-59

Sample Legend: 733/57-59

QA target conc: 733/58

Results will include

- Div 01 Raw data ~~of~~ BW 11-21-05
- QA sample % Recoveries
- Comparison of 16P samples (dirty/clean - see 733/57)
- Comparison of results from Sep/Oct 2003 sampling of same wells

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
0905C-1

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 268259

Client: Division 20

Date Received: 10/07/05

Project No.: 06002.01.242

SRR: 28120

Task Order: 051011-4

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.0600	0.0600
Antimony	<0.0100	0.0100
Arsenic	0.0152	0.005
Barium	<0.00500	0.00500
Beryllium	<0.00500	0.00500
Bismuth	<0.0100	0.0100
Boron	0.224	0.02
Cadmium	<0.00500	0.00500
Calcium	5.27	0.05
Chromium	<0.00500	0.00500
Cobalt	<0.00500	0.00500
Copper	<0.00500	0.00500
Iron	<0.0500	0.0500
Lanthanum	<0.00500	0.00500
Lead	<0.00500	0.00500
Lithium	0.0930	0.01
Magnesium	1.01	0.05
Manganese	0.00542	0.005
Molybdenum	0.0442	0.005
Nickel	<0.00500	0.00500
Palladium	<0.00500	0.00500
Phosphorus	0.0345	0.02
Potassium	2.98	0.3
Selenium	<0.0100	0.0100
Silicon	21.6	0.02
Silver	<0.00500	0.00500
Sodium	101	0.25
Strontium	0.0397	0.005
Sulfur	13.6	0.02
Thallium	<0.0100	0.0100
Thorium	<0.0250	0.0250
Tin	0.0136	0.005
Titanium	<0.00500	0.00500
Tungsten	<0.0100	0.0100
Uranium	<0.100	0.100
Vanadium	<0.00500	0.00500
Yttrium	<0.00500	0.00500
Zinc	<0.00500	0.00500
Zirconium	<0.00500	0.00500

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID: 0905C-2

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 268260

Client: Division 20

Date Received: 10/07/05

Project No.: 06002.01.242

SRR: 28120

Task Order: 051011-4

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	0.349	0.06
Antimony	<0.0100	0.0100
Arsenic	0.0137	0.005
Barium	0.0116	0.005
Beryllium	<0.00500	0.00500
Bismuth	<0.0100	0.0100
Boron	0.177	0.02
Cadmium	<0.00500	0.00500
Calcium	3.84	0.05
Chromium	<0.00500	0.00500
Cobalt	<0.00500	0.00500
Copper	<0.00500	0.00500
Iron	0.563	0.05
Lanthanum	<0.00500	0.00500
Lead	<0.00500	0.00500
Lithium	0.0774	0.01
Magnesium	0.413	0.05
Manganese	0.0115	0.005
Molybdenum	0.0450	0.005
Nickel	<0.00500	0.00500
Palladium	<0.00500	0.00500
Phosphorus	0.0580	0.02
Potassium	2.23	0.3
Selenium	<0.0100	0.0100
Silicon	19.9	0.02
Silver	<0.00500	0.00500
Sodium	106	0.25
Strontium	0.0275	0.005
Sulfur	15.7	0.02
Thallium	<0.0100	0.0100
Thorium	<0.0250	0.0250
Tin	0.0129	0.005
Titanium	<0.00500	0.00500
Tungsten	<0.0100	0.0100
Uranium	<0.100	0.100
Vanadium	<0.00500	0.00500
Yttrium	<0.00500	0.00500
Zinc	0.0153	0.005
Zirconium	<0.00500	0.00500

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID
0905C-3

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 268261

Client: Division 20

Date Received: 10/07/05

Project No.: 06002.01.242

SRR: 28120

Task Order: 051011-4

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	0.204	0.06
Antimony	<0.0100	0.0100
Arsenic	0.0169	0.005
Barium	0.00803	0.005
Beryllium	<0.00500	0.00500
Bismuth	<0.0100	0.0100
Boron	0.198	0.02
Cadmium	<0.00500	0.00500
Calcium	4.15	0.05
Chromium	<0.00500	0.00500
Cobalt	<0.00500	0.00500
Copper	<0.00500	0.00500
Iron	0.273	0.05
Lanthanum	<0.00500	0.00500
Lead	<0.00500	0.00500
Lithium	0.0546	0.01
Magnesium	0.286	0.05
Manganese	<0.00500	0.00500
Molybdenum	0.00564	0.005
Nickel	<0.00500	0.00500
Palladium	<0.00500	0.00500
Phosphorus	0.0783	0.02
Potassium	3.52	0.3
Selenium	<0.0100	0.0100
Silicon	33.7	0.02
Silver	<0.00500	0.00500
Sodium	97.4	0.25
Strontium	0.0303	0.005
Sulfur	9.66	0.02
Thallium	<0.0100	0.0100
Thorium	<0.0250	0.0250
Tin	0.0112	0.005
Titanium	<0.00500	0.00500
Tungsten	<0.0100	0.0100
Uranium	<0.100	0.100
Vanadium	<0.00500	0.00500
Yttrium	<0.00500	0.00500
Zinc	<0.00500	0.00500
Zirconium	<0.00500	0.00500

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID: 0905C-4

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 268262

Client: Division 20

Date Received: 10/07/05

Project No.: 06002.01.242

SRR: 28120

Task Order: 051011-4

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.0600	0.0600
Antimony	<0.0100	0.0100
Arsenic	0.00841	0.005
Barium	0.00678	0.005
Beryllium	<0.00500	0.00500
Bismuth	<0.0100	0.0100
Boron	0.161	0.02
Cadmium	<0.00500	0.00500
Calcium	15.8	0.05
Chromium	<0.00500	0.00500
Cobalt	<0.00500	0.00500
Copper	<0.00500	0.00500
Iron	<0.0500	0.0500
Lanthanum	<0.00500	0.00500
Lead	<0.00500	0.00500
Lithium	0.0478	0.01
Magnesium	1.10	0.05
Manganese	<0.00500	0.00500
Molybdenum	0.00681	0.005
Nickel	<0.00500	0.00500
Palladium	<0.00500	0.00500
Phosphorus	<0.0200	0.0200
Potassium	2.91	0.3
Selenium	<0.0100	0.0100
Silicon	24.5	0.02
Silver	<0.00500	0.00500
Sodium	53.1	0.25
Strontium	0.0440	0.005
Sulfur	8.54	0.02
Thallium	<0.0100	0.0100
Thorium	<0.0250	0.0250
Tin	0.00911	0.005
Titanium	<0.00500	0.00500
Tungsten	<0.0100	0.0100
Uranium	<0.100	0.100
Vanadium	<0.00500	0.00500
Yttrium	<0.00500	0.00500
Zinc	<0.00500	0.00500
Zirconium	<0.00500	0.00500

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID
0905C-5

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 268263

Client: Division 20

Date Received: 10/07/05

Project No.: 06002.01.242

SRR: 28120

Task Order: 051011-4

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.0600	0.0600
Antimony	<0.0100	0.0100
Arsenic	0.0109	0.005
Barium	<0.00500	0.00500
Beryllium	<0.00500	0.00500
Bismuth	<0.0100	0.0100
Boron	0.150	0.02
Cadmium	<0.00500	0.00500
Calcium	15.4	0.05
Chromium	<0.00500	0.00500
Cobalt	<0.00500	0.00500
Copper	<0.00500	0.00500
Iron	<0.0500	0.0500
Lanthanum	<0.00500	0.00500
Lead	<0.00500	0.00500
Lithium	0.0400	0.01
Magnesium	1.28	0.05
Manganese	<0.00500	0.00500
Molybdenum	<0.00500	0.00500
Nickel	<0.00500	0.00500
Palladium	<0.00500	0.00500
Phosphorus	0.0234	0.02
Potassium	3.95	0.3
Selenium	<0.0100	0.0100
Silicon	27.4	0.02
Silver	<0.00500	0.00500
Sodium	48.8	0.25
Strontium	0.0639	0.005
Sulfur	7.47	0.02
Thallium	<0.0100	0.0100
Thorium	<0.0250	0.0250
Tin	0.00824	0.005
Titanium	<0.00500	0.00500
Tungsten	<0.0100	0.0100
Uranium	<0.100	0.100
Vanadium	0.00535	0.005
Yttrium	<0.00500	0.00500
Zinc	<0.00500	0.00500
Zirconium	<0.00500	0.00500

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID
0905C-6

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 268264

Client: Division 20

Date Received: 10/07/05

Project No.: 06002.01.242

SRR: 28120

Task Order: 051011-4

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	1.33	0.06
Antimony	<0.0100	0.0100
Arsenic	0.00993	0.005
Barium	0.0499	0.005
Beryllium	<0.00500	0.00500
Bismuth	<0.0100	0.0100
Boron	0.178	0.02
Cadmium	<0.00500	0.00500
Calcium	9.63	0.05
Chromium	0.00633	0.005
Cobalt	<0.00500	0.00500
Copper	0.00665	0.005
Iron	1.71	0.05
Lanthanum	<0.00500	0.00500
Lead	0.0158	0.005
Lithium	0.0773	0.01
Magnesium	1.27	0.05
Manganese	0.0703	0.005
Molybdenum	0.0244	0.005
Nickel	<0.00500	0.00500
Palladium	<0.00500	0.00500
Phosphorus	0.0671	0.02
Potassium	2.42	0.3
Selenium	<0.0100	0.0100
Silicon	24.2	0.02
Silver	<0.00500	0.00500
Sodium	108	0.25
Strontium	0.0760	0.005
Sulfur	15.7	0.02
Thallium	<0.0100	0.0100
Thorium	<0.0250	0.0250
Tin	0.0122	0.005
Titanium	<0.00500	0.00500
Tungsten	<0.0100	0.0100
Uranium	<0.100	0.100
Vanadium	<0.00500	0.00500
Yttrium	<0.00500	0.00500
Zinc	0.0478	0.005
Zirconium	<0.00500	0.00500

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID: 0905C-7

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 268265

Client: Division 20

Date Received: 10/07/05

Project No.: 06002.01.242

SRR: 28120

Task Order: 051011-4

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.0600	0.0600
Antimony	<0.0100	0.0100
Arsenic	<0.00500	0.00500
Barium	<0.00500	0.00500
Beryllium	<0.00500	0.00500
Bismuth	<0.0100	0.0100
Boron	<0.0200	0.0200
Cadmium	<0.00500	0.00500
Calcium	9.86	0.0500
Chromium	<0.00500	0.00500
Cobalt	<0.00500	0.00500
Copper	<0.00500	0.00500
Iron	9.90	0.0500
Lanthanum	<0.00500	0.00500
Lead	<0.00500	0.00500
Lithium	<0.0100	0.0100
Magnesium	9.70	0.0500
Manganese	<0.00500	0.00500
Molybdenum	<0.00500	0.00500
Nickel	<0.00500	0.00500
Palladium	<0.00500	0.00500
Phosphorus	<0.0200	0.0200
Potassium	9.51	0.3000
Selenium	<0.0100	0.0100
Silicon	<0.0200	0.0200
Silver	<0.00500	0.00500
Sodium	10.2	0.2500
Strontium	<0.00500	0.00500
Sulfur	<0.0200	0.0200
Thallium	<0.0100	0.0100
Thorium	<0.0250	0.0250
Tin	<0.00500	0.00500
Titanium	<0.00500	0.00500
Tungsten	<0.0100	0.0100
Uranium	<0.100	0.100
Vanadium	<0.00500	0.00500
Yttrium	<0.00500	0.00500
Zinc	<0.00500	0.00500
Zirconium	<0.00500	0.00500

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SOUTHWEST RESEARCH INSTITUTE

DUPLICATE SUMMARY

Sample ID: 0905C-1

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 268259D

Client: Division 20

Date Received: 10/07/05

Project No.: 06002.01.242

SRR: 28120

Task Order: 051011-4

Analysis	Sample Result (mg/L)	Duplicate Result (mg/L)	RPD
Aluminum	<0.0600	<0.0600	0.00%
Antimony	<0.0100	<0.0100	0.00%
Arsenic	0.0152	0.0127	17.9%
Barium	<0.00500	<0.00500	0.00%
Beryllium	<0.00500	<0.00500	0.00%
Bismuth	<0.0100	<0.0100	0.00%
Boron	0.224	0.226	0.89%
Cadmium	<0.00500	<0.00500	0.00%
Calcium	5.27	5.26	0.19%
Chromium	<0.00500	<0.00500	0.00%
Cobalt	<0.00500	<0.00500	0.00%
Copper	<0.00500	<0.00500	0.00%
Iron	<0.0500	<0.0500	0.00%
Lanthanum	<0.00500	<0.00500	0.00%
Lead	<0.00500	<0.00500	0.00%
Lithium	0.0930	0.0891	4.28%
Magnesium	1.01	1.01	0.00%
Manganese	0.00542	0.00545	0.55%
Molybdenum	0.0442	0.0444	0.45%
Nickel	<0.00500	<0.00500	0.00%
Palladium	<0.00500	<0.00500	0.00%
Phosphorus	0.0345	0.0279	21.2%
Potassium	2.98	3.11	4.27%
Selenium	<0.0100	<0.0100	0.00%
Silicon	21.6	21.6	0.00%
Silver	<0.00500	<0.00500	0.00%
Sodium	101	101	0.00%
Strontium	0.0397	0.0397	0.00%
Sulfur	13.6	13.6	0.00%
Thallium	<0.0100	<0.0100	0.00%
Thorium	<0.0250	<0.0250	0.00%
Tin	0.0136	0.0137	0.73%
Titanium	<0.00500	<0.00500	0.00%
Tungsten	<0.0100	<0.0100	0.00%
Uranium	<0.100	<0.100	0.00%
Vanadium	<0.00500	<0.00500	0.00%
Yttrium	<0.00500	<0.00500	0.00%
Zinc	<0.00500	<0.00500	0.00%
Zirconium	<0.00500	<0.00500	0.00%

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SOUTHWEST RESEARCH INSTITUTE

MATRIX SPIKE SUMMARY

Sample ID
0905C-1

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 268259S

Client: Division 20

Date Received: 10/07/05

Project No.: 06002.01.242

SRR: 28120

Task Order: 051011-4

Analysis	Sample Result (mg/L)	Spike Result (mg/L)	Spike Added (mg/L)	Recovery
Aluminum	<0.0600	2.05	2.00	103%
Antimony	<0.0100	0.520	0.50	104%
Arsenic	0.0152	2.11	2.00	105%
Barium	<0.00500	2.01	2.00	101%
Beryllium	<0.00500	0.0490	0.05	98.0%
Bismuth	NA	NA	NA	NA
Boron	NA	NA	NA	NA
Cadmium	<0.00500	0.0511	0.05	102%
Calcium	5.27	25.0	20.0	98.7%
Chromium	<0.00500	0.198	0.20	99.0%
Cobalt	<0.00500	0.505	0.50	101%
Copper	<0.00500	0.258	0.25	103%
Iron	<0.0500	1.10	1.00	110%
Lanthanum	NA	NA	NA	NA
Lead	<0.00500	0.504	0.50	101%
Lithium	0.0930	3.82	4.00	93.2%
Magnesium	1.01	21.0	20.0	100%
Manganese	0.00542	0.510	0.50	101%
Molybdenum	NA	NA	NA	NA
Nickel	<0.00500	0.498	0.50	99.6%
Palladium	NA	NA	NA	NA
Phosphorus	NA	NA	NA	NA
Potassium	2.98	22.7	20.0	98.6%
Selenium	<0.0100	2.30	2.00	115%
Silicon	21.6	25.6	4.00	100%
Silver	<0.00500	0.0481	0.05	96.2%
Sodium	101	118	20.0	85.0%
Strontium	NA	NA	NA	NA
Sulfur	13.6	17.7	4.00	103%
Thallium	<0.0100	2.10	2.00	105%
Thorium	NA	NA	NA	NA
Tin	NA	NA	NA	NA
Titanium	NA	NA	NA	NA
Tungsten	NA	NA	NA	NA
Uranium	NA	NA	NA	NA
Vanadium	<0.00500	0.499	0.50	99.8%
Yttrium	NA	NA	NA	NA
Zinc	<0.00500	0.518	0.50	104%
Zirconium	NA	NA	NA	NA

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TITLE 21 NOV 05 CONT BUS PROJECT

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SOUTHWEST RESEARCH INSTITUTE

LABORATORY CONTROL SAMPLE

Sample ID: LCSW - K12E2, K12H1

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: NA

Client: Division 20

Date Received: NA

Project No.: 06002.01.242

SRR: 28120

Task Order: 051011-4

Analysis	Sample Result (mg/L)	True Value (mg/L)	Recovery
Aluminum	1.95	2.00	97.5%
Antimony	0.503	0.500	101%
Arsenic	2.04	2.00	102%
Barium	2.00	2.00	100%
Beryllium	0.0494	0.0500	98.8%
Bismuth	NA	NA	NA
Boron	NA	NA	NA
Cadmium	0.0508	0.0500	102%
Calcium	20.0	20.0	100%
Chromium	0.197	0.200	98.5%
Cobalt	0.499	0.500	99.8%
Copper	0.250	0.250	100%
Iron	1.09	1.00	109%
Lanthanum	NA	NA	NA
Lead	0.498	0.500	99.6%
Lithium	3.78	4.00	94.5%
Magnesium	20.0	20.0	100%
Manganese	0.504	0.500	101%
Molybdenum	NA	NA	NA
Nickel	0.494	0.500	98.8%
Palladium	NA	NA	NA
Phosphorus	NA	NA	NA
Potassium	19.0	20.0	95.0%
Selenium	2.11	2.00	106%
Silicon	4.03	4.00	101%
Silver	0.0509	0.0500	102%
Sodium	19.2	20.0	96.0%
Strontium	NA	NA	NA
Sulfur	4.14	4.00	104%
Thallium	2.07	2.00	104%
Thorium	NA	NA	NA
Tin	NA	NA	NA
Titanium	NA	NA	NA
Tungsten	NA	NA	NA
Uranium	NA	NA	NA
Vanadium	0.493	0.500	98.6%
Yttrium	NA	NA	NA
Zinc	0.502	0.500	100%
Zirconium	NA	NA	NA

NA- Not Applicable.

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SOUTHWEST RESEARCH INSTITUTE

BLANK SUMMARY

Sample ID
PBW - K12E2, K12H1

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: NA

Client: Division 20

Date Received: NA

Project No.: 06002.01.242

SRR: 28120

Task Order: 051011-4

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.0600	0.0600
Antimony	<0.0100	0.0100
Arsenic	<0.00500	0.00500
Barium	<0.00500	0.00500
Beryllium	<0.00500	0.00500
Bismuth	<0.0100	0.0100
Boron	<0.0200	0.0200
Cadmium	<0.00500	0.00500
Calcium	<0.0500	0.0500
Chromium	<0.00500	0.00500
Cobalt	<0.00500	0.00500
Copper	<0.00500	0.00500
Iron	<0.0500	0.0500
Lanthanum	<0.00500	0.00500
Lead	<0.00500	0.00500
Lithium	<0.0100	0.0100
Magnesium	<0.0500	0.0500
Manganese	<0.00500	0.00500
Molybdenum	<0.00500	0.00500
Nickel	<0.00500	0.00500
Palladium	<0.00500	0.00500
Phosphorus	<0.0200	0.0200
Potassium	<0.300	0.300
Selenium	<0.0100	0.0100
Silicon	<0.0200	0.0200
Silver	<0.00500	0.00500
Sodium	<0.250	0.250
Strontium	<0.00500	0.00500
Sulfur	<0.0200	0.0200
Thallium	<0.0100	0.0100
Thorium	<0.0250	0.0250
Tin	<0.00500	0.00500
Titanium	<0.00500	0.00500
Tungsten	<0.0100	0.0100
Uranium	<0.100	0.100
Vanadium	<0.00500	0.00500
Yttrium	<0.00500	0.00500
Zinc	<0.00500	0.00500
Zirconium	<0.00500	0.00500

NA- Not Applicable.

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TITLE 22 Nov 05 BAW

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QA accuracy data from blind standard
Target Conc for QA std 733/58
Sample Results 733/84

Element	0905C-7 Sample Result (mg/L)	Target Conc mg/L	Percent Recovery
Aluminum	<0.0600	-	-
Antimony	<0.0100	-	-
Arsenic	<0.00500	-	-
Barium	<0.00500	-	-
Beryllium	<0.00500	-	-
Bismuth	<0.0100	-	-
Boron	<0.0200	-	-
Cadmium	<0.00500	-	-
Calcium	9.86	10.0	98.6
Chromium	<0.00500	-	-
Cobalt	<0.00500	-	-
Copper	<0.00500	-	-
Iron	9.90	10.0	99.0
Lanthanum	<0.00500	-	-
Lead	<0.00500	-	-
Lithium	<0.0100	-	-
Magnesium	9.70	10.00	97.0
Manganese	<0.00500	-	-
Molybdenum	<0.00500	-	-
Nickel	<0.00500	-	-
Palladium	<0.00500	-	-
Phosphorus	<0.0200	-	-
Potassium	9.51	10.00	95.1
Selenium	<0.0100	-	-
Silicon	<0.0200	-	-
Silver	<0.00500	-	-
Sodium	10.2	10.00	102.0
Strontium	<0.00500	-	-
Sulfur	<0.0200	-	-
Thallium	<0.0100	-	-
Thorium	<0.0250	-	-
Tin	<0.00500	-	-
Titanium	<0.00500	-	-
Tungsten	<0.0100	-	-
Uranium	<0.100	-	-
Vanadium	<0.00500	-	-
Yttrium	<0.00500	-	-
Zinc	<0.00500	-	-
Zirconium	<0.00500	-	-

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TITLE 22 NOV 05 CONT BAW PROJECT

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NC-EWDP-16P Comparison of clean and dirty samples form 2005 event
Source: 733/79+83

Element	NC-EWDP-16P Clean 0905C-2 Conc (mg/L)	NC-EWDP-16P Dirty 0905C-6 Conc (mg/L)	Percent Difference
Aluminum	0.349	1.33	281
Antimony			
Arsenic	0.0137	0.00993	-28
Barium	0.0116	0.0499	330
Beryllium			
Bismuth			
Boron	0.177	0.178	0.6
Cadmium			
Calcium	3.84	9.63	151
Chromium		0.00633	na
Cobalt			
Copper		0.00665	na
Iron	0.563	1.71	204
Lanthanum			
Lead		0.0158	na
Lithium	0.0774	0.0773	-0.1
Magnesium	0.413	1.27	208
Manganese	0.0115	0.0703	511
Molybdenum	0.0450	0.0244	-46
Nickel			
Palladium			
Phosphorus	0.0580	0.0671	16
Potassium	2.23	2.42	8.5
Selenium			
Silicon	19.9	24.2	22
Silver			
Sodium	106	108	1.9
Strontium	0.0275	0.0760	176
Sulfur	15.7	15.7	0.0
Thallium			
Thorium			
Tin	0.0129	0.0122	-5.4
Titanium			
Tungsten			
Uranium			
Vanadium			
Yttrium			
Zinc	0.0153	0.0478	212
Zirconium			

Results left blank if below reporting limit
Reporting limit values available on 733/88

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NC-EWDP-16P Comparison of 2003 and 2005 data
Source for 2003 data: 628/9
Source for 2005 data: Clean (733/79) and dirty (733/83)

Element	NC-EWDP-16P 2003 16P-1003-FA-5 Conc (mg/L)	NC-EWDP-16P 2005 Clean 0905C-2 Conc (mg/L)	Percent Difference	NC-EWDP-16P 2003 16P-1003-FA-5 Conc (mg/L)	NC-EWDP-16P 2005 Dirty 0905C-6 Conc (mg/L)	Percent Difference
Aluminum	0.620	0.349	44	0.620	1.33	-115
Antimony						
Arsenic	0.0145	0.0137	5.2	0.0145	0.00993	31
Barium	0.0216	0.0116	46	0.0216	0.0499	-131
Beryllium						
Bismuth						
Boron	0.204	0.177	13	0.204	0.178	13
Cadmium						
Calcium	2.17	3.84	-77	2.17	9.63	-344
Chromium					0.00633	na
Cobalt						
Copper					0.00665	na
Iron	1.14	0.563	51	1.14	1.71	-50
Lanthanum						
Lead					0.0158	
Lithium	0.0815	0.0774	5.0	0.081	0.0773	5.1
Magnesium	0.388	0.413	-6.4	0.388	1.27	-227
Manganese	0.0245	0.0115	53	0.0245	0.0703	-187
Molybdenum	0.0626	0.0450	28	0.0626	0.0244	61
Nickel						
Palladium						
Phosphorus	0.0432	0.0580	-34	0.0432	0.0671	-55
Potassium	1.92	2.23	-16	1.92	2.42	-26
Selenium						
Silicon	21.1	19.9	5.5	21.1	24.2	-15
Silver						
Sodium	110	106	3.8	110	108	2.0
Strontium	0.0277	0.0275	0.8	0.0277	0.0760	-174
Sulfur	20.2	15.7	22	20.2	15.7	22
Thallium						
Thorium						
Tin		0.0129	na		0.0122	na
Titanium						
Tungsten						
Uranium						
Vanadium						
Yttrium						
Zinc	0.0147	0.0153	-3.9	0.0147	0.0478	-225
Zirconium						

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NC-EWDP-24P Comparison of 2003 and 2005 data
2003 Source: 610/119
2005 Source: 733/81

Element	NC-EWDP-24P 2003 24P-0903-FA-5 Conc (mg/L)	NC-EWDP-24P 2005 0905C-4 Conc (mg/L)	Percent Difference
Aluminum			
Antimony			
Arsenic		0.00841	na
Barium	0.0309	0.00678	78
Beryllium			
Bismuth			
Boron	0.159	0.161	-1.3
Cadmium			
Calcium	15.9	15.8	0.6
Chromium			
Cobalt			
Copper			
Iron			
Lanthanum			
Lead			
Lithium	0.0545	0.0478	12
Magnesium	1.39	1.10	21
Manganese	0.172		na
Molybdenum	0.0534	0.00681	87
Nickel			
Palladium			
Phosphorus			
Potassium	3.82	2.91	24
Selenium			
Silicon	16.6	24.5	-47
Silver			
Sodium	53.7	53.1	1.1
Strontium	0.0732	0.0440	40
Sulfur	8.23	8.54	-3.7
Thallium			
Thorium			
Tin		0.00911	na
Titanium			
Tungsten			
Uranium			
Vanadium			
Yttrium			
Zinc			
Zirconium			

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NC-EWDP-27P Comparison of 2003 and 2005 data
2003 Source: 610/124
2005 Source: 733/78

Element	NC-EWDP-27P 2003 27P-0903-FA-5 Conc (mg/L)	NC-EWDP-27P 2005 0905C-1 Conc (mg/L)	Percent Difference
Aluminum	0.298		na
Antimony			
Arsenic	0.0164	0.0152	7.0
Barium	0.00651		na
Beryllium			
Bismuth			
Boron	0.232	0.224	3.5
Cadmium			
Calcium	4.62	5.27	-14
Chromium			
Cobalt			
Copper			
Iron	0.163		na
Lanthanum			
Lead			
Lithium	0.0951	0.0930	2.2
Magnesium	0.874	1.01	-16
Manganese	0.00876	0.00542	38
Molybdenum	0.0912	0.0442	52
Nickel			
Palladium			
Phosphorus	0.0458	0.0345	25
Potassium	3.42	2.98	13
Selenium			
Silicon	19.1	21.6	-13
Silver			
Sodium	101	101	-0.2
Strontium	0.0480	0.0397	17
Sulfur	13.3	13.6	-2.0
Thallium			
Thorium			
Tin		0.0136	na
Titanium			
Tungsten			
Uranium			
Vanadium			
Yttrium			
Zinc			
Zirconium			

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NC-EWDP-28P Comparison of 2003 and 2005 data
2003 Source:610/129
2005 Source: 733/80

Element	NC-EWDP-28P 2003 28P-0903-FA-5 Conc (mg/L)	NC-EWDP-28P 2005 0905C-3 Conc (mg/L)	Percent Difference
Aluminum		0.204	na
Antimony			
Arsenic	0.0152	0.0169	-11
Barium	0.00614	0.00803	-31
Beryllium			
Bismuth			
Boron	0.220	0.198	10
Cadmium			
Calcium	3.47	4.15	-19
Chromium			
Cobalt			
Copper			
Iron	0.104	0.273	-163
Lanthanum			
Lead			
Lithium	0.0670	0.0546	19
Magnesium	0.322	0.286	11
Manganese			
Molybdenum	0.00828	0.00564	32
Nickel			
Palladium			
Phosphorus	0.0900	0.0783	13
Potassium	4.10	3.52	14
Selenium			
Silicon	29.1	33.7	-16
Silver			
Sodium	97.6	97.4	0.2
Strontium	0.0363	0.0303	17
Sulfur	11.3	9.66	14
Thallium			
Thorium			
Tin		0.0112	na
Titanium			
Tungsten			
Uranium			
Vanadium	0.00571		na
Yttrium			
Zinc			
Zirconium			

Results left blank if below reporting limit
Reporting limit values available on 733/88

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TITLE 22 NOV 05 CONT BW PROJECT

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NC-EWDP-29P Comparison of 2003 and 2005 data
2003 Source: 610/136
2005 Source: 733/82

Element	NC-EWDP-29P 2003 29P-1003-FA-5 Conc (mg/L)	NC-EWDP-29P 2005 0905C-5 Conc (mg/L)	Percent Difference
Aluminum	0.0799		na
Antimony			
Arsenic	0.00649	0.0109	-68
Barium	0.0147		na
Beryllium			
Bismuth			
Boron	0.149	0.150	-0.8
Cadmium			
Calcium	12.8	15.4	-21
Chromium			
Cobalt			
Copper			
Iron	0.053		na
Lanthanum			
Lead			
Lithium	0.0435	0.0400	8.0
Magnesium	1.08	1.28	-19
Manganese	0.00933		na
Molybdenum			
Nickel			
Palladium			
Phosphorus		0.0234	na
Potassium	4.05	3.95	2.4
Selenium			
Silicon	26.6	27.4	-3.0
Silver			
Sodium	53.2	48.8	8.4
Strontium	0.0763	0.0639	16
Sulfur	7.90	7.47	5.4
Thallium			
Thorium			
Tin		0.00824	na
Titanium			
Tungsten			
Uranium			
Vanadium	0.00721	0.00535	26
Yttrium			
Zinc			
Zirconium			

Results left blank if below reporting limit
Reporting limit values available on 733/88

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Results for the QA samples (733/89) look good.

Two cation samples were collected in the field from NC-EWDP-16P when it was noticed that the original filtered-acidified (FA) sample remained cloudy or "dirty" after treatment. The filtered-unacidified (FUA) sample, which was clearer or "clean", was split into new FUA and FA samples (see 733/43 for details). The cation results for clean and dirty FA samples is on 733/90.

Several of the prominent cations have similar concentrations between the "clean" and "dirty" samples from 16P (sulfur, sodium, silicon, and potassium). However some prominent cations do appear to be different between the samples (calcium, magnesium, and iron). Variations are also apparent with some of the trace level cations.

Possible temporal variations at the five wells was examined by comparing the Sept/Oct 2003 sampling event results with the Sept 2005 sampling results. The comparison for the 2003 and 2005 data for 16P is on 733/91. The 2003 and 2005 data (both "clean" and "dirty" samples) matched well for the following cations: sulfur, sodium,, silicon, and potassium. However, the clean sample results provided a better match for the 2003 data for the prominent cations that varied between the two 2005 samples. The data for the prominent cations matched well between the 2003 and 2005 data for the other four wells. The biggest difference was with silicon at well 24P (47% different).

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TITLE 23 NOV 05 BW PROJECT

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Div 01 Anion Results for Sept 2005 NC-EWDP Groundwater Samples

Initial Entry: 733/57

Samples: Six total: Five well samples and one QA sample

Sample and QA Collection: 733/57-59

Sample Legend: 733/58-59

QA Target Conc: 733/58

Results will include:

- Div 01 raw data
- Table with nitrite and nitrate expressed in mg/L of NO2 and NO3 (not mg/L of N)
- Table with phosphate expressed in mg/L of HPO4 (not mg/L of P)
- QA sample % Recoveries
- Temporal comparison of 2003 and 2005 results from same wells

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PROPRIETARY INFORMATION

TITLE 23 NOV05 CONT BN PROJECT

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
0905A-1

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 268253

Client: Division 20

Date Received: 10/07/05

Project No.: 06002.01.242

SRR: 28119

Task Order: 051011-3

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Bromide	0.104	0.1
Chloride	9.72	0.1
Fluoride	3.21	0.1
Nitrate-N	0.750	0.1
Nitrite-N	<0.1	0.1
Phosphate-P	0.0697	0.01
Sulfate	41.5	2

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
0905A-2

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 268254

Client: Division 20

Date Received: 10/07/05

Project No.: 06002.01.242

SRR: 28119

Task Order: 051011-3

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Bromide	<0.1	0.1
Chloride	9.34	0.1
Fluoride	2.74	0.1
Nitrate-N	1.31	0.1
Nitrite-N	<0.1	0.1
Phosphate-P	0.0748	0.01
Sulfate	47.0	2

PROPRIETARY INFORMATION

TITLE 23NOV05 CONT BLW PROJECT

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: 0905A-3

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 268255

Client: Division 20

Date Received: 10/07/05

Project No.: 06002.01.242

SRR: 28119

Task Order: 051011-3

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Bromide	<0.1	0.1
Chloride	7.88	0.1
Fluoride	2.00	0.1
Nitrate-N	1.35	0.1
Nitrite-N	<0.1	0.1
Phosphate-P	0.115	0.01
Sulfate	29.0	2

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: 0905A-4

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 268256

Client: Division 20

Date Received: 10/07/05

Project No.: 06002.01.242

SRR: 28119

Task Order: 051011-3

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Bromide	<0.1	0.1
Chloride	6.92	0.1
Fluoride	1.95	0.1
Nitrate-N	1.08	0.1
Nitrite-N	<0.1	0.1
Phosphate-P	0.0390	0.01
Sulfate	26.4	2

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: 0905A-5

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Water
Lab System ID: 268257

Client: Division 20
Date Received: 10/07/05
Project No.: 06002.01.242
SRR: 28119
Task Order: 051011-3

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Bromide	<0.1	0.1
Chloride	6.65	0.1
Fluoride	2.01	0.1
Nitrate-N	1.32	0.1
Nitrite-N	<0.1	0.1
Phosphate-P	0.0513	0.01
Sulfate	22.4	2

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: 0905A-6

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Water
Lab System ID: 268258

Client: Division 20
Date Received: 10/07/05
Project No.: 06002.01.242
SRR: 28119
Task Order: 051011-3

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Bromide	8.31	0.1
Chloride	4.00	0.1
Fluoride	1.98	0.1
Nitrate-N	1.76	0.1
Nitrite-N	<0.1	0.1
Phosphate-P	3.89	0.01
Sulfate	8.21	0.1

TITLE 23 NOV05 CONT BW PROJECT

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SOUTHWEST RESEARCH INSTITUTE

DUPLICATE SUMMARY

Sample ID
0905A-1

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 268253D

Client: Division 20

Date Received: 10/07/05

Project No.: 06002.01.242

SRR: 28119

Task Order: 051011-3

Analysis	Sample Result (mg/L)	Duplicate Result (mg/L)	RPD
Bromide	0.104	0.101	2.93%
Chloride	9.72	9.68	0.41%
Fluoride	3.21	3.18	0.94%
Nitrate-N	0.750	0.758	1.06%
Nitrite-N	<0.1	<0.1	0.00%
Phosphate-P	0.0697	0.0784	11.7%
Sulfate	41.5	41.7	0.48%

SOUTHWEST RESEARCH INSTITUTE

MATRIX SPIKE SUMMARY

Sample ID
0905A-1

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 268253S

Client: Division 20

Date Received: 10/07/05

Project No.: 06002.01.242

SRR: 28119

Task Order: 051011-3

Analysis	Sample Result (mg/L)	Spike Result (mg/L)	Spike Added (mg/L)	Recovery
Bromide	0.104	3.92	4	95.4%
Chloride	9.72	11.5	2	89.0%
Fluoride	3.21	4.10	1	89.0%
Nitrate-N	0.750	1.60	0.904	94.0%
Nitrite-N	<0.1	0.877	1	87.7%
Phosphate-P	0.0697	0.356	0.3	95.4%
Sulfate	41.5	124	80	103%

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TITLE 23 Nov 05 CONT BAW PROJECT

SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: LCSW

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: NA

Client: Division 20

Date Received: NA

Project No.: 06002.01.242

SRR: 28119

Task Order: 051011-3

Analysis	Sample Result (mg/L)	True Value (mg/L)	Recovery
Bromide	407	400	102%
Chloride	207	200	104%
Fluoride	103	100	103%
Nitrate-N	91.1	90.4	101%
Nitrite-N	90.4	91.3	99.0%
Phosphate-P	1.80	1.82	98.9%
Sulfate	410	400	103%

NA- Not Applicable.

SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID: PBW

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: NA

Client: Division 20

Date Received: NA

Project No.: 06002.01.242

SRR: 28119

Task Order: 051011-3

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Bromide	<0.1	0.1
Chloride	<0.1	0.1
Fluoride	<0.1	0.1
Nitrate-N	<0.1	0.1
Nitrite-N	<0.1	0.1
Phosphate-P	<0.01	0.01
Sulfate	<0.1	0.1

NA- Not Applicable.

PROPRIETARY INFORMATION

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Div 01 Anion results for EWDP groundwater samples from Sept 2005 event

Data source: 733/97-102
Sample ID legend source: 733/58-59

Conversion of nitrogen mg/L to nitrate and nitrite mg/L

GED Sample ID	Div 01 Sample ID	NO2 as N mg/L	NO3 as N mg/L	NO2 mg/L	NO3 mg/L
NC-EWDP-27P-0905-FUA	0905A-1	<0.1	0.750	<0.33	3.32
NC-EWDP-16P-0905-FUA-2 split	0905A-2	<0.1	1.31	<0.33	5.80
NC-EWDP-28P-0905-FUA-1	0905A-3	<0.1	1.35	<0.33	5.98
NC-EWDP-24P-0905-FUA	0905A-4	<0.1	1.08	<0.33	4.78
NC-EWDP-29P-0905-FUA	0905A-5	<0.1	1.32	<0.33	5.84
0905A-6 (anion QA std)	0905A-6	<0.1	1.76	<0.33	7.79

Converted by dividing the measured value (N mg/L) by the percentage of nitrogen in nitrate (0.22590) and in nitrite (0.30446)
N = 14.0067g/mol, NO2 = 46.0055g/mol, and NO3 = 62.0049g/mol

Conversion of phosphorus mg/L to HPO4 mg/L

GED Sample ID	Div 01 Sample ID	PO4 as P mg/L	PO4 as HPO4
NC-EWDP-27P-0905-FUA	0905A-1	0.0697	0.216
NC-EWDP-16P-0905-FUA-2 split	0905A-2	0.0748	0.232
NC-EWDP-28P-0905-FUA-1	0905A-3	0.115	0.356
NC-EWDP-24P-0905-FUA	0905A-4	0.0390	0.121
NC-EWDP-29P-0905-FUA	0905A-5	0.0513	0.159
0905A-6 (anion QA std)	0905A-6	3.89	12.1

Converted by dividing the measured value (P mg/L) by the percentage of phosphorus in HPO4 (0.3227)
P = 30.974g/mol and HPO4 = 95.9793g/mol

Summary of NC-EWDP Sept 2005 Anion Results (note NO2, NO3, and HPO4 expression)

GED Sample ID	Div 01 Sample ID	Bromide mg/L	Chloride mg/L	Fluoride mg/L	NO2 mg/L	NO3 mg/L	HPO4 mg/L	Sulfate mg/L
NC-EWDP-27P-0905-FUA	0905A-1	0.104	9.72	3.21	<0.33	3.32	0.216	41.5
NC-EWDP-16P-0905-FUA-2 split	0905A-2	<0.1	9.34	2.74	<0.33	5.80	0.232	47
NC-EWDP-28P-0905-FUA-1	0905A-3	<0.1	7.88	2.00	<0.33	5.98	0.356	29.0
NC-EWDP-24P-0905-FUA	0905A-4	<0.1	6.92	1.95	<0.33	4.78	0.121	26.4
NC-EWDP-29P-0905-FUA	0905A-5	<0.1	6.65	2.01	<0.33	5.84	0.159	22.4
0905A-6 (anion QA std)	0905A-6	8.31	4.00	1.98	<0.33	7.79	12.1	8.21

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Anion QA Results for EWDP groundwater sampling event Sept 2005

Data source: 733/103
QA target conc source: 733/58

For Sample 0905A-6

Analyte	Target Conc (ppm)	Measured Conc (ppm)	Percent Difference
Bromide	8	8.31	3.88
Chloride	4	4.00	0.00
Fluoride	2	1.98	-1.00
Nitrate (NO3)	8	7.79	-2.63
Phosphate (HPO4)	12	12.1	0.83
Sulfate	8	8.21	2.63

QA % recoveries look good (preceding)

2003 + 2005 Temporal comparison (following)

NC-EWDP-16P Comparison of 2003 and 2005 data

Element	NC-EWDP-16P 2003 16P-1003-FUA-1 Conc (mg/L)	NC-EWDP-16P 2005 0905A-2 Conc (mg/L)	Percent Difference
Bromide			
Chloride	9.37	9.34	0.32
Fluoride	2.61	2.74	-5.0
Nitrate-N	1.17	1.31	-12
Nitrite-N			
Phosphate-P	0.0248	0.0748	-202
Sulfate	52.9	47.0	11

Results left blank if below reporting limit. Reporting limit values available on 733/102
Sources: 2003 data from 610/195 and 2005 data from 733/98

NC-EWDP-24P Comparison of 2003 and 2005 data

Element	NC-EWDP-24P 2003 24P-0903-FUA-1 Conc (mg/L)	NC-EWDP-24P 2005 0905A-4 Conc (mg/L)	Percent Difference
Bromide			
Chloride	7.11	6.92	2.7
Fluoride	2.00	1.95	2.5
Nitrate-N	0.346	1.08	-212
Nitrite-N			
Phosphate-P	0.0168	0.0390	-132
Sulfate	23.9	26.4	-10

Results left blank if below reporting limit. Reporting limit values available on 733/102
Sources: 2003 data from 610/184 and 2005 data from 733/99

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NC-EWDP-27P Comparison of 2003 and 2005 data

Element	NC-EWDP-27P 2003 27P-0903-FUA-1 Conc (mg/L)	2005 0905A-1 Conc (mg/L)	Percent Difference
Bromide		0.104	na
Chloride	9.68	9.72	-0.41
Fluoride	3.31	3.21	3.0
Nitrate-N	0.643	0.750	-17
Nitrite-N			
Phosphate-P	0.0317	0.0697	-120
Sulfate	38.5	41.5	-7.8

Results left blank if below reporting limit. Reporting limit values available on 733/102
Sources: 2003 data from 610/185 and 2005 data from 733/98

NC-EWDP-28P Comparison of 2003 and 2005 data

Element	NC-EWDP-28P 2003 28P-0903-FUA-1 Conc (mg/L)	2005 0905A-3 Conc (mg/L)	Percent Difference
Bromide			
Chloride	8.41	7.88	6.3
Fluoride	2.01	2.00	0.50
Nitrate-N	1.38	1.35	2.2
Nitrite-N			
Phosphate-P	0.111	0.115	-3.6
Sulfate	33.2	29.0	13

Results left blank if below reporting limit. Reporting limit values available on 733/102
Sources: 2003 data from 610/186 and 2005 data from 733/99

NC-EWDP-29P Comparison of 2003 and 2005 data

Element	NC-EWDP-29P 2003 29P-1003-FUA-1 Conc (mg/L)	2005 0905A-5 Conc (mg/L)	Percent Difference
Bromide			
Chloride	6.80	6.65	2.2
Fluoride	1.90	2.01	-5.8
Nitrate-N	1.19	1.32	-11
Nitrite-N			
Phosphate-P	0.0302	0.0513	-70
Sulfate	22.8	22.4	1.8

Results left blank if below reporting limit. Reporting limit values available on 733/102
Sources: 2003 data from 610/187 and 2005 data from 733/100

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Temporal comparison between 2003 and 2005 was favorable expect for
- 24P nitrate and
- all phosphate except 28P

28 DEC 05 BW

XRF + LOI Results from Washington State University for NC-EWDP-22PC Sonic Core Samples

NC-EWDP-22PC Sonic Core Samples from 696/175-177

Please note that the last 3 samples (60-62) on 696/177 were labled incorrectly on this submittal form. See 710/14 for correct label IDs. Reference email on 733/107.

- XRF and LOI results on 733/108-114
- 59 samples and 3 QAs for a total of 62
- ID information on 696/175-177
- Purchase ~~Order~~ Requ for XRF/LOI = 05021884 12-28-05 BW
- Purchase Order for XRF/LOI = 575764J
- Summary of previous and current XRF analyses (QAs) with NIST certificate values on 733/115
- ~~Rep~~ BW 12-28-05
- Procurement Plans Acceptance Calculations on 733/116

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Bradley Werling

From: Paul Bertetti [pbertetti@cnwra.swri.edu]
Sent: Thursday, June 23, 2005 9:53 AM
To: Bradley Werling
Subject: FW: XRF, LOI values for 62 attached

0205BER.xls (289 KB)

FYI

See Diane's statement about the labels and drying.

-----Original Message-----
From: Diane Johnson Cornelius [mailto:geolab@mail.wsu.edu]
Sent: Monday, June 13, 2005 6:44 PM
To: Paul Bertetti
Subject: XRF, LOI values for 62 attached

HI Paul: Attached are the XRF values for your 62 samples we received May 19, 05. We had no problems with them and the values look good. The last 3 were labelled differently on the sample than on the list, we used the labels on the samples (22-765f not 764f, 22-768f not 769f, 22-774f not 773f). We dried them all for 2h at 105C prior to weighing for LOI determination because some seemed damp. Usually we charge extra for this so next time you might want to dry them before sending, or budget in 2h of extra sample prep at $25/h.

I've included a second table with the values renormalized to include LOI, both tables are valid but the second table is the one to use when comparing to ICP-MS values which are reported using a "sample as received" basis, not a dry weight basis. We also converted FeO and MnO to Fe2O3 and Mn2O3 in that table since the oxidized powders were used to prepare the beads.

Thanks for the POs, I'll submit 575764J now, and return the excess sample and submit the second one after the ICP values are finished.

Please let me know that you've received the file OK, and if you have any questions or concerns.

Thanks a bunch, and best regards, Diane.

Diane Johnson Cornelius, M.S., Research Technologist Supervisor, GeoAnalytical Laboratory
509-335-4486 Phone, 509-335-7816 FAX
Department of Geology, 1228 Webster Physical Sciences Bldg,Washington State University, Pullman, WA 99164-2812 http://www.wsu.edu:8080/~geology/

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TITLE 28 DEC 05 CONT BW **PROJECT**

Run 0205, Paul Bertetti, CNWRA, Southwest Research Institute

	BER 22 462F	BER 22 465F	BER 22 472F	BER 22 477F	BER 22 480F	BER 22 487F	BER 22 492F	BER 22 498F	BER 22 503F	BER 22 508F
Date	2-Jun-05	2-Jun-05	2-Jun-05	2-Jun-05	2-Jun-05	2-Jun-05	2-Jun-05	2-Jun-05	2-Jun-05	2-Jun-05
Unnormalized Major Elements (Weight %):										
SiO2	72.67	71.50	72.79	72.61	70.93	73.04	72.27	73.81	72.57	72.60
TiO2	0.334	0.372	0.374	0.400	0.533	0.393	0.346	0.363	0.383	0.412
Al2O3	13.61	14.61	14.20	14.29	14.79	14.16	14.76	14.04	14.65	14.48
FeO*	3.34	3.10	2.81	2.71	3.64	2.75	2.23	2.48	2.44	3.04
MnO	0.089	0.099	0.090	0.100	0.122	0.093	0.080	0.085	0.075	0.101
MgO	0.85	1.29	1.06	1.06	1.48	1.46	1.26	1.26	0.99	1.24
CaO	1.33	1.62	1.57	1.56	1.86	1.83	1.85	1.72	1.42	1.82
Na2O	2.41	1.92	2.22	2.18	2.15	1.78	2.28	1.87	2.22	1.94
K2O	4.17	3.62	3.74	3.78	3.65	3.40	3.77	3.48	4.36	3.59
P2O5	0.105	0.090	0.097	0.082	0.074	0.089	0.081	0.071	0.083	0.085
Total	98.92	98.22	98.95	98.77	99.24	99.00	98.93	99.18	99.19	99.31
LOI %	**2.43**	**4.11**	**3.51**	**3.68**	**4.30**	**4.32**	**3.86**	**4.14**	**3.30**	**4.32**
Normalized Major Elements (Weight %):										
SiO2	73.47	72.80	73.56	73.51	71.47	73.78	73.05	74.42	73.16	73.11
TiO2	0.338	0.378	0.378	0.405	0.537	0.397	0.350	0.366	0.386	0.415
Al2O3	13.76	14.87	14.35	14.47	14.90	14.30	14.92	14.16	14.77	14.58
FeO*	3.38	3.16	2.84	2.74	3.67	2.78	2.26	2.50	2.46	3.06
MnO	0.090	0.100	0.091	0.102	0.123	0.094	0.081	0.085	0.076	0.102
MgO	0.86	1.31	1.07	1.07	1.50	1.47	1.27	1.27	1.00	1.25
CaO	1.35	1.65	1.59	1.58	1.88	1.85	1.87	1.73	1.43	1.84
Na2O	2.44	1.95	2.24	2.21	2.17	1.80	2.31	1.88	2.24	1.95
K2O	4.21	3.68	3.78	3.82	3.68	3.43	3.81	3.50	4.40	3.61
P2O5	0.106	0.092	0.098	0.083	0.074	0.090	0.082	0.072	0.084	0.086
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Unnormalized Trace Elements (ppm):										
Ni	15	16	13	12	19	16	12	13	19	13
Cr	38	19	23	11	17	18	12	14	28	16
Sc	5	6	5	5	6	5	5	4	5	5
V	30	36	35	32	43	32	26	31	29	38
Ba	492	589	589	592	696	608	703	614	637	650
Rb	155	131	135	136	131	134	133	129	152	130
Sr	249	382	378	416	458	457	476	455	344	497
Zr	244	286	289	312	369	287	267	273	319	288
Y	30	30	32	31	31	30	27	30	32	29
Nb	22.7	22.4	22.9	24.5	27.6	23.3	23.0	25.8	23.5	22.9
Ga	21	24	21	23	23	23	22	20	21	21
Cu	24	11	14	7	8	9	6	8	6	8
Zn	68	84	79	84	111	79	70	70	69	86
Pb	28	30	28	30	26	24	27	27	29	28
La	63	58	61	67	71	63	55	59	79	63
Ce	110	128	119	133	139	128	107	114	140	123
Th	24	27	24	28	27	26	25	28	27	25
Nd	41	41	41	45	44	43	34	38	47	41
sum tr.	**1657**	**1920**	**1908**	**1988**	**2248**	**2006**	**2033**	**1955**	**2008**	**2083**
in %	**0.17**	**0.19**	**0.19**	**0.20**	**0.22**	**0.20**	**0.20**	**0.20**	**0.20**	**0.21**
sum m+tr	**99.08**	**98.41**	**99.14**	**98.97**	**99.47**	**99.21**	**99.14**	**99.37**	**99.39**	**99.52**
r as oxides	**99.12**	**98.45**	**99.18**	**99.01**	**99.52**	**99.25**	**99.18**	**99.41**	**99.43**	**99.56**

Major elements are normalized on a volatile-free basis, with total Fe expressed as FeO.
"R" denotes a duplicate bead made from the same rock powder.

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Run 0205, Paul Bertetti, CNWRA, Southwest Research Institute

	BER 22 514F	BER 22 518F	BER 22 522F	BER 22 530F	BER 22 535F	BER 22 540F	BER 22 541F	BER 22 547F	BER 22 550F	BER 22 555F
Date	2-Jun-05	2-Jun-05	2-Jun-05	2-Jun-05	2-Jun-05	2-Jun-05	2-Jun-05	2-Jun-05	2-Jun-05	2-Jun-05
Unnormalized Major Elements (Weight %):										
SiO2	73.05	72.72	71.90	72.00	71.54	70.70	71.61	72.06	70.83	73.29
TiO2	0.353	0.368	0.372	0.366	0.369	0.450	0.445	0.414	0.545	0.393
Al2O3	14.63	14.69	14.97	15.08	15.35	15.16	14.77	15.28	14.63	14.52
FeO*	2.54	2.67	2.74	2.55	2.51	2.96	2.95	2.62	3.75	2.32
MnO	0.088	0.088	0.091	0.091	0.084	0.114	0.109	0.099	0.127	0.086
MgO	1.28	1.40	1.34	1.42	1.56	1.38	1.31	1.17	1.15	1.37
CaO	1.69	1.96	1.80	1.91	2.01	1.79	1.86	1.78	1.72	1.95
Na2O	1.99	1.82	1.87	1.89	2.03	2.45	2.27	2.41	2.33	2.07
K2O	3.66	3.57	3.76	3.66	3.61	3.81	3.79	3.78	4.07	3.52
P2O5	0.081	0.089	0.088	0.082	0.074	0.068	0.074	0.071	0.074	0.080
Total	99.36	99.38	98.93	99.05	99.14	98.87	99.19	99.67	99.23	99.61
LOI %	**4.09**	**4.48**	**4.37**	**4.64**	**4.83**	**3.54**	**4.33**	**4.34**	**4.22**	**5.10**
Normalized Major Elements (Weight %):										
SiO2	73.53	73.18	72.68	72.69	72.16	71.50	72.20	72.30	71.38	73.58
TiO2	0.355	0.371	0.376	0.369	0.372	0.455	0.448	0.415	0.549	0.395
Al2O3	14.72	14.78	15.13	15.23	15.48	15.33	14.89	15.33	14.74	14.58
FeO*	2.55	2.69	2.76	2.58	2.53	2.99	2.98	2.62	3.78	2.33
MnO	0.089	0.088	0.092	0.092	0.085	0.115	0.110	0.099	0.128	0.086
MgO	1.29	1.41	1.35	1.44	1.57	1.40	1.32	1.17	1.16	1.37
CaO	1.70	1.97	1.82	1.93	2.03	1.81	1.87	1.78	1.73	1.96
Na2O	2.00	1.83	1.89	1.91	2.04	2.48	2.28	2.41	2.34	2.08
K2O	3.69	3.60	3.80	3.69	3.65	3.85	3.82	3.79	4.11	3.54
P2O5	0.081	0.089	0.089	0.083	0.075	0.069	0.075	0.071	0.075	0.081
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Unnormalized Trace Elements (ppm):										
Ni	13	13	12	13	12	12	11	11	11	12
Cr	15	13	15	14	12	10	11	11	14	10
Sc	6	5	6	6	6	5	5	5	5	6
V	33	35	33	31	30	30	31	28	41	21
Ba	524	637	646	613	663	651	680	694	743	643
Rb	139	134	144	140	132	136	134	123	140	127
Sr	447	555	487	513	514	427	473	441	441	511
Zr	259	270	267	271	262	331	322	310	390	308
Y	29	29	32	31	28	31	31	28	30	28
Nb	24.2	22.9	24.0	24.2	25.4	25.7	25.7	25.8	26.2	26.7
Ga	23	23	23	24	22	25	24	24	22	21
Cu	7	9	8	8	10	6	7	8	7	6
Zn	76	78	81	76	78	90	86	79	103	73
Pb	27	26	26	29	25	29	27	30	29	28
La	59	63	60	63	55	63	65	60	75	57
Ce	121	113	115	121	110	128	125	116	146	119
Th	27	25	25	27	26	28	27	26	28	29
Nd	39	38	37	40	36	41	42	38	47	37
sum tr.	**1868**	**2091**	**2041**	**2045**	**2046**	**2067**	**2127**	**2057**	**2298**	**2063**
in %	**0.19**	**0.21**	**0.20**	**0.20**	**0.20**	**0.21**	**0.21**	**0.21**	**0.23**	**0.21**
sum m+tr	**99.54**	**99.59**	**99.14**	**99.25**	**99.34**	**99.08**	**99.40**	**99.88**	**99.46**	**99.81**
r as oxides	**99.58**	**99.63**	**99.18**	**99.29**	**99.38**	**99.12**	**99.44**	**99.92**	**99.50**	**99.85**

Major elements are normalized on a volatile-free basis, with total Fe expressed as FeO.
"R" denotes a duplicate bead made from the same rock powder.

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TITLE 28 DEC 05 CONT BW PROJECT

Run 0205, Paul Bertetti, CNWRA, Southwest Research Institute

	BER 22 561F	BER 22 567F	BER 22 572F	BER 22 577F	BER 22 580F	BER 22 589F	BER 22 596F	BER 22 601F	BER 22 605F	BER 22 610F
Date	2-Jun-05	3-Jun-05	3-Jun-05	3-Jun-05	3-Jun-05	3-Jun-05	3-Jun-05	3-Jun-05	3-Jun-05	3-Jun-05
Unnormalized Major Elements (Weight %):										
SiO2	72.95	73.01	72.18	73.08	73.87	73.15	72.49	71.97	72.08	71.35
TiO2	0.338	0.384	0.375	0.353	0.290	0.335	0.388	0.384	0.430	0.507
Al2O3	14.57	14.83	15.49	14.65	14.35	14.48	14.57	15.28	15.19	14.87
FeO*	2.22	2.44	2.07	2.25	1.70	2.16	2.40	2.76	2.50	3.35
MnO	0.086	0.086	0.077	0.083	0.071	0.086	0.091	0.084	0.076	0.107
MgO	1.27	1.26	1.65	1.17	1.00	0.99	1.06	1.38	1.52	1.24
CaO	1.80	1.72	2.05	2.04	1.83	1.62	1.90	1.98	2.22	1.83
Na2O	2.39	2.04	1.94	2.12	2.14	2.53	2.41	1.85	1.78	1.96
K2O	3.74	3.62	3.41	3.63	3.67	3.98	3.90	3.59	3.29	3.73
P2O5	0.068	0.073	0.076	0.082	0.058	0.063	0.111	0.088	0.114	0.088
Total	99.42	99.45	99.32	99.46	98.97	99.41	99.30	99.35	99.20	99.03
LOI %	**4.92**	**4.96**	**5.77**	**5.20**	**5.44**	**5.06**	**5.17**	**6.11**	**6.12**	**6.01**
Normalized Major Elements (Weight %):										
SiO2	73.38	73.42	72.67	73.48	74.63	73.59	72.99	72.44	72.66	72.05
TiO2	0.340	0.387	0.378	0.355	0.293	0.337	0.391	0.386	0.433	0.512
Al2O3	14.65	14.91	15.60	14.73	14.50	14.57	14.67	15.38	15.32	15.01
FeO*	2.23	2.45	2.09	2.26	1.72	2.17	2.41	2.77	2.52	3.38
MnO	0.086	0.086	0.077	0.084	0.072	0.086	0.091	0.084	0.077	0.108
MgO	1.27	1.26	1.66	1.17	1.01	0.99	1.06	1.39	1.53	1.26
CaO	1.81	1.72	2.07	2.05	1.85	1.63	1.91	1.99	2.24	1.85
Na2O	2.40	2.05	1.95	2.14	2.16	2.55	2.43	1.86	1.80	1.98
K2O	3.76	3.64	3.43	3.65	3.71	4.01	3.92	3.61	3.31	3.77
P2O5	0.068	0.074	0.077	0.082	0.059	0.063	0.112	0.088	0.115	0.089
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Unnormalized Trace Elements (ppm):										
Ni	15	14	13	11	11	10	13	16	24	14
Cr	19	19	14	13	9	11	16	21	35	19
Sc	5	6	6	5	4	4	5	6	7	6
V	22	31	22	29	19	22	31	45	42	44
Ba	612	540	591	700	661	562	632	655	614	611
Rb	137	139	122	124	125	133	144	133	123	129
Sr	469	445	527	581	564	419	481	516	504	452
Zr	269	286	308	262	257	291	266	251	281	353
Y	28	31	32	27	28	29	29	30	30	32
Nb	23.6	25.1	26.1	22.2	22.6	22.2	24.1	23.2	22.8	25.0
Ga	22	23	28	19	20	22	21	23	22	22
Cu	9	9	8	6	7	5	7	9	12	9
Zn	70	73	62	67	56	78	71	79	65	93
Pb	25	31	27	25	27	32	26	27	23	26
La	57	63	62	56	52	64	58	63	62	81
Ce	110	129	116	107	108	119	114	115	121	157
Th	25	28	27	23	27	24	25	25	24	28
Nd	36	39	37	37	33	42	39	39	41	50
sum tr.	**1953**	**1931**	**2029**	**2114**	**2032**	**1889**	**2000**	**2075**	**2052**	**2151**
in %	**0.20**	**0.19**	**0.20**	**0.21**	**0.20**	**0.19**	**0.20**	**0.21**	**0.21**	**0.22**
sum m+tr	**99.61**	**99.64**	**99.52**	**99.67**	**99.18**	**99.60**	**99.50**	**99.56**	**99.40**	**99.25**
r as oxides	**99.65**	**99.68**	**99.56**	**99.71**	**99.22**	**99.64**	**99.54**	**99.60**	**99.45**	**99.29**

Major elements are normalized on a volatile-free basis, with total Fe expressed as FeO.
"R" denotes a duplicate bead made from the same rock powder.

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TITLE 28DEC05 CONT BAW PROJECT

Run 0205, Paul Bertetti, CNWRA, Southwest Research Institute

	BER 22 614F	BER 22 619F	BER 22 625F	BER 22 631F	BER 22 636F	BER 22 640F	BER 22 645F	BER 22 647F	BER 22 653F	BER 22 659F
Date	3-Jun-05	3-Jun-05	3-Jun-05	3-Jun-05	3-Jun-05	3-Jun-05	4-Jun-05	4-Jun-05	4-Jun-05	4-Jun-05
Unnormalized Major Elements (Weight %):										
SiO2	72.71	70.96	74.53	73.50	74.30	73.71	74.92	74.31	73.01	72.07
TiO2	0.355	0.554	0.288	0.326	0.228	0.345	0.238	0.367	0.351	0.467
Al2O3	14.85	14.74	13.93	14.29	13.60	13.99	13.44	13.81	14.59	14.32
FeO*	2.30	3.69	1.92	2.18	1.37	2.46	1.51	2.43	2.12	3.15
MnO	0.079	0.120	0.066	0.092	0.087	0.084	0.094	0.071	0.077	0.113
MgO	1.34	1.22	0.99	0.86	0.37	0.98	0.47	0.98	1.13	1.14
CaO	2.08	1.85	1.61	1.41	0.70	1.59	0.84	1.86	1.77	1.87
Na2O	1.96	2.32	1.95	2.67	3.51	2.09	3.40	1.86	2.21	2.22
K2O	3.45	3.64	3.94	4.29	4.91	4.13	4.55	3.52	3.94	3.75
P2O5	0.075	0.095	0.074	0.067	0.042	0.080	0.049	0.103	0.076	0.089
Total	99.20	99.17	99.30	99.69	99.12	99.46	99.51	99.31	99.26	99.20
LOI %	**6.01**	**4.74**	**4.36**	**3.52**	**1.67**	**4.22**	**1.91**	**4.50**	**4.40**	**4.23**
Normalized Major Elements (Weight %):										
SiO2	73.29	71.55	75.06	73.73	74.96	74.11	75.29	74.83	73.55	72.65
TiO2	0.357	0.558	0.290	0.327	0.230	0.347	0.239	0.370	0.354	0.471
Al2O3	14.97	14.86	14.03	14.33	13.73	14.07	13.51	13.90	14.70	14.44
FeO*	2.32	3.72	1.94	2.19	1.39	2.47	1.52	2.45	2.13	3.18
MnO	0.080	0.121	0.067	0.092	0.087	0.084	0.095	0.071	0.077	0.114
MgO	1.35	1.23	1.00	0.87	0.38	0.99	0.47	0.99	1.14	1.15
CaO	2.10	1.86	1.62	1.42	0.70	1.60	0.84	1.88	1.78	1.89
Na2O	1.97	2.34	1.96	2.68	3.54	2.10	3.42	1.87	2.22	2.24
K2O	3.48	3.67	3.97	4.30	4.95	4.15	4.57	3.54	3.97	3.78
P2O5	0.076	0.096	0.074	0.067	0.042	0.081	0.049	0.103	0.077	0.090
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Unnormalized Trace Elements (ppm):										
Ni	13	13	13	14	25	13	13	17	12	11
Cr	14	14	18	16	48	20	19	27	14	18
Sc	4	5	4	5	3	4	3	6	5	5
V	32	46	30	25	12	28	17	42	29	44
Ba	752	691	524	533	296	556	254	653	643	727
Rb	119	120	144	142	173	142	172	128	134	126
Sr	560	464	417	334	115	383	174	474	423	447
Zr	278	368	225	278	230	277	225	241	270	302
Y	26	32	30	30	33	30	36	29	28	29
Nb	20.6	25.9	21.7	22.0	21.8	22.8	26.4	19.5	21.7	22.1
Ga	22	24	21	21	19	22	22	18	20	22
Cu	6	4	10	7	7	9	3	10	6	8
Zn	64	101	56	72	65	74	61	59	65	85
Pb	27	27	28	27	31	27	30	26	26	30
La	60	81	57	60	60	59	46	55	60	69
Ce	113	151	109	123	107	114	93	100	110	130
Th	24	26	27	24	25	26	28	21	24	25
Nd	37	52	37	42	40	41	35	36	36	44
sum tr.	**2171**	**2246**	**1772**	**1774**	**1312**	**1848**	**1257**	**1961**	**1927**	**2143**
in %	**0.22**	**0.22**	**0.18**	**0.18**	**0.13**	**0.18**	**0.13**	**0.20**	**0.19**	**0.21**
sum m+tr	**99.42**	**99.40**	**99.48**	**99.87**	**99.25**	**99.65**	**99.64**	**99.50**	**99.46**	**99.41**
r as oxides	**99.46**	**99.44**	**99.51**	**99.91**	**99.28**	**99.69**	**99.66**	**99.54**	**99.50**	**99.46**

Major elements are normalized on a volatile-free basis, with total Fe expressed as FeO.
"R" denotes a duplicate bead made from the same rock powder.

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TITLE 28DEC05 CONT BAW PROJECT

Run 0205, Paul Bertetti, CNWRA, Southwest Research Institute

	BER 22 664F	BER 22 671F	BER 22 676F	BER 22 682F	BER 22 686F	BER 22 695F	BER 22 701F	BER 22 707F	BER 22 711F	BER 22 716F
Date	4-Jun-05	4-Jun-05	4-Jun-05	4-Jun-05	4-Jun-05	4-Jun-05	4-Jun-05	4-Jun-05	4-Jun-05	4-Jun-05
Unnormalized Major Elements (Weight %):										
SiO2	73.17	73.26	72.85	72.95	73.00	73.44	72.11	73.47	74.71	73.99
TiO2	0.349	0.335	0.358	0.355	0.341	0.335	0.289	0.313	0.275	0.334
Al2O3	14.55	14.43	14.65	14.50	14.32	14.29	15.81	14.15	13.39	14.02
FeO*	1.99	1.88	2.33	2.12	2.12	2.06	1.81	2.00	1.82	1.98
MnO	0.074	0.077	0.096	0.087	0.091	0.078	0.080	0.087	0.098	0.069
MgO	1.12	0.98	1.23	1.19	1.06	1.17	2.26	0.95	0.65	1.01
CaO	1.85	1.54	1.64	1.81	1.59	1.90	2.17	1.53	1.12	1.93
Na2O	2.27	2.61	2.22	2.26	2.68	2.07	1.83	2.66	3.12	2.18
K2O	3.65	4.21	3.93	3.86	4.06	3.65	3.06	4.07	4.25	3.72
P2O5	0.090	0.110	0.069	0.081	0.082	0.076	0.104	0.061	0.044	0.066
Total	99.12	99.42	99.37	99.21	99.35	99.08	99.52	99.28	99.48	99.31
LOI %	**4.39**	**3.44**	**4.45**	**4.95**	**4.07**	**5.24**	**6.16**	**3.80**	**3.11**	**4.95**
Normalized Major Elements (Weight %):										
SiO2	73.82	73.68	73.31	73.54	73.48	74.12	72.46	74.00	75.10	74.51
TiO2	0.352	0.337	0.360	0.358	0.344	0.338	0.290	0.315	0.277	0.336
Al2O3	14.68	14.51	14.74	14.61	14.41	14.43	15.89	14.25	13.46	14.12
FeO*	2.01	1.89	2.35	2.14	2.13	2.08	1.82	2.01	1.83	2.00
MnO	0.075	0.078	0.097	0.087	0.092	0.078	0.080	0.088	0.098	0.070
MgO	1.13	0.98	1.24	1.20	1.06	1.18	2.27	0.95	0.66	1.01
CaO	1.87	1.55	1.65	1.83	1.60	1.92	2.18	1.54	1.12	1.94
Na2O	2.29	2.62	2.23	2.27	2.70	2.09	1.84	2.68	3.14	2.20
K2O	3.68	4.24	3.95	3.89	4.09	3.69	3.07	4.10	4.27	3.75
P2O5	0.091	0.111	0.070	0.082	0.082	0.077	0.104	0.061	0.045	0.066
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Unnormalized Trace Elements (ppm):										
Ni	16	15	14	12	12	16	14	13	111	13
Cr	22	20	18	14	16	20	15	16	245	16
Sc	5	4	4	4	4	4	4	5	3	5
V	33	23	29	26	30	27	21	24	18	26
Ba	633	560	547	608	583	647	445	510	390	617
Rb	124	140	134	134	147	129	106	139	153	124
Sr	420	301	356	451	369	505	377	369	275	513
Zr	278	263	285	275	252	253	213	271	260	263
Y	31	31	32	30	30	29	27	31	33	27
Nb	20.2	21.2	23.5	23.3	21.6	21.0	26.4	21.9	23.6	20.5
Ga	21	24	25	21	21	22	35	22	21	21
Cu	14	7	5	7	7	17	7	4	21	5
Zn	63	63	80	73	70	70	66	68	75	55
Pb	26	29	29	27	29	28	29	30	27	27
La	67	64	63	56	55	56	51	55	52	57
Ce	129	118	130	112	104	114	104	107	98	109
Th	22	26	27	26	25	26	29	25	25	24
Nd	41	42	43	39	35	36	35	35	35	38
sum tr.	**1965**	**1754**	**1846**	**1937**	**1810**	**2022**	**1606**	**1746**	**1865**	**1960**
in %	**0.20**	**0.18**	**0.18**	**0.19**	**0.18**	**0.20**	**0.16**	**0.17**	**0.19**	**0.20**
sum m+tr	**99.32**	**99.60**	**99.55**	**99.40**	**99.53**	**99.28**	**99.68**	**99.45**	**99.67**	**99.51**
r as oxides	**99.36**	**99.63**	**99.59**	**99.44**	**99.57**	**99.32**	**99.71**	**99.49**	**99.71**	**99.54**

Major elements are normalized on a volatile-free basis, with total Fe expressed as FeO.
"R" denotes a duplicate bead made from the same rock powder.

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TITLE 28 DEC 05 CONT BW PROJECT

Run 0205, Paul Bertetti, CNWRA, Southwest Research Institute

	BER 22 722F	BER 22 726F	BER 22 736F	BER 22 741F	BER 22 745F	BER 22 748F	BER 22 753F	BER 22 757F	BER 22 760F	BER 22 765F
Date	4-Jun-05	4-Jun-05	4-Jun-05	4-Jun-05	4-Jun-05	4-Jun-05	4-Jun-05	4-Jun-05	4-Jun-05	4-Jun-05
Unnormalized Major Elements (Weight %):										
SiO2	72.35	73.23	71.59	72.18	72.88	71.91	70.99	71.14	73.70	67.70
TiO2	0.407	0.323	0.347	0.393	0.318	0.429	0.498	0.496	0.293	0.005
Al2O3	14.11	14.06	15.04	14.57	14.42	14.59	14.42	14.89	13.95	17.83
FeO*	2.80	2.08	2.41	2.84	2.20	3.00	3.95	2.52	2.10	0.05
MnO	0.099	0.090	0.081	0.100	0.084	0.089	0.111	0.073	0.083	0.003
MgO	0.93	0.91	1.16	1.30	1.16	1.09	1.27	0.77	0.63	0.05
CaO	1.60	1.46	1.54	2.08	1.88	2.42	2.27	1.92	1.36	0.10
Na2O	2.65	2.80	2.43	2.20	2.35	2.29	2.07	3.17	3.03	2.43
K2O	4.23	4.22	4.60	3.57	3.99	3.44	3.48	4.46	4.56	11.82
P2O5	0.088	0.072	0.085	0.060	0.068	0.078	0.066	0.139	0.057	0.006
Total	99.27	99.25	99.28	99.27	99.34	99.33	99.11	99.59	99.77	100.01
LOI %	**3.59**	**3.73**	**4.10**	**5.12**	**4.86**	**5.02**	**5.39**	**3.15**	**3.21**	**0.48**
Normalized Major Elements (Weight %):										
SiO2	72.88	73.79	72.10	72.70	73.37	72.39	71.63	71.43	73.88	67.70
TiO2	0.410	0.326	0.350	0.396	0.320	0.432	0.502	0.498	0.293	0.005
Al2O3	14.22	14.16	15.15	14.67	14.52	14.69	14.55	14.95	13.98	17.83
FeO*	2.83	2.10	2.43	2.86	2.21	3.02	3.98	2.53	2.11	0.05
MnO	0.100	0.091	0.082	0.101	0.084	0.089	0.112	0.073	0.084	0.003
MgO	0.94	0.92	1.16	1.31	1.16	1.10	1.28	0.78	0.63	0.05
CaO	1.61	1.47	1.55	2.09	1.89	2.43	2.29	1.93	1.36	0.10
Na2O	2.67	2.82	2.45	2.21	2.37	2.31	2.08	3.18	3.04	2.43
K2O	4.26	4.25	4.63	3.60	4.01	3.46	3.51	4.48	4.57	11.82
P2O5	0.089	0.073	0.085	0.060	0.069	0.078	0.067	0.140	0.057	0.006
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Unnormalized Trace Elements (ppm):										
Ni	14	12	14	10	181	10	10	13	13	5
Cr	21	17	17	12	221	10	12	13	33	0
Sc	5	4	4	5	4	3	5	5	3	1
V	31	21	24	32	27	32	47	41	19	1
Ba	560	529	534	589	559	707	599	554	495	123
Rb	149	148	170	122	137	112	118	135	148	541
Sr	370	336	295	516	455	649	593	375	315	69
Zr	304	292	277	303	249	296	331	289	273	4
Y	32	33	34	29	29	25	29	30	30	3
Nb	23.1	22.8	21.9	22.4	21.0	20.2	21.3	21.5	22.0	0.0
Ga	20	23	24	23	21	19	23	21	22	21
Cu	8	11	15	6	7	6	7	6	8	6
Zn	83	76	75	88	66	74	107	54	62	4
Pb	29	30	28	29	27	27	25	27	28	50
La	64	65	60	63	61	62	74	66	64	0
Ce	122	121	114	121	109	113	131	120	121	3
Th	27	26	25	26	26	25	28	23	23	1
Nd	43	43	42	40	38	37	45	46	44	1
sum tr.	**1906**	**1809**	**1774**	**2037**	**2239**	**2227**	**2208**	**1841**	**1721**	**831**
in %	**0.19**	**0.18**	**0.18**	**0.20**	**0.22**	**0.22**	**0.22**	**0.18**	**0.17**	**0.08**
sum m+tr	**99.46**	**99.43**	**99.46**	**99.48**	**99.57**	**99.56**	**99.33**	**99.77**	**99.94**	**100.09**
r as oxides	**99.50**	**99.47**	**99.50**	**99.52**	**99.62**	**99.60**	**99.38**	**99.81**	**99.97**	**100.10**

Major elements are normalized on a volatile-free basis, with total Fe expressed as FeO.
"R" denotes a duplicate bead made from the same rock powder.

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TITLE 28 DEC 05 cont BW PROJECT

Run 0205, Paul Bertetti, CNWRA, Southwest Research Institute

	BER 22 768F	BER 22 774F	BER 22 465F	BER 22 465FR	BER 22 580F	BER 22 580FR	BER 22 707F	BER 22 707FR
Date	5-Jun-05	12-Jun-05	2-Jun-05	5-Jun-05	3-Jun-05	5-Jun-05	4-Jun-05	5-Jun-05
Unnormalized Major Elements (Weight %):								
SiO2	65.61	72.88	71.50	71.90	73.87	73.98	73.47	73.67
TiO2	0.007	0.242	0.372	0.372	0.290	0.290	0.313	0.311
Al2O3	20.51	14.13	14.61	14.62	14.35	14.39	14.15	14.20
FeO*	0.04	1.89	3.10	3.02	1.70	1.63	2.00	2.01
MnO	0.002	0.051	0.099	0.097	0.071	0.071	0.087	0.087
MgO	0.01	0.25	1.29	1.27	1.00	0.99	0.95	0.95
CaO	2.10	0.98	1.62	1.61	1.83	1.82	1.53	1.53
Na2O	6.08	4.68	1.92	1.91	2.14	2.14	2.66	2.69
K2O	5.30	4.14	3.62	3.61	3.67	3.68	4.07	4.07
P2O5	0.019	0.041	0.090	0.089	0.058	0.058	0.061	0.061
Total	99.68	99.30	98.22	98.52	98.97	99.06	99.28	99.58
LOI %	**0.35**	**0.74**						
Normalized Major Elements (Weight %):								
SiO2	65.82	73.40	72.80	72.98	74.63	74.69	74.00	73.98
TiO2	0.007	0.243	0.378	0.378	0.293	0.293	0.315	0.313
Al2O3	20.58	14.23	14.87	14.84	14.50	14.53	14.25	14.26
FeO*	0.04	1.91	3.16	3.07	1.72	1.65	2.01	2.02
MnO	0.002	0.051	0.100	0.099	0.072	0.072	0.088	0.087
MgO	0.01	0.25	1.31	1.29	1.01	1.00	0.95	0.96
CaO	2.10	0.99	1.65	1.64	1.85	1.84	1.54	1.54
Na2O	6.10	4.72	1.95	1.94	2.16	2.16	2.68	2.70
K2O	5.32	4.17	3.68	3.67	3.71	3.71	4.10	4.08
P2O5	0.019	0.041	0.092	0.091	0.059	0.058	0.061	0.062
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Unnormalized Trace Elements (ppm):								
Ni	6	11	16	17	11	11	13	13
Cr	0	6	19	19	9	9	16	16
Sc	0	5	6	5	4	4	5	4
V	5	7	36	35	19	17	24	25
Ba	2481	907	589	589	661	663	510	512
Rb	110	132	131	129	125	125	139	139
Sr	456	65	382	379	564	563	369	369
Zr	11	285	286	278	257	253	271	270
Y	2	42	30	29	28	28	31	30
Nb	0.0	15.4	22.4	22.6	22.6	22.8	21.9	23.1
Ga	17	18	24	23	20	20	22	21
Cu	8	6	11	10	7	7	4	5
Zn	5	49	84	81	56	55	68	68
Pb	69	19	30	29	27	28	30	29
La	6	35	58	66	52	55	55	52
Ce	7	66	128	126	108	104	107	105
Th	1	13	27	27	27	26	25	25
Nd	2	30	41	43	33	36	35	36
sum tr.	**3188**	**1711**	**1920**	**1908**	**2032**	**2027**	**1746**	**1742**
in %	**0.32**	**0.17**	**0.19**	**0.19**	**0.20**	**0.20**	**0.17**	**0.17**
sum m+tr	**100.00**	**99.47**	**98.41**	**98.71**	**99.18**	**99.26**	**99.45**	**99.75**
r as oxides	**100.04**	**99.50**	**98.45**	**98.75**	**99.22**	**99.30**	**99.49**	**99.79**

Major elements are normalized on a volatile-free basis, with total Fe expressed as FeO.
"R" denotes a duplicate bead made from the same rock powder.

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Summary table of previous and current XRF analyses of QA Samples and NIST certificate values

	SRM 70a Potassium Feldspar				SRM 99a Soda Feldspar				SRM 278 Obsidian Rock			
	Current Analyses BER 22 765F	Previous Analyses BER 628 XRF27	Certified Value	Certified Value Uncertainty	Current Analyses BER 22 768F	Previous Analyses BER628 XRF28	Certified Value	Certified Value Uncertainty	Current Analyses BER 22 774F	Previous Analyses BER628 XRF29	Certified Value	Certified Value Uncertainty
Date	4-Jun-05	1-Jul-04	15-Nov-90		5-Jun-05	4-Jul-04	15-Nov-90		12-Jun-05	4-Jul-04	27-Mar-92	
LOI (%)	0.48	0.40	0.40		0.35	0.26			0.74	0.76		
	Unnormalized Results (Weight %):											
SiO2	67.70	67.14	67.1	±0.1	65.61	65.84	65.2	±0.1	72.88	73.38	73.05	±0.13
TiO2	0.005	0.01	0.01	±0.01	0.007	0.01	0.007	±0.001	0.242	0.24	0.245	±0.007
Al2O3	17.83	17.75	17.9	±0.1	20.51	20.57	20.5	±0.1	14.13	14.31	14.15	±0.15
FeO	0.05	0.06	0.063	±0.009	0.04	0.04	0.054	±0.009	1.89	1.90	1.84	±0.02
MnO	0.003	0.00			0.002	0.00			0.051	0.05	0.052	±0.002
MgO	0.05	0.07			0.01	0.01	0.02	±0.01	0.25	0.26		
CaO	0.10	0.11	0.11	±0.01	2.10	2.15	2.14	±0.01	0.98	1.01	0.983	±0.002
Na2O	2.43	2.41	2.5	±0.1	6.08	6.22	6.2	±0.1	4.68	4.82	4.84	±0.05
K2O	11.82	11.80	11.8	±0.1	5.30	5.45	5.2	±0.1	4.14	4.28	4.16	±0.02
P2O5	0.006	0.01			0.019	0.02	0.02	±0.01	0.041	0.04	0.036	±0.003
Total	100.01	99.36	99.48		99.68	100.31	99.341		99.30	100.29	99.356	
	Normalized Results (Weight %):											
SiO2	67.70	67.57	67.4		65.82	65.64	65.6		73.40	73.17	73.52	
TiO2	0.005	0.01	0.01		0.007	0.01	0.007		0.243	0.24	0.247	
Al2O3	17.83	17.86	18.0		20.58	20.51	20.6		14.23	14.27	14.24	
FeO	0.05	0.06	0.063		0.04	0.04	0.054		1.91	1.89	1.85	
MnO	0.003	0.00			0.002	0.00			0.051	0.05	0.052	
MgO	0.05	0.07			0.01	0.01	0.02		0.25	0.26		
CaO	0.10	0.11	0.11		2.10	2.14	2.15		0.99	1.01	0.989	
Na2O	2.43	2.43	2.5		6.10	6.20	6.2		4.72	4.81	4.87	
K2O	11.82	11.88	11.9		5.32	5.43	5.2		4.17	4.27	4.19	
P2O5	0.006	0.01			0.019	0.02	0.02		0.041	0.04	0.036	
Total	100.00	100.00	100.00		100.00	100.00	100.00		100.00	100.00	100.00	
	Trace Elements (ppm):											
Ni	5	7			6	8			11	10	3.6	±0.3
Cr	0	5			0	6			6	11		
Sc	1	1			0	2			5	5		
V	1	1			5	2			7	7		
Ba	123	130	180	±90	2481	2516	2330	±90	907	909		
Rb	541	538	550	±90	110	106			132	129	127.5	±0.3
Sr	69	69			456	456			65	65	63.5	±0.1
Zr	4	14			11	18			285	279		
Y	3	3			2	3			42	42		
Nb	0.0	0			0.0	0			15.4	16		
Ga	21	21			17	18			18	20		
Cu	6	11			8	10			6	8	5.9	±0.2
Zn	4	7			5	7			49	50		
Pb	50	51			69	67			19	18	16.4	±0.2
La	0	4			6	3			35	33		
Ce	3	13			7	5			66	64		
Th	1	0			1	0			13	12	12.4	±0.3

Uncertainty values from SRM standard certificates are "expected" values - see certificates for details

Sources: Certified values from NIST Certificates
Previous analyses from 696/167
Current analyses from 733/113-114

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TABLE with ~~Procu~~ Procurement Plan Acceptance Calculations

	Current Analyses	Previous Analyses	NIST Certified Values (normalized)	Percent Different of Current Value from	
ID	BER 22 765F	BER 628 XRF27	SRM 70a		
Date	4-Jun-05	1-Jul-04	15-Nov-90	Previous Analyses	NIST Certified Values (normalized)
SiO2	67.70	67.57	67.4	0.2	0.4
TiO2	0.005	0.01	0.01	-50.0	-50.0
Al2O3	17.83	17.86	18.0	-0.2	-0.9
FeO	0.05	0.06	0.063	-16.7	-20.6
CaO	0.10	0.11	0.11	-9.1	-9.1
Na2O	2.43	2.43	2.5	0.0	-2.8
K2O	11.82	11.88	11.9	-0.5	-0.7

	BER 22 765F	BER 628 XRF27	SRM 99a		
Date	4-Jun-05	1-Jul-04	15-Nov-90	Previous Analyses	NIST Certified Values (normalized)
SiO2	65.82	65.64	65.6	0.3	0.3
TiO2	0.007	0.01	0.007	-30.0	0.0
Al2O3	20.58	20.51	20.6	0.3	-0.1
FeO	0.04	0.04	0.054	0.0	-25.9
MgO	0.01	0.01	0.02	0.0	-50.0
CaO	2.10	2.14	2.15	-1.9	-2.3
Na2O	6.10	6.20	6.2	-1.6	-1.6
K2O	5.32	5.43	5.2	-2.0	2.3
P2O5	0.019	0.02	0.02	-5.0	-5.0

	BER 22 765F	BER 628 XRF27	SRM 278		
Date	4-Jun-05	1-Jul-04	27-Mar-92	Previous Analyses	NIST Certified Values (normalized)
SiO2	73.40	73.17	73.52	0.3	-0.2
TiO2	0.243	0.24	0.247	1.3	-1.6
Al2O3	14.23	14.27	14.24	-0.3	-0.1
FeO	1.91	1.89	1.85	1.1	3.2
MnO	0.051	0.05	0.052	2.0	-1.9
CaO	0.99	1.01	0.989	-2.0	0.1
Na2O	4.72	4.81	4.87	-1.9	-3.1
K2O	4.17	4.27	4.19	-2.3	-0.5
P2O5	0.041	0.04	0.036	2.5	13.9

Source 733/115

Acceptance criteria for analyses documented in paperwork with PO 575764J. ~~Criter~~ BW 12/28/05

43/50 results are ± 15% for the majority of the certified components listed on the NIST Certificate relative to the NIST values and the most recent previous results from same lab.

Data Accepted 12-28-05 BAW

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Washington State University ICP-MS Results for NC-EWDP-22PC Sonic Core Samples < #35 Mesh

NC-EWDP-22PC Sonic Core Samples (< #35 Mesh) from 696/175-177

XRF + LOI Analyses for same samples at 733/106-116

Note: Last 3 samples (60-62) on 696/177 were labeled incorrectly on the submittal form. See 710/14 for correct label IDs. Reference email on 733/107

ICP-MS Results on 733/118-121

59 samples + 3 QAs for a total of 62

ID info on 696/175-177

- ICPMS Analyses: Pur Req 05022341, PO ~~54~~ 575766J BW 1-9-06
- Summary of previous + current QA analyses along with NIST cert values on 733/122
- Procurement Plan acceptance calculations on 733/123

1-9-06 BW

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1/9/2006

Sample ID	La ppm	Ce ppm	Pr ppm	Nd ppm	Sm ppm	Eu ppm	Gd ppm	Tb ppm	Dy ppm	Ho ppm	Er ppm	Tm ppm	Yb ppm
BER 22-462-F	53.75	95.66	9.74	33.61	6.56	0.86	5.30	0.85	5.05	1.00	2.69	0.42	2.69
BER 22-465-F	56.41	112.73	10.21	34.95	6.68	0.94	5.14	0.83	4.90	0.95	2.68	0.40	2.55
BER 22-472-F	59.87	112.62	10.71	36.72	6.95	0.97	5.59	0.87	5.20	1.04	2.94	0.44	2.76
BER 22-477-F	63.81	121.36	11.43	38.84	7.32	0.95	5.83	0.91	5.33	1.05	2.90	0.44	2.82
BER 22-480-F	65.73	131.62	11.80	40.20	7.57	0.96	5.96	0.94	5.39	1.08	2.99	0.45	2.89
BER 22-487-F	55.67	110.96	10.19	35.13	6.70	0.89	5.26	0.84	4.91	0.97	2.67	0.41	2.62
BER 22-492-F	52.72	102.46	9.64	32.95	6.26	0.93	4.97	0.78	4.54	0.91	2.52	0.39	2.48
BER 22-498-F	52.59	103.27	9.62	32.82	6.27	0.86	5.06	0.82	4.84	0.98	2.70	0.43	2.73
BER 22-503-F	71.79	128.88	12.56	42.56	7.50	1.13	5.64	0.88	5.20	1.02	2.83	0.44	2.86
BER 22-508-F	55.72	107.34	10.08	34.23	6.41	0.88	5.21	0.81	4.81	0.95	2.62	0.40	2.58
BER 22-514-F	52.77	104.37	9.53	32.80	6.43	0.77	5.14	0.83	4.84	0.97	2.77	0.42	2.66
BER 22-518-F	53.60	100.17	9.60	32.92	6.24	0.81	4.98	0.79	4.62	0.92	2.58	0.40	2.52
BER 22-522-F	55.39	110.01	10.16	35.28	6.87	0.90	5.49	0.88	5.06	1.02	2.87	0.44	2.77
BER 22-530-F	54.88	105.82	10.06	34.78	6.73	0.87	5.41	0.86	5.03	1.00	2.77	0.42	2.63
BER 22-535-F	49.56	94.85	9.01	30.99	5.88	0.85	4.66	0.74	4.43	0.88	2.43	0.38	2.41
BER 22-540-F	59.04	115.87	10.81	37.29	7.08	0.98	5.58	0.87	5.08	1.00	2.73	0.42	2.67
BER 22-541-F	58.90	112.29	10.62	36.39	6.91	0.92	5.39	0.85	4.96	0.98	2.73	0.41	2.67
BER 22-547-F	54.62	106.85	9.96	34.28	6.57	0.98	5.10	0.80	4.68	0.91	2.52	0.39	2.52
BER 22-550-F	70.55	138.72	12.74	43.70	8.15	1.13	6.15	0.96	5.57	1.08	2.98	0.46	2.92
BER 22-555-F	52.42	109.20	9.74	33.92	6.56	0.93	5.07	0.82	4.84	0.95	2.64	0.40	2.60
BER 22-561-F	52.08	103.04	9.63	32.96	6.48	0.88	5.10	0.82	4.88	0.98	2.67	0.40	2.61
BER 22-567-F	58.97	114.52	10.03	33.86	6.49	0.86	5.21	0.85	5.11	1.03	2.95	0.44	2.85
BER 22-572-F	59.43	108.01	10.44	35.66	6.84	0.96	5.37	0.89	5.22	1.06	2.96	0.47	2.99
BER 22-577F	51.65	95.22	9.53	32.87	6.29	0.86	4.87	0.78	4.61	0.92	2.52	0.40	2.47
BER 22-580-F	50.96	97.12	8.82	29.85	5.81	0.82	4.66	0.76	4.49	0.93	2.60	0.40	2.52
BER 22-589-F	60.47	112.45	11.02	38.14	7.16	0.95	5.53	0.87	4.98	0.99	2.81	0.41	2.60
BER 22-596-F	52.55	100.13	9.56	33.13	6.55	0.82	5.15	0.85	4.97	1.01	2.76	0.43	2.68
BER 22-601-F	53.17	101.03	9.64	33.45	6.49	0.95	5.26	0.82	4.89	0.97	2.75	0.42	2.64
BER 22-605-F	60.02	111.54	10.37	35.45	6.72	1.02	5.19	0.84	5.01	1.01	2.79	0.42	2.70
BER 22-610-F	76.72	145.63	13.17	44.81	8.00	1.08	5.93	0.93	5.48	1.07	2.96	0.45	2.93
BER 22-614-F	54.70	104.27	9.62	32.95	6.11	1.01	4.64	0.75	4.40	0.86	2.42	0.37	2.41
BER 22-619-F	70.20	134.85	13.00	44.89	8.38	1.07	6.11	0.92	5.36	1.04	2.83	0.43	2.72
BER 22-625-F	52.60	98.62	9.92	33.97	6.60	0.86	5.18	0.84	4.94	1.00	2.70	0.42	2.68
BER 22-631-F	57.42	110.16	10.51	35.78	6.78	0.96	5.17	0.84	4.87	0.95	2.68	0.41	2.59
BER 22-636-F	53.83	98.61	10.19	35.37	6.96	0.93	5.56	0.89	5.16	1.05	2.91	0.44	2.76
BER 22-640-F	54.94	99.54	10.04	34.19	6.52	0.85	5.13	0.82	4.78	0.96	2.67	0.41	2.58
BER 22-645-F	45.20	87.06	8.97	31.16	6.86	0.55	5.76	0.94	5.82	1.17	3.19	0.49	3.11
BER 22-647-F	49.16	89.48	8.93	31.04	5.97	0.94	4.91	0.77	4.59	0.92	2.51	0.39	2.45
BER 22-653-F	54.24	99.91	9.75	33.60	6.45	0.89	5.09	0.80	4.75	0.95	2.57	0.39	2.59

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Analyses by ICP-MS

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Sample ID	La ppm	Ce ppm	Pr ppm	Nd ppm	Sm ppm	Eu ppm	Gd ppm	Tb ppm	Dy ppm	Ho ppm	Er ppm	Tm ppm	Yb ppm
BER 22-659-F	60.36	115.46	10.89	37.58	7.08	1.02	5.56	0.84	4.87	0.96	2.62	0.40	2.52
BER 22-664-F	61.54	112.32	10.51	35.74	6.66	1.03	5.29	0.83	4.88	0.98	2.70	0.41	2.66
BER 22-671-F	58.42	104.12	10.52	36.26	6.92	0.98	5.45	0.85	5.04	1.02	2.83	0.42	2.79
BER 22-676-F	57.20	113.06	10.59	36.95	7.24	0.92	5.82	0.89	5.23	1.04	2.78	0.43	2.78
BER 22-682-F	51.20	97.35	9.30	31.86	6.37	0.83	5.15	0.81	4.90	0.97	2.64	0.40	2.63
BER 22-686-F	50.66	96.47	9.41	32.74	6.57	0.88	5.25	0.83	4.90	0.98	2.67	0.40	2.56
BER 22-695-F	51.70	100.39	9.31	32.31	6.18	0.85	4.98	0.79	4.69	0.95	2.57	0.39	2.55
BER 22-701-F	45.57	90.74	8.44	29.22	6.00	0.71	4.89	0.75	4.48	0.88	2.37	0.37	2.41
BER 22-707-F	50.32	96.42	9.43	32.67	6.64	0.79	5.42	0.86	5.10	1.02	2.77	0.41	2.65
BER 22-711-F	47.00	87.81	8.92	30.91	6.70	0.68	5.59	0.91	5.45	1.07	2.89	0.44	2.78
BER 22-716-F	53.14	97.30	9.36	31.86	6.02	0.87	4.78	0.75	4.46	0.89	2.49	0.38	2.47
BER 22-722-F	62.16	113.46	11.18	39.01	7.35	1.03	6.30	0.92	5.31	1.04	2.86	0.43	2.83
BER 22-726-F	58.31	106.64	10.60	36.90	7.39	0.90	5.79	0.92	5.37	1.06	2.85	0.43	2.72
BER 22-736-F	60.66	106.99	11.12	38.54	7.61	0.99	6.08	0.95	5.65	1.12	3.00	0.45	2.86
BER 22-741-F	56.51	109.87	10.25	35.70	6.81	0.87	5.50	0.85	4.93	0.99	2.67	0.41	2.59
BER 22-745-F	54.90	99.90	10.05	34.39	6.62	0.91	5.18	0.81	4.67	0.93	2.63	0.39	2.50
BER 22-748-F	56.75	101.31	9.94	33.80	6.23	0.96	4.80	0.73	4.18	0.80	2.24	0.33	2.14
BER 22-753-F	66.76	122.87	11.96	40.41	7.42	0.89	5.60	0.85	4.83	0.94	2.61	0.39	2.51
BER 22-757-F	62.36	108.71	11.16	38.00	7.23	1.13	5.71	0.89	5.05	1.01	2.71	0.41	2.69
BER 22-760-F	61.71	111.07	11.31	38.52	7.38	0.99	5.72	0.90	5.22	1.03	2.80	0.42	2.68
BER 22-765-F	0.60	0.73	0.09	0.37	0.12	0.63	0.15	0.03	0.21	0.05	0.14	0.02	0.14
BER 22-768-F	2.81	4.19	0.49	1.90	0.54	0.84	0.52	0.07	0.37	0.06	0.14	0.02	0.10
BER 22-774-F	30.56	58.14	6.54	24.92	5.92	0.85	5.68	1.05	6.77	1.44	4.22	0.66	4.35
BER 22-472-F ®fl	58.13	109.86	10.45	35.53	6.76	0.96	5.45	0.86	5.09	1.02	2.85	0.43	2.76
BER 22-596-F ®fl	53.23	101.37	9.69	33.23	6.52	0.84	5.18	0.84	4.94	0.99	2.79	0.42	2.61
BER 22-726-F ®	58.89	108.12	10.81	37.22	7.32	0.91	5.83	0.93	5.32	1.07	2.92	0.43	2.75
BER 22-753-F ®	66.06	121.40	11.76	39.97	7.32	0.88	5.45	0.83	4.76	0.93	2.55	0.39	2.53

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Sample ID	Lu ppm	Ba ppm	Th ppm	Nb ppm	Y ppm	Hf ppm	Ta ppm	U ppm	Pb ppm	Rb ppm	Cs ppm	Sr ppm	Sc ppm	Zr ppm
BER 22-462-F	0.41	451	21.46	22.49	27.47	6.21	1.51	3.34	25.12	133.6	12.93	223	5.0	207
BER 22-465-F	0.40	541	22.49	22.36	25.60	7.03	1.50	3.06	25.34	112.3	17.65	343	5.7	239
BER 22-472-F	0.45	560	22.31	23.08	28.99	7.28	1.54	3.18	24.58	120.8	18.02	350	5.5	250
BER 22-477-F	0.44	566	25.06	24.83	28.71	8.03	1.65	3.17	26.30	120.9	18.57	385	5.2	280
BER 22-480-F	0.45	651	24.68	27.85	29.47	9.03	1.74	2.85	24.81	118.1	18.73	425	6.1	327
BER 22-487-F	0.41	573	22.40	23.37	26.80	6.93	1.60	3.08	21.96	118.8	21.08	417	5.9	235
BER 22-492-F	0.39	665	22.83	23.66	25.64	6.82	1.61	2.77	23.68	119.6	18.50	445	5.3	234
BER 22-498-F	0.44	573	24.24	25.70	27.37	7.10	1.73	3.17	24.05	116.0	19.01	423	5.5	238
BER 22-503-F	0.45	584	24.09	23.58	28.40	7.56	1.59	3.37	23.44	135.3	13.98	311	5.6	276
BER 22-508-F	0.41	596	23.17	23.17	27.02	7.17	1.56	2.94	23.95	116.7	19.98	454	5.7	252
BER 22-514-F	0.43	482	23.94	24.11	27.73	6.86	1.61	3.12	23.70	125.4	19.87	411	5.6	228
BER 22-518-F	0.40	574	22.58	22.62	26.40	6.71	1.53	2.80	21.42	119.1	20.88	501	5.7	232
BER 22-522-F	0.43	596	23.68	24.48	29.46	6.86	1.61	3.06	22.68	128.7	19.45	444	6.2	230
BER 22-530-F	0.42	559	23.82	23.31	28.45	6.91	1.59	2.83	23.68	123.3	20.02	463	6.1	235
BER 22-535-F	0.38	603	22.75	24.44	25.42	6.63	1.59	2.47	21.33	116.1	18.17	465	6.0	226
BER 22-540-F	0.43	592	24.33	25.65	28.54	8.08	1.66	2.66	25.49	120.4	15.15	390	6.0	287
BER 22-541-F	0.42	617	24.45	25.34	28.37	7.95	1.65	2.64	23.70	119.2	17.86	432	5.6	285
BER 22-547-F	0.41	623	24.37	25.66	26.09	7.70	1.67	2.58	25.45	111.8	14.41	403	5.8	272
BER 22-550-F	0.47	702	25.63	26.62	30.02	9.84	1.71	2.76	27.60	127.8	15.09	417	5.8	364
BER 22-555-F	0.41	604	26.82	26.47	26.99	7.92	1.80	3.00	24.92	115.0	18.34	470	6.2	275
BER 22-561-F	0.41	573	22.56	24.73	27.29	7.16	1.60	2.71	22.50	123.8	17.15	437	5.4	246
BER 22-567-F	0.45	501	25.50	25.04	28.91	7.65	1.67	3.22	26.55	125.2	18.12	409	5.9	260
BER 22-572-F	0.47	550	24.01	26.79	29.68	8.05	1.68	3.10	22.97	108.9	16.85	483	5.8	278
BER 22-577F	0.39	648	21.24	22.64	25.95	6.89	1.46	2.58	23.28	112.0	18.30	538	4.8	237
BER 22-580-F	0.40	609	23.32	23.00	25.43	6.97	1.59	2.80	23.78	111.2	17.24	521	4.3	230
BER 22-589-F	0.42	514	22.37	22.56	27.66	7.58	1.48	2.76	27.65	118.6	13.50	386	4.7	264
BER 22-596-F	0.43	576	22.75	24.52	28.10	7.04	1.66	3.03	22.40	128.1	16.37	446	5.6	239
BER 22-601-F	0.42	597	22.43	22.92	27.65	6.73	1.57	2.82	22.59	119.3	19.99	477	6.7	228
BER 22-605-F	0.43	565	22.16	22.82	27.98	7.03	1.52	2.95	20.69	109.5	17.82	466	7.3	251
BER 22-610-F	0.47	566	25.21	25.37	30.13	8.60	1.66	3.17	23.46	113.6	18.22	419	6.7	317
BER 22-614-F	0.37	699	21.09	21.26	24.79	6.88	1.50	2.49	23.95	105.0	18.99	515	5.5	244
BER 22-619-F	0.43	630	23.67	25.06	29.28	8.87	1.55	2.72	23.26	105.0	13.13	418	5.9	328
BER 22-625-F	0.42	483	23.85	21.77	28.34	5.99	1.44	3.11	24.01	126.2	17.80	380	5.0	200
BER 22-631-F	0.41	488	21.82	21.90	27.74	7.13	1.38	2.98	23.27	125.3	12.91	302	4.8	246
BER 22-636-F	0.44	269	21.75	21.87	30.43	6.35	1.37	3.64	25.33	151.1	6.30	104	3.9	202
BER 22-640-F	0.42	502	23.25	22.14	27.84	7.17	1.44	2.98	22.07	123.2	14.65	345	4.7	248
BER 22-645-F	0.48	239	24.73	25.79	32.90	6.81	1.66	4.02	26.49	155.0	7.53	160	2.9	202
BER 22-647-F	0.40	610	18.97	19.40	25.91	6.20	1.38	2.92	22.63	113.4	18.10	433	5.3	216
BER 22-653-F	0.41	602	22.12	21.97	26.63	6.83	1.46	2.77	23.73	120.6	13.90	391	4.8	242

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Paul Bertetti - CNSWRA, Southwest Research Institute 1/9/2006

Sample ID	Lu ppm	Ba ppm	Th ppm	Nb ppm	Y ppm	Hf ppm	Ta ppm	U ppm	Pb ppm	Rb ppm	Cs ppm	Sr ppm	Sc ppm	Zr ppm
BER 22-659-F	0.40	667	23.06	21.48	26.87	7.54	1.47	2.66	27.41	111.2	15.01	404	5.4	268
BER 22-664-F	0.43	584	19.92	20.10	27.82	6.88	1.30	2.82	23.23	108.0	12.17	380	5.1	245
BER 22-671-F	0.43	526	23.72	21.63	28.63	6.79	1.45	3.14	25.33	126.8	10.92	275	4.5	237
BER 22-676-F	0.44	502	24.19	23.17	28.85	7.61	1.53	2.75	25.00	119.0	11.81	324	4.5	258
BER 22-682-F	0.42	564	22.42	23.45	27.39	7.24	1.51	2.91	23.92	119.9	13.91	418	4.6	247
BER 22-686-F	0.40	536	22.22	21.45	27.60	6.85	1.45	3.01	24.06	130.3	13.49	336	4.6	229
BER 22-695-F	0.40	598	22.82	21.73	26.51	6.73	1.50	2.81	23.91	115.4	16.28	465	4.6	231
BER 22-701-F	0.39	410	26.73	25.20	25.16	6.08	1.92	2.14	25.75	92.9	12.61	340	4.8	183
BER 22-707-F	0.42	476	23.12	22.41	28.35	7.11	1.51	2.87	25.96	125.2	11.36	340	3.9	237
BER 22-711-F	0.43	364	23.05	23.72	30.50	7.28	1.50	3.25	24.09	138.3	8.30	258	3.2	235
BER 22-716-F	0.39	575	20.99	20.63	25.25	6.71	1.38	2.86	23.10	110.5	13.68	476	4.4	237
BER 22-722-F	0.45	525	24.87	22.84	29.55	7.76	1.48	3.44	25.35	135.1	12.82	348	5.4	276
BER 22-726-F	0.42	481	23.59	22.67	29.69	7.34	1.45	3.04	25.24	130.7	10.86	303	4.0	256
BER 22-736-F	0.45	508	22.71	22.27	31.79	7.20	1.43	3.37	24.21	155.0	11.59	278	4.7	245
BER 22-741-F	0.41	554	24.93	22.84	27.79	7.67	1.47	2.52	24.78	111.7	14.97	490	4.8	269
BER 22-745-F	0.40	521	24.01	21.19	26.72	6.52	1.42	2.67	24.45	121.9	14.05	401	4.2	216
BER 22-748-F	0.35	664	23.12	19.97	22.26	7.42	1.42	2.27	24.12	99.4	15.72	597	4.6	262
BER 22-753-F	0.40	566	25.64	21.96	26.38	8.40	1.43	2.38	22.34	104.8	14.91	549	4.9	293
BER 22-757-F	0.42	519	20.40	21.56	27.90	7.27	1.34	2.76	23.33	120.6	8.23	347	5.3	259
BER 22-760-F	0.42	471	22.54	21.89	28.56	7.12	1.40	3.00	24.60	134.4	9.47	292	3.6	243
BER 22-765-F	0.02	117	0.35	0.77	1.37	0.07	0.12	0.12	46.19	502.9	9.04	62	0.2	2
BER 22-768-F	0.02	2478	0.53	0.36	1.77	0.34	0.02	0.21	64.21	103.4	0.50	440	0.4	8
BER 22-774-F	0.71	889	12.15	16.16	41.06	7.75	1.37	4.15	15.79	123.6	4.97	63	5.7	269
BER 22-472-F ®fl	0.44	555	22.39	22.83	28.85	7.20	1.54	3.16	23.93	120.6	17.65	347	5.6	248
BER 22-596-F ®fl	0.42	586	22.84	24.65	27.81	7.11	1.67	3.12	23.16	130.1	16.77	448	5.6	241
BER 22-726-F ®	0.44	487	23.29	23.08	29.91	7.40	1.45	3.07	25.36	131.1	10.73	304	4.3	254
BER 22-753-F ®	0.40	561	25.61	22.17	26.56	8.34	1.42	2.33	21.92	105.9	14.83	549	5.5	296

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	SRM 70a Potassium Feldspar				SRM 99a Soda Feldspar				SRM 278 Obsidian Rock			
	Current Analyses BER 22 765F	Previous Analyses BER 628 XRF27	Certified Value	Certified Value Uncertainty	Current Analyses BER 22 768F	Previous Analyses BER628 XRF28	Certified Value	Certified Value Uncertainty	Current Analyses BER 22 774F	Previous Analyses BER628 XRF29	Certified Value	Certified Value Uncertainty
Date	5-Jun-09	2-Jul-08	16-Nov-94		6-Jun-09	5-Jul-08	16-Nov-94		13-Jun-09	5-Jul-08	28-Mar-96	
	Trace Elements (ppm):											
La	0.60	0.59			2.81	2.73			30.56	31.19		
Ce	0.73	0.67			4.19	4.03			58.14	59.12		
Pr	0.09	0.08			0.49	0.47			6.54	6.56		
Nd	0.37	0.31			1.90	1.90			24.92	25.25		
Sm	0.12	0.10			0.54	0.55			5.92	6.06		
Eu	0.63	0.63			0.84	0.85			0.85	0.83		
Gd	0.15	0.14			0.52	0.52			5.68	5.85		
Tb	0.03	0.03			0.07	0.07			1.05	1.05		
Dy	0.21	0.21			0.37	0.34			6.77	6.92		
Ho	0.05	0.04			0.06	0.05			1.44	1.45		
Er	0.14	0.13			0.14	0.13			4.22	4.24		
Tm	0.02	0.02			0.02	0.02			0.66	0.67		
Yb	0.14	0.14			0.10	0.10			4.35	4.42		
Lu	0.02	0.02			0.02	0.01			0.71	0.72		
Ba	117	119	180	± 90	2478	2534	2330	± 90	889	908		
Th	0.35	0.39			0.53	0.50			12.15	12.53	12.4	± 0.3
Nb	0.77	0.81			0.36	0.33			16.16	16.57		
Y	1.37	1.35			1.77	1.72			41.06	41.84		
Hf	0.07	0.06			0.34	0.32			7.75	7.83		
Ta	0.12	0.13			0.02	0.02			1.37	1.38		
U	0.12	0.12			0.21	0.20			4.15	4.30		
Pb	46.19	47.56			64.21	65.10			15.79	16.18	16.4	± 0.2
Rb	502.9	510.8	550	± 90	103.4	104.3			123.6	123.8	127.5	± 0.3
Cs	9.04	9.28			0.50	0.44			4.97	5.13		
Sr	62	70			440	448			63	64	63.5	± 0.1
Sc	0.2	0.1			0.4	0.2			5.7	5.9		
Zr	2	2			8	8			269	276		

Uncertainty values from SRM standard certificates are "expected" values - see certificates for details

Sources
- Certified values from NIST Certificates
- Previous analyses from 696/165-166
- Current analyses from 733/118-121

Summary Table of previous + current QA ICP-MS Analyses and NIST cert Values

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Table with Procurement Plan acceptance calculations

	Current Analyses	Previous Analyses	NIST Certified Values	Percent Different of Current Value from	
ID	BER 22 765F	BER 628 XRF27	SRM 70a	Previous Analyses	NIST Certified Values
Date	5-Jun-09	2-Jul-08	16-Nov-94		
Ba	117	119	180	-2.0	-35
Rb	502.9	510.8	550	-1.5	-8.6
ID	BER 22 765F	BER 628 XRF27	SRM 99a	Previous Analyses	NIST Certified Values
Date	5-Jun-09	2-Jul-08	16-Nov-94		
Ba	2478	2534	2330	-2.2	6.4
ID	BER 22 765F	BER 628 XRF27	SRM 278	Previous Analyses	NIST Certified Values
Date	5-Jun-09	2-Jul-08	28-Mar-96		
Th	12.15	12.53	12.4	-3.0	-2.0
Pb	15.79	16.18	16.4	-2.4	-3.7
Rb	123.6	123.8	127.5	-0.2	-3.1
Sr	63	64	63.5	-0.9	-0.4

Source 733/122

Acceptance criteria for procurement plan with PO 5757665 requisition.

13/14 of the ~~collective majority of~~ BW 1-9-06 trace ~~compo~~ BW 1-9-06 components listed on the NIST cert are within ±20% of the NIST values and the most recent previous analyses. (criteria >50%)

Data Accepted 1-9-06 BW

2-9-06 BW

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Results from MiniSonde Multiparameter Probe Analyses From Two NC-EWDP Groundwater Sampling Events

MiniSonde results from these sampling events were already documented in the SN from manually recording the results observed on the Surveyor4 data display unit during the sampling. The following files contain data that was collected at specific intervals over a short period of time and stored in the Surveyor4 data unit during that same analyses. The relevant information is contained in the header information for each file.

The first two results were collected during the May 2004 NCEWDP sampling event (628/117)

The next five results were collected during the Sept 2005 NC-EWDP sampling event (733/32)

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Well NC-EWDP 19PB Deep

Date 10 MAY 04

Bin/Log Data

628/129

Log File Name : 19PBDEEP0504
Setup Date (MMDDYY) : 051004
Setup Time (HHMMSS) : 113501
Starting Date (MMDDYY) : 051004
Starting Time (HHMMSS) : 114200
Stopping Date (MMDDYY) : 051004
Stopping Time (HHMMSS) : 120000
Interval (HHMMSS) : 000030
Warmup (HHMMSS) : 000030

Date MMDDYY	Time HHMMSS	IBVSvr4a Volts	Temp øC	BPSvr4a mmHg	Latitude DMS	Longitud DMS	Altitude meters	SpCond æS/cm	pH Units	ORP mV	DO mg/l	DO% Sat
5/10/2004	11:42:00	7.5	27.19	679.9	N 29ø26'35.3"	W 98ø36'52.4"	242	399.3	8.15	240	3.64	55.1
5/10/2004	11:42:30	7.5	27.17	680.6	N 29ø26'35.3"	W 98ø36'52.4"	242	399.2	8.16	241	3.63	55
5/10/2004	11:43:00	7.5	27.13	679.9	N 29ø26'35.3"	W 98ø36'52.4"	242	399.2	8.17	242	3.64	55
5/10/2004	11:43:30	7.5	27.12	680.3	N 29ø26'35.3"	W 98ø36'52.4"	242	398.7	8.17	243	3.62	54.7
5/10/2004	11:44:00	7.5	27.12	680.1	N 29ø26'35.3"	W 98ø36'52.4"	242	398.4	8.17	243	3.62	54.7
5/10/2004	11:44:30	7.5	27.14	680.1	N 29ø26'35.3"	W 98ø36'52.4"	242	398.3	8.11	244	3.61	54.7
5/10/2004	11:45:00	7.5	27.14	680.2	N 29ø26'35.3"	W 98ø36'52.4"	242	397.1	8.17	244	3.61	54.6
5/10/2004	11:45:30	7.5	26.95	680.2	N 29ø26'35.3"	W 98ø36'52.4"	242	397.3	8.18	246	3.63	54.8
5/10/2004	11:46:00	7.5	26.92	680.6	N 29ø26'35.3"	W 98ø36'52.4"	242	396.5	8.17	247	3.62	54.5
5/10/2004	11:46:30	7.5	26.91	680.3	N 29ø26'35.3"	W 98ø36'52.4"	242	396.1	8.17	248	3.62	54.5
5/10/2004	11:47:00	7.5	26.92	680.3	N 29ø26'35.3"	W 98ø36'52.4"	242	395.7	8.17	249	3.61	54.4
5/10/2004	11:47:30	7.5	26.93	680.7	N 29ø26'35.3"	W 98ø36'52.4"	242	395.3	8.17	250	3.61	54.4
5/10/2004	11:48:00	7.5	26.94	680.4	N 29ø26'35.3"	W 98ø36'52.4"	242	395.2	8.17	251	3.61	54.4
5/10/2004	11:48:30	7.5	26.95	680.4	N 29ø26'35.3"	W 98ø36'52.4"	242	395.1	8.16	252	3.6	54.2
5/10/2004	11:49:00	7.5	26.94	680.7	N 29ø26'35.3"	W 98ø36'52.4"	242	395.3	8.17	252	3.6	54.2
5/10/2004	11:49:30	7.5	26.96	680.3	N 29ø26'35.3"	W 98ø36'52.4"	242	394.8	8.17	253	3.59	54.1
5/10/2004	11:50:00	7.5	26.96	680.6	N 29ø26'35.3"	W 98ø36'52.4"	242	394.7	8.17	253	3.56	53.7
5/10/2004	11:50:30	7.5	26.95	680.4	N 29ø26'35.3"	W 98ø36'52.4"	242	395.5	8.17	253	3.58	54
5/10/2004	11:51:00	7.5	26.95	680.7	N 29ø26'35.3"	W 98ø36'52.4"	242	395.8	8.17	254	3.59	54.1
5/10/2004	11:51:30	7.5	26.95	680.3	N 29ø26'35.3"	W 98ø36'52.4"	242	395.2	8.17	254	3.59	54.1
5/10/2004	11:52:00	7.5	26.96	680.3	N 29ø26'35.3"	W 98ø36'52.4"	242	395.7	8.17	254	3.6	54.2
5/10/2004	11:52:30	7.5	26.97	680.3	N 29ø26'35.3"	W 98ø36'52.4"	242	395.8	8.17	255	3.59	54.1
5/10/2004	11:53:00	7.5	26.97	680.4	N 29ø26'35.3"	W 98ø36'52.4"	242	395.8	8.18	255	3.6	54.2
5/10/2004	11:53:30	7.5	26.98	680.5	N 29ø26'35.3"	W 98ø36'52.4"	242	395.4	8.17	256	3.6	54.2
5/10/2004	11:54:00	7.5	26.98	680.4	N 29ø26'35.3"	W 98ø36'52.4"	242	394.9	8.17	256	3.59	54.2
5/10/2004	11:54:30	7.5	27	680.6	N 29ø26'35.3"	W 98ø36'52.4"	242	391.6	8.22	257	3.62	54.6
5/10/2004	11:55:00	7.5	26.98	680.3	N 29ø26'35.3"	W 98ø36'52.4"	242	391	8.17	257	3.62	54.6
5/10/2004	11:55:30	7.5	26.98	680.6	N 29ø26'35.3"	W 98ø36'52.4"	242	390.3	8.17	258	3.6	54.4
5/10/2004	11:56:00	7.5	27	680.5	N 29ø26'35.3"	W 98ø36'52.4"	242	389.3	8.16	258	3.59	54.2
5/10/2004	11:56:30	7.5	27.02	680.4	N 29ø26'35.3"	W 98ø36'52.4"	242	389.2	8.17	259	3.58	54
5/10/2004	11:57:00	7.5	27.02	680.5	N 29ø26'35.3"	W 98ø36'52.4"	242	388.5	8.17	259	3.58	54.1
5/10/2004	11:57:30	7.5	27.02	680.4	N 29ø26'35.3"	W 98ø36'52.4"	242	389.2	8.17	259	3.58	54.1
5/10/2004	11:58:00	7.5	27.05	680.5	N 29ø26'35.3"	W 98ø36'52.4"	242	388.5	8.17	259	3.6	54.4
5/10/2004	11:58:30	7.5	27.06	680.3	N 29ø26'35.3"	W 98ø36'52.4"	242	388.1	8.17	260	3.59	54.2
5/10/2004	11:59:00	7.5	27.06	680.2	N 29ø26'35.3"	W 98ø36'52.4"	242	390	8.19	259	3.63	54.9
5/10/2004	11:59:30	7.5	27.08	680.5	N 29ø26'35.3"	W 98ø36'52.4"	242	388.7	8.19	258	3.61	54.5
5/10/2004	12:00:00	7.5	27.08	680.1	N 29ø26'35.3"	W 98ø36'52.4"	242	388.7	8.16	258	3.61	54.5

Recovery finished at 011806 071321

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TITLE 9 Feb 06 cont BKW PROJECT

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Well: NC-EWDP 19PB shallow
File name incorrect
Date: 2-9-06 BW
11MAY2004
Original Data
628/128

Log File Name : 19PB-DEEP--051104
Setup Date (MMDDYY) : 051104
Setup Time (HHMMSS) : 111612
Starting Date (MMDDYY) : 051104
Starting Time (HHMMSS) : 113000
Stopping Date (MMDDYY) : 051104
Stopping Time (HHMMSS) : 114500
Interval (HHMMSS) : 000030
Warmup (HHMMSS) : 000030

Date MMDDYY	Time HHMMSS	IBVSvr4a Volts	Temp øC	BPSvr4a mmHg	Latitude DMS	Longitud DMS	Altitude meters	SpCond uS/cm	pH Units	ORP mV	DO mg/l	DO% Sat
5/11/2004	11:30:00	7.4	25.13	685.4	N 29ø26'35.3"	W 98ø36'52.4"	242	331.1	8.31	245	2.17	31.8
5/11/2004	11:30:30	7.4	25.16	686.2	N 29ø26'35.3"	W 98ø36'52.4"	242	330.6	8.31	246	2.18	31.8
5/11/2004	11:31:00	7.4	25.2	686.5	N 29ø26'35.3"	W 98ø36'52.4"	242	330.7	8.31	246	2.17	31.6
5/11/2004	11:31:30	7.4	25.23	686.5	N 29ø26'35.3"	W 98ø36'52.4"	242	331.2	8.3	246	2.18	31.9
5/11/2004	11:32:00	7.4	25.25	686.4	N 29ø26'35.3"	W 98ø36'52.4"	242	331.1	8.3	246	2.16	31.6
5/11/2004	11:32:30	7.4	25.29	686.2	N 29ø26'35.3"	W 98ø36'52.4"	242	331.1	8.31	247	2.16	31.6
5/11/2004	11:33:00	7.4	25.24	686.5	N 29ø26'35.3"	W 98ø36'52.4"	242	331.5	8.3	247	2.16	31.6
5/11/2004	11:33:30	7.4	25.26	686.2	N 29ø26'35.3"	W 98ø36'52.4"	242	331.1	8.31	247	2.15	31.4
5/11/2004	11:34:00	7.4	25.3	686.4	N 29ø26'35.3"	W 98ø36'52.4"	242	331.4	8.3	248	2.14	31.4
5/11/2004	11:34:30	7.4	25.28	686.2	N 29ø26'35.3"	W 98ø36'52.4"	242	331.2	8.3	248	2.15	31.5
5/11/2004	11:35:00	7.4	25.31	686	N 29ø26'35.3"	W 98ø36'52.4"	242	331.3	8.3	249	2.15	31.5
5/11/2004	11:35:30	7.4	25.36	686.4	N 29ø26'35.3"	W 98ø36'52.4"	242	331.5	8.3	249	2.16	31.6
5/11/2004	11:36:00	7.4	25.35	686	N 29ø26'35.3"	W 98ø36'52.4"	242	331.6	8.3	249	2.16	31.6
5/11/2004	11:36:30	7.4	25.35	686	N 29ø26'35.3"	W 98ø36'52.4"	242	331.3	8.3	249	2.15	31.5
5/11/2004	11:37:00	7.4	25.38	686.5	N 29ø26'35.3"	W 98ø36'52.4"	242	331.3	8.3	250	2.17	31.7
5/11/2004	11:37:30	7.4	25.41	686.4	N 29ø26'35.3"	W 98ø36'52.4"	242	331.5	8.3	250	2.17	31.9
5/11/2004	11:38:00	7.4	25.46	686.4	N 29ø26'35.3"	W 98ø36'52.4"	242	331.2	8.3	250	2.16	31.7
5/11/2004	11:38:30	7.4	25.54	686	N 29ø26'35.3"	W 98ø36'52.4"	242	331.1	8.3	250	2.18	32
5/11/2004	11:39:00	7.4	25.55	686.2	N 29ø26'35.3"	W 98ø36'52.4"	242	331.4	8.3	251	2.19	32.1
5/11/2004	11:39:30	7.4	25.53	686.3	N 29ø26'35.3"	W 98ø36'52.4"	242	332.1	8.3	250	2.2	32.4
5/11/2004	11:40:00	7.4	25.48	685.9	N 29ø26'35.3"	W 98ø36'52.4"	242	332.2	8.3	250	2.22	32.9
5/11/2004	11:40:30	7.4	25.43	685.6	N 29ø26'35.3"	W 98ø36'52.4"	242	332.3	8.3	249	2.25	33
5/11/2004	11:41:00	7.4	25.41	685.8	N 29ø26'35.3"	W 98ø36'52.4"	242	332.2	8.3	249	2.28	33.4
5/11/2004	11:41:30	7.4	25.46	686.2	N 29ø26'35.3"	W 98ø36'52.4"	242	331.6	8.3	249	2.29	33.5
5/11/2004	11:42:00	7.4	25.37	685.7	N 29ø26'35.3"	W 98ø36'52.4"	242	331.8	8.3	249	2.29	33.6
5/11/2004	11:42:30	7.4	25.35	686.2	N 29ø26'35.3"	W 98ø36'52.4"	242	332.3	8.3	249	2.3	33.7
5/11/2004	11:43:00	7.4	25.3	685.9	N 29ø26'35.3"	W 98ø36'52.4"	242	332.3	8.3	249	2.32	34
5/11/2004	11:43:30	7.4	25.35	685.8	N 29ø26'35.3"	W 98ø36'52.4"	242	332	8.3	248	2.33	34.1
5/11/2004	11:44:00	7.4	25.38	686.1	N 29ø26'35.3"	W 98ø36'52.4"	242	331.7	8.3	248	2.36	34.6
5/11/2004	11:44:30	7.4	25.35	686.1	N 29ø26'35.3"	W 98ø36'52.4"	242	331.9	8.29	248	2.38	34.9
5/11/2004	11:45:00	7.4	25.35	686	N 29ø26'35.3"	W 98ø36'52.4"	242	332.3	8.29	248	2.37	34.7

Recovery finished at 011806 071438

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TITLE 9 FEB06 CONT BAIL PROJECT

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WELL
NC-EWDP
27P
DATE
19SEP05
ORIG Data
733/46

Log File Name : 27 09 19 05
Setup Date (MMDDYY) : 091905
Setup Time (HHMMSS) : 013202
Starting Date (MMDDYY) : 091905
Starting Time (HHMMSS) : 013300
Stopping Date (MMDDYY) : 091905
Stopping Time (HHMMSS) : 014700
Interval (HHMMSS) : 000030
Warmup (HHMMSS) : 000030

Date MMDDYY	Time HHMMSS	IBVSvr4a Volts	Temp øC	BPSvr4a mmHg	Latitude DMS	Longitud DMS	Altitude meters	SpCond uS/cm	pH Units	ORP mV	DO mg/l	DO% Sat
9/19/2005	1:33:00	7.5	31.91	685.9	N 29ø26'35.3"	W 98ø36'52.4"	242	516.8	8.22	211	2.98	45.4
9/19/2005	1:33:30	7.5	31.89	685.8	N 29ø26'35.3"	W 98ø36'52.4"	242	525.4	8.22	209	2.99	45.4
9/19/2005	1:34:00	7.5	31.84	685.5	N 29ø26'35.3"	W 98ø36'52.4"	242	525	8.23	208	2.99	45.4
9/19/2005	1:34:30	7.5	31.86	685.5	N 29ø26'35.3"	W 98ø36'52.4"	242	520.2	8.22	207	2.97	45
9/19/2005	1:35:00	7.5	31.85	685.8	N 29ø26'35.3"	W 98ø36'52.4"	242	521.1	8.23	206	3.09	46.8
9/19/2005	1:35:30	7.5	31.85	685.8	N 29ø26'35.3"	W 98ø36'52.4"	242	515.5	8.23	205	3	45.5
9/19/2005	1:36:00	7.5	31.81	685.4	N 29ø26'35.3"	W 98ø36'52.4"	242	526	8.23	205	3.01	45.6
9/19/2005	1:36:30	7.5	31.82	685.3	N 29ø26'35.3"	W 98ø36'52.4"	242	534.3	8.23	204	2.99	45.3
9/19/2005	1:37:00	7.5	31.8	685.6	N 29ø26'35.3"	W 98ø36'52.4"	242	539.1	8.23	203	3.02	45.7
9/19/2005	1:37:30	7.5	31.73	685.3	N 29ø26'35.3"	W 98ø36'52.4"	242	542.4	8.23	203	3.01	45.5
9/19/2005	1:38:00	7.5	31.79	685.3	N 29ø26'35.3"	W 98ø36'52.4"	242	503.8	8.23	202	3.02	45.7
9/19/2005	1:38:30	7.5	31.8	685.2	N 29ø26'35.3"	W 98ø36'52.4"	242	494.2	8.22	202	3	45.4
9/19/2005	1:39:00	7.5	31.81	685	N 29ø26'35.3"	W 98ø36'52.4"	242	487.3	8.23	201	3.01	45.5
9/19/2005	1:39:30	7.5	31.79	685.3	N 29ø26'35.3"	W 98ø36'52.4"	242	510.2	8.22	201	3.04	46
9/19/2005	1:40:00	7.5	31.83	685.2	N 29ø26'35.3"	W 98ø36'52.4"	242	510.4	8.23	200	3.07	46.5
9/19/2005	1:40:30	7.5	31.83	684.8	N 29ø26'35.3"	W 98ø36'52.4"	242	519.1	8.23	200	3.01	45.6
9/19/2005	1:41:00	7.5	31.82	684.9	N 29ø26'35.3"	W 98ø36'52.4"	242	518.5	8.23	199	3.08	46.6
9/19/2005	1:41:30	7.5	31.74	685.2	N 29ø26'35.3"	W 98ø36'52.4"	242	535.5	8.23	199	3.11	46.4
9/19/2005	1:42:00	7.5	31.74	685	N 29ø26'35.3"	W 98ø36'52.4"	242	540.3	8.22	199	3.08	46.6
9/19/2005	1:42:30	7.5	31.76	685	N 29ø26'35.3"	W 98ø36'52.4"	242	544.9	8.23	198	3.01	45.5
9/19/2005	1:43:00	7.5	31.8	684.9	N 29ø26'35.3"	W 98ø36'52.4"	242	547.5	8.23	198	2.98	45.2
9/19/2005	1:43:30	7.5	31.78	685.1	N 29ø26'35.3"	W 98ø36'52.4"	242	549	8.23	198	3.07	46.4
9/19/2005	1:44:00	7.5	31.77	684.9	N 29ø26'35.3"	W 98ø36'52.4"	242	552	8.23	198	3.04	45.9
9/19/2005	1:44:30	7.5	31.78	684.9	N 29ø26'35.3"	W 98ø36'52.4"	242	557.6	8.23	198	3.12	47.3
9/19/2005	1:45:00	7.5	31.82	684.7	N 29ø26'35.3"	W 98ø36'52.4"	242	559.3	8.24	197	2.99	45.4
9/19/2005	1:45:30	7.5	31.82	684.9	N 29ø26'35.3"	W 98ø36'52.4"	242	563	8.23	197	3.03	45.8
9/19/2005	1:46:00	7.5	31.81	684.5	N 29ø26'35.3"	W 98ø36'52.4"	242	539.6	8.24	197	3.05	46.1
9/19/2005	1:46:30	7.5	31.78	684.9	N 29ø26'35.3"	W 98ø36'52.4"	242	536.1	8.23	197	3.07	46.5
9/19/2005	1:47:00	7.5	31.8	684.5	N 29ø26'35.3"	W 98ø36'52.4"	242	534.7	8.23	197	3.03	45.8

Recovery finished at 011806 071601

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TITLE 9 FEB 05 06 cont BHW PROJECT

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Bw

Well: NC-EWDP-16P

Date: 20 Sep 05

Orig Data: 733/44

Log File Name : 16P 09-20-2005
Setup Date (MMDDYY) : 092005
Setup Time (HHMMSS) : 112837
Starting Date (MMDDYY) : 092005
Starting Time (HHMMSS) : 113300
Stopping Date (MMDDYY) : 092005
Stopping Time (HHMMSS) : 114000
Interval (HHMMSS) : 000030
Warmup (HHMMSS) : 000030

Date MMDDYY	Time HHMMSS	IBVSvr4a Volts	Temp øC	BPSvr4a mmHg	Latitude DMS	Longitud DMS	Altitude meters	SpCond uS/cm	pH Units	ORP mV	DO mg/l	DO% Sat
9/20/2005	11:33:00	7.4	25.26	692.2	N 29ø26'35.3"	W 98ø36'52.4"	242	472.1	8.3	259	7.89	105.6
9/20/2005	11:33:30	7.4	25.34	691.7	N 29ø26'35.3"	W 98ø36'52.4"	242	474.2	8.32	255	7.71	103.2
9/20/2005	11:34:00	7.4	25.42	692.3	N 29ø26'35.3"	W 98ø36'52.4"	242	478.5	8.33	253	7.74	103.8
9/20/2005	11:34:30	7.4	25.44	692.4	N 29ø26'35.3"	W 98ø36'52.4"	242	482.6	8.34	251	7.81	104.7
9/20/2005	11:35:00	7.4	25.41	692.3	N 29ø26'35.3"	W 98ø36'52.4"	242	484.9	8.34	250	7.68	103
9/20/2005	11:35:30	7.4	25.51	691.9	N 29ø26'35.3"	W 98ø36'52.4"	242	488.6	8.35	249	7.65	102.8
9/20/2005	11:36:00	7.4	25.5	692.3	N 29ø26'35.3"	W 98ø36'52.4"	242	491.7	8.35	248	7.62	102.4
9/20/2005	11:36:30	7.4	25.58	692.4	N 29ø26'35.3"	W 98ø36'52.4"	242	493.4	8.35	248	7.68	103.2
9/20/2005	11:37:00	7.4	25.79	692.3	N 29ø26'35.3"	W 98ø36'52.4"	242	496.7	8.35	247	7.72	104.4
9/20/2005	11:37:30	7.4	25.76	692.4	N 29ø26'35.3"	W 98ø36'52.4"	242	498.6	8.35	246	7.67	103.5
9/20/2005	11:38:00	7.4	25.77	692.5	N 29ø26'35.3"	W 98ø36'52.4"	242	499.3	8.35	246	7.63	103
9/20/2005	11:38:30	7.4	25.78	692	N 29ø26'35.3"	W 98ø36'52.4"	242	504.6	8.36	245	7.65	103.1
9/20/2005	11:39:00	7.4	25.71	692.4	N 29ø26'35.3"	W 98ø36'52.4"	242	509.8	8.36	245	7.66	103.3
9/20/2005	11:39:30	7.4	25.64	692.2	N 29ø26'35.3"	W 98ø36'52.4"	242	509.9	8.37	244	7.6	102.4

Recovery finished at 011806 071704

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TITLE 9 FEB06 CONT BAW PROJECT

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Well: NC-EWDP-28P

Date: 21Sept05

Orig Data: 733/48

Date MMDDYY	Time HHMMSS	IBVSvr4a Volts	Temp øC	BPSvr4a mmHg	Latitude DMS	Longitud DMS	Altitude meters	SpCond uS/cm	pH Units	ORP mV	DO mg/l	DO% Sat
9/21/2005	12:07:00	7.4	30.42	690.3	N 29ø26'35.3"	W 98ø36'52.4"	242	457	8.57	223	3.67	53.2
9/21/2005	12:07:30	7.4	30.63	690.2	N 29ø26'35.3"	W 98ø36'52.4"	242	453.3	8.55	223	3.64	52.9
9/21/2005	12:08:00	7.4	30.78	689.9	N 29ø26'35.3"	W 98ø36'52.4"	242	453.8	8.56	222	3.56	51.9
9/21/2005	12:08:30	7.4	30.87	689.9	N 29ø26'35.3"	W 98ø36'52.4"	242	454.2	8.55	221	3.49	50.9
9/21/2005	12:09:00	7.4	31.02	689.8	N 29ø26'35.3"	W 98ø36'52.4"	242	452	8.56	220	3.45	50.4
9/21/2005	12:09:30	7.4	31.13	690	N 29ø26'35.3"	W 98ø36'52.4"	242	453.4	8.56	219	3.46	50.7
9/21/2005	12:10:00	7.4	31.19	689.9	N 29ø26'35.3"	W 98ø36'52.4"	242	451.2	8.57	219	3.51	51.5
9/21/2005	12:10:30	7.4	31.22	689.7	N 29ø26'35.3"	W 98ø36'52.4"	242	450.9	8.57	218	3.49	51.2
9/21/2005	12:11:00	7.3	31.26	689.6	N 29ø26'35.3"	W 98ø36'52.4"	242	451	8.57	218	3.47	50.9
9/21/2005	12:11:30	7.4	31.3	690	N 29ø26'35.3"	W 98ø36'52.4"	242	451.4	8.57	217	3.42	50.3
9/21/2005	12:12:00	7.3	31.34	689.8	N 29ø26'35.3"	W 98ø36'52.4"	242	453.8	8.58	217	3.45	50.8

Log File Name : 28 9-21-05
Setup Date (MMDDYY) : 092105
Setup Time (HHMMSS) : 120256
Starting Date (MMDDYY) : 092105
Starting Time (HHMMSS) : 120700
Stopping Date (MMDDYY) : 092105
Stopping Time (HHMMSS) : 121205
Interval (HHMMSS) : 000030
Warmup (HHMMSS) : 000030

Recovery finished at 011806 071811

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WELL: NC-EWDP-24P

DATE: 22Sep05

ORIG DATA

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Log File Name : 24PB 092205
Setup Date (MMDDYY) : 092205
Setup Time (HHMMSS) : 100928
Starting Date (MMDDYY) : 092205
Starting Time (HHMMSS) : 101500
Stopping Date (MMDDYY) : 092205
Stopping Time (HHMMSS) : 103000
Interval (HHMMSS) : 000030
Warmup (HHMMSS) : 000030

Date MMDDYY	Time HHMMSS	IBVSvr4a Volts	Temp øC	BPSvr4a mmHg	Latitude DMS	Longitud DMS	Altitude meters	SpCond uS/cm	pH Units	ORP mV	DO mg/l	DO% Sat
9/22/2005	10:15:00	7.2	30.38	688.4	N 29ø26'35.3"	W 98ø36'52.4"	242	320.8	7.84	264	4.73	69.5
9/22/2005	10:15:30	7.2	30.4	688.1	N 29ø26'35.3"	W 98ø36'52.4"	242	320.8	7.84	264	4.76	69.9
9/22/2005	10:16:00	7.2	30.42	688.4	N 29ø26'35.3"	W 98ø36'52.4"	242	320.8	7.83	264	4.75	69.8
9/22/2005	10:16:30	7.2	30.43	688.1	N 29ø26'35.3"	W 98ø36'52.4"	242	321	7.83	264	4.76	69.9
9/22/2005	10:17:00	7.2	30.46	688.3	N 29ø26'35.3"	W 98ø36'52.4"	242	320.9	7.84	265	4.74	69.7
9/22/2005	10:17:30	7.2	30.45	688	N 29ø26'35.3"	W 98ø36'52.4"	242	320.9	7.83	265	4.75	69.8
9/22/2005	10:18:00	7.2	30.44	688.2	N 29ø26'35.3"	W 98ø36'52.4"	242	321.2	7.83	265	4.75	69.8
9/22/2005	10:18:30	7.2	30.43	687.9	N 29ø26'35.3"	W 98ø36'52.4"	242	321.4	7.84	265	4.76	70.1
9/22/2005	10:19:00	7.2	30.41	687.8	N 29ø26'35.3"	W 98ø36'52.4"	242	321.5	7.83	265	4.77	70
9/22/2005	10:19:30	7.2	30.4	688.2	N 29ø26'35.3"	W 98ø36'52.4"	242	321.3	7.84	265	4.76	69.9
9/22/2005	10:20:00	7.2	30.4	687.9	N 29ø26'35.3"	W 98ø36'52.4"	242	321.4	7.84	265	4.79	70.4
9/22/2005	10:20:30	7.2	30.4	687.8	N 29ø26'35.3"	W 98ø36'52.4"	242	321.6	7.83	266	4.77	70.1
9/22/2005	10:21:00	7.2	30.4	687.8	N 29ø26'35.3"	W 98ø36'52.4"	242	321.6	7.83	266	4.8	70.5
9/22/2005	10:21:30	7.2	30.38	687.8	N 29ø26'35.3"	W 98ø36'52.4"	242	321.4	7.84	266	4.78	70.2
9/22/2005	10:22:00	7.2	30.37	687.6	N 29ø26'35.3"	W 98ø36'52.4"	242	321.9	7.83	266	4.78	70.3
9/22/2005	10:22:30	7.2	30.36	688	N 29ø26'35.3"	W 98ø36'52.4"	242	321.6	7.84	266	4.78	70.2
9/22/2005	10:23:00	7.2	30.36	687.8	N 29ø26'35.3"	W 98ø36'52.4"	242	321.6	7.84	266	4.78	70.2
9/22/2005	10:23:30	7.2	30.33	687.7	N 29ø26'35.3"	W 98ø36'52.4"	242	321.6	7.84	266	4.81	70.6
9/22/2005	10:24:00	7.2	30.3	687.5	N 29ø26'35.3"	W 98ø36'52.4"	242	321.7	7.83	266	4.81	70.6
9/22/2005	10:24:30	7.2	30.28	687.6	N 29ø26'35.3"	W 98ø36'52.4"	242	321.8	7.84	266	4.82	70.6
9/22/2005	10:25:00	7.2	30.26	687.4	N 29ø26'35.3"	W 98ø36'52.4"	242	321.8	7.84	266	4.79	70.2
9/22/2005	10:25:30	7.2	30.25	687.7	N 29ø26'35.3"	W 98ø36'52.4"	242	322.1	7.84	266	4.81	70.5
9/22/2005	10:26:00	7.2	30.24	687.8	N 29ø26'35.3"	W 98ø36'52.4"	242	321.6	7.84	266	4.81	70.5
9/22/2005	10:26:30	7.2	30.24	687.6	N 29ø26'35.3"	W 98ø36'52.4"	242	321.8	7.84	266	4.79	70.2
9/22/2005	10:27:00	7.2	30.28	687.6	N 29ø26'35.3"	W 98ø36'52.4"	242	321.9	7.84	266	4.82	70.6
9/22/2005	10:27:30	7.2	30.31	687.3	N 29ø26'35.3"	W 98ø36'52.4"	242	321.7	7.84	266	4.83	70.8
9/22/2005	10:28:00	7.2	30.33	687.3	N 29ø26'35.3"	W 98ø36'52.4"	242	321.8	7.84	266	4.81	70.6
9/22/2005	10:28:30	7.2	30.35	687.5	N 29ø26'35.3"	W 98ø36'52.4"	242	321.8	7.84	266	4.82	70.7
9/22/2005	10:29:00	7.2	30.39	687.5	N 29ø26'35.3"	W 98ø36'52.4"	242	321.8	7.84	266	4.82	70.8
9/22/2005	10:29:30	7.2	30.42	687.3	N 29ø26'35.3"	W 98ø36'52.4"	242	321.8	7.84	266	4.81	70.7
9/22/2005	10:30:00	7.2	30.43	687.5	N 29ø26'35.3"	W 98ø36'52.4"	242	321.7	7.84	266	4.82	70.8

Recovery finished at 011806 071922

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PROPRIETARY INFORMATION

TITLE 9 FEB 06 CONT BW PROJECT

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WELL ~~29P~~ BW 2-9-06
NC-EWDP-29P

DATE: 23 Sep 05

DATA: 733/53

Log File Name : 29P
Setup Date (MMDDYY) : 092305
Setup Time (HHMMSS) : 085934
Starting Date (MMDDYY) : 092305
Starting Time (HHMMSS) : 090000
Stopping Date (MMDDYY) : 092305
Stopping Time (HHMMSS) : 090700
Interval (HHMMSS) : 000030
Warmup (HHMMSS) : 000030

Date MMDDYY	Time HHMMSS	IBVSvr4a Volts	Temp øC	BPSvr4a mmHg	Latitude DMS	Longitud DMS	SpCond uS/cm	pH Units	ORP mV	DO mg/l	DO% Sat	Altitude feet
Late probe turn on at 092305 085935												
9/23/2005	9:00:00	7.2	26.06	685.3	N 36ø36'25.2"	W117ø08'48.8"	303	7.96	260	5.65	77.2	-112
9/23/2005	9:00:30	7.2	26.1	685.4	N 36ø36'25.2"	W117ø08'48.8"	303.7	7.96	260	5.64	77.2	-112
9/23/2005	9:01:00	7.2	26.12	685.3	N 36ø36'25.2"	W117ø08'48.8"	304	7.97	261	5.6	76.7	-112
9/23/2005	9:01:30	7.2	26.16	685.2	N 36ø36'25.2"	W117ø08'48.8"	304	7.97	262	5.55	76	-112
9/23/2005	9:02:00	7.2	26.18	685.8	N 36ø36'25.2"	W117ø08'48.8"	304.2	7.97	263	5.57	76.3	-112

Recovery finished at 011806 072021

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PROPRIETARY INFORMATION

TITLE 10 Feb 2006 PROJECT

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Preparation of basalt sample to be used as a QA check standard in XRD, and potentially other, analyses

Previous XRD analyses of rock and alluvium samples have included several QA check standards submitted as "blind" unknowns. The purpose of these samples is to provide a check on the quality of the analytical results. In past work we have focused on silica-rich samples of zeolite or, in most cases, the silica-rich, rhyolitic (felsic) alluvium of Fortymile Wash, NV. Thus, our QA check samples have been selected to mimic the Si-rich mineral content of these samples. Don Hooper and others have recently collected several samples from the Sunset Crater region (I believe that is the correct location) that are of basaltic origin. ~~Bast~~ 2/10/06 Basalt has several Fe-Mg minerals (such as olivine) that are not expected in rhyolitic materials. Thus, our previous QA check samples do not include important mineral phases for basalts. Since there is no source of basaltic XRD sample/standards, we will prepare our own. The goal will be to prepare a bulk sample of basaltic mineral composition that can be analyzed (via splits) using XRD in a separate laboratory

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TITLE 10 Feb 2006 PR PROJECT

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than will be used for the XRD analyses of the Sunset Crater samples. A comparison of the indepent XRD pattern from the split sample can be used a guide for acceptance of the XRD analytical results.

Materials:

Basalt samples: from Ward's Natural Science
cat. no. 47 E 1042 Basalt (Flood)
Pullman, WA

Balance: Mettler PR 5002
S/N 1122 42 733 cal due 05/12/06

rock hammer / sledge
polystyrene vials
agate mortar / pestle
polyethylene bags
weigh paper
brushes
SPEX 8000 Mixer Mill w/ tungsten carbide sample holder and bearings

Procedure:

I collected two ~ 1"-1.5" dia. rock samples from the box containing the Ward's Basalt (Flood), Pullman, WA. These samples were broken into smaller fragments using a sledge-type rock hammer (w/in ziploc bags to contain fragments. The 2 original samples were about 60 g each. I broke the original large samples into 1-2 cm pieces.

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TITLE 10 Feb 2006 PM PROJECT

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The 1-2 cm pieces of basalt were crushed to smaller pieces (< 4mm, passing thru No. 5 sieve) using a heavy agate mortar and pestle.

The small chips and partially ground basalt was transfered to the tungsten carbide sample holder (Spex 8000 Mixer mill) in quantities of about 10-15 g.

The mixer sample holder was sealed (with 2 tungsten carbide ball bearings) and run for ~5 min for each sample. The process was repeated several times to generate a large quantity of basalt powder/sand. This material was re-introduced into the mixer mill in quantities of 10-15 g and pulverized for 10-12 min to generate a fine basalt powder. The powder ~100g was placed in a polystyrene vial, labeled, and sealed. About 10% of the basalt chips were lost during the initial breaking/crushing phase [very hard to keep chips in the mortar/pestle]

The final sample was labeled

Basalt (Flood) Pullman, Wa Ward's cat no. 49 E 1042

This sample along with NBS 99a was used to generate two "blind" QA check samples for the Sunset crater analysis (Hooper / ~~Nesc~~ Necsolu).

2/10/06 PM

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TITLE 10 Feb 2006 PROJECT

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About 7-10 g of sample was placed in a small polystyrene vial for transfer to Hooper / Necsoiu. A split of the basalt sample was also taken (another sample actually) and placed in a labeled polystyrene vial for analysis by XRD at Div 18 of SwRI

		vial wt. (g)	vial + sample (g)	sample (g)
1	NBS 99a	5.53	12.85	7.32
2	Basalt (Flood)	5.52	16.64	11.12
3	Basalt (Flood) - Div 18	5.56	13.79	8.23

masses measured using Mettler PR5002

Samples 1 and 2 are transferred to M. Necsoiu for subsequent use by him in the Sunset Crater work. He will provide XRD results (from Core Lab) for our records.

Sample 3 will be submitted to Div 18 for XRD analyses.

6 April 06 MK

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PROPRIETARY INFORMATION

TITLE 26 APRIL 06 BAW PROJECT

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CALIBRATION of Nanopure Diamond Analytical Ultrapure Water System

Water System: Barnstead model D11901 serial number 11900 10979691

Calibration Module: Barnstead model E896X5 serial # 896020321720 with current cert performed by SwRI cal lab (asset#009582)

Performed calibration of sensing electronics on water system following instructions listed in the "Nanopure Diamond Analytical Ultrapure Water System Operation Manual Series 11900" (11/2/00) under the NIST Calibration Module Section (pg 29)

System responded with LED displaying "passed."

Label placed on unit indicating date, status, and reference to this page.

8-7-06 BAW

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PROPRIETARY INFORMATION

TITLE 7 AUG 2006 BAW PROJECT

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Div 01 Cation Results for Sorption Ref Solutions + Groundwater Samples

Initial Entry for Sorption Experiment: 742/45-46

Samples: Total=65; 8 Analyzed and 57 cancelled analyses

Two Reference Solns: 742/77 (19PB-2 series)

Two QA Solns: 742/75

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57 Experimental solns (742/76-77) canceled. See 800/10 for explanation on analyses cancelation.

Sample Collection: Ref Solns 742/77
QA Solns 742/75
UTSA 742/73
Exp Solns 742/76-77

Sample ID Legends: Ref soln: 742/77
QA Solns: 742/77

Exp Solns: 742/76-77

QA target Conc: 742/61

Delivery + Chain ~~Co~~ BW 8-7-06 of Custody: 742/80 to ~~800~~ BW 8-7-06 742/86

Information following raw data includes

- Tables ~~1+2~~ 3+4 on blind standard compared to target values BW 8-8-06
- Tables 1+2 comparing ref. soln values to targets
- Table 5 comparing duplicate blind standards to each other

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID
W1922-58C

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 280643

Client: Division 20

Date Received: 06/06/06

Project No.: 06002.01.242

SRR: 29276

Task Order: 060606-10

Method: ICP - 6010B		
Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Antimony	<0.150	0.150
Arsenic	<0.0500	0.0500
Barium	<0.0500	0.0500
Beryllium	<0.0500	0.0500
Bismuth	<0.100	0.100
Boron	<0.200	0.200
Cadmium	<0.0500	0.0500
Calcium	14.0	0.500
Chromium	<0.0500	0.0500
Cobalt	<0.0500	0.0500
Copper	<0.0500	0.0500
Iron	<0.500	0.500
Lanthanum	<0.0500	0.0500
Lead	<0.0500	0.0500
Lithium	<0.150	0.150
Magnesium	1.13	0.500
Manganese	<0.0500	0.0500
Molybdenum	<0.0500	0.0500
Nickel	<0.0500	0.0500
Palladium	<0.100	0.100
Phosphorus	<0.200	0.200
Potassium	<5.00	5.00
Selenium	<0.0500	0.0500
Silicon	11.8	0.200
Silver	<0.0500	0.0500
Sodium	51.5	2.50
Strontium	<0.0500	0.0500
Sulfur	9.32	0.200
Thallium	<0.100	0.100
Thorium	<0.300	0.300
Tin	<0.0500	0.0500
Titanium	<0.0500	0.0500
Tungsten	<0.100	0.100
Uranium	<1.25	1.25
Vanadium	<0.0500	0.0500
Yttrium	<0.0500	0.0500
Zinc	<0.0500	0.0500
Zirconium	<0.0500	0.0500

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PROPRIETARY INFORMATION

TITLE 7 AUG 2006 BW PROJECT

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID
W1922-59C

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 280644

Client: Division 20

Date Received: 06/06/06

Project No.: 06002.01.242

SRR: 29276

Task Order: 060606-10

Method: ICP - 6010B		
Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Antimony	<0.150	0.150
Arsenic	<0.0500	0.0500
Barium	<0.0500	0.0500
Beryllium	<0.0500	0.0500
Bismuth	<0.100	0.100
Boron	<0.200	0.200
Cadmium	<0.0500	0.0500
Calcium	<0.500	0.500
Chromium	<0.0500	0.0500
Cobalt	<0.0500	0.0500
Copper	<0.0500	0.0500
Iron	<0.500	0.500
Lanthanum	<0.0500	0.0500
Lead	<0.0500	0.0500
Lithium	<0.150	0.150
Magnesium	1.21	0.500
Manganese	<0.0500	0.0500
Molybdenum	<0.0500	0.0500
Nickel	<0.0500	0.0500
Palladium	<0.100	0.100
Phosphorus	<0.200	0.200
Potassium	<5.00	5.00
Selenium	<0.0500	0.0500
Silicon	11.8	0.200
Silver	<0.0500	0.0500
Sodium	52.9	2.50
Strontium	<0.0500	0.0500
Sulfur	9.58	0.200
Thallium	<0.100	0.100
Thorium	<0.300	0.300
Tin	<0.0500	0.0500
Titanium	<0.0500	0.0500
Tungsten	<0.100	0.100
Uranium	<1.25	1.25
Vanadium	<0.0500	0.0500
Yttrium	<0.0500	0.0500
Zinc	<0.0500	0.0500
Zirconium	<0.0500	0.0500

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TITLE 7 AUG 06 BAW PROJECT

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID
W1922-60C

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 280646

Client: Division 20

Date Received: 06/06/06

Project No.: 06002.01.242

SRR: 29276

Task Order: 060606-10

Method: ICP - 6010B		
Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Antimony	<0.150	0.150
Arsenic	<0.0500	0.0500
Barium	<0.0500	0.0500
Beryllium	<0.0500	0.0500
Bismuth	<0.100	0.100
Boron	<0.200	0.200
Cadmium	<0.0500	0.0500
Calcium	20.1	0.500
Chromium	<0.0500	0.0500
Cobalt	<0.0500	0.0500
Copper	<0.0500	0.0500
Iron	19.7	0.500
Lanthanum	<0.0500	0.0500
Lead	<0.0500	0.0500
Lithium	<0.150	0.150
Magnesium	19.3	0.500
Manganese	<0.0500	0.0500
Molybdenum	<0.0500	0.0500
Nickel	<0.0500	0.0500
Palladium	<0.100	0.100
Phosphorus	<0.200	0.200
Potassium	19.6	5.00
Selenium	<0.0500	0.0500
Silicon	<0.200	0.200
Silver	<0.0500	0.0500
Sodium	18.9	2.50
Strontium	<0.0500	0.0500
Sulfur	<0.200	0.200
Thallium	<0.100	0.100
Thorium	<0.300	0.300
Tin	<0.0500	0.0500
Titanium	<0.0500	0.0500
Tungsten	<0.100	0.100
Uranium	<1.25	1.25
Vanadium	<0.0500	0.0500
Yttrium	<0.0500	0.0500
Zinc	<0.0500	0.0500
Zirconium	<0.0500	0.0500

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TITLE 7 AUG 06 BAW PROJECT

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID
W1922-61C

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 280647

Client: Division 20

Date Received: 06/06/06

Project No.: 06002.01.242

SRR: 29276

Task Order: 060606-10

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Method: ICP - 6010B		
Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Antimony	<0.150	0.150
Arsenic	<0.0500	0.0500
Barium	<0.0500	0.0500
Beryllium	<0.0500	0.0500
Bismuth	<0.100	0.100
Boron	<0.200	0.200
Cadmium	<0.0500	0.0500
Calcium	20.4	0.500
Chromium	<0.0500	0.0500
Cobalt	<0.0500	0.0500
Copper	<0.0500	0.0500
Iron	19.8	0.500
Lanthanum	<0.0500	0.0500
Lead	<0.0500	0.0500
Lithium	<0.150	0.150
Magnesium	19.4	0.500
Manganese	<0.0500	0.0500
Molybdenum	<0.0500	0.0500
Nickel	<0.0500	0.0500
Palladium	<0.100	0.100
Phosphorus	<0.200	0.200
Potassium	22.1	5.00
Selenium	<0.0500	0.0500
Silicon	<0.200	0.200
Silver	<0.0500	0.0500
Sodium	19.1	2.50
Strontium	<0.0500	0.0500
Sulfur	<0.200	0.200
Thallium	<0.100	0.100
Thorium	<0.300	0.300
Tin	<0.0500	0.0500
Titanium	<0.0500	0.0500
Tungsten	<0.100	0.100
Uranium	<1.25	1.25
Vanadium	<0.0500	0.0500
Yttrium	<0.0500	0.0500
Zinc	<0.0500	0.0500
Zirconium	<0.0500	0.0500

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SOUTHWEST RESEARCH INSTITUTE

LABORATORY CONTROL SAMPLE

Sample ID
LCSW - G07H4

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: NA

Client: Division 20

Date Received: NA

Project No.: 06002.01.242

SRR: 29276

Task Order: 060606-10

Method: ICP - 6010B			
Analysis	Sample Result (mg/L)	True Value (mg/L)	Recovery
Aluminum	19.2	20.0	96.0%
Antimony	4.85	5.00	97.0%
Arsenic	19.7	20.0	98.5%
Barium	20.0	20.0	100.0%
Beryllium	0.489	0.500	97.8%
Bismuth	NA	NA	NA
Boron	NA	NA	NA
Cadmium	0.486	0.500	97.2%
Calcium	202	200	101.0%
Chromium	1.88	2.00	94.0%
Cobalt	4.90	5.00	98.0%
Copper	2.37	2.50	94.8%
Iron	11.0	10.0	110.0%
Lanthanum	NA	NA	NA
Lead	4.79	5.00	95.8%
Lithium	NA	NA	NA
Magnesium	200	200	100.0%
Manganese	4.93	5.00	98.6%
Molybdenum	NA	NA	NA
Nickel	4.72	5.00	94.4%
Palladium	NA	NA	NA
Phosphorus	40.6	40.0	101.5%
Potassium	197	200	98.5%
Selenium	20.0	20.0	100.0%
Silicon	39.9	40.0	99.8%
Silver	0.484	0.500	96.8%
Sodium	200	200	100.0%
Strontium	NA	NA	NA
Sulfur	NA	NA	NA
Thallium	20.2	20.0	101.0%
Thorium	NA	NA	NA
Tin	NA	NA	NA
Titanium	NA	NA	NA
Tungsten	NA	NA	NA
Uranium	NA	NA	NA
Vanadium	4.79	5.00	95.8%
Yttrium	NA	NA	NA
Zinc	4.90	5.00	98.0%
Zirconium	NA	NA	NA

NA- Not Applicable.

Continued To Page

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PROPRIETARY INFORMATION

TITLE 7AUG06 BAW PROJECT

Continued From Page

SOUTHWEST RESEARCH INSTITUTE

BLANK SUMMARY

Sample ID
PBW - G07H4

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: NA

Client: Division 20

Date Received: NA

Project No.: 06002.01.242

SRR: 29276

Task Order: 060606-10

Method: ICP - 6010B		
Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.500	0.500
Antimony	<0.150	0.150
Arsenic	<0.0500	0.0500
Barium	<0.0500	0.0500
Beryllium	<0.0500	0.0500
Bismuth	<0.100	0.100
Boron	<0.200	0.200
Cadmium	<0.0500	0.0500
Calcium	<0.500	0.500
Chromium	<0.0500	0.0500
Cobalt	<0.0500	0.0500
Copper	<0.0500	0.0500
Iron	<0.500	0.500
Lanthanum	<0.0500	0.0500
Lead	<0.0500	0.0500
Lithium	<0.150	0.150
Magnesium	<0.500	0.500
Manganese	<0.0500	0.0500
Molybdenum	<0.0500	0.0500
Nickel	<0.0500	0.0500
Palladium	<0.100	0.100
Phosphorus	<0.200	0.200
Potassium	<5.00	5.00
Selenium	<0.0500	0.0500
Silicon	<0.200	0.200
Silver	<0.0500	0.0500
Sodium	<2.50	2.50
Strontium	<0.0500	0.0500
Sulfur	<0.200	0.200
Thallium	<0.100	0.100
Thorium	<0.300	0.300
Tin	<0.0500	0.0500
Titanium	<0.0500	0.0500
Tungsten	<0.100	0.100
Uranium	<1.25	1.25
Vanadium	<0.0500	0.0500
Yttrium	<0.0500	0.0500
Zinc	<0.0500	0.0500
Zirconium	<0.0500	0.0500

NA- Not Applicable.

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PROPRIETARY INFORMATION

TITLE 8 AUG 06 BAW PROJECT

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Table 1: Comparison of cation target and Div 01 results
for reference solution 19PB-2 Simulated Groundwater with Calcium

Species	Target Conc (mg/L)	Div 01 Conc (mg/L)
Calcium	14	14.0
Magnesium	1.3	1.13
Potassium	3.6	<5.00
Silicon	20	11.8
Sodium	52	51.5

Source for target conc: 742/28 and 742/75
Source for Div 01 results: 733/138

8-10-06 BW

NOTE
Do not use data, Target concs are not appropriate. Values represent actual groundwater and not simulated water conc.

See 812/4, 7, and 10

8-10-06 BW

Table 2: Comparison of cation target and Div 01 results
for reference solution 19PB-2 Simulated Groundwater without Calcium

Species	Target Conc (mg/L)	Div 01 Conc (mg/L)
Magnesium	1.3	1.21
Potassium	3.6	<5.00
Silicon	20	11.8
Sodium	52	52.9

Source for target conc: 742/36 and 742/75
Source for Div 01 results: 733/139

8-10-06 BW

8-8-06 BW

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PROPRIETARY INFORMATION

TITLE 8 AUG 06 BAW PROJECT

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Table 3: Comparison of cation target and Div 01 results for blind standard QA-cation1

Species	Target Conc (mg/L)	Div 01 Conc (mg/L)	Percent Recovery
Calcium	20	20.1	101
Magnesium	20	19.3	97
Potassium	20	19.6	98
Sodium	20	18.9	95

Source for target conc: 742/61 and 742/75
Source for Div 01 results: 733/140

Table 4: Comparison of cation target and Div 01 results for blind standard QA-cation2

Species	Target Conc (mg/L)	Div 01 Conc (mg/L)	Percent Recovery
Calcium	20	20.4	102
Magnesium	20	19.4	97
Potassium	20	22.1	111
Sodium	20	19.1	96

Source for target conc: 742/61 and 742/75
Source for Div 01 results: 733/141

Table 5: Comparison of cation Div01 results of duplicate blind standards QA-cation1 and QA-cation2

Species	QA-cation1 Conc (mg/L)	QA-cation2 Conc (mg/L)	Percent Difference
Calcium	20.1	20.4	1.5
Magnesium	19.3	19.4	0.5
Potassium	19.6	22.1	12.8
Sodium	18.9	19.1	1.1

Source: 733/140-141

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TITLE 8 AUG ~~08~~ 06 BAW PROJECT

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Div 01 Anion Results for Sorption Ref Solutions + Groundwater Samples

Initial Entry for Sorption Experiment: 742/45-46

Samples: Total 65: 8 analyzed and 57 cancelled analyses

Two Reference Solns: 742/77 (19PB-2 series)

Two QA Solns: 742/75

Information potentially subject to copyright protection was redacted from this location. The redacted material is for a client other than NRC.

57 Experimental solns (742/76-77) cancelled. See BW 8-8-06 ~~810~~ 800/10 for explanation on cancelled analyses.

Sample Collection: Ref Solns 742/77
QA Solns 742/75
Exp Solns 742/76-77

Sample ID Legends: Ref soln: 742/77
QA Solns: 742/77
Exp Soln 742/76-77

QA target Conc: 742/61

Delivery + Chain of Custody: 742/87 to 800/4

Information following raw data includes:

Table 1: Conversion of QA concentrations expressed in molecules to elements

BW 8-8-06 ~~Table 2: Conversion of Ref Solns expressed in molecules to elements.~~ BW 8-8-06

Tables 2+3: Comparison of blind QA stds to target conc's

Table 4: Comparing duplicate blind QA stds to each other.

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PROPRIETARY INFORMATION

TITLE 8AUGOE BW PROJECT

Continu

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID
W1922-58A

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 280733

Client: Division 20

Date Received: 06/06/06

Project No.: 06002.01.242

SRR: 29277

Task Order: 060608-6

Method: IC - EPA 300		
Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Bromide	<0.1	0.1
Chloride	6.22	0.1
Fluoride	1.38	0.1
Nitrate-N	0.634	0.1
Nitrite-N	<0.1	0.1
Phosphate-P	<0.1	0.1
Sulfate	27.6	0.2

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID
W1922-59A

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 280734

Client: Division 20

Date Received: 06/06/06

Project No.: 06002.01.242

SRR: 29277

Task Order: 060608-6

Method: IC - EPA 300		
Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Bromide	<0.1	0.1
Chloride	11.1	0.1
Fluoride	1.32	0.1
Nitrate-N	0.663	0.1
Nitrite-N	<0.1	0.1
Phosphate-P	<0.1	0.1
Sulfate	28.6	0.2

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TITLE 8 AUG 06 BAW PROJECT

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

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Sample ID
W1922-60A

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 280736

Client: Division 20

Date Received: 06/06/06

Project No.: 06002.01.242

SRR: 29277

Task Order: 060608-6

Method: IC - EPA 300		
Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Bromide	8.01	0.1
Chloride	3.98	0.1
Fluoride	1.88	0.1
Nitrate-N	1.77	0.1
Nitrite-N	<0.1	0.1
Phosphate-P	3.83	0.1
Sulfate	8.10	0.1

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Sample ID
W1922-61A

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 280737

Client: Division 20

Date Received: 06/06/06

Project No.: 06002.01.242

SRR: 29277

Task Order: 060608-6

Method: IC - EPA 300		
Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Bromide	8.03	0.1
Chloride	4.01	0.1
Fluoride	1.87	0.1
Nitrate-N	1.78	0.1
Nitrite-N	<0.1	0.1
Phosphate-P	3.83	0.1
Sulfate	8.11	0.1

TITLE 8 AUG 06 BW PROJECT

Continued From

SOUTHWEST RESEARCH INSTITUTE

DUPLICATE SUMMARY

Sample ID
W1922-60A

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 280736

Client: Division 20

Date Received: 06/06/06

Project No.: 06002.01.242

SRR: 29277

Task Order: 060608-6

Method: IC - EPA 300			
Analysis	Sample Result (mg/L)	Duplicate Result (mg/L)	RPD
Bromide	8.01	8.05	0.50%
Chloride	3.98	4.01	0.75%
Fluoride	1.88	1.88	0.00%
Nitrate-N	1.77	1.78	0.56%
Nitrite-N	<0.1	<0.1	0.00%
Phosphate-P	3.83	3.84	0.26%
Sulfate	8.10	8.14	0.49%

SOUTHWEST RESEARCH INSTITUTE

MATRIX SPIKE SUMMARY

Sample ID
W1922-60A

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 280736

Client: Division 20

Date Received: 06/06/06

Project No.: 06002.01.242

SRR: 29277

Task Order: 060608-6

Method: IC - EPA 300				
Analysis	Sample Result (mg/L)	Spike Result (mg/L)	Spike Added (mg/L)	Recovery
Bromide	8.01	11.9	4.00	97.3%
Chloride	3.98	6.44	2.00	123%
Fluoride	1.88	2.80	1.00	92.0%
Nitrate-N	1.77	2.64	0.904	96.2%
Nitrite-N	<0.1	1.10	1.09	101%
Phosphate-P	3.83	5.71	1.96	95.9%
Sulfate	8.10	11.9	4.00	95.0%

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PROPRIETARY INFORMATION

SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID
LCS

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Water
Lab System ID: NA

Client: Division 20
Date Received: NA
Project No.: 06002.01.242
SRR: 29277
Task Order: 060608-6

Method: IC - EPA 300			
Analysis	Sample Result (mg/L)	True Value (mg/L)	Recovery
Bromide	398	400	99.5%
Fluoride	96.6	100	96.6%
Nitrate-N	89.9	90.4	99.4%
Phosphate-P	192	196	98.0%

NA- Not Applicable.

SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID
LCS

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Water
Lab System ID: NA

Client: Division 20
Date Received: NA
Project No.: 06002.01.242
SRR: 29277
Task Order: 060608-6

Method: IC - EPA 300			
Analysis	Sample Result (mg/L)	True Value (mg/L)	Recovery
Bromide	406	400	102%
Chloride	209	200	105%
Fluoride	98.3	100	98.3%
Nitrate-N	92.1	90.4	102%
Nitrite-N	115	109	106%
Phosphate-P	196	196	100%
Sulfate	402	400	101%

NA- Not Applicable.

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PROPRIETARY INFORMATION

TITLE 8 AUG 06 BAW PROJECT

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: LCS

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: NA

Client: Division 20

Date Received: NA

Project No.: 06002.01.242

SRR: 29277

Task Order: 060608-6

Method: IC - EPA 300			
Analysis	Sample Result (mg/L)	True Value (mg/L)	Recovery
Sulfate	404	400	101%

NA- Not Applicable.

SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID: PB

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: NA

Client: Division 20

Date Received: NA

Project No.: 06002.01.242

SRR: 29277

Task Order: 060608-6

Method: IC - EPA 300		
Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Bromide	<0.1	0.1
Fluoride	<0.1	0.1
Nitrate-N	<0.1	0.1
Phosphate-P	<0.1	0.1

NA- Not Applicable.

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SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID
PB

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: NA

Client: Division 20

Date Received: NA

Project No.: 06002.01.242

SRR: 29277

Task Order: 060608-6

Method: IC - EPA 300		
Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Bromide	<0.1	0.1
Chloride	<0.1	0.1
Fluoride	<0.1	0.1
Nitrate-N	<0.1	0.1
Nitrite-N	<0.1	0.1
Phosphate-P	<0.1	0.1
Sulfate	<0.1	0.1

NA- Not Applicable.

SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID
PB

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: NA

Client: Division 20

Date Received: NA

Project No.: 06002.01.242

SRR: 29277

Task Order: 060608-6

Method: IC - EPA 300		
Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Sulfate	<0.1	0.1

NA- Not Applicable.

TITLE 8 AUG 06 BAW PROJECT

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Table 1: Conversion of QA Target Concentrations Expressed in Molecules to Elements

Species	Target Conc (g/mL)	Conversion Factor (mutiplication factor)	Species	Target Conc (g/mL)
Bromide	8	na	Bromide	8
Chloride	4	na	Chloride	4
Fluoride	2	na	Fluoride	2
Nitrate as NO3	8	0.2259	Nitrate as N	1.81
Nitrate as NO2	na	na	Nitrite as N	na
Phosphate as HPO4	12	0.3227	Phospahte as P	3.87
Sulfate as SO4	8	na	Sulfate as SO4	8

N = 14.0067g/mol, NO2 = 46.0055g/mol, and NO3 = 62.0049g/mol
P = 30.974g/mol and HPO4 = 95.9793g/mol
na = not applicable
Source for target conc: 742/61

see note on ~~833~~ 733/150 BW 8-31-06

delete BW 8-9-06

Table 2: Conversion of Reference Solution Target Concentrations Expressed in Molecules to Elements
Same target concentration for simulated water with and without calcium

Species	Target Conc (g/mL)	Conversion Factor (mutiplication factor)	Species	Target Conc (g/mL)
Bromide	na	na	Bromide	na
Chloride	7	na	Chloride	7
Fluoride	1.8	na	Fluoride	1.8
Nitrate as NO3	3	0.2259	Nitrate as N	0.68
Nitrate as NO2	na	na	Nitrite as N	na
Phosphate as HPO4	na	na	Phospahte as P	na
Sulfate as SO4	29	na	Sulfate as SO4	29

N = 14.0067g/mol, NO2 = 46.0055g/mol, and NO3 = 62.0049g/mol
na = not applicable
Source for target conc: 742/28 and 36

8-8-06 BW

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END of SN 733

CONTINUED in SN 812

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PROPRIETARY INFORMATION

GEOSCIENCES AND ENGINEERING DIVISION

SCIENTIFIC NOTEBOOK REVIEW CHECKLIST RECORD

Scientific Notebook No.: 733 Date Turned In: 9/28/2006

Accomplished

- [✓] 1. Initial entries per QAP-001
- [✓] 2. Dating of entries
- [✓] 3. Corrections (crossed out, one line through w/initials/date)
- [✓] 4. No White out used
- [✓] 5. Page number visible on copy or original notebook
- [✓] 6. In process entries per QAP-001
- [✓] 7. Figure information present
- [✓] 8. Text readable
- [NA] 9. Copyrighted material is identified
- [✓] 10. Permanent ink or type only
- [✓] 11. Signing of entries (not required on each page)
- [NA] 12. Electronic media in the scientific notebook properly labeled
- [✓] 13. NRC Supplementary Scientific Notebook Questions are addressed. (send completed form to P. Mackin)

Any discrepancies must be resolved before notebook closeout.

==========

I have reviewed this scientific notebook and find it in agreement with QAP-001.

R.C. [signature] 9/29/2006

Manager's Signature Date

Form QAP-01 (9/2006)

CNWRA SINGLE DOCUMENT SUBMISSION FORM

Document Date:	08/30/2005
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Author Name:	Werling B, Roberts M, McGinnis R, Bertetti P
Author Affiliation:	Center for Nuclear Waste Regulatory Analyses
Docket Number:	WM-00011
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