308 - - - Q200210210002
Scientific Notebook # 463

H63 3 9 6 R

RADIONUCLIDE TRANSPORT

21
150

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20.01402.871 - RT
Bradley Werling 522-6565

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- p182 9-17-01 BAW

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Investigator	Signature	Page Initial
Bradley Werling	Bradley Werling	BAW
Paul Bertetti	Paul Bertetti	PB

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periodic review completed 06 Aug 02 PB

5/29/2001 BAW

Continuation of Neptunium/Calcite Sorption Experiments from Logbook 309.

Target Concentration Ca 20ppm

To make 100mL of 20ppm Ca from 1000ppm stock,

$$\frac{(2\,mL)(1000\,ppm)}{100\,mL} = 20\,ppm$$

Reagents - calcium std (1000ppm) - Spex Certiprep cat# PLCA2-2X, lot# 7-114CA, rec 1/31/2001, opened 2/21/2001, expires 1/31/2002
nanopure water

Soln ID: Ca Stock
Added 2mL (vol pipet) of 1000ppm Ca to a 100mL vol flask and diluted to mark with nanopure water.

Target Concentration 1% (w/w) LaCl

Reagents - 10% (w/w) LaCl
nanopure water

Soln ID: 1% LaCl
Added 10mL of 10% LaCl to a 100mL vol flask and diluted to mark with nanopure water

Target Concentration 0.1N $NaClO_4$

To make 100mL of 0.1N $NaClO_4$ from anhydrous sodium perchlorate,

$$\frac{(1.2244\,g\,NaClO_4)\left(\frac{1\,mol}{122.44\,g\,NaClO_4}\right)}{0.1\,L} = 0.1N\,NaClO_4$$

reagents: Sodium perchlorate (anhydrous): Mallinckrodt cat# 1190, lot# KTKJ dried at 44°C for over 24 hours.
nanopure water

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AE240 Mettler Electronic Balance

Mass (g) of 100mL flask	Mass (g) of flask and $NaClO_4$	Mass (g) of $NaClO_4$
62.1018	63.3269	1.2251

Added 1.2251 g of $NaClO_4$ to a 100mL Vol flask and diluted to mark with nanopure water. Labeled as $NaClO_4$ Stock.

AA Blank 0.1% (w/w) LaCl and 0.01N $NaClO_4$

reagents: 0.1N $NaClO_4$ (463/002 - $NaClO_4$ stock)
1% (w/w) LaCl (1%LaCl - 463/001)
nanopure water

Added 20mL of 0.1N $NaClO_4$ and 20mL 1% (w/w) LaCl into a 200mL Vol flask and diluted to mark with nanopure water. Labeled AA blank - 463/002

Calcium Curve for A.A. Analysis

Target concentration: 0.1% (w/w) LaCl and 0.01N NaClO4
Volumetric pipets were used to transfer all solutions in the 0.5 mL to 25 mL volume range

Calcium calibration curve

Soln ID	Target Conc of Ca (ppm)	Vol (mL) of Ca Stock 463/1 (20ppm Ca)	Vol (ml) of 1%LaCl 463-1 (1% LaCl)	Vol (ml) of $NaClO_4$ Stock 463/2 (0.1N NaClO4)	Final Volume (mL)
Ca1*	4	10	5	5	50
Ca2	2	5	5	5	50
Ca3	1.2	3	5	5	50
Ca4	0.8	2	5	5	50
Ca5	0.4	1	5	5	50
Ca6	0.2	0.5	5	5	50

* AA sensitivity check

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Calcite sample solution preparation

Dilution Factor 2
Target concentration: 0.1% (w/w) LaCl and 0.05N NaClO4*

Soln ID	Vol (mL) of Sample	Vol (ml) of 1%LaCl 463/1 (1% LaCl)	Vol (ml) of $NaClO_4$ Stock 463/2 (0.1N NaClO4)	Final Volume (mL)
NpCA1G1	5	1	0	10
NpCA1H2	5	1	0	10
NpCA2G2	5	1	0	10
NpCA2H2	5	1	0	10
NpCA3G1	5	1	0	10
NpCA3H1	5	1	0	10

*Sample soln already has 0.1N NaClO4 in it

Dilution Factor 10
Target concentration: 0.1% (w/w) LaCl and 0.01N NaClO4*

Soln ID	Vol (mL) of Sample	Vol (ml) of 1%LaCl 463/1 (1% LaCl)	Vol (ml) of $NaClO_4$ Stock 463/2 (0.1N NaClO4)	Final Volume (mL)
NpCA1F2	1	1	0	10
NpCA3F1	1	1	0	10

*Sample soln already has 0.1N NaClO4 in it

Dilution Factor 20

Multiple step dilution: DF2 then DF10
Target concentration: 0.1% (w/w) LaCl and 0.01N NaClO4
Step 1: DF2

Soln ID	Vol (mL) of Sample	Vol (ml) of 1%LaCl 463/1 (1% LaCl)	Vol (ml) of $NaClO_4$ Stock 463/2 (0.1N NaClO4)	Final Volume (mL)
NpCA1E1	5	0	0	10
NpCA2E2	5	0	0	10
NpCA3E1	5	0	0	10

Step 2: DF10

Soln ID*	Vol (mL) of Sample	Vol (ml) of 1%LaCl 463/1 (1% LaCl)	Vol (ml) of $NaClO_4$ Stock 463/2 (0.1N NaClO4)	Final Volume (mL)
NpCA1E1	1	1	0.5	10
NpCA2E2	1	1	0.5	10
NpCA3E1	1	1	0.5	10

* DF 2 Solutions from step 1

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Dilution Factor 100

Multiple step dilution: DF10 then DF10
Target concentration: 0.1% (w/w) LaCl and 0.01N NaClO4
Step 1: DF10

Soln ID	Vol (mL) of Sample	Vol (ml) of 1%LaCl 463/1 (1% LaCl)	Vol (ml) of $NaClO_4$ Stock 463/2 (0.1N NaClO4)	Final Volume (mL)
NpCA1D2	1	0	0	10
NpCA3D1	1	0	0	10

Step 2: DF10

Soln ID*	Vol (mL) of Sample	Vol (ml) of 1%LaCl 463/1 (1% LaCl)	Vol (ml) of $NaClO_4$ stock 463/2 (0.1N NaClO4)	Final Volume (mL)
NpCA1D2	1	1	1	10
NpCA3D1	1	1	1	10

* DF 10 Solutions from step 1

Dilution Factor 400

Multiple step dilution: DF40 then DF10
Target concentration: 0.1% (w/w) LaCl and 0.01N NaClO4
Step 1: DF40

Soln ID	Vol (mL) of Sample	Vol (ml) of 1%LaCl 463/1 (1% LaCl)	Vol (ml) of $NaClO_4$ stock 463/2 (0.1N NaClO4)	Final Volume (mL)
NpCA1C1	5	0	0	200
NpCA2C2	5	0	0	200
NpCA3C1	5	0	0	250

Step 2: DF10

Soln ID*	Vol (mL) of Sample	Vol (ml) of 1%LaCl 463/1 (1% LaCl)	Vol (ml) of $NaClO_4$ stock 463/2 (0.1N NaClO4)	Final Volume (mL)
NpCA1C1	1	1	1	10
NpCA2C2	1	1	1	10
NpCA3C1	1	1	1	10

* DF 40 Solutions from step 1

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Dilution Factor 2000

Multiple step dilution: DF200 then DF10
Target concentration: 0.1% (w/w) LaCl and 0.01N NaClO4
Step 1: DF200

Soln ID	Vol (mL) of Sample	Vol (ml) of 1%LaCl 463/1 (1% LaCl)	Vol (ml) of $NaClO_4$ Stock 463/2 (0.1N NaClO4)	Final Volume (mL)
NpCA1B2	1	0	0	200
NpCA3B1	1	0	0	200

Step 2: DF10

Soln ID*	Vol (mL) of Sample	Vol (ml) of 1%LaCl 463/1 (1% LaCl)	Vol (ml) of $NaClO_4$ Stock 463/2 (0.1N NaClO4)	Final Volume (mL)
NpCA1B2	1	1	1	10
NpCA3B1	1	1	1	10

* DF 200 Solutions from step 1

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Dilution Factor 10000

Multiple step dilution: DF100 then DF50 then DF2
Target concentration: 0.1% (w/w) LaCl and 0.01N NaClO4

Step 1: DF100

Soln ID	Vol (mL) of Sample	Vol (ml) of 1% LaCl 463/1 (1% LaCl)	Vol (ml) of $NaClO_4$ stock 463/2 (0.1N NaClO4)	Final Volume (mL)
NpCa1A1	1	0	0	100
NpCa2A2	1	0	0	100
NpCa3A1	1	0	0	100

Step 2: DF50

Soln ID*	Vol (mL) of Sample	Vol (ml) of 1% LaCl 463/1 (1% LaCl)	Vol (ml) of $NaClO_4$ stock 463/2 (0.1N NaClO4)	Final Volume (mL)
NpCa1A1	1	0	0	50
NpCa2A2	1	0	0	50
NpCa3A1	1	0	0	50

* DF 100 Solutions from step 1

Step 3: DF2

Soln ID*	Vol (mL) of Sample	Vol (ml) of 1% LaCl 463/1 (1% LaCl)	Vol (ml) of $NaClO_4$ stock 463/2 (0.1N NaClO4)	Final Volume (mL)
NpCa1A1	5	1	1	10
NpCa2A2	5	1	1	10
NpCa3A1	5	1	1	10

* DF 5000 Solutions from step 2

AA Analysis of Selected Np/calcite solution for Calcium

Perkin Elmer 3100 Atomic Absorption Spectrophotometer
Ca-Mg Lamp - 6mV λ = 422.7 nm, slit = 0.7mm, high
Air-acetylene flame
Blank = 0.1%(w/w) LaCl and 0.01N $NaClO_4$
AA blank (463/002)
Integration time = 3sec

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Absorbance Values - CA analysis

ID	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
Ca1 - 4ppm	0.307	0.307	0.307	0.307	0.307
Ca2 - 2ppm	0.154	0.154	0.155	0.154	0.155
Ca3 - 1.2ppm	0.092	0.092	0.092	0.091	0.091
Ca4 - 0.8ppm	0.060	0.060	0.060	0.060	0.060
Ca5 - 0.4ppm	0.048	0.047	0.047	0.044	0.044
Ca6 - 0.2ppm	0.015	0.015	0.015	0.015	0.015
NpCA1G1-DF2	0.174	0.174	0.174	0.174	0.174
NpCA1H2-DF2	0.059	0.060	0.060	0.060	0.060
NpCA2G2-DF2	0.203	0.202	0.203	0.205	0.204
NpCA2H2-PF2	0.065	0.066	0.065	0.065	0.065
NpCA3G1-DF2	0.167	0.168	0.167	0.168	0.167
NpCA3H1-DF2	0.058	0.058	0.058	0.058	0.058
NpCA1F2-DF10	0.161	0.162	0.162	0.162	0.162
NpCA3F1-DF10	0.155	0.155	0.155	0.154	0.154
NpCA1E1-DF20	0.199	0.198	0.197	0.196	0.196
NpCA2E2-DF20	0.205	0.205	0.204	0.203	0.204
NpCA3E1-DF20	0.195	0.194	0.195	0.194	0.194
Ca3	0.095	0.095	0.095	0.095	0.095
NpCA1D2-DF100	0.120	0.120	0.120	0.119	0.120
NpCA3D1-DF100	0.114	0.114	0.114	0.113	0.112
NpCA1C1-DF400	0.097	0.097	0.097	0.097	0.097
NpCA2C2-DF400	0.096	0.096	0.096	0.096	0.095
NpCA3C1-DF400	0.097	0.097	0.096	0.095	0.095
NpCA1B2-DF2000	0.060	0.061	0.060	0.060	0.060
NpCA3B1-DF2000	0.060	0.060	0.060	0.059	0.059
NpCA1A1-DF10000	0.060	0.061	0.061	0.060	0.061
NpCA2A2-DF10000	0.059	0.059	0.059	0.059	0.059
NpCA3A1-DF10000	0.060	0.059	0.060	0.060	0.059
Ca3	0.093	0.093	0.093	0.093	0.092

A2 max = 0.001 A2 normal = 0.001

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Aspirated an ~ 1% HNO_3 soln through the AA for ten minutes upon completion of analysis.

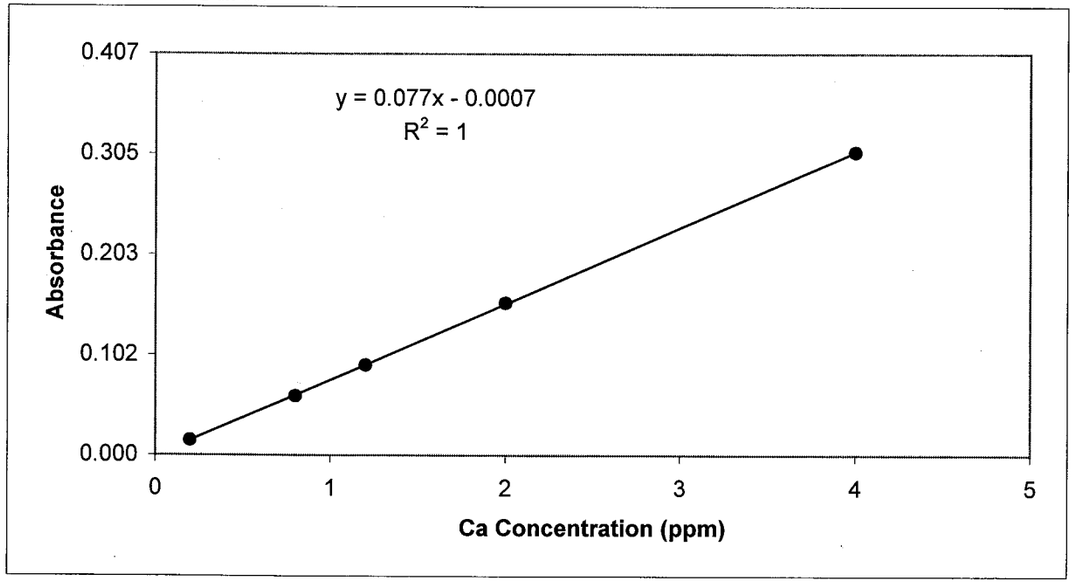
Calcium Concentration in Selected Np/Calcite Solutions

Ca Std Data

Solution ID	Ca Std (ppm)	Absorbance					Average Absorbance
		Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	
Ca1	4	0.307	0.307	0.307	0.307	0.307	0.3070
Ca2	2	0.154	0.154	0.155	0.154	0.155	0.1544
Ca3	1.2	0.092	0.092	0.092	0.091	0.091	0.0916
Ca4	0.8	0.060	0.060	0.060	0.060	0.060	0.0600
Ca5*	0.4	0.048	0.047	0.047	0.044	0.044	0.0460
Ca6	0.2	0.015	0.015	0.015	0.015	0.015	0.0150

*Omitted Ca5 data from Cal Curve (R^2 @ 0.9967 if included)

Ca Calibration Curve



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Ca Sample Summary Data

Sample ID	Dilution Factor	Average Absorbance	Measured Conc (ppm) of Dilute Solution	Conc (ppm) of Original Solution
NpCA1G1	2	0.1740	2.269	4.54E+00
NpCA1H2	2	0.0598	0.786	1.57E+00
NpCA2G2	2	0.2034	2.651	5.30E+00
NpCA2H2	2	0.0652	0.856	1.71E+00
NpCA3G1	2	0.1674	2.183	4.37E+00
NpCA3H1	2	0.0580	0.762	1.52E+00
NpCA1F2	10	0.1618	2.110	2.11E+01
NpCA3F1	10	0.1546	2.017	2.02E+01
NpCA1E1	20	0.1972	2.570	5.14E+01
NpCA2E2	20	0.2042	2.661	5.32E+01
NpCA3E1	20	0.1944	2.534	5.07E+01
NpCA1D2	100	0.1198	1.565	1.56E+02
NpCA3D1	100	0.1134	1.482	1.48E+02
NpCA1C1	400	0.0970	1.269	5.08E+02
NpCA2C2	400	0.0958	1.253	5.01E+02
NpCA3C1	400	0.0960	1.256	5.02E+02
NpCA1B2	2000	0.0602	0.791	1.58E+03
NpCA3B1	2000	0.0596	0.783	1.57E+03
NpCA1A1	10000	0.0606	0.796	7.96E+03
NpCA2A2	10000	0.0590	0.775	7.75E+03
NpCA3A1	10000	0.0596	0.783	7.83E+03

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Final LSA results for Np CA1, Np CA2, Np CA3 expts.

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Protocol# 15 - Pa_Np_Exp_AB.lsa Serial# 405314 User: Bertetti

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Assay Definition-

Assay Description:

Assay Type: Alpha/Beta
Report Name: Np_Pa_Exp
Output Data Path: C:\Packard\Tricarb\Results\Bertetti\Pa_Np_Exp_AB
Raw Results Path: C:\Packard\Tricarb\Results\Bertetti\Pa_Np_Exp_AB
Comma-Delimited File Name: C:\Packard\Tricarb\Results\Bertetti\Pa_Np_Exp_AB\Np_Pa_AB.txt

Count Conditions-

Nuclide: Manual Np/Pa
Quench Indicator: SIS
External Std Terminator (sec): n/a
Pre-Count Delay (min): 0.00
Quench Set:
Count Time (min): 120.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: On - 1st Vial
Low CPM Threshold: Off
2 Sigma % Terminator: On - Any Region

In Use Discriminator: 143

Regions	LL	UL	Bkg Subtract	2Sigma % Terminator
Beta A	0.0	400.0	1st Vial	0.00
Beta B	0.0	2000.0	1st Vial	0.00
Alpha	100.0	400.0	1st Vial	2.00

Count Corrections-

Static Controller: On Luminescence Correction: Off
Colored Samples: n/a Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
Beta A				
Beta B				
Alpha				

IPA Block Data
Software Version IC: 2.09
Software Version EC: 1.10
Instrument Model: Tri-Carb 3100TR
Instrument Serial Number: 405314
3H Chi Square: 13.63 Date Processed: 5/26/01 4:16:21 PM
14C Chi Square: 23.34 Date Processed: 5/26/01 4:16:21 PM
3H E^2/B (0-18.6 keV and 1-18.6 keV): 264.46 Date Processed: 5/26/01 4:16:21 PM
14C E^2/B (0-156 keV and 1-156 keV): 533.52 Date Processed: 5/26/01 4:16:21 PM
3H Efficiency (0-18.6 keV): 65.60 Date Processed: 5/26/01 4:16:21 PM
14C Efficiency (0-156 keV): 96.70 Date Processed: 5/26/01 4:16:21 PM
IPA Background Date Processed: 5/26/01 4:16:21 PM
3H Background CPM (0-18.6 keV): 16.23 Date Processed: 5/26/01 4:16:21 PM
14C Background CPM (0-156 keV): 23.23 Date Processed: 5/26/01 4:16:21 PM
3H Calibration DPM: 285000
3H Reference Date: 10/29/99
14C Calibration DPM: 134100

Sample list:

1 - blank
2 - 17 - Np CA13 ab 1
19 - 34 - Np CA12 ab 2
37 - 52 - Np CA11 ab 1
55 - 70 - Np CA22 ab 2
73 - 88 - Np CA21 ab 1
91 - 106 - Np CA23 ab 1
109 - 124 - Np CA32 ab 1
127 - 142 - Np CA31 ab 1
145 - 160 - Np CA12 ab 1
163 - 178 - Np CA22 ab 1
181 - 196 - Np CA31 i and Np CA32 i

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Protocol# 15 - Pa_Np_Exp_AB.lsa Serial# 405314 User: Bertetti

========== Errors and Warnings ==========
========== End of Errors and Warnings ==========

Cycle 1 Results S#	Count Time	CPMA	A:2S%	CPMB	B:2S%	CPMa	alpha2S%	SIS	MESSAGES B
1	120.00	20.46	4.04	24.77	3.67	0.63	23.09	796.0	
2	34.70	30.06	8.48	31.03	8.68	287.59	2.00	417.8	
3	34.07	28.76	8.84	28.74	9.28	292.98	2.00	349.3	
4	34.60	27.58	9.05	28.53	9.27	288.48	2.00	394.8	
5	34.35	26.32	9.40	26.56	9.82	290.52	2.00	331.7	
6	61.16	14.06	12.20	14.29	12.86	162.90	2.01	341.6	
7	59.91	14.41	12.04	15.24	12.27	166.29	2.01	466.2	
8	57.43	16.96	9.76	19.70	10.05	173.52	2.01	372.2	
9	55.23	19.21	9.81	19.56	10.27	180.44	2.01	319.9	
10	54.27	17.63	10.60	18.35	10.90	183.66	2.01	423.3	
11	53.71	17.93	10.49	18.35	10.95	185.56	2.01	344.5	
12	47.12	24.36	8.69	23.96	9.30	211.62	2.01	196.8	
13	46.97	25.15	8.50	25.78	8.79	212.34	2.01	334.5	
14	48.23	36.19	6.41	36.65	6.64	206.80	2.01	297.8	
15	48.09	37.27	6.28	37.70	6.51	207.34	2.01	295.2	
16	40.35	85.44	3.91	86.16	3.99	247.23	2.01	286.6	
17	41.73	87.95	3.78	88.03	3.88	239.03	2.01	241.6	
Missing vial 18.									
19	28.30	43.04	7.22	43.89	7.39	352.80	2.00	333.8	
20	28.10	44.74	7.06	45.73	7.21	355.32	2.00	363.7	
21	49.44	19.71	10.06	19.93	10.57	201.66	2.01	297.8	
22	48.69	20.93	9.65	21.01	10.19	204.78	2.01	309.7	
23	63.94	16.11	10.70	16.54	11.17	155.77	2.01	383.3	
24	64.91	15.25	11.13	15.91	11.48	153.45	2.01	360.8	
25	47.06	26.38	8.19	26.00	8.72	211.95	2.01	202.2	
26	46.20	27.94	7.90	28.22	8.24	215.89	2.01	298.4	
27	44.52	27.45	8.13	28.13	8.40	223.99	2.01	366.7	
28	44.46	27.85	8.05	28.61	8.29	224.30	2.01	350.3	
29	44.99	29.55	7.66	30.42	7.87	221.67	2.01	360.2	
30	44.75	29.15	7.76	29.36	8.11	222.86	2.01	275.4	
31	44.28	40.40	6.15	40.57	6.39	225.26	2.01	247.5	
32	43.15	40.68	6.19	41.17	6.40	231.19	2.01	307.8	
33	41.57	74.13	4.22	74.15	4.34	239.98	2.01	251.4	
34	41.20	77.11	4.13	77.49	4.23	242.14	2.01	260.0	
Missing vial 35.									
Missing vial 36.									
37	27.40	48.92	6.72	49.80	6.87	364.34	2.00	346.4	
38	27.16	49.24	6.72	50.12	6.87	367.56	2.00	352.4	
39	32.59	38.79	7.27	38.84	7.56	306.37	2.00	269.3	
40	32.67	39.78	7.14	40.12	7.38	305.47	2.00	309.3	
41	53.52	23.64	8.44	23.51	8.95	186.26	2.01	258.3	
42	52.98	23.50	8.51	23.63	8.96	188.16	2.01	261.3	
43	27.81	51.71	6.43	52.00	6.62	359.25	2.00	282.4	
44	27.80	55.62	6.13	56.13	6.29	359.20	2.00	305.6	
45	42.85	29.51	7.84	29.49	8.23	232.75	2.01	239.5	
46	43.70	31.53	7.40	32.60	7.56	228.32	2.01	396.3	
47	44.70	34.28	6.89	34.54	7.17	223.16	2.01	304.9	
48	43.85	34.23	6.96	34.44	7.25	227.43	2.01	284.7	
49	40.48	43.50	6.08	43.86	6.29	246.44	2.01	287.5	
50	40.43	42.89	6.15	43.33	6.35	246.74	2.01	280.1	
51	42.76	75.07	4.13	75.35	4.24	233.26	2.01	268.0	
52	41.38	75.87	4.17	75.91	4.28	241.04	2.01	242.0	
Missing vial 53.									
Missing vial 54.									
55	28.56	46.80	6.79	47.40	6.98	349.59	2.00	316.1	
56	28.59	48.69	6.61	49.94	6.72	349.15	2.00	361.5	
57	32.60	36.29	7.62	36.55	7.91	306.15	2.00	303.3	
58	32.33	34.82	7.88	35.49	8.11	308.78	2.00	362.4	
59	39.70	31.76	7.68	32.16	7.96	251.39	2.01	323.3	
60	40.00	32.49	7.52	33.18	7.75	249.55	2.01	357.7	
61	38.99	34.30	7.32	34.68	7.59	255.88	2.01	307.8	
62	39.81	34.55	7.21	35.57	7.38	250.62	2.01	371.8	
63	25.25	59.07	6.17	58.56	6.40	395.65	2.00	216.0	
64	25.04	58.58	6.23	58.90	6.40	398.94	2.00	313.9	
65	23.59	76.45	5.41	77.01	5.52	423.37	2.00	293.8	
66	23.68	76.12	5.42	77.26	5.50	422.01	2.00	326.9	
67	23.02	146.92	3.71	147.13	3.77	434.00	2.00	257.8	
68	22.58	148.59	3.72	148.84	3.78	442.38	2.00	255.8	
69	21.82	287.88	2.63	288.71	2.64	457.76	2.00	260.6	
70	21.70	285.44	2.65	287.03	2.66	460.20	2.00	271.2	
Missing vial 71.									
Missing vial 72.									
73	28.69	53.68	6.18	53.97	6.37	348.00	2.00	306.7	
74	28.23	51.63	6.39	52.03	6.58	353.61	2.00	309.1	
75	36.10	36.91	7.19	37.53	7.41	276.47	2.00	329.8	
76	35.42	38.43	7.05	39.49	7.20	281.79	2.00	360.6	
77	38.84	34.28	7.33	34.35	7.66	256.87	2.01	268.2	
78	38.84	34.43	7.31	35.58	7.46	256.84	2.01	384.9	
79	21.62	76.67	5.63	76.48	5.78	462.14	2.00	270.9	
80	21.47	78.42	5.57	79.24	5.67	465.42	2.00	318.2	
81	29.37	52.75	6.19	53.44	6.34	339.93	2.00	341.3	
82	28.86	53.07	6.21	52.71	6.45	346.08	2.00	237.9	
83	24.30	73.66	5.46	74.20	5.58	411.02	2.00	287.3	
84	24.34	74.41	5.42	74.82	5.54	410.59	2.00	296.8	
85	22.43	147.84	3.75	148.22	3.80	445.43	2.00	271.3	
86	22.68	146.87	3.74	146.57	3.80	440.42	2.00	258.9	
87	23.21	251.06	2.74	250.98	2.77	430.35	2.00	247.4	
88	22.83	254.88	2.74	255.39	2.77	437.48	2.00	259.0	
Missing vial 89.									
Missing vial 90.									
91	28.57	55.57	6.06	55.84	6.23	349.57	2.00	294.7	
92	28.09	53.91	6.23	54.41	6.39	355.41	2.00	310.3	
93	33.94	38.94	7.12	39.88	7.29	294.07	2.00	337.0	
94	33.40	41.79	6.83	41.91	7.08	298.81	2.00	269.4	
95	38.41	36.40	7.06	37.14	7.26	259.80	2.01	359.1	
96	38.30	36.49	7.06	36.83	7.32	260.52	2.01	307.5	
97	47.63	31.04	7.21	31.86	7.42	209.39	2.01	353.3	
98	46.85	33.24	6.90	33.46	7.20	212.84	2.01	308.4	
99	25.42	67.03	5.67	67.40	5.81	392.81	2.00	273.7	
100	25.66	63.60	5.84	63.85	5.99	389.20	2.00	273.0	
101	24.48	83.10	5.05	83.85	5.14	408.16	2.00	303.1	
102	24.35	78.88	5.23	79.05	5.35	410.05	2.00	273.7	
103	22.26	150.16	3.73	151.42	3.76	448.88	2.00	287.3	
104	21.95	150.34	3.75	150.81	3.80	455.18	2.00	268.9	
105	22.52	272.35	2.67	273.24	2.68	443.47	2.00	266.7	
106	22.59	277.24	2.64	277.54	2.66	442.31	2.00	260.8	
Missing vial 107.									
Missing vial 108.									
109	23.21	70.58	5.73	71.70	5.83	430.44	2.00	317.2	
110	23.49	71.79	5.64	72.08	5.77	425.22	2.00	277.7	
111	24.52	60.17	6.18	60.55	6.34	407.25	2.00	292.8	
112	24.62	64.68	5.89	64.71	6.06	405.67	2.00	309.5	
113	26.11	57.29	6.19	57.00	6.41	382.37	2.00	259.5	
114	26.11	58.09	6.14	58.76	6.28	382.52	2.00	321.8	
115	25.67	56.71	6.29	57.39	6.43	389.05	2.00	307.4	
116	25.74	59.96	6.05	60.74	6.18	387.88	2.00	332.3	
117	28.28	54.75	6.14	55.50	6.29	353.05	2.00	320.7	
118	28.49	54.94	6.11	54.70	6.33	350.45	2.00	265.3	
119	28.53	57.78	5.91	58.86	6.02	349.95	2.00	320.3	
120	27.87	60.02	5.83	60.81	5.95	358.36	2.00	314.8	
121	27.13	88.02	4.64	88.36	4.74	368.23	2.00	271.1	
122	26.67	85.84	4.75	85.81	4.86	374.40	2.00	251.9	
123	25.46	171.18	3.24	171.74	3.28	392.31	2.00	267.5	
124	25.62	175.40	3.19	175.43	3.23	389.85	2.00	257.1	

Np CA13 ab 1

Np CA12 ab 2

Np CA11 ab 1

Np CA22 ab 2

Np CA21 ab 1

Np CA23 ab 1

Np CA32 ab 1

5/30/01 9:44:39 PM QuantaSmart (TM) - 1.10
Protocol# 15 - Pa_Np_Exp_AB.lsa Serial# 405314 User

4 Jun 01
PB

/30/01 9:44:39 PM QuantaSmart (TM) - 1.10
rotocol# 15 - Pa_Np_Exp_AB.lsa Serial# 405314 Use

Missing vial 125.								
Missing vial 126.								
127	24.99	69.58	5.58	70.43	5.69	399.54	2.00	312.2
128	24.55	67.16	5.76	67.41	5.90	406.75	2.00	291.9
129	22.43	72.50	5.73	73.09	5.85	445.25	2.00	283.9
130	22.71	67.87	5.94	68.01	6.09	440.06	2.00	299.6
131	25.88	59.87	6.04	60.55	6.18	386.01	2.00	312.8
132	26.19	65.95	5.65	66.41	5.78	381.28	2.00	317.1
133	25.40	65.53	5.76	66.45	5.87	393.08	2.00	311.5
134	25.36	65.54	5.76	65.89	5.90	393.78	2.00	285.3
135	28.83	58.83	5.81	59.52	5.94	346.24	2.00	294.6
136	28.53	57.28	5.94	57.11	6.14	350.06	2.00	294.5
137	27.40	64.47	5.61	65.20	5.73	364.45	2.00	305.3
138	27.97	66.03	5.47	65.79	5.64	356.90	2.00	260.5
139	25.58	94.83	4.56	94.58	4.67	390.38	2.00	258.1
140	24.66	93.53	4.68	93.77	4.78	405.09	2.00	270.9
141	25.07	185.49	3.12	185.25	3.16	398.46	2.00	251.9
142	24.93	185.44	3.13	186.06	3.16	400.54	2.00	267.0
Missing vial 143.								
Missing vial 144.								
145	28.57	114.47	3.86	114.72	3.93	349.50	2.00	271.7
146	28.77	114.79	3.85	114.82	3.92	347.10	2.00	264.3
147	50.28	56.05	4.64	56.74	4.77	198.26	2.01	287.3
148	49.77	56.84	4.62	56.71	4.79	200.40	2.01	264.4
149	67.31	42.53	4.95	42.55	5.16	147.94	2.01	257.7
150	67.60	43.05	4.89	43.21	5.10	147.30	2.01	290.8
151	48.59	64.00	4.32	65.00	4.41	205.20	2.01	310.3
152	47.77	66.60	4.24	67.30	4.34	208.71	2.01	304.7
153	43.03	68.43	4.37	69.21	4.47	231.82	2.01	290.5
154	42.65	70.77	4.29	71.18	4.40	233.91	2.01	284.1
155	42.31	72.88	4.23	73.27	4.34	235.84	2.01	287.2
156	42.10	72.80	4.24	73.31	4.34	236.90	2.01	282.4
157	41.45	83.62	3.92	83.73	4.01	240.68	2.01	265.6
158	42.36	79.35	4.01	79.62	4.10	235.49	2.01	258.7
159	39.82	118.82	3.22	118.60	3.29	250.56	2.01	241.7
160	40.44	116.04	3.25	116.68	3.30	246.70	2.01	266.1
Missing vial 161.								
Missing vial 162.								
163	29.53	104.47	4.02	105.44	4.08	338.22	2.00	300.9
164	28.98	108.60	3.96	109.43	4.02	344.54	2.00	278.5
165	33.55	88.87	4.17	89.84	4.24	297.47	2.00	285.4
166	33.62	87.66	4.20	88.68	4.27	296.88	2.00	302.4
167	41.40	72.83	4.28	73.13	4.39	241.02	2.01	275.1
168	40.34	73.59	4.30	74.37	4.39	247.34	2.01	286.8
169	38.78	85.40	3.99	86.06	4.07	257.37	2.01	293.6
170	38.18	82.34	4.11	82.93	4.20	261.29	2.01	294.4
171	25.13	121.17	3.98	121.47	4.04	397.43	2.00	270.8
172	24.90	125.00	3.92	125.15	3.99	401.22	2.00	263.2
173	24.05	140.04	3.74	140.31	3.79	415.26	2.00	271.0
174	23.64	138.26	3.80	138.43	3.85	422.39	2.00	261.5
175	22.63	201.42	3.14	202.06	3.17	441.58	2.00	252.7
176	22.51	200.42	3.15	200.96	3.18	443.76	2.00	260.0
177	22.25	306.69	2.52	306.69	2.53	448.90	2.00	241.7
178	22.03	309.86	2.51	310.19	2.53	453.35	2.00	247.7
Missing vial 179.								
Missing vial 180.								
181	23.68	252.39	2.71	253.78	2.73	421.88	2.00	273.7
182	21.95	326.42	2.45	326.35	2.47	455.05	2.00	250.6
183	21.35	472.05	2.04	471.67	2.05	468.04	2.00	238.9
184	20.85	466.45	2.08	467.32	2.09	478.99	2.00	256.8
185	21.86	444.77	2.08	445.73	2.09	457.11	2.00	254.0
186	20.68	462.67	2.10	463.53	2.11	483.13	2.00	252.6
187	21.39	451.02	2.09	451.30	2.10	467.02	2.00	239.9
188	20.74	456.93	2.11	456.81	2.12	481.73	2.00	244.1
189	21.47	453.27	2.08	453.90	2.09	465.23	2.00	245.1

NpCA31 ab1

NpCA12 ab1

NpCA22 ab1

NpCA31i and NpCA32i

/30/01 9:44:39 PM QuantaSmart (TM) - 1.10 Page # 5
rotocol# 15 - Pa_Np_Exp_AB.lsa Serial# 405314 User: Bertetti

190	21.52	453.52	2.08	453.53	2.09	464.48	2.00	243.5
191	21.51	453.88	2.08	453.75	2.09	464.55	2.00	245.7
192	21.61	441.60	2.10	442.98	2.11	462.26	2.00	260.1
193	21.28	440.73	2.12	441.40	2.13	469.44	2.00	252.7
194	21.57	450.01	2.08	450.94	2.09	463.07	2.00	256.4
195	21.83	461.68	2.04	462.32	2.05	457.46	2.00	248.4
196	20.93	468.60	2.07	468.97	2.08	477.25	2.00	255.5

6/11/2001 BAW

12 June 2001
BAW

Preparation/Transfer of water samples to Div01 (SWRI) for major + minor element analysis by ICP.

Samples from Nye County Early Warning Drilling Program

There were six original samples in 1L polypropylene bottles. Duplicate analysis was used so 12 samples were delivered to division 01. Aliquots were transfered into 30mL polypropylene bottles after the 1L bottles were inverted (shaken) several times.

Sample 1 - refridgerated, from well NC-EWDP-3S, deep zone, 500ft, unfiltered, acidified, collected by Paul Bertetti on 15 Nov 99
Two aliquots for div01 analysis labeled 35500UFA1 + 35500UFA2

Sample 2 - refridgerated, from well NC-EWDP-3S, middle zone, 408 ft, unfiltered, acidified, collected by Paul Bertetti on 15 Nov 99
Two aliquots labeled 35408UFA1 + 35408UFA2

Sample 3 - refridgerated, from well NC-EWDP-3S, deep zone, 500ft, filtered, acidified, collected by Paul Bertetti on 15 Nov 99 BAW 6/12/01
Two aliquots labeled ~~55~~ 35500FA11 + 35500FA12

Sample 4 - refridgerated, from well NC-EWDP-3S, middle zone, 408ft, filtered, acidified, collected by Paul Bertetti on 15 Nov 99 BAW 6/12/01
Two aliquots labeled ~~35500~~ 35408FA11 + 35408FA12

Sample 5 - not refridgerated, from well NC EWDP-19D, unfiltered, not acidified, collected 8-17-2000 by Pete Striffler.
Two aliquots labeled 19D4FU1 + 19D4FU2

12 June 2001
sent BAW

Sample 6 - not refrigerated, from well MC-EWDP-15D, unfiltered, acidified, collected by Pete Stiffler 8-17-2000 - bottle browning. Two aliquots labeled 19D4FA1 + 19D4FA2

Client Name/Address: Bradley Werling
CNWRA / Div 20
Bld 57

SAMPLE LIST/CHAIN OF CUSTODY

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

Requested Turnaround:
- ☐ 1 Week
- ☒ 2 Weeks (Normal) if possible
- ☐ 3 Weeks
- ☐ Other: _____

Client Purchase Order/Other ID | Site/Zone ID

Analyses Requested

SwRI Contact: Mike Dammann

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time (mm/dd/yy)	Matrix Type	Sample Type	# of Containers	Analysis of major + minor elements - ICP									
35500UFA1	11/15/99		W	DM	1	X									
35500UFA2	11/15/99				1	X									
35408UFA1	11/15/99				1	X									
35408UFA2	11-15-99				1	X									
35500FA11	11-15-99				1	X									
35500FA12	11-15-99				1	X									
35408FA11	11-15-99				1	X									
35408FA12	11-15-99				1	X									
19D4FUA1	8-17-00				1	X	*sample	not	acidified	>	please	analyze			
19D4FUA2	8-17-00		↓	↓	1	X	*sample	not	acidified		any way				

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** = Other (Specify)

Project is nuclear safety related - 10 CFR - Part 21, Appendix B

POC for questions is Bradley Werling X6565

Matrix Types: **A** - Air; **P** - Product; **S** - Soil; **T** - Tissue; **W** - Water

Sample Types: **DM** - Dissolved Metals; **ER** - Equipment Rinsate; **FB** - Field Blank; **MSD** - Matrix Spike Duplicate; **MS** - Matrix Spike; **TB** - Trip Blank; **TM** - Total Metals; **ES** - Environmental Samples; **FD** - Field Duplicate

Relinquished by (Signature):

Received by (Signature)

Relinquished by Sampler (Signature): Bradley Werling

Relinquished by (Signature)

Received by (Signature):

Comments:

SwRI Project No. 20.01402.871

Received by SwRI Lab (Signature): Marie L Galonic

Samples Disposed by:

Date/Time: 6-11-01 14:57

Div 01 COC Form 01-01-001, Rev 1/97

Page 1 of 2

12 June 2001
Last BAW

SAMPLE LIST/CHAIN OF CUSTODY

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

Client Name/Address: Bradley Werling
CNWRA - Div 20
Bld 57

Requested Turnaround:
☐ 1 Week
☒ 2 Weeks (Normal) if possible
☐ 3 Weeks
☐ Other: _____

Client Purchase Order/Other ID:

Site/Zone ID:

Analyses Requested

SwRI Contact: Mike Damann

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time (mm/dd/yy)	Matrix Type	Sample Type	# of Containers	Analysis of major + minor elements - ICP
19D4FA1	8-17-00		W	DM	1	X
19D4FA2	8-17-00		〃	〃	1	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 = Other (Specify)

Project is nuclear safety related - 10 CFR - Part 21, Appendix B

POC for questions is Bradley Werling X6565

Matrix Types: **A** - Air; **P** - Product; **S** - Soil; **T** - Tissue; **W** - Water

Sample Types: **DM** - Dissolved Metals; **ER** - Equipment Rinsate; **FB** - Field Blank; **MSD** - Matrix Spike Duplicate; **MS** - Matrix Spike; **TB** - Trip Blank; **TM** - Total Metals; **ES** - Environmental Samples; **FD** - Field Duplicate

Relinquished by (Signature):

Received by (Signature)

Relinquished by Sampler (Signature): Bradley Werling

Relinquished by (Signature)

Received by (Signature):

Comments:

SwRI Project No. 20.01402.871

Received by SwRI Lab (Signature): Marie A Polanco

Samples Disposed by:

Date/Time: 6-11-01 @ 14:57

Div 01 COC Form 01-01-001, Rev 1/97

25 June 01 BAW

Transfer of Potassium std to Div01 for K analysis. Suspect problem based on info from Alka. About 25mL of 0.1M K^+ soln (Orion 921906, lot EZ1 (0/02), rec 1/01) transfered to a 30mL pp bottle. Labeled K std.

SAMPLE LIST/CHAIN OF CUSTODY

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

Client Name/Address: Bradley Werling CNWRA/Div 20 Bld 57

Client Purchase Order/Other ID | Site/Zone ID

SwRI Contact: Mike Dr WMG UD

Requested Turnaround:
☐ 1 Week
☒ 2 Weeks (Normal) if possible
☐ 3 Weeks
☐ Other: _____

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 = Other (Specify)

Analyses Requested

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time (mm/dd/yy)	Matrix Type	Sample Type	# of Containers	Final dilution for ICP analysis
K std	6/25/01	10:15	W	DM	1	X

Orion 921906 Potassium Standard 0.1000±0.0005 M

Project is nuclear safety related – 10CFR Part 21, Appendix B

QC for questions is Bradley Werling - ext 6565, fax 5184

SwRI Project No.: 20.01402.871

Requested by SwRI (Signature)

Shipped Date: 6/25/01

Date/Time: 6/25 11:45

Page 1 of 1

Matrix Types: **A** - Air; **P** - Product; **S** - Soil; **T** - Tissue; **W** - Water

Sample Types: **DM** - Dissolved Metals; **ER** - Equipment Rinsate; **FB** - Field Blank; **MSD** - Matrix Spike Duplicate; **MS** - Matrix Spike; **TB** - Trip Blank; **TM** - Total Metals; **ES** - Environmental Samples; **FD** - Field Duplicate

Relinquished by Sampler (Signature): Bradley Werling

Received by (Signature):

Relinquished by (Signature):

Received by (Signature)

Relinquished by (Signature)

Comments:

Div 01 COC Form 01-01-001, Rev 1/97

25 June 01 cont BAW

Results for EWDP samples (see 463/13)

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: 19DUFA1

Lab Name: Southwest Research Institute
Client: Division 20
Lab Code: SwRI
Date Received: 06/11/01
Matrix: Liquid
Project No.: 20.01402.871
Lab System ID: 162629
Work Order: 20370

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	1.87	0.05
Antimony	<0.01	0.01
Arsenic	0.038	0.005
Barium	<0.005	0.005
Beryllium	<0.005	0.005
Bismuth	<0.01	0.01
Boron	0.173	0.02
Cadmium	<0.005	0.005
Calcium	1.35	0.05
Chromium	<0.005	0.005
Cobalt	<0.005	0.005
Copper	<0.005	0.005
Iron	0.754	0.03
Lanthanum	<0.005	0.005
Lead	<0.005	0.005
Lithium	0.136	0.005
Magnesium	0.268	0.05
Manganese	0.011	0.005
Molybdenum	0.009	0.005
Nickel	<0.005	0.005
Palladium	<0.01	0.01
Phosphorus	0.027	0.02
Potassium	4.19	0.1
Selenium	<0.01	0.01
Silicon	36.8	0.05
Silver	<0.005	0.005
Sodium	109	0.2
Strontium	<0.005	0.005
Sulfur	6.63	0.02
Thallium	<0.01	0.01
Thorium	<0.01	0.01
Tin	<0.005	0.005
Titanium	0.019	0.005
Tungsten	<0.01	0.01
Uranium	<0.1	0.1
Vanadium	0.006	0.005
Yttrium	<0.005	0.005
Zinc	<0.005	0.005
Zirconium	<0.005	0.005

25 June 01
cont BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: 19DUFA2

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 06/11/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 162630
Work Order: 20370

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	1.82	0.05
Antimony	<0.01	0.01
Arsenic	0.038	0.005
Barium	<0.005	0.005
Beryllium	<0.005	0.005
Bismuth	<0.01	0.01
Boron	0.172	0.02
Cadmium	<0.005	0.005
Calcium	1.29	0.05
Chromium	<0.005	0.005
Cobalt	<0.005	0.005
Copper	<0.005	0.005
Iron	0.731	0.03
Lanthanum	<0.005	0.005
Lead	<0.005	0.005
Lithium	0.134	0.005
Magnesium	0.263	0.05
Manganese	0.010	0.005
Molybdenum	0.007	0.005
Nickel	<0.005	0.005
Palladium	<0.01	0.01
Phosphorus	0.026	0.02
Potassium	4.20	0.1
Selenium	<0.01	0.01
Silicon	36.8	0.05
Silver	<0.005	0.005
Sodium	110	0.2
Strontium	<0.005	0.005
Sulfur	6.66	0.02
Thallium	<0.01	0.01
Thorium	<0.01	0.01
Tin	<0.005	0.005
Titanium	0.017	0.005
Tungsten	<0.01	0.01
Uranium	<0.1	0.1
Vanadium	0.006	0.005
Yttrium	<0.005	0.005
Zinc	<0.005	0.005
Zirconium	<0.005	0.005

25 June 01
cont BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: 19DUFUA1

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 06/11/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 162631
Work Order: 20370

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	1.37	0.05
Antimony	<0.01	0.01
Arsenic	0.038	0.005
Barium	<0.005	0.005
Beryllium	<0.005	0.005
Bismuth	<0.01	0.01
Boron	0.170	0.02
Cadmium	<0.005	0.005
Calcium	1.22	0.05
Chromium	<0.005	0.005
Cobalt	<0.005	0.005
Copper	<0.005	0.005
Iron	0.529	0.03
Lanthanum	<0.005	0.005
Lead	<0.005	0.005
Lithium	0.134	0.005
Magnesium	0.200	0.05
Manganese	0.006	0.005
Molybdenum	0.007	0.005
Nickel	<0.005	0.005
Palladium	<0.01	0.01
Phosphorus	0.032	0.02
Potassium	4.14	0.1
Selenium	<0.01	0.01
Silicon	34.5	0.05
Silver	<0.005	0.005
Sodium	110	0.2
Strontium	<0.005	0.005
Sulfur	6.74	0.02
Thallium	<0.01	0.01
Thorium	<0.01	0.01
Tin	0.019	0.005
Titanium	0.009	0.005
Tungsten	0.038	0.01
Uranium	<0.1	0.1
Vanadium	0.006	0.005
Yttrium	<0.005	0.005
Zinc	<0.005	0.005
Zirconium	<0.005	0.005

25 June 01
cont BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
19DUFUA2

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Liquid

Lab System ID: 162632

Client: Division 20

Date Received: 06/11/01

Project No.: 20.01402.871

Work Order: 20370

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	1.26	0.05
Antimony	<0.01	0.01
Arsenic	0.038	0.005
Barium	<0.005	0.005
Beryllium	<0.005	0.005
Bismuth	<0.01	0.01
Boron	0.168	0.02
Cadmium	<0.005	0.005
Calcium	1.19	0.05
Chromium	<0.005	0.005
Cobalt	<0.005	0.005
Copper	<0.005	0.005
Iron	0.463	0.03
Lanthanum	<0.005	0.005
Lead	<0.005	0.005
Lithium	0.133	0.005
Magnesium	0.188	0.05
Manganese	0.005	0.005
Molybdenum	0.007	0.005
Nickel	<0.005	0.005
Palladium	<0.01	0.01
Phosphorus	0.038	0.02
Potassium	4.11	0.1
Selenium	<0.01	0.01
Silicon	34.3	0.05
Silver	<0.005	0.005
Sodium	109	0.2
Strontium	<0.005	0.005
Sulfur	6.72	0.02
Thallium	<0.01	0.01
Thorium	<0.01	0.01
Tin	0.021	0.005
Titanium	0.009	0.005
Tungsten	0.061	0.01
Uranium	<0.1	0.1
Vanadium	0.005	0.005
Yttrium	<0.005	0.005
Zinc	<0.005	0.005
Zirconium	<0.005	0.005

25 June 01
cont BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
3S408FA11

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Liquid

Lab System ID: 162633

Client: Division 20

Date Received: 06/11/01

Project No.: 20.01402.871

Work Order: 20370

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	0.139	0.05
Antimony	<0.01	0.01
Arsenic	0.034	0.005
Barium	<0.005	0.005
Beryllium	<0.005	0.005
Bismuth	<0.01	0.01
Boron	0.233	0.02
Cadmium	<0.005	0.005
Calcium	0.795	0.05
Chromium	<0.005	0.005
Cobalt	<0.005	0.005
Copper	<0.005	0.005
Iron	0.129	0.03
Lanthanum	<0.005	0.005
Lead	<0.005	0.005
Lithium	0.160	0.005
Magnesium	0.141	0.05
Manganese	0.007	0.005
Molybdenum	0.012	0.005
Nickel	<0.005	0.005
Palladium	<0.01	0.01
Phosphorus	0.033	0.02
Potassium	3.82	0.1
Selenium	<0.01	0.01
Silicon	27.4	0.05
Silver	<0.005	0.005
Sodium	123	0.2
Strontium	<0.005	0.005
Sulfur	16.8	0.02
Thallium	<0.01	0.01
Thorium	<0.01	0.01
Tin	<0.005	0.005
Titanium	<0.005	0.005
Tungsten	<0.01	0.01
Uranium	<0.1	0.1
Vanadium	<0.005	0.005
Yttrium	<0.005	0.005
Zinc	0.077	0.005
Zirconium	<0.005	0.005

25 June 01
cont BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
3S408FA12

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 06/11/01

Matrix: Liquid

Project No.: 20.01402.871

Lab System ID: 162634

Work Order: 20370

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	0.142	0.05
Antimony	<0.01	0.01
Arsenic	0.036	0.005
Barium	<0.005	0.005
Beryllium	<0.005	0.005
Bismuth	<0.01	0.01
Boron	0.235	0.02
Cadmium	<0.005	0.005
Calcium	0.803	0.05
Chromium	<0.005	0.005
Cobalt	<0.005	0.005
Copper	<0.005	0.005
Iron	0.143	0.03
Lanthanum	<0.005	0.005
Lead	<0.005	0.005
Lithium	0.162	0.005
Magnesium	0.146	0.05
Manganese	0.007	0.005
Molybdenum	0.013	0.005
Nickel	<0.005	0.005
Palladium	<0.01	0.01
Phosphorus	0.030	0.02
Potassium	3.83	0.1
Selenium	<0.01	0.01
Silicon	27.4	0.05
Silver	<0.005	0.005
Sodium	123	0.2
Strontium	<0.005	0.005
Sulfur	17.0	0.02
Thallium	<0.01	0.01
Thorium	<0.01	0.01
Tin	<0.005	0.005
Titanium	<0.005	0.005
Tungsten	<0.01	0.01
Uranium	<0.1	0.1
Vanadium	0.006	0.005
Yttrium	<0.005	0.005
Zinc	0.089	0.005
Zirconium	<0.005	0.005

25 June 01
cont BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
3S408UFA1

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 06/11/01

Matrix: Liquid

Project No.: 20.01402.871

Lab System ID: 162635

Work Order: 20370

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	0.285	0.05
Antimony	<0.01	0.01
Arsenic	0.035	0.005
Barium	<0.005	0.005
Beryllium	<0.005	0.005
Bismuth	<0.01	0.01
Boron	0.236	0.02
Cadmium	<0.005	0.005
Calcium	0.914	0.05
Chromium	<0.005	0.005
Cobalt	<0.005	0.005
Copper	<0.005	0.005
Iron	0.301	0.03
Lanthanum	<0.005	0.005
Lead	<0.005	0.005
Lithium	0.166	0.005
Magnesium	0.215	0.05
Manganese	0.017	0.005
Molybdenum	0.013	0.005
Nickel	<0.005	0.005
Palladium	<0.01	0.01
Phosphorus	0.036	0.02
Potassium	3.95	0.1
Selenium	<0.01	0.01
Silicon	28.4	0.05
Silver	<0.005	0.005
Sodium	124	0.2
Strontium	<0.005	0.005
Sulfur	17.1	0.02
Thallium	<0.01	0.01
Thorium	<0.01	0.01
Tin	<0.005	0.005
Titanium	<0.005	0.005
Tungsten	<0.01	0.01
Uranium	<0.1	0.1
Vanadium	0.006	0.005
Yttrium	<0.005	0.005
Zinc	0.184	0.005
Zirconium	<0.005	0.005

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cont BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: 3S408UFA2

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 162636

Client: Division 20
Date Received: 06/11/01
Project No.: 20.01402.871
Work Order: 20370

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	0.277	0.05
Antimony	<0.01	0.01
Arsenic	0.035	0.005
Barium	<0.005	0.005
Beryllium	<0.005	0.005
Bismuth	<0.01	0.01
Boron	0.238	0.02
Cadmium	<0.005	0.005
Calcium	0.907	0.05
Chromium	<0.005	0.005
Cobalt	<0.005	0.005
Copper	<0.005	0.005
Iron	0.297	0.03
Lanthanum	<0.005	0.005
Lead	<0.005	0.005
Lithium	0.167	0.005
Magnesium	0.216	0.05
Manganese	0.016	0.005
Molybdenum	0.012	0.005
Nickel	<0.005	0.005
Palladium	<0.01	0.01
Phosphorus	0.037	0.02
Potassium	3.96	0.1
Selenium	<0.01	0.01
Silicon	28.6	0.05
Silver	<0.005	0.005
Sodium	125	0.2
Strontium	<0.005	0.005
Sulfur	17.3	0.02
Thallium	<0.01	0.01
Thorium	<0.01	0.01
Tin	<0.005	0.005
Titanium	<0.005	0.005
Tungsten	<0.01	0.01
Uranium	<0.1	0.1
Vanadium	0.006	0.005
Yttrium	<0.005	0.005
Zinc	0.185	0.005
Zirconium	<0.005	0.005

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cont BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: 3S500FA11

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 162637

Client: Division 20
Date Received: 06/11/01
Project No.: 20.01402.871
Work Order: 20370

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.05	0.05
Antimony	<0.01	0.01
Arsenic	0.038	0.005
Barium	<0.005	0.005
Beryllium	<0.005	0.005
Bismuth	<0.01	0.01
Boron	0.301	0.02
Cadmium	<0.005	0.005
Calcium	0.882	0.05
Chromium	<0.005	0.005
Cobalt	<0.005	0.005
Copper	<0.005	0.005
Iron	<0.03	0.03
Lanthanum	<0.005	0.005
Lead	<0.005	0.005
Lithium	0.262	0.005
Magnesium	0.102	0.05
Manganese	<0.005	0.005
Molybdenum	0.011	0.005
Nickel	<0.005	0.005
Palladium	<0.01	0.01
Phosphorus	0.037	0.02
Potassium	3.73	0.1
Selenium	<0.01	0.01
Silicon	23.2	0.05
Silver	<0.005	0.005
Sodium	148	0.2
Strontium	0.007	0.005
Sulfur	17.1	0.02
Thallium	<0.01	0.01
Thorium	<0.01	0.01
Tin	<0.005	0.005
Titanium	<0.005	0.005
Tungsten	<0.01	0.01
Uranium	<0.1	0.1
Vanadium	<0.005	0.005
Yttrium	<0.005	0.005
Zinc	<0.005	0.005
Zirconium	<0.005	0.005

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cont - BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
3S500FA12

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Liquid

Lab System ID: 162638

Client: Division 20

Date Received: 06/11/01

Project No.: 20.01402.871

Work Order: 20370

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.05	0.05
Antimony	<0.01	0.01
Arsenic	0.036	0.005
Barium	<0.005	0.005
Beryllium	<0.005	0.005
Bismuth	<0.01	0.01
Boron	0.301	0.02
Cadmium	<0.005	0.005
Calcium	0.884	0.05
Chromium	<0.005	0.005
Cobalt	<0.005	0.005
Copper	<0.005	0.005
Iron	<0.03	0.03
Lanthanum	<0.005	0.005
Lead	<0.005	0.005
Lithium	0.263	0.005
Magnesium	0.098	0.05
Manganese	<0.005	0.005
Molybdenum	0.011	0.005
Nickel	<0.005	0.005
Palladium	<0.01	0.01
Phosphorus	0.036	0.02
Potassium	3.75	0.1
Selenium	<0.01	0.01
Silicon	23.1	0.05
Silver	<0.005	0.005
Sodium	148	0.2
Strontium	0.007	0.005
Sulfur	17.1	0.02
Thallium	<0.01	0.01
Thorium	<0.01	0.01
Tin	<0.005	0.005
Titanium	<0.005	0.005
Tungsten	<0.01	0.01
Uranium	<0.1	0.1
Vanadium	<0.005	0.005
Yttrium	<0.005	0.005
Zinc	<0.005	0.005
Zirconium	<0.005	0.005

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cont BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
3S500UFA1

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Liquid

Lab System ID: 162639

Client: Division 20

Date Received: 06/11/01

Project No.: 20.01402.871

Work Order: 20370

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	0.082	0.05
Antimony	<0.01	0.01
Arsenic	0.037	0.005
Barium	<0.005	0.005
Beryllium	<0.005	0.005
Bismuth	<0.01	0.01
Boron	0.304	0.02
Cadmium	<0.005	0.005
Calcium	0.990	0.05
Chromium	<0.005	0.005
Cobalt	<0.005	0.005
Copper	<0.005	0.005
Iron	0.267	0.03
Lanthanum	<0.005	0.005
Lead	<0.005	0.005
Lithium	0.263	0.005
Magnesium	0.107	0.05
Manganese	0.006	0.005
Molybdenum	0.011	0.005
Nickel	<0.005	0.005
Palladium	<0.01	0.01
Phosphorus	0.037	0.02
Potassium	3.76	0.1
Selenium	<0.01	0.01
Silicon	23.4	0.05
Silver	<0.005	0.005
Sodium	148	0.2
Strontium	0.007	0.005
Sulfur	17.2	0.02
Thallium	<0.01	0.01
Thorium	<0.01	0.01
Tin	<0.005	0.005
Titanium	<0.005	0.005
Tungsten	<0.01	0.01
Uranium	<0.1	0.1
Vanadium	<0.005	0.005
Yttrium	<0.005	0.005
Zinc	0.244	0.005
Zirconium	<0.005	0.005

25 June 01
cont BAW

SOUTHWEST RESEARCH INSTITUTE
DUPLICATE SUMMARY

Sample ID
3S500UFA1

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 162639

Client: Division 20
Date Received: 06/11/01
Project No.: 20.01402.871
Work Order: 20370

Analysis	Sample Result (mg/L)	Duplicate Result (mg/L)	RPD
Aluminum	0.082	0.080	1.93%
Antimony	<0.01	<0.01	0.00%
Arsenic	0.037	0.037	1.47%
Barium	<0.005	<0.005	0.00%
Beryllium	<0.005	<0.005	0.00%
Bismuth	<0.01	<0.01	0.00%
Boron	0.304	0.297	2.21%
Cadmium	<0.005	<0.005	0.00%
Calcium	0.990	0.982	0.72%
Chromium	<0.005	<0.005	0.00%
Cobalt	<0.005	<0.005	0.00%
Copper	<0.005	<0.005	0.00%
Iron	0.267	0.269	0.79%
Lanthanum	<0.005	<0.005	0.00%
Lead	<0.005	<0.005	0.00%
Lithium	0.263	0.257	2.37%
Magnesium	0.107	0.108	0.59%
Manganese	0.006	0.006	5.50%
Molybdenum	0.011	0.011	2.36%
Nickel	<0.005	<0.005	0.00%
Palladium	<0.01	<0.01	0.00%
Phosphorus	0.037	0.031	16.77%
Potassium	3.76	3.64	3.20%
Selenium	<0.01	<0.01	0.00%
Silicon	23.4	22.8	2.52%
Silver	<0.005	<0.005	0.00%
Sodium	148	145	2.56%
Strontium	0.007	0.007	3.01%
Sulfur	17.2	16.9	1.88%
Thallium	<0.01	<0.01	0.00%
Thorium	<0.01	<0.01	0.00%
Tin	<0.005	<0.005	0.00%
Titanium	<0.005	<0.005	0.00%
Tungsten	<0.01	<0.01	0.00%
Uranium	<0.1	<0.1	0.00%
Vanadium	<0.005	<0.005	0.00%
Yttrium	<0.005	<0.005	0.00%
Zinc	0.244	0.285	15.24%
Zirconium	<0.005	<0.005	0.00%

25 June 01
cont BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
3S500UFA2

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 162640

Client: Division 20
Date Received: 06/11/01
Project No.: 20.01402.871
Work Order: 20370

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	0.100	0.05
Antimony	<0.01	0.01
Arsenic	0.037	0.005
Barium	<0.005	0.005
Beryllium	<0.005	0.005
Bismuth	<0.01	0.01
Boron	0.303	0.02
Cadmium	<0.005	0.005
Calcium	1.01	0.05
Chromium	<0.005	0.005
Cobalt	<0.005	0.005
Copper	<0.005	0.005
Iron	0.268	0.03
Lanthanum	<0.005	0.005
Lead	<0.005	0.005
Lithium	0.264	0.005
Magnesium	0.114	0.05
Manganese	0.006	0.005
Molybdenum	0.011	0.005
Nickel	<0.005	0.005
Palladium	<0.01	0.01
Phosphorus	0.026	0.02
Potassium	3.75	0.1
Selenium	<0.01	0.01
Silicon	23.4	0.05
Silver	<0.005	0.005
Sodium	148	0.2
Strontium	0.007	0.005
Sulfur	17.2	0.02
Thallium	<0.01	0.01
Thorium	<0.01	0.01
Tin	<0.005	0.005
Titanium	<0.005	0.005
Tungsten	<0.01	0.01
Uranium	<0.1	0.1
Vanadium	<0.005	0.005
Yttrium	<0.005	0.005
Zinc	0.245	0.005
Zirconium	<0.005	0.005

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cont BAW

SOUTHWEST RESEARCH INSTITUTE
MATRIX SPIKE SUMMARY

Sample ID: 3S500UFA2

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 06/11/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 162640
Work Order: 20370

Analysis	Sample Result (mg/L)	Spike Result (mg/L)	Spike Added (mg/L)	Recovery
Aluminum	0.100	2.18	2.00	104.0%
Antimony	<0.01	0.536	0.500	107.2%
Arsenic	0.037	2.25	2.00	110.4%
Barium	<0.005	2.02	2.00	100.9%
Beryllium	<0.005	0.052	0.050	104.6%
Bismuth	NA	NA	NA	NA
Boron	NA	NA	NA	NA
Cadmium	<0.005	0.054	0.050	107.3%
Calcium	1.01	21.5	20	102.4%
Chromium	<0.005	0.211	0.200	105.7%
Cobalt	<0.005	0.538	0.500	107.5%
Copper	<0.005	0.266	0.250	106.5%
Iron	0.268	1.25	1.00	98.6%
Lanthanum	NA	NA	NA	NA
Lead	<0.005	0.545	0.500	108.9%
Lithium	NA	NA	NA	NA
Magnesium	0.114	20.5	20	101.9%
Manganese	0.006	0.526	0.500	104.0%
Molybdenum	NA	NA	NA	NA
Nickel	<0.005	0.528	0.500	105.5%
Palladium	NA	NA	NA	NA
Phosphorus	NA	NA	NA	NA
Potassium	3.75	29.4	20	128.4%
Selenium	<0.01	2.19	2.00	109.4%
Silicon	NA	NA	NA	NA
Silver	<0.005	0.049	0.050	98.0%
Sodium	148	175	20	132.1%
Strontium	NA	NA	NA	NA
Sulfur	NA	NA	NA	NA
Thallium	<0.01	2.31	2.00	115.3%
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	<0.005	0.518	0.500	103.7%
Yttrium	NA	NA	NA	NA
Zinc	0.245	0.805	0.500	112.0%
Zirconium	NA	NA	NA	NA

NA- Not Applicable.

25 June 01
cont BAW

SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: LCSW

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: NA

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: NA
Work Order: 20370

Analysis	Sample Result (mg/L)	True Value (mg/L)	Recovery
Aluminum	1.94	2.00	97.2%
Antimony	0.507	0.500	101.4%
Arsenic	2.06	2.00	103.0%
Barium	2.02	2.00	101.0%
Beryllium	0.050	0.050	99.5%
Bismuth	NA	NA	NA
Boron	NA	NA	NA
Cadmium	0.051	0.050	101.2%
Calcium	19.7	20	98.4%
Chromium	0.200	0.200	100.0%
Cobalt	0.504	0.500	100.8%
Copper	0.249	0.250	99.5%
Iron	0.954	1.00	95.4%
Lanthanum	NA	NA	NA
Lead	0.510	0.500	102.0%
Lithium	NA	NA	NA
Magnesium	19.7	20	98.3%
Manganese	0.498	0.500	99.7%
Molybdenum	NA	NA	NA
Nickel	0.495	0.500	99.0%
Palladium	NA	NA	NA
Phosphorus	NA	NA	NA
Potassium	16.9	20	84.6%
Selenium	2.00	2.00	99.8%
Silicon	NA	NA	NA
Silver	0.050	0.050	100.0%
Sodium	17.9	20	89.4%
Strontium	NA	NA	NA
Sulfur	NA	NA	NA
Thallium	2.14	2.00	107.0%
Thorium	NA	NA	NA
Tin	NA	NA	NA
Titanium	NA	NA	NA
Tungsten	NA	NA	NA
Uranium	NA	NA	NA
Vanadium	0.502	0.500	100.3%
Yttrium	NA	NA	NA
Zinc	0.517	0.500	103.4%
Zirconium	NA	NA	NA

NA- Not Applicable.

25 June 01
sent BAW

SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID
PBW

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Liquid

Project No.: 20.01402.871

Lab System ID: NA

Work Order: 20370

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Aluminum	<0.05	0.05
Antimony	<0.01	0.01
Arsenic	<0.005	0.005
Barium	<0.005	0.005
Beryllium	<0.005	0.005
Bismuth	<0.01	0.01
Boron	<0.02	0.02
Cadmium	<0.005	0.005
Calcium	<0.05	0.05
Chromium	<0.005	0.005
Cobalt	<0.005	0.005
Copper	<0.005	0.005
Iron	<0.03	0.03
Lanthanum	<0.005	0.005
Lead	<0.005	0.005
Lithium	<0.005	0.005
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Molybdenum	<0.005	0.005
Nickel	<0.005	0.005
Palladium	<0.01	0.01
Phosphorus	<0.02	0.02
Potassium	<0.1	0.1
Selenium	<0.01	0.01
Silicon	<0.05	0.05
Silver	<0.005	0.005
Sodium	<0.2	0.2
Strontium	<0.005	0.005
Sulfur	<0.02	0.02
Thallium	<0.01	0.01
Thorium	<0.01	0.01
Tin	<0.005	0.005
Titanium	<0.005	0.005
Tungsten	<0.01	0.01
Uranium	<0.1	0.1
Vanadium	<0.005	0.005
Yttrium	<0.005	0.005
Zinc	<0.005	0.005
Zirconium	<0.005	0.005

16 June 2021
BAW

Potassium Standard Investigation- suspect problem with standard based on Alka's results. Standard target value was 0.1000M ± 0.0005M KCl.

$\left(\frac{0.1\ mol\ K}{L}\right)\left(\frac{39.098\ g\ K}{1\ mol\ K}\right)\left(\frac{10^3\ mg}{g}\right) = 3910\ mg/L$ or ppm K

Curve DATA Made from suspect standard

reagents: nanopure water
0.1M K^+ std: Orion 921906, lot EZ1, rec 1/01, 475 mL
K ISA (ion strength adjuster): Orion 931911, lot EV1, rec 1/01, 475 mL use 2mL per 100mL of sample/std.

Target conc K^+ (ppm)	Vol (mL) of 0.1M K^+	Vol (mL) of nanopure	Vol (mL) of K ISA soln
782	5	20	0.5
1564	10	15	0.5
3910	25	0	0.5

SAMPLE DATA Soln of KCl prepared from solid KCl to compare against curve made from suspect standard

Weighed 0.2015g of KCl (Fisher P217-500, lot 006242; using an Mettler AE240 electronic balance) into a 100mL volumetric flask and diluted to mark with nanopure water.

conc of soln:

$\frac{0.2015\ g\ KCl\left(\frac{39.098\ g\ K}{74.56\ g\ KCl}\right)\left(\frac{10^3\ mg}{g}\right)}{0.1\ L} = 1057\ mg/L$ or ppm

26 June 2001 cont BAW

Analyzed with a potassium ion selective electrode (Cole Parmer cat # 27502) attached to an Orion model 920A (serial # 039518)

Calibrated suspect std- 782, 1561, + 3910 ppm K^+
slope = 55.9

Target ppm of Sample	Measured ppm of Sample	% Diff from 1057 ppm
1057	1439	36.1

Analysis by AA of suspect standard:

Soln prep, Cal Curve from good std.
reagents: nanopure water
1000 ppm K: Spex Certiprep cat # PLK2-2X, lot # 7-95K, rec 1/31/01, opened 3/1/01.

K Stock at 10 ppm K
Added 1 mL of 1000 ppm K (with a vol. pipet) to a 100 mL vol. flask and diluted to mark with nanopure water.

All final volumes were 50 mL (volumetric flasks)
Volumetric pipets were used to transfer all solutions in the 0.5 mL to 25 mL volume range
% LaCl is w/w

Potassium calibration curve

Soln ID	Target Conc of k (ppm)	Target Conc of LaCl (%)	Vol (mL) of K Stock (463-34) (10 ppm K)	Vol (ml) of 463/001 (1% LaCl)
K1*	2	0.1	10	5
K2	1	0.1	5	5
K4	0.4	0.1	2	5
K6	0.1	0.1	0.5	5

* AA sensitivity check

26 June 2001 cont BAW

AA sample prep from suspect std of 3910 ppm K

2 Step dilution to 3.91 ppm (total DF 1000)

DF 50 by adding 2 mL (vol pipet) of 3910 ppm K^+ (Orion 921906) to a 100 mL vol flask and diluting to mark with nanopure water. This yielded a 78.2 ppm K soln.
DF 20 by adding 5 mL (vol pipet) of 78.2 ppm (DF 50 above) to a 100 mL vol flask and diluting to mark with nanopure water. This yield a 3.91 ppm K soln.

Two sample were prepared for AA analysis from the above 3.91 ppm K soln

DF 2 by adding 5 mL of 3.91 ppm K and 1 mL of 1% LaCl (463/34) to a 10 mL vol flask and diluting to mark with nanopure water. This yields a 1.955 ppm K soln. (total DF from 3910 is 2000 fold)
DF 10 by adding 1 mL of 3.91 ppm K and 1 mL of 1% LaCl (463/34) to a 10 mL vol flask and diluting to mark with nanopure water. This yields a 0.391 ppm K soln (total DF from 3910 ppm is 10,000 fold)

AA analysis of suspect Orion 0.1M std.

Perkin Elmer 3100 Atomic Absorption Spectrophotometer
K Hollow Cathode lamp - 8 mA Fisher 14-386-106H
λ = 766.5 nm, slit = 0.7 nm, high, air-acetylene flame
Blank = 0.1% La (w/w) 309/190
Integration time for samples = 3 sec.

26 June 2001 cont BAW

Absorbance Values of Standards (463/34)

ID	Conc (ppm)	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
K1	2	0,185	0,184	0,184	0,182	0,183
K2	1	0,091	0,091	0,090	0,090	0,091
K4	0,4	0,036	0,038	0,037	0,038	0,036
K6	0,1	0,009	0,009	0,009	0,008	0,009

Absorbance values of Samples Corion 463/35)

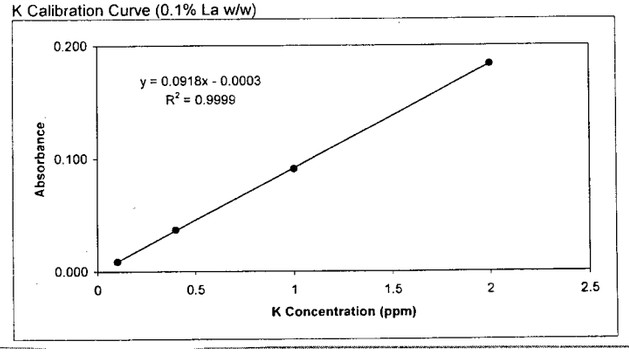
ID	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
3910DF2000	0,119	0,116	0,119	0,119	0,118
3910DF10,000	0,017	0,017	0,018	0,019	0,018
K2	0,091	0,093	0,092	0,092	0,092

Correction for AA (none) - Flux (1 out of 10 readings dropped 0,008).

K Standard Data (0.1% La w/w)

Solution ID	Ca Std (ppm)	Absorbance Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Average Absorbance
K1	2	0.185	0.184	0.184	0.182	0.183	0.1836
K2	1	0.091	0.091	0.090	0.090	0.091	0.0906
K4	0.4	0.036	0.038	0.037	0.038	0.036	0.0370
K6	0.1	0.009	0.009	0.009	0.008	0.009	0.0088

K Calibration Curve (0.1% La w/w)



26 June 01 cont BAW

K Sample Data

Solution ID	Absorbance Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Average Absorbance
3910ppm/DF2000	0.119	0.116	0.119	0.119	0.118	0.1182
3910ppm/DF10000	0.017	0.017	0.018	0.019	0.018	0.0178

Solution ID	Measured conc of diluted solution (ppm)	AA conc for solution (ppm)	ppm % Difference of measured vs stated
3910ppm/DF2000	1.2908	2582	34.0
3910ppm/DF10000	0.1972	1972	49.6

Orion states concentration at 1.000M +/- 0.0005M (3910ppm +/- 20ppm)

The AA method reveals that the Orion std concentration is lower than the stated value.

Method	Percentage Orion Std ppm is low
AA	34,0
ISE*	36,1

*ISE data from 463/34

The Orion std was taken to Dr. Ol (SWRI) for ICP analysis (see 463/16). Still waiting for results. The same orion std (different lot) was ordered. We intend to analysis the old lot std vs the new lot std.

26 June 2001 BAW

29 June 01
BAW

collection/filtering of uranophane samples for XRD analysis.
Equipment:
Clamping filter, Filter paper (Metricel membrane filter product # 63069, lot 1050807, GN-6, 47mm, 0.45 um), Filter flask, vacuum pump

Samples: URSA 5C, 6A, 6C, 7A, 7C

Swirled sample and poored into filter. Rinsed sample container thoroughly and transfered to filter. Removed top part of filter and carefully rinsed w/ nanopure water into filter. Aspirated for a while. Turned off vacuum. Carefully removed filter paper with tweezers and placed into a petri dish. Covered with a watch glass and allowed to air dry.

29 June 01
BAW

02 July 01
BAW

Divol results of Orion Std 921906, lot EZ1/0.1M K+

Attached are the divion 01 results for sample KStd (see 463/16). These results indicate that the Orion std concentration is lower than the manufacturer stated value on the label (0.1000M or 3910ppm).

$$\%\,low = \frac{3910 - 2621}{3910} = 32.97\%$$

This value is similar to values produced by AA and ISE analyses (463/37)

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Water
Work Order: 20459

Client: Division 20
Date Received: 06/25/01
Project No.: 20.01402.871

Sample ID	Lab System ID	Potassium Result (mg/L)
Prep Blank	----	<0.2
Lab Control	----	19.2
True Value	----	20.0
Recovery	----	96.0%
KSTD	163536	2621
Duplicate result	163536	2627
RPD	163536	0.23%
Spike result	163536	4663
Spike added	163536	2000
Recovery	163536	102.1%

Reporting Limit: 0.2 mg/L

23July2001 BAW

Transfer of Uranophane Samples to Div 18 for XRD analysis

The filtered and air dried samples (463/38) were transferred into ~15 mL bottles and taken to Jim Spencer. The 5 samples were labeled as follows: URSA5C
URSA6C
URSA6A
URSA7A
URSA7C
Each had cation-radioactive labels on the bottle.

26July01 BAW

Preparation of Lanthanum Solutions for AA analysis

Soln A - 1% La (w/w)

$$\frac{26.735\text{g } LaCl_3\cdot 7H_2O \left(\frac{138.9\text{g La}}{371.374\text{g } LaCl_3\cdot 7H_2O}\right)}{(990\text{g } H_2O + 10\text{g La})} \times 100$$

yields 1.0000% (w/w) La

reagents: Lanthanum chloride ($LaCl_3\cdot 7H_2O$) Fisher catalog # L9-250, lot # 985153A
nanopure water

Added about 100 mL of nanopure water to a tared 1000 mL pp beaker (Mettler ~~AE 4-1815~~ 7/6/01 PM4600). Recorded mass. Then added 26.74g $LaCl_3\cdot 7H_2O$. Added water until 1000g total reached.

Mass (g) of tared bottle + 100 mL H_2O	Mass (g) with $LaCl_3\cdot 7H_2O$ added	Final Mass (g)
103.65	130.39	1000.0

06Jul01 cont BAW

Soln B - 0.1% La (w/w)

Added 100 mL (grad cylinder) of 1% La (463/40)-Soln A to a 1000 mL polypropylene bottle. Added 900 mL (grad cylinder) of nanopure water.

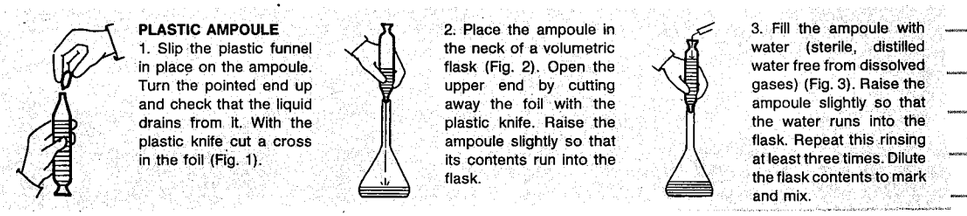
10Jul2001 BAW

Soln Base - at 0.1N NaOH

reagents - nanopure water
- Dilut-it 4687-01 (JT Baker lot H33121)

instructions 2/18/02 BAW

Followed ~~instructions~~ on box (see below) using a 1000 mL vol. flask.



PLASTIC AMPOULE
1. Slip the plastic funnel in place on the ampoule. Turn the pointed end up and check that the liquid drains from it. With the plastic knife cut a cross in the foil (Fig. 1).

2. Place the ampoule in the neck of a volumetric flask (Fig. 2). Open the upper end by cutting away the foil with the plastic knife. Raise the ampoule slightly so that its contents run into the flask.

3. Fill the ampoule with water (sterile, distilled water free from dissolved gases) (Fig. 3). Raise the ampoule slightly so that the water runs into the flask. Repeat this rinsing at least three times. Dilute the flask contents to mark and mix.

Labeled flask - Soln Base

10 Jul 2001 BAW

1 July 2001
BAW

Various calcite solutions in equilibrium with atmospheric PCO_2.

Calculated additions of calcium perchlorate, sodium perchlorate, and sodium hydroxide will be used to bring the solution chemistry close to equilibrium conditions. Solid calcite (30 g) will be added to each solution (final volume at two liters) and air will be bubbled to ensure equilibrium with atmosphere. Table 1 contains target reagent amounts for the various solutions.

Table 1. Target (calculated) amounts of reagents for calcite solutions.

Soln ID	Target pH Of solution	Mass of Calcite (g)	Mass of NaClO4 (g)	Mass of 0.1 NaOH (g)	Amount of $Ca(ClO_4)_2$ $4H_2O$
Soln A	7.25	30	2.3949	4.40	408.51 g
Soln B	7.50	30	2.3827	5.40	86.70 g
Soln C	7.75	30	24.3656	10.00	27.50 g
Soln D	8.00	30	24.2921	16.00	8.18 g
Soln E	8.25	30	24.1697	26.00	2.545 g
Soln F	8.50	30	24.3656	42.00	0.815 mL
Soln G	8.75	30	24.3656	96.00	0.270 mL
Soln H	9.00	30	24.3656	184.00	0.096 mL

Reagents: Sodium perchlorate (anhydrous): Mallinckrodt catalog # 1190, lot # KTKJ
dried at 46°C for over 3 hours
1.01M Ca from Calcium perchlorate solution 309/258Ca
0.1M Sodium hydroxide solution labeled Soln Base (463/41)
Calcite (Fisher Scientific cat # C64-500, lot # 986396, opened 7/11/2001
Nanopure water

The appropriate amount of sodium perchlorate was weighed (Mettler AE 240) in a weighing boat and transferred to a 600mL beaker. The weighing boat was rinsed with nanopure water several times to ensure complete transfer of the sodium perchlorate into the beaker. The beaker with sodium perchlorate was placed on the Mettler PM4600 balance and tared to zero. Next, the appropriate amount of sodium hydroxide was added by weight (Mettler PM4600). Then the appropriate amount of calcium perchlorate was added. For solutions Soln A - E, the solution was tared to zero (Mettler PM4600) and the calcium perchlorate was added by weight. For solutions Soln F - H, the calcium perchlorate was added by volume (micropipette). Table 2 contains actual reagent amounts for the various solutions.The solution in the 600mL beaker was transferred to a 2L volumetric flask and diluted to mark with nanopure water. This 2L solution was transferred to a 2L polycarbonate container that contained 30g of calcite (see tables for ID of calcite containers). Gas bubblers were inserted into each container to ensure equilibrium with atmosphere.

11 July 2001
cont BAW

Table 2. Actual amounts of reagents used for calcite solutions.

Soln ID	Target pH Of solution	Mass of Calcite (g)	Mass of NaClO4 (g)	Mass of 0.1 NaOH (g)	Amount of $Ca(ClO_4)_2$ $4H_2O$
Soln A	7.25	30.00	2.3947	4.49	408.50g
Soln B	7.50	30.00	2.3831	5.41	86.69g
Soln C	7.75	30.00	24.3637	10.00	27.51g
Soln D	8.00	30.00	24.2941	16.01	8.45g
Soln E	8.25	30.00	24.1713	26.92	2.58
Soln F	8.50	30.00	24.3680	42.01	0.815mL
Soln G	8.75	30.00	24.3676	96.01	0.270mL
Soln H	9.00	30.00	24.3650	184.00	0.096mL

Soln A 7.25 30.00

Soln A redone with new $Ca(ClO_4)_2 \cdot 4H_2O$ soln. Not enough of 309/258 Ca for all solutions.

Soln CaP - calcium perchlorate at 1.0M

$$\frac{184.6\text{ g } Ca(ClO_4)_2 \cdot 4H_2O}{0.6\text{ L}} \left(\frac{1\text{ mol Ca}}{311.04\text{ g } Ca(ClO_4)_2 \cdot 4H_2O}\right) = 0.9999\text{M Ca}$$

reagents $Ca(ClO_4)_2 \cdot 4H_2O$ - Aldrich 401420, lot # 08524MI, rec 4/9/01, opened 4/23/01
nanopure water

Approximately 300mL of nanopure water was added to a

7/11/2001
BAW

(July 2001 cnt BAW)

Soln CaP - calcium perchlorate at 1.0 M

$$\frac{62.21\ g\ Ca(ClO_4)_2\cdot 4H_2O}{0.2\ L}\left(\frac{1\ mol\ Ca}{311.04\ g\ Ca(ClO_4)_2\cdot 4H_2O}\right) = 1.000\ M\ Ca$$

reagents $Ca(ClO_4)_2\cdot 4H_2O$ - Aldrich cat# 401420, lot# 08524 MI, rec 4/4/01, open 4/23/01
nanopure water

Approximately 100 mL of nanopure water was added to a 250 mL beaker (pp) + tared. Added 62.23 g of $Ca(ClO_4)_2\cdot 4H_2O$. Transfered soln to a 200 mL vol flask and diluted to mark with nanopure water. Solns B-H were made with this Soln CaP. Soln A was made with 309/258 Ca.

(7 July 01 BAW)

Reanalysis of Uranophane by XRD

Crushed samples URSA 7A and URSA 7C (463/40) in a mortar + pestal. Request XRD sample time be doubled from previous analysis.

Sample crushing procedure
Each sample crushed separated. In a fume hood, transfered sample from 15 mL bottle into mortar. Carefully crushed to a fine powder. Transfered sample back to 15 mL bottle. Cleaned mortar + pestal with a wet chemwipe. Disposed of chemwipe into radioactive waste container. Rinsed mortar + pestal with nanopure water. Dried and repeated procedure for second sample. Delivered samples to Jim Spencer (div 18) for XRD analysis

labeled URSA 7A#2 and URSA 7C#2

7/31/2001 BAW

pH Analysis of Calcite Solns

Calcite solns A-H (463/43)
pH meter orion 920A serial# 039522
orion 810s combo electrode 3C with ATC probe
Calibrated with
pH5 (7-27-01) Fisher cat# SB102-500, lot# 012430-24
pH9 (7-27-01) Fisher cat# SB114-500, lot# 007377-24
Cal temp at 20.3°C, cal set pts 5.00 and 9.02

Slope of cal curve @ 99.9%

Challenged with
pH7 (7-27-01) Fisher cat# SB108-500, lot# 000749-24

Soln ID	pH measurement
pH 7	7.06
soln A	7.13
soln B	7.44
soln C	7.68
soln D	7.93
soln E	8.17
soln F	8.39
soln G	8.70
soln H	9.00
pH 7	7.05

10 mL aliquot removed with 10 mL disposable extend pipette and place in 10 mL disposable microbeaker w/ stirring bar.

7/31/2001 BAW

2 Aug 2001 BAW

Prep of Calcite Solutions for ICP Analysis

Calcite solns A-H (463/43)
nanopure water
1000ppm Calcium - Spex Certiprep cat# PLCA2-2X, lot# 7-114CA in 2% HNO_3
conc HNO_3 - Fisher trace metal grade cat# A509-212, lot# 1100040
Filters - Microgon Inc Dyna Gard filter cat# DG2M-330-10 lot# 75-66A
20 30mL Syringe - Becton Dickinson ~~cat# 309650~~ BW 8/2/01 BW 8/2/01

Eight samples, 3 duplicates, and 1 QA sample was prepared.

Aliquots of sample were removed with the 20 30mL syringe w/ filter BW 8/2/01. The filter was removed. The aliquot was transfered to a 30mL polypropylene bottle.

Sample ID	Soln ID (463/43)	Vol (mL) of Soln	Vol (µl) of conc HNO_3*
PA3	Soln A	20	50
PB1	Soln B		
PC1	Soln C		
PD1	Soln D		
PE2	Soln E		
PF1	Soln F		
PG1	Soln G		
PH2	Soln H		
SA3	Soln A		
SE2	Soln E		
SH2	Soln H		

*50 microliters of conc HNO_3 added to preserve sample

2 Aug 2001 cont BAW

QA sample preparation

Added 3mL (vol pipette) of 1000ppm Ca into a 25mL vol flask and diluted to mark with nanopure water. Labeled QA3

8 Aug 2001 BAW

Preparation of ~~Al~~ BW 8/8/01 Neptunium/Calcite test tubes

Calcite: (309/14651) prepared for last series of NpCa experiments: stored in dessicator; dried in oven at 50°C for before this usage.
Solns A to H (463/43)
Electronic balance: Mettler AE240

72 polycarbonate test tubes with drilled holes in the caps were appropriately labeled (see following tables). The NPCA label prefix used on all test tubes represented neptunium/calcite. Three different calcite masses were used: NPCA4 series (0.1g), NPCA5 series (0.18g), and NPCA6 series (0.28g). Eight different pH solns were used: A (7.25), B (7.50), C (7.75), D (8.00), E (8.25), F (8.50), G (8.75), and H (9.00). Each test was prepared in triplicate as represented by the suffix 1, 2, or 3.

A 30mL glass beaker (spout directed to the right) was used to stabilize the test tubes on the balance. The test tubes were tilted to the right. Calcite for NPCA6 series (0.28g) was added to the test tubes by a 1/8 tsp scoop. Calcite for NPCA5 series (0.18g) was added to the test tubes by a small vial cap. Calcite for NPCA4 series (0.10g) was added to a tared weighing dish, with a spatula. The weigh dish was "coated" with calcite before this was done. 0.10g aliquots were transfered from the weighing dish to the appropriate test tube

Aug 2001 cont BAW

Date Measured →	8/8/2001	8/9/2001	8/10/2001
Test Tube ID	Mass (g) of test tube	Mass (g) of test tube + calcite	Mass (g) of test tube + calcite + solution
NPCA4A1	22.1100	22.2084	52.1921
NPCA4A2	22.0391	22.1374	52.4291
NPCA4A3	22.1327	22.2323	52.6397
NPCA5A1	22.2531	22.4674	52.8124
NPCA5A2	21.8936	22.1074	52.3755
NPCA5A3	22.0819	22.2985	52.6382
NPCA6A1	21.8913	22.3245	52.5791
NPCA6A2	22.1357	22.5419	52.6680
NPCA6A3	22.1188	22.5338	52.7753
NPCA4B1	21.9027	22.0024	51.3930
NPCA4B2	22.3413	22.4404	52.2695
NPCA4B3	22.0946	22.1966	51.7835
NPCA5B1	22.3656	22.6027	53.1378
NPCA5B2	22.1866	22.3999	52.0268
NPCA5B3	22.0564	22.2946	51.7615
NPCA6B1	22.0939	22.5305	53.2623
NPCA6B2	22.0440	22.4855	51.6895
NPCA6B3	21.9279	22.3777	52.5224
NPCA4C1	21.9985	22.0987	51.1039
NPCA4C2	22.1017	22.2027	52.0066
NPCA4C3	22.2135	22.3134	52.1574
NPCA5C1	22.0348	22.2397	52.1342
NPCA5C2	22.1454	22.3756	51.4493
NPCA5C3	22.1542	22.3550	51.9183

8 Aug 2001 cont BAW

Date Measured →	8/8/2001	8/9/2001	8/10/2001
Test Tube ID	Mass (g) of test tube	Mass (g) of test tube + calcite	Mass (g) of test tube + calcite + solution
NPCA6C1	21.9402	22.3732	plus 8/10/01 51.7336
NPCA6C2	22.0393	22.5058	52.3070
NPCA6C3	22.1098	22.5468	51.7828
NPCA4D1	22.0843	22.1803	51.7060
NPCA4D2	22.1078	22.2073	52.5733
NPCA4D3	22.0885	22.1896	52.1353
NPCA5D1	22.1709	22.3636	52.1988
NPCA5D2	22.3674	22.6034	52.3095
NPCA5D3	22.3099	22.5125	52.3634
NPCA6D1	22.1209	22.5734	52.3047
NPCA6D2	22.0571	22.5278	52.2248
NPCA6D3	22.0728	22.4980	50.6714
NPCA4E1	22.1121	22.2126	52.5119
NPCA4E2	22.1029	22.2037	51.9759
NPCA4E3	22.0903	22.1920	51.3891
NPCA5E1	22.2202	22.4450	52.5099
NPCA5E2	22.1441	22.3753	52.0653
NPCA5E3	21.9996	22.2054	52.2164
NPCA6E1	22.1340	22.5852	52.1971
NPCA6E2	22.1621	22.5946	52.3831
NPCA6E3	21.9938	22.4648	51.8862
NPCA4F1	22.0659	22.1681	51.9417
NPCA4F2	22.0804	22.1798	51.8878
NPCA4F3	22.1435	22.2478	51.7803

5 Aug 2001
, ont BAW

Date Measured →	8/8/2001	8/9/2001	8/10/2001
Test Tube ID	Mass (g) of test tube	Mass (g) of test tube + calcite	Mass (g) of test tube + calcite + solution
NPCA5F1	22.1563	22.3755	51.8414
NPCA5F2	21.9538	22.1442	51.9830
NPCA5F3	22.0774	22.2931	51.8886
NPCA6F1	22.0154	22.4914	51.9792
NPCA6F2	22.0127	22.5098	52.1622
NPCA6F3	22.1570	22.5962	52.1194
NPCA4G1	22.0870	22.1886	51.3062
NPCA4G2	22.1084	22.2102	52.1930
NPCA4G3	21.9803	22.0830	51.4209
NPCA5G1	22.0876	22.3040	52.0262
NPCA5G2	22.4243	22.6440	52.1721
NPCA5G3	22.2015	22.4167	52.0102
NPCA6G1	22.0422	22.4710	51.4465
NPCA6G2	22.0574	22.4651	51.8141
NPCA6G3	22.0946	22.5312	51.6558
NPCA4H1	22.1312	22.2313	51.8295
NPCA4H2	22.4190	22.5202	53.1612
NPCA4H3	21.9069	22.0088	51.9724
NPCA5H1	22.0616	22.3072	52.0634
NPCA5H2	22.1646	22.3649	52.2396
NPCA5H3	22.2763	22.4875	52.2413
NPCA6H1	22.1989	22.6489	52.1569
NPCA6H2	22.1513	22.5532	52.5820
NPCA6H3	22.0566	22.4924	52.3045

6/11/2001 BAW

Preparation/Transfer of water samples to Div 01 (SWRI) for major + minor element analysis by ICP.

Samples from Nye County Early Warning Drilling Program.

There were six original samples in 1 L polypropylene bottles. Duplicates were given to div 01 for analysis so a total of 12 samples for analysis were generated in 30mL polypropylene bottles

Sample 1 used to generate 355004FA1 and 355004FA2
Sample was refrigerated (stored). From well NC-EWDP-3S, deep zone, 500-ft, unfiltered, acidified collected 15 Nov 99 by Paul Bertetti.

Sample 2 used to generate 354084FA1 and 354084FA2
Sample was stored in a refridgerator. Water from well NC-EWDP-3S, middle zone, 408 ft, unfiltered, acidified, collected 15 Nov 99 by Paul Bertetti.

(miscommunication from 8/1/01 ↓ entry made by BAW on 463/13; pages were skipped in error.)

6/12/2001 BAW

10 Aug 2001 BAW

Continuation of preparation of test tube solutions From 8 Aug 2001 (463/47)

240 mL of each solution (A-H) was removed from the 2L containers (463/43). A 30 mL syringe was used to collect 30 mL aliquots. A syringe filter (Micrologen Dynagard catalog number D62M-330-100, lot # 75-66A) was attached to the syringe and the soln was dispensed into the appropriate test tube.

Check of Calcite 309/14651 dryness - (~2g (calcite)

Mass (g) crucible + Calcite before drying	Mass (g) after 3 hrs at 50°C	Mass (g) after 23 hrs at 50°C
20.9319	20.9302	20.9309

8/13/2001 BAW

Neptunium spiking of test tube calcite solutions

Calcite test tube solns (463/48-50)
pH meter orion 920A serial # 039522
orion 8103 combo electrode 3C with ATC probe
Calibrated with
pH 7 (8-13-01) Fisher cat# SB108-500, lot# 000749-24
pH 9 (8-13-01) Fisher cat# SB114-500, lot# 007577-24
Cal temp at 21.2°C, cal set pts 7.04, 9.04

Slope of cal curve = ~~100.5%~~ BAW 8/13/01 98.0%

Sampling of 72 tubes partial - designed to test pH of series (4, 5, +6) and solns (A to H).

pH 7 value at 7.04 setpt after analysis was at 7.06

Mettler AE240 balance used for mass readings. 30mL beaker had spout to the right and test tubes were tilted to the right.

Neptunium spike solution was stock soln # 46A, 118 ppm ^{237}Np - 8.307 dpm/g soln = 18400 dpm/g - 29 Nov 99. Spike amt was 100 µL.
Base spike solution was 0.321 N NaOH (309/259) 4/16/01. Spike amt was 110 µL

The solutions (test tubes) were all vortexed before neptunium and base spikes were added. Neptunium was added first. Test tube solutions were re weighed.
Test tubes were placed in racks on a shaker-gyrator and continuously shaken.

8/13/2001 cont BAW

Date Measured →	8-13-2001	8-13-2001	8-13-2001	8-13-2001
Test Tube ID	pH	Mass (g) before neptunium spike	Mass (g) after neptunium spike	Mass (g) after base spike
NPCA4A1	7.14	51.9765	52.0753	52.1856
NPCA4A2	—	52.2309	52.3284	52.4382
NPCA4A3	—	52.4270	52.5239	52.6347
NPCA5A1	—	52.6160	52.7137	52.8248
NPCA5A2	7.14	52.1551	52.2522	52.3625
NPCA5A3	—	52.4474	52.5450	52.6553
NPCA6A1	—	52.3836	52.4807	52.5910
NPCA6A2	—	52.4779	52.5749	52.6841
NPCA6A3	7.11	52.5889	52.6877	52.7981
NPCA4B1	—	51.1870	51.2846	51.3948
NPCA4B2	7.52	52.0627	52.1603	52.2708
NPCA4B3	—	51.5856	51.6828	51.7909
NPCA5B1	—	52.9397	53.0373	53.1467
NPCA5B2	—	51.8328	51.9297	52.0400
NPCA5B3	7.58	51.5605	51.6576	51.7674
NPCA6B1	7.56	53.0783	53.1758	53.2858
NPCA6B2	—	51.5020	51.5996	51.7097
NPCA6B3	—	52.3233	52.4207	52.5312
NPCA4C1	—	50.9157	51.0141	51.1254
NPCA4C2	—	51.8163	51.9137	52.0226
NPCA4C3	7.76	51.9537	52.0519	52.1656
NPCA5C1	7.73	51.9205	52.0180	52.1278
NPCA5C2	—	51.7556	51.8528	51.9636
NPCA5C3	—	51.7293	51.8274	51.9378

8/13/2001
cont BAW

Date Measured →	8-13-2001	8-13-2001	8-13-2001	8-13-2001
Test Tube ID	pH	Mass (g) before neptunium spike	Mass (g) after neptunium spike	Mass (g) after base spike
NPCA6C1	—	51.5380	51.6349	51.8119
NPCA6C2	7.72	52.1060	52.2038	52.3137
NPCA6C3	—	51.6044	51.7016	51.7447
NPCA4D1	7.98	51.5015	51.6000	51.7093
NPCA4D2	—	52.3781	52.4759	52.5851
NPCA4D3	—	51.9410	52.0393	52.1514
NPCA5D1	—	52.0066	52.1040	52.2132
NPCA5D2	7.94	52.0899	52.1872	52.2963
NPCA5D3	—	52.1754	52.2736	52.3833
NPCA6D1	—	52.1141	52.2118	52.3214
NPCA6D2	—	52.0405	52.1384	52.2484
NPCA6D3	7.94	50.4774	50.5748	50.6849
NPCA4E1	—	52.3229	52.4215	52.5308
NPCA4E2	8.31	51.7710	51.8698	51.9793
NPCA4E3	—	51.1953	51.2938	51.4066
NPCA5E1	—	52.2667	52.3639	52.4759
NPCA5E2	—	51.8661	51.9641	52.0746
NPCA5E3	8.31	52.0093	52.1069	52.2177
NPCA6E1	8.25	51.9963	52.0943	52.2039
NPCA6E2	—	52.1964	52.2941	52.4033
NPCA6E3	—	51.7113	51.8094	51.9200
NPCA4F1	—	51.7581	51.8574	51.9661
NPCA4F2	—	51.6937	51.7924	51.9006
NPCA4F3	8.46	51.5670	51.6659	51.7771

8/13/2001
cont BAW

Date Measured →	8-13-2001	8-13-2001	8-13-2001	8-13-2001
Test Tube ID	pH	Mass (g) before neptunium spike	Mass (g) after neptunium spike	Mass (g) after base spike
NPCA5F1	8.40	51.6196	51.7173	51.8285
NPCA5F2	—	51.7767	51.8743	51.9767
NPCA5F3	—	51.6955	51.7939	51.9032
NPCA6F1	—	51.7948	51.8933	51.9794
NPCA6F2	8.40	51.9679	52.0656	52.1654
NPCA6F3	—	51.9468	52.0450	52.1574
NPCA4G1	8.71	51.1109	51.2095	51.3184
NPCA4G2	—	52.0147	52.1141	52.2228
NPCA4G3	—	51.2412	51.3400	51.4446
NPCA5G1	—	51.8431	51.9406	52.0508
NPCA5G2	8.68	51.9757	52.0742	52.1877
NPCA5G3	—	51.8353	51.9341	52.0475
NPCA6G1	—	51.2490	51.3478	51.4610
NPCA6G2	—	51.6315	51.7300	51.8430
NPCA6G3	8.68	51.4647	51.5632	51.6759
NPCA4H1	—	51.6482	51.7480	51.8564
NPCA4H2	9.05	52.9268	53.0258	53.1337
NPCA4H3	—	51.7645	51.8636	51.9725
NPCA5H1	—	51.8784	51.9760	52.0884
NPCA5H2	—	52.0630	52.1622	52.2747
NPCA5H3	8.94	52.0488	52.1479	52.2613
NPCA6H1	8.99	51.9530	52.0523	52.1641
NPCA6H2	—	52.4082	52.5074	52.6225
NPCA6H3	—	52.1239	52.2223	52.3364

8-14/2001 BAW

Vortexing Np/Cq test tube solutions

Each of the 72 test tubes were vortexed in order to ensure thorough mixing. Paraffin was placed over the hole in the cap to prevent solution from escaping. If droplets were on the paraffin after vortexing, it was disposed of in the "rad waste box. A new piece of paraffin was used for the next test tube.

8-16-2001 BAW

LSA + pH analysis of Np/Cq test tube solns

Calcite test tube solns (463/53-55)
0.1N HNO_3 - (309/254) 27 Jun 01 PB diluted 1/10
pH meter orion 920A serial # ~~039522~~ 039522 BAW 2-18-02
orion 8103 combination electrode 3C w/ ATC probe
Calibrated with
pH 7 (8-13-01) Fisher SB108-500, lot# 000749-24
pH 9 (8-13-01) Fisher SB114-500, lot# 007377-24
Cal temp 21.6°C cal set pts 7.03, 9.04
Slope of cal curve 98.1
pH 7 (setpt 7.03) after analysis measured at 7.04
Mettler AE240 balance
30mL beaker (spout to right) holder. Test tubes tilted to the right.

LSA samples done in duplicate (lower case a/b)
Test tubes weighed. LSA vials labeled, 0.5mL 0.1N HNO_3 added, and weighed. Test tubes swirled. 0.5mL samples added to LSA vials. LSA vials reweighed. pH measured from test tubes. Test tube reweighed.

8-16-01 BAW

8-16-2001 cont BAW

Date Measured →	8-16-2001	8-16-2001
Test Tube ID	Mass (g) of Vial and HNO3	Mass (g) after adding sample
NpCA5E1a	7.6547	8.1481
NpCA5E1b	7.6764	8.1695
NpCA5F1a	7.6575	8.1492
NpCA5F1b	7.6918	8.1838
NpCA5G1a	7.6335	8.1267
NpCA5G1b	7.6343	8.1277
NpCA5H1a	7.6128	8.1052
NpCA5H1b	7.6407	8.1262
NpCA6A1a	7.7952	8.2982
NpCA6A1b	7.5533	8.0571
NpCA6B1a	7.6026	8.0936
NpCA6B1b	7.6267	8.1183
NpCA6C1a	7.5933	8.0877
NpCA6C1b	7.5925	8.0860
NpCA6D1a	7.6093	8.1018
NpCA6D1b	7.6817	8.1737
NpCA6E1a	7.7360	8.2287
NpCA6E1b	7.6544	8.1473
NpCA6F1a	7.6709	8.1646
NpCA6F1b	7.6532	8.1459
NpCA6G1a	7.7518	8.2436
NpCA6G1b	7.6593	8.1492
NpCA6H1a	7.6939	8.1868
NpCA6H1b	7.7591	8.2493

8-16-2001
cont BAW

Test Tube ID	Date Measured → 8-16-2001 Mass (g) of Vial and HNO3	8-16-2001 Mass (g) after adding sample
NpCA4A1a	7.5920	8.0941
NpCA4A1b	7.5957	8.1052
NpCA4B1a	7.6133	8.1098
NpCA4B1b	7.6587	8.1573
NpCA4C1a	7.8246	8.3226
NpCA4C1b	7.6028	8.0962
NpCA4D1a	7.6858	8.1833
NpCA4D1b	7.6571	8.1558
NpCA4E1a	7.7356	8.2301
NpCA4E1b	7.8025	8.3020
NpCA4F1a	7.7934	8.2843
NpCA4F1b	7.6885	8.1876
NpCA4G1a	7.5817	8.0687
NpCA4G1b	7.6567	8.1546
NpCA4H1a	7.6569	8.1541
NpCA4H1b	7.6576	8.1527
NpCA5A1a	7.6756	8.1747
NpCA5A1b	7.6537	8.1569
NpCA5B1a	7.6171	8.1097
NpCA5B1b	7.6857	8.1769
NpCA5C1a	7.6293	8.1188
NpCA5C1b	7.6032	8.0973
NpCA5D1a	7.6120	8.1064
NpCA5D1b	7.7215	8.2140

8-16-2001
cont BAW

Test Tube ID	Date Measured → 8-16-2001 Mass (g) before measuring pH*	8-16-2001 pH	8-16-2001 Mass (g) after measuring pH@
NpCA4A1	52.0155	7.09	50.9754
NpCA4B1	51.2118	7.55	50.1934
NpCA4C1	50.9464	7.67	49.9316
NpCA4D1	51.5066	7.97	50.4795
NpCA4E1	52.3571	8.23	51.3350
NpCA4F1	51.7927	8.47	50.7795
NpCA4G1	51.1538	8.73	50.1432
NpCA4H1	51.6868	8.96	50.6765
NpCA5A1	52.6479	7.08	51.6239
NpCA5B1	52.9663	7.55	51.9594
NpCA5C1	51.9425	7.67	50.9351
NpCA5D1	52.0345	7.96	51.0256
NpCA5E1	52.2484	8.21	51.2374
NpCA5F1	51.6277	8.40	50.6199
NpCA5G1	51.8728	8.73	50.8592
NpCA5H1	51.8905	8.91	50.8868
NpCA6A1	52.4025	7.03	51.3739
NpCA6B1	53.1165	7.54	52.1027
NpCA6C1	51.5369	7.66	50.5237
NpCA6D1	52.1327	7.96	51.1221
NpCA6E1	52.0185	8.17	51.0112
NpCA6F1	51.8010	8.40	50.7862
NpCA6G1	51.2854	8.74	50.2803
NpCA6H1	51.9906	8.96	50.9838

*Before LSA sample removed
@After LSA sample removed

17 Aug 2001 BAW

LSA + pH analysis of Np/Ca test tube solns

17 Aug 2001 last BAW

Calcite test tube solns (463/55-55)
0.1N HNO_3 - 1/10 dilution of 1.0N (309/254) done 8-17-01 by BW
pH meter - orion 920A serial # 039522
Orion 8103 combo electrode 3C w/ ATC probe
Calibrated with
pH 7 (8-13-01) Fisher SB108-500, lot#000749-24
pH 9 (8-13-01) Fisher SB114-500, lot# 007377-24
Cal temp 21.6°C cal set pts 7.03, 9.04
Slope of cal curve 97.8
pH 7 soln (set pt 7.03) measured after analysis of 7.04 after series 2 & 3 and 7.02 after series 1 BW 8/17/01
Mettler AE240 balance 8/17/01 BW
30mL beaker (spout to right) used as holder, Test tubes tilted to right inside of holder

LSA samples done in duplicate (lower case a/b)

BW 8-17-01
Test tubes weighed. LSA vials labeled, ~~0.5mL pH~~ 0.5mL of 0.1N HNO_3 added, and then weighed. Test tubes swirled. 0.5mL of NpCA samples added to each LSA vial. LSA vials reweighed, pH measured from test tubes. Test tubes reweighed

[Mass(g) before measuring pH] column data was initial mass before LSA aliquots were removed.

[Mass(g) after measuring pH] column data was mass after LSA aliquots were removed.

BW 8/17/01

Date Measured →	8-17-2001	8-17-2001	8-17-2001
Test Tube ID	Mass (g) before measuring pH	pH	Mass (g) after measuring pH
NpCA4A2	52.2063	7.08	51.1544
NpCA4B2	52.0256	7.53	51.0040
NpCA4C2	51.7876	7.65	50.7650
NpCA4D2	52.3363	7.96	51.3087
NpCA4E2	51.7467	8.21	50.7242
NpCA4F2	51.6649	8.34	50.6355
NpCA4G2	51.9887	8.68	50.9677
NpCA4H2	52.9077	8.95	51.8825
NpCA5A2	52.1115	7.03	51.0602
NpCA5B2	51.7924	7.51	50.7700
NpCA5C2	51.7133	7.68	50.6847
NpCA5D2	52.0465	7.94	51.0223
NpCA5E2	51.8286	8.23	50.8061
NpCA5F2	51.7112	8.39	50.6835
NpCA5G2	51.9395	8.69	50.9193
NpCA5H2	52.0438	8.92	51.0181
NpCA6A2	52.4426	6.97	51.3923
NpCA6B2	51.4614	7.55	50.4215
NpCA6C2	52.0667	7.66	51.0322
NpCA6D2	52.0006	7.92	50.9852
NpCA6E2	52.1427	8.24	51.1151
NpCA6F2	51.9265	8.34	50.9038
NpCA6G2	51.6099	8.64	50.5919
NpCA6H2	52.3895	8.89	51.3647

7 AUG 2001
CONT BAW

Test Tube ID	Date Measured → 8-17-2001 Mass (g) before measuring pH	8-17-2001 pH	8-17-2001 Mass (g) after measuring pH
NpCA4A3	52.3881	6.94	51.3391
NpCA4B3	51.5296	7.53	50.5032
NpCA4C3	51.9238	7.67	50.9051
NpCA4D3	51.9060	7.91	50.8702
NpCA4E3	51.1658	8.20	50.1460
NpCA4F3	51.5317	8.40	50.4999
NpCA4G3	51.2013	8.72	50.1682
NpCA4H3	51.7220	8.95	50.6975
NpCA5A3	52.4243	6.89	51.3730
NpCA5B3	51.5182	7.48	50.4935
NpC54C3 BW 8/17/01	51.6883	7.67	50.7536
NpCA5D3	52.1342	7.91	51.1144
NpCA5E3	51.9632	8.26	50.9785
NpCA5F3	51.6564	8.41	50.8150
NpCA5G3	51.8182	8.69	50.7944
NpCA5H3	52.0259	9.00	50.9968
NpCA6A3	52.5554	6.82	51.5122
NpCA6B3	52.2539	7.45	51.2251
NpCA6C3	51.5552	7.59	50.5281
NpCA6D3	50.4254	7.93	49.4029
NpCA6E3	51.6743	8.19	50.6549
NpCA6F3	51.9162	8.40	50.8854
NpCA6G3	51.4427	8.64	50.4154
NpCA6H3	52.1003	8.89	51.0752

11 AUG 2001
CONT BAW

Test Tube ID	Date Measured → 8-17-2001 Mass (g) of Vial and HNO3	8-17-2001 Mass (g) after adding sample
NpCA4A2a	7.5780	8.0843
NpCA4A2b	7.5673	8.0705
NpCA4B2a	7.5748	8.0689
NpCA4B2b	7.6228	8.1143
NpCA4C2a	7.6149	8.1079
NpCA4C2b	7.7242	8.2168
NpCA4D2a	7.7752	8.2707
NpCA4D2b	7.6370	8.1322
NpCA4E2a	7.7214	8.2153
NpCA4E2b	7.6197	8.1140
NpCA4F2a	7.6317	8.1251
NpCA4F2b	7.5898	8.0870
NpCA4G2a	7.6266	8.1137
NpCA4G2b	7.6837	8.1815
NpCA4H2a	7.6464	8.1403
NpCA4H2b	7.6031	8.1001
NpCA5A2a	7.6619	8.1657
NpCA5A2b	7.6640	8.1722
NpCA5B2a	7.6437	8.1381
NpCA5B2b	7.6236	8.1179
NpCA5C2a	7.6627	8.1562
NpCA5C2b	7.6537	8.1500
NpCA5D2a	7.6921	8.1851
NpCA5D2b	7.6303	8.1263

17 AUG2001
CONT BAWS

Date Measured →	8-18-2001	8-18-2001
Test Tube ID	Mass (g) of Vial and HNO3	Mass (g) after adding sample
NpCA5E2a	7.5727	8.0659
NpCA5E2b	7.6478	8.1410
NpCA5F2a	7.7727	8.2675
NpCA5F2b	7.6347	8.1308
NpCA5G2a	7.6116	8.0995
NpCA5G2b	7.7258	8.2208
NpCA5H2a	7.6218	8.1152
NpCA5H2b	7.6408	8.1366
NpCA6A2a	7.8256	8.3331
NpCA6A2b	7.7940	8.3010
NpCA6B2a	7.8204	8.3160
NpCA6B2b	7.8493	8.3452
NpCA6C2a	7.7633	8.2608
NpCA6C2b	7.7197	8.2202
NpCA6D2a	7.7284	8.2221
NpCA6D2b	7.7782	8.2679
NpCA6E2a	7.7399	8.2365
NpCA6E2b	7.8030	8.2978
NpCA6F2a	7.7603	8.2533
NpCA6F2b	7.8028	8.2968
NpCA6G2a	7.7543	8.2477
NpCA6G2b	7.8043	8.2998
NpCA6H2a	7.8216	8.3154
NpCA6H2b	7.7875	8.2836

17 AUG01
CONT BAWS

Date Measured →	8-18-2001	8-18-2001
Test Tube ID	Mass (g) of Vial and HNO3	Mass (g) after adding sample
NpCA4A3a	7.6463	8.1521
NpCA4A3b	7.6435	8.1500
NpCA4B3a	7.7073	8.1986
NpCA4B3b	7.6454	8.1387
NpCA4C3a	7.5819	8.0713
NpCA4C3b	7.7268	8.2249
NpCA4D3a	7.6137	8.1084
NpCA4D3b	7.6639	8.1610
NpCA4E3a	7.6722	8.1665
NpCA4E3b	7.6529	8.1427
NpCA4F3a	7.5899	8.0828
NpCA4F3b	7.6074	8.1030
NpCA4G3a	7.6222	8.1175
NpCA4G3b	7.7014	8.1978
NpCA4H3a	7.6196	8.1081
NpCA4H3b	7.6222	8.1199
NpCA5A3a	7.6127	8.1221
NpCA5A3b	7.6294	8.1381
NpCA5B3a	7.5906	8.0853
NpCA5B3b	7.6578	8.1542
NpCA5C3a	7.6220	8.0457
NpCA5C3b	7.6417	8.1152
NpCA5D3a	7.6607	8.1552
NpCA5D3b	7.6366	8.1268

7 AUG 2001
CONT BWS

Date Measured →	8-17-2001	8-17-2001
Test Tube ID	Mass (g) of Vial and HNO3	Mass (g) after adding sample
NpCA5E3a	7.6059	8.0864
NpCA5E3b	7.6891	8.1565
NpCA5F3a	7.6147	8.0396
NpCA5F3b	7.6088	BWS 8-17-01 8.7.9925
NpCA5G3a	7.6283	8.1209
NpCA5G3b	7.6599	8.1500
NpCA5H3a	7.6787	8.1718
NpCA5H3b	7.5620	8.0583
NpCA6A3a	7.7799	8.2858
NpCA6A3b	7.8202	8.3234
NpCA6B3a	7.7663	8.2607
NpCA6B3b	7.7722	8.2681
NpCA6C3a	7.8160	8.3094
NpCA6C3b	7.7915	8.2879
NpCA6D3a	7.7778	8.2707
NpCA6D3b	7.7378	8.2335
NpCA6E3a	7.7297	8.2167
NpCA6E3b	7.6833	8.1783
NpCA6F3a	7.8065	8.3007
NpCA6F3b	7.7694	8.2652
NpCA6G3a	7.8289	8.3235
NpCA6G3b	7.7274	8.2226
NpCA6H3a	7.7870	8.2814
NpCA6H3b	7.8078	8.3032

20 AUG 2001
BWS

Second Sampling of Np/Ca test tube solns for pH LSA

Calcite test tube solns (463/53-55)
0.1N HNO_3 - 1/10 dilution of 1.0N (309/254) done 8-17-01 BWS
pH meter - orion 920A serial # 039522
Orion 8103 combo electrode 3C w/ ATC probe
Calibrated with
pH7 (8-20-01) Fisher SB108-500, lot 000749-24
pH9 (8-20-01) Fisher SB114-500, lot 007377-24
Cal temp at 21.5°C cal setpts at 7.03, 9.04
Slope of cal curve 98.6
Measurement of pH7 (setpt 7.03) at end of analysis = 7.05
Mettler AE 240 balance
30mL beaker (spout to right) used as holder. Test tubes tilted to right inside of holder

LSA samples done in duplicate (lower case a/b) suffix "2" indicates second sampling set. Note- set "1" from (463/57-66)

Test tubes weighed, LSA vials labeled, 0.5mL of 0.1N HNO_3 added, and then reweighed. Test tubes swirled. 0.5mL of NpCA samples added to each LSA vial, LSA vials reweighed. pH measured from test tubes. Test tubes reweighed.

[Mass (g) before measuring pH] column data was initial mass before LSA aliquots were removed.

[Mass (g) after measuring pH] column data ~~Mass~~ BWS 8/20/01 was mass after LSA aliquots were removed.

20 AUG 01 BWS

20 AUG 01
CONT BAW

Test Tube ID	Date Measured → 8-20-2001 Mass (g) before measuring pH	8-20-2001 pH	8-20-2001 Mass (g) after measuring pH
NpCA4A1	50.7809	6.91 ~~7.14~~ BW 8/24/01	49.7236
NpCA4B1	49.9784	7.59	48.9632
NpCA4C1	49.7331	7.68	48.7129
NpCA4D1	50.2745	~~7.95~~	49.2514
NpCA4E1	51.1317	8.18	50.1139
NpCA4F1	50.5821	8.35 BW 3/02/08	49.5602
NpCA4G1	49.9463	~~8.65~~ 65	48.9295
NpCA4H1	50.4756	8.89	49.4627
NpCA5A1	51.4106	6.86	50.3711
NpCA5B1	51.7535	7.53	50.7453
NpCA5C1	50.7218	7.67	49.7075
NpCA5D1	50.8122	7.91	49.8060
NpCA5E1	51.0026	8.19	49.9835
NpCA5F1	50.3943	8.37	49.3820
NpCA5G1	50.6532	8.65	49.6326
NpCA5H1	50.6702	8.90	49.6523
NpCA6A1	51.1582	6.89	50.1186
NpCA6B1	51.9060	7.50	50.8926
NpCA6C1	50.2884	7.65	49.2525
NpCA6D1	50.9070	7.92	49.8827
NpCA6E1	50.7913	8.15	49.7868
NpCA6F1	50.5755	8.34	49.5607
NpCA6G1	50.0741	8.65 ~~7.65~~ BW 8/24/01	49.0553
NpCA6H1	50.7650	8.89	49.7510

20 AUG 01
CONT BAW

Test Tube ID	Date Measured → 8-20-2001 Mass (g) of Vial and HNO3	8-20-2001 Mass (g) after adding sample
NpCA4A1a2	7.7724	8.2670
NpCA4A1b2	7.8469	8.3517
NpCA4B1a2	7.7652	8.2560
NpCA4B1b2	7.7453	8.2410
NpCA4C1a2	7.7331	8.2265
NpCA4C1b2	7.8452	8.3414
NpCA4D1a2	7.7719	8.2661
NpCA4D1b2	7.8040	8.3006
NpCA4E1a2	7.7742	8.2679
NpCA4E1b2	7.8135	8.3096
NpCA4F1a2	7.8551	8.3492
NpCA4F1b2	7.7553	8.2535
NpCA4G1a2	7.7692	8.2630
NpCA4G1b2	7.7982	8.2956
NpCA4H1a2	7.8568	8.3505
NpCA4H1b2	7.8383	8.3352
NpCA5A1a2	7.7862	8.2913
NpCA5A1b2	7.7940	8.3001
NpCA5B1a2	7.7429	8.2354
NpCA5B1b2	7.7721	8.2624
NpCA5C1a2	7.8548	8.3448
NpCA5C1b2	7.8593	8.3574
NpCA5D1a2	7.7856	8.2805
NpCA5D1b2	7.7897	8.2789

20AUG01
BAW

Date Measured →	8-20-2001	8-20-2001
Test Tube ID	Mass (g) of Vial and HNO3	Mass (g) after adding sample
NpCA5E1a2	7.7720	8.2651
NpCA5E1b2	7.7840	8.2834
NpCA5F1a2	7.7960	8.2874
NpCA5F1b2	7.8262	8.3165
NpCA5G1a2	7.7650	8.2599
NpCA5G1b2	7.8004	8.2976
NpCA5H1a2	7.7959	8.2895
NpCA5H1b2	7.7912	8.2876
NpCA6A1a2	7.8376	8.3398
NpCA6A1b2	7.7984	8.3051
NpCA6B1a2	7.7836	8.2759
NpCA6B1b2	7.7473	8.2415
NpCA6C1a2	7.8543	8.3585
NpCA6C1b2	7.7938	8.2939
NpCA6D1a2	7.7959	8.2911
NpCA6D1b2	7.8115	8.3114
NpCA6E1a2	7.7862	8.2761
NpCA6E1b2	7.8056	8.2977
NpCA6F1a2	7.7431	8.2388
NpCA6F1b2	7.8662	8.3591
NpCA6G1a2	7.8160	8.3112
NpCA6G1b2	7.8575	8.3556
NpCA6H1a2	7.8083	8.3007
NpCA6H1b2	7.8263	8.3209

21AUG01
BAW

LSA - pH analysis of Np/Ca test tube solns - 2nd Sampling

Calcite test tube solns (463/53-55)
0.1N HNO_3 - 1/10 dilution of 1.0N (309/254) done on 8-17-01 by BAW
pH meter - orion 920A serial # 039522
orion 8103 combo electrode, 3C w/ATC probe
Calibrated with
pH 7 (~~8-13~~ BAW 8/21/01 8/20/01) Fisher SB108-500, lot# 000749-24
pH 9 (8-20-2001) Fisher SB114-500, lot# 007377-24
cal temp = 21.6°C cal set pts = 7.03, 9.04
slope of cal curve = 100.5
Mettler AE 240 balance
30mL beaker (spout to right) used as holder. Test tubes tilted to right inside of holder

LSA samples done in duplicate (lower case a/b)

Test tube weighed, LSA vials labeled, 1/2mL of 0.1N HNO_3 added, and then weighed, Test tubes swirled. 1/2mL of NpCA samples added to each LSA vial. LSA vials reweighed, pH measured from test tubes. Test tubes reweighed.

[Mass(g) before measuring pH] column data was initial mass before LSA aliquots were removed.
[Mass(g) after measuring pH] column data was mass after LSA aliquots were removed.

Challange mass (20.0001g target) measurements
start of analysis = 19.9999 and at end of analysis = 20.0000

pH challange (pH 7 set pt at 7.03)
after series 2 = 7.04 and after series 3 = 7.02

21AUG01
CONT BAW

Date Measured →	8-21-2001	8-21-2001	8-21-2001
Test Tube ID	Mass (g) before measuring pH	pH	Mass (g) after measuring pH
NpCA4A2	50.9692	6.86	49.9278
NpCA4B2	50.8106	7.46	49.7823
NpCA4C2	50.5752	7.63	49.5414
NpCA4D2	51.1032	7.95	50.0866
NpCA4E2	50.5418	8.15	49.5163
NpCA4F2	50.4478	8.34	49.4312
NpCA4G2	50.7782	8.63	49.7488
NpCA4H2	51.6995	8.89	50.6716
NpCA5A2	50.8575	6.86	49.8079
NpCA5B2	50.5810	7.50	49.5579
NpCA5C2	50.4786	7.65	49.4544
NpCA5D2	50.8318	7.93	49.8093
NpCA5E2	50.6109	8.18	49.5818
NpCA5F2	50.4706	8.38	49.4535
NpCA5G2	50.7281	8.68	49.7097
NpCA5H2	50.8302	8.89	49.8034
NpCA6A2	51.1878	6.88	50.1365
NpCA6B2	50.2297	7.49	49.2063
NpCA6C2	50.8367	7.68	49.8053
NpCA6D2	50.7894	7.89	49.761?
NpCA6E2	50.9141	8.15	49.8905
NpCA6F2	50.7139	8.31	49.6874
NpCA6G2	50.3982	8.62	49.3701
NpCA6H2	51.1743	8.86	50.1553

21AUG2001
CONT BAW

Date Measured →	8-21-2001	8-21-2001	8-21-2001
Test Tube ID	Mass (g) before measuring pH	pH	Mass (g) after measuring pH
NpCA4A3	51.1343	6.89	50.0826
NpCA4B3	50.3016	7.48	49.2712
NpCA4C3	50.7077	7.66	49.6810
NpCA4D3	50.6865	7.91	49.6496
NpCA4E3	49.9474	8.17	48.9230
NpCA4F3	50.2957	8.41	49.2625
NpCA4G3	49.9844	8.62	48.9590
NpCA4H3	50.4945	8.87	49.4640
NpCA5A3	51.1924	6.83	50.1342
NpCA5B3	50.2975	7.52	49.2710
NpCA4C3	50.5652	7.65	49.5286
NpCA5D3	50.9201	7.88	49.8974
NpCA5E3	50.7748	8.14	49.7409
NpCA5F3	50.6119	8.31	49.5899
NpCA5G3	50.6027	8.58	49.5751
NpCA5H3	50.8058	8.85	49.7786
NpCA6A3	51.3284	6.85	50.2747
NpCA6B3	51.0003	7.41	49.9801
NpCA6C3	50.3250	7.58	49.2955
NpCA6D3	49.2098	7.83	48.1878
NpCA6E3	50.4637	8.11	49.4389
NpCA6F3	50.6871	8.30	49.6623
NpCA6G3	50.2207	8.59	49.1914
NpCA6H3	50.8859	8.81	49.8679

21AUG01
CONT BAW

Date Measured →	8-21-2001	8-21-2001
Test Tube ID	Mass (g) of Vial and HNO3	Mass (g) after adding sample
NpCA4A2a2	7.7975	8.3032
NpCA4A2b2	7.8099	8.3090
NpCA4B2a2	7.8595	8.3519
NpCA4B2b2	7.8089	8.3040
NpCA4C2a2	7.7486	8.2441
NpCA4C2b2	7.8685	8.3661
NpCA4D2a2	7.8410	8.3361
NpCA4D2b2	7.8567	8.3480
NpCA4E2a2	7.8706	8.3659
NpCA4E2b2	7.8236	8.3210
NpCA4F2a2	7.8162	8.3104
NpCA4F2b2	7.7815	8.2770
NpCA4G2a2	7.7728	8.2673
NpCA4G2b2	7.7539	8.2517
NpCA4H2a2	7.7969	8.2952
NpCA4H2b2	7.7930	8.2904
NpCA5A2a2	7.8494	8.3555
NpCA5A2b2	7.8718	8.3816
NpCA5B2a2	7.8706	8.3659
NpCA5B2b2	7.8044	8.3018
NpCA5C2a2	7.8491	8.3407
NpCA5C2b2	7.8477	8.3455
NpCA5D2a2	7.7964	8.2928
NpCA5D2b2	7.8076	8.3035

21AUG01
CONT BAW

Date Measured →	8-21-2001	8-21-2001
Test Tube ID	Mass (g) of Vial and HNO3	Mass (g) after adding sample
NpCA5E2a2	7.8197	8.3136
NpCA5E2b2	7.8032	8.2994
NpCA5F2a2	7.7796	8.2737
NpCA5F2b2	7.8307	8.3203
NpCA5G2a2	7.8177	8.3117
NpCA5G2b2	7.7829	8.2788
NpCA5H2a2	7.8283	8.3242
NpCA5H2b2	7.8189	8.3137
NpCA6A2a2	7.7495	8.2579
NpCA6A2b2	7.7948	8.3033
NpCA6B2a2	7.8282	8.3215
NpCA6B2b2	7.7964	8.2933
NpCA6C2a2	7.7660	8.2624
NpCA6C2b2	7.8355	8.3343
NpCA6D2a2	7.8404	8.3371
NpCA6D2b2	7.8188	8.3163
NpCA6E2a2	7.8336	8.3281
NpCA6E2b2	7.7649	8.2585
NpCA6F2a2	7.8327	8.3247
NpCA6F2b2	7.8060	8.3030
NpCA6G2a2	7.8159	8.3108
NpCA6G2b2	7.8001	8.2973
NpCA6H2a2	7.8310	8.3213
NpCA6H2b2	7.8016	8.2954

21 AUG 2001
CONT BAW

Date Measured →	8-21-2001	8-21-2001
Test Tube ID	Mass (g) of Vial and HNO3	Mass (g) after adding sample
NpCA4A3a2	7.7479	8.2552
NpCA4A3b2	7.7887	8.2983
NpCA4B3a2	7.8097	8.3049
NpCA4B3b2	7.7559	8.2534
NpCA4C3a2	7.7918	8.2861
NpCA4C3b2	7.6502	8.1488
NpCA4D3a2	7.7903	8.2864
NpCA4D3b2	7.7714	8.2698
NpCA4E3a2	7.7814	8.2759
NpCA4E3b2	7.7930	8.2900
NpCA4F3a2	7.7659	8.2631
NpCA4F3b2	7.8438	8.3426
NpCA4G3a2	7.7944	8.2816
NpCA4G3b2	7.8198	8.3167
NpCA4H3a2	7.7905	8.2846
NpCA4H3b2	7.8087	8.3073
NpCA5A3a2	7.8755	8.3843
NpCA5A3b2	7.8405	8.3477
NpCA5B3a2	7.8075	8.3030
NpCA5B3b2	7.7950	8.2936
NpCA5C3a2	7.7798	8.2781
NpCA5C3b2	7.8046	8.3036
NpCA5D3a2	7.8259	8.3232
NpCA5D3b2	7.7924	~~8.2837~~ ~~8.2857~~ 8.2818-02 BW

21 AUG 01
CONT BAW

Date Measured →	8-21-2001	8-21-2001
Test Tube ID	Mass (g) of Vial and HNO3	Mass (g) after adding sample
NpCA5E3a2	7.7956	8.2917
NpCA5E3b2	7.7763	8.2748
NpCA5F3a2	7.7731	8.2667
NpCA5F3b2	7.7940	8.2837
NpCA5G3a2	7.7504	8.2470
NpCA5G3b2	7.7934	8.2926
NpCA5H3a2	7.8244	8.3219
NpCA5H3b2	7.7873	8.2823
NpCA6A3a2	7.8275	8.3346
NpCA6A3b2	7.9082	8.4189
NpCA6B3a2	7.7776	8.2728
NpCA6B3b2	7.8424	8.3351
NpCA6C3a2	7.8013	8.3000
NpCA6C3b2	7.7902	8.2866
NpCA6D3a2	7.7739	8.2694
NpCA6D3b2	7.7568	8.2513
NpCA6E3a2	7.8573	8.3518
NpCA6E3b2	7.7788	8.2724
NpCA6F3a2	7.8550	8.3486
NpCA6F3b2	7.9312	8.4250
NpCA6G3a2	7.7817	8.2760
NpCA6G3b2	7.8004	8.2983
NpCA6H3a2	7.8185	8.3098
NpCA6H3b2	7.8156	8.3120

9Aug01 BAW

Prep of aliquots for LSA

Added 5 mL of Ultima Gold AB (Packard cat# 6013329, lot# 91-9031) to each LSA vial of NpCA samples "one" 463/57+58, 63-66 and samples "two" 463/69+70, 74+77.

Mass + pH Measurement of NpCA test solns (selected)

pH meter ~ orion 920A serial# 039522
orion 8103 combo electrode 3c w/ ATC probe
Calibrated with
pH7 (8-29-01) Fisher SB108-500, lot# 000749-24
pH9 (8-29-01) Fisher SB114-500, lot# 007377-24
Cal temp 20.5°C and cal setpts: 7.03 and 9.05
Slope of cal curve 98.4%

Mettler AE 240 balance
30mL beaker (spout to right) used as holder. Test tubes tilted to right side of holder

Test tubes weighed (24 total of 72), pH taken, Test tubes not reweighed. 24 selected tube will be used for desorbtion test.

Challange mass (20.0001g target) measurements
start of analysis = 20.0002g end of analysis = 20.0001g

Challange pH (pH 7 setpt at 7.05)
end of analysis - 7.03

BW 29-AUG-01

29AUG01 CONT BAW

Date Measured →	8-29-2001	8-29-2001
Test Tube ID	Mass (g) before measuring pH	pH
NpCA4A1	49.1621	6.92
NpCA4B1	48.3203	7.48
NpCA4C1	48.1098	7.67
NpCA4D1	48.6674	7.94
NpCA4E1	49.5344	8.16
NpCA4F1	49.0132	8.34
NpCA4G1	48.4053	8.63
NpCA4H1	48.9407	8.87
NpCA5A2	49.2610	6.83
NpCA6B2	48.6913	7.41
NpCA5C2	48.9041	7.61
NpCA6D2	49.2271	7.86
NpCA5E2	49.0488	BW 8-29-01 ~~8.30~~ 8.06
NpCA6F2	49.1852	BW 8-29-01 ~~8.40~~ 8.40
NpCA5G2	49.2095	8.68
NpCA6H2	49.6885	8.90
NpCA6A3	49.7976	6.85
NpCA5B3	48.7727	7.43
NpCA6C3	48.7727	7.55
NpCA5D3	49.3857	7.84
NpCA6E3	48.9356	8.10
NpCA5F3	49.0923	8.28
NpCA6G3	48.7162	8.58
NpCA5H3	49.3074	8.83

30 Aug 2001
BAW

Prep for sorption chemical analysis and desorption trial run

Mettler AE240 balance: 30mL beaker (spout to right) used as holder. Test tubes tilted to right side of holder.
Gyratory shaker:
24 Test tube NpCA solutions from 463/79
20 mL BD Syringe
10 mL BD Syringe
Syringe filter: Microgen Inc Dynagard filter cat# DG2M-330-100, lot# 75-66A
Conc $HN0_3$ (trace metal grade) Fisher cat # A509-212, lot# 1100040
1000 ppm calcium: Spex certiprep cat# PLCA2-2X, lot# 7-114CA in 2% $HN0_3$

The samples were taken through the procedure in groups of six. This was done in order to ensure that the calcite in the test tubes would not dry out after the removal of the original solution (sorption phase) and before the addition of the replacement solution (desorb phase)

Sorption chemical analysis portion:
The liquid portion was withdrawn from the test tube using a 10mL syringe with a syringe filter attached. The syringe filter was removed and the liquid was dispensed into a labeled 30mL polypropylene bottle. This step was repeated in order to remove as much solution as possible from the test tube (approximately 30mL of solution) without removing the calcite. A 50 microliter (eppendorf pipette) aliquot of conc $HN0_3$ (trace metal grade) was added to each of the 30mL bottles in order to preserve the sample. Sample labels matched the test tube labels. A quality assurance sample was generated by adding 3mL (vol pippette) of 1000ppm calcium into a 25mL vol flask and diluting to mark with nanopure water. The QA sample was labeled NpCAQA. Samples were delivered to Div 01 for analysis (see 463/41-93 for sample custody sheet). This procedure was performed on each of the 24 test tube solutions.

Desorption portion:
Test tubes with calcite (solution removed) were weighed. Twenty mL (syringe) of the appropriate solution [A-H (463/42)] was added to the test tube. The test tube was vortexed to ensure mixing. The test tube was reweighed. The test tube were placed in an activated gyratory shaker.

BAW 8-30-2001

30 Aug 2001
CONT BAW

Date Measured →	8-30-2001	8-30-2001	8-30-2001
Test Tube ID	Mass (g) before solution addition	ID of solution added (463/42)	Mass (g) after solution addition
NpCA4A1	22.3334	Soln A	44,4877
NpCA4B1	23,1125	Soln B	43.2230
NpCA4C1	22,2457	Soln C	43,9485
NpCA4D1	22.3921	Soln D	42,5507
NpCA4E1	22.7377	Soln E	42.4359
NpCA4F1	22,3415	Soln F	41.6344
NpCA4G1	22.3501	Soln G	42.2080
NpCA4H1	22.3357	Soln H	42.7548
NpCA5A2	22,2976	Soln A	43.8597
NpCA6B2	22,7614	Soln B	42,6381
NpCA5C2	22,5975	Soln C	42,5040
NpCA6D2	23,6409	Soln D	43,3842
NpCA5E2	22,5953	Soln E	42.4866
NpCA6F2	23.0347	Soln F	42,5632
NpCA5G2	22.7940	Soln G	42,7642
NpCA6H2	23,6045	Soln H	43,8991
NpCA6A3	23.2553	Soln A	45,8558
NpCA5B3	22,8020	Soln B	43.2367
NpCA6C3	22.8126	Soln C	43.2957
NpCA5D3	22,7185	Soln D	43.3455
NpCA6E3	22,7683	Soln E	42.9465
NpCA5F3	22.4785	Soln F	42.1529
NpCA6G3	23.1311	Soln G	43.0782
NpCA5H3	23.0738	Soln H	43.3346

1AUG01 Division 01 Results for Calcite Soln Chemical Analysis

31AUG01 CONT BW

These results are for calcite solns A-H from 463/42

Sampling may be found on 463/46-47

Below is a summary of the sample results

Summary of Div 01 Results for Calcite Solutions 463/43

Element	Sample Conc (ppm)							
	PA3	PB1	PC1	PD1	PE2	PF1	PG1	PH2
Ca	6849	1433	437	135	43.0	17.8	4.57	1.65
Mg	*	*	*	*	*	*	*	*
Mn	*	*	*	*	*	*	*	*
K	*	*	0.212	0.175	0.130	0.155	0.189	0.199
Na	274	238	2309	2276	2257	2271	2343	2435
Sr	0.759	0.186	0.066	0.024	0.013	0.011	0.008	0.007

Element	Sample Dup Conc (ppm)		
	SA3	SE2	SH2
Ca	6820	43.3	1.68
Mg	*	*	*
Mn	*	*	*
K	*	0.148	0.197
Na	272	2248	2473
Sr	0.746	0.013	0.007

Element	QA Sample Conc (ppm)		
	QA3	Target	Difference
Ca	115	120	4.17%
Mg	*	na	na
Mn	*	na	na
K	*	na	na
Na	*	na	na
Sr	0.007	na	na

* Sample result below reporting limit

Element	Reporting Limit-ppm
Ca	0.05
Mg	0.05
Mn	0.005
K	0.1
Na	0.1
Sr	0.005

On the following pages are the Div01 results

BW 8-31-01

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: PA3

Lab Name: Southwest Research Institute
Client: Division 20
Lab Code: SwRI
Date Received: 08/03/01
Matrix: Liquid
Project No.: 20.01402.871
Lab System ID: 165624
Work Order: 20714

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	6849	0.05
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	<0.1	0.1
Sodium	274	0.1
Strontium	0.759	0.005

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: PB1

Lab Name: Southwest Research Institute
Client: Division 20
Lab Code: SwRI
Date Received: 08/03/01
Matrix: Liquid
Project No.: 20.01402.871
Lab System ID: 165625
Work Order: 20714

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	1433	0.05
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	<0.1	0.1
Sodium	238	0.1
Strontium	0.186	0.005

31AUG01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: PC1

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 08/03/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 165626
Work Order: 20714

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	437	0.05
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	0.212	0.1
Sodium	2309	0.1
Strontium	0.066	0.005

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: PD1

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 08/03/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 165627
Work Order: 20714

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	135	0.05
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	0.175	0.1
Sodium	2276	0.1
Strontium	0.024	0.005

31AUG01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: PE2

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 08/03/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 165628
Work Order: 20714

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	43.0	0.05
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	0.130	0.1
Sodium	2257	0.1
Strontium	0.013	0.005

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: PF1

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 08/03/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 165629
Work Order: 20714

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	17.8	0.05
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	0.155	0.1
Sodium	2271	0.1
Strontium	0.011	0.005

1AUG01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: PG1

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 165630

Client: Division 20
Date Received: 08/03/01
Project No.: 20.01402.871
Work Order: 20714

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	4.57	0.05
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	0.189	0.1
Sodium	2343	0.1
Strontium	0.008	0.005

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: PH2

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 165631

Client: Division 20
Date Received: 08/03/01
Project No.: 20.01402.871
Work Order: 20714

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	1.65	0.05
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	0.199	0.1
Sodium	2435	0.1
Strontium	0.007	0.005

31AUG01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: SA3

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 165633

Client: Division 20
Date Received: 08/03/01
Project No.: 20.01402.871
Work Order: 20714

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	6820	0.05
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	<0.1	0.1
Sodium	272	0.1
Strontium	0.746	0.005

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: SE2

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 165634

Client: Division 20
Date Received: 08/03/01
Project No.: 20.01402.871
Work Order: 20714

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	43.3	0.05
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	0.148	0.1
Sodium	2248	0.1
Strontium	0.013	0.005

1 AUG01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: SH2

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 08/03/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 165635
Work Order: 20714

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	1.68	0.05
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	0.197	0.1
Sodium	2473	0.1
Strontium	0.007	0.005

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: QA3

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 08/03/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 165632
Work Order: 20714

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	115	0.05
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	<0.1	0.1
Sodium	<0.1	0.1
Strontium	0.007	0.005

31 AUG01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
DUPLICATE SUMMARY

Sample ID: PA3

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 08/03/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 165624
Work Order: 20714

Analysis	Sample Result (mg/L)	Duplicate Result (mg/L)	RPD
Calcium	6849	6842	0.11%
Magnesium	<0.05	<0.05	0.00%
Manganese	<0.005	<0.005	0.00%
Potassium	<0.1	<0.1	0.00%
Sodium	274	273	0.33%
Strontium	0.759	0.753	0.82%

SOUTHWEST RESEARCH INSTITUTE
MATRIX SPIKE SUMMARY

Sample ID: PB1

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 08/03/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 165625
Work Order: 20714

Analysis	Sample Result (mg/L)	Spike Result (mg/L)	Spike Added (mg/L)	Recovery
Calcium	1433	5395	4000	99.0%
Magnesium	<0.05	20.1	20	100.4%
Manganese	<0.005	0.500	0.5	100.0%
Potassium	<0.1	32.5	20	162.5%
Sodium	238	2050	2000	90.6%
Strontium	0.186	2.13	2	97.2%

NA- Not Applicable.

31 AUG01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID
LCSW

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Liquid

Project No.: 20.01402.871

Lab System ID: NA

Work Order: 20714

Analysis	Sample Result (mg/L)	True Value (mg/L)	Recovery
Calcium	19.6	20.0	98.1%
Magnesium	20.0	20.0	100.0%
Manganese	0.490	0.500	98.0%
Potassium	16.5	20.0	82.5%
Sodium	17.8	20.0	89.2%
Strontium	1.94	2.00	97.2%

NA- Not Applicable.

SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID
PBW

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Liquid

Project No.: 20.01402.871

Lab System ID: NA

Work Order: 20714

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	<0.05	0.05
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	<0.1	0.1
Sodium	<0.1	0.1
Strontium	<0.005	0.005

NA- Not Applicable.

045ep01 BAW

BW 9/4/01

Chain of Custody sheets for 24 ~~NPCA~~ NpCA solutions (see 463/80-81)

SAMPLE LIST/CHAIN OF CUSTODY

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

Requested Turnaround:
☐ 1 Week
☐ 2 Weeks (Normal)
☑ 3 Weeks if possible
☐ Other:

SwRI Contact: Mike Dammann

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 = Other (Specify)

Project is nuclear safety related - 10 CFR Part 21, Appendix B

POC for questions is Bradley Werling X6565 - fax 5734

Radioactive - max Np^{237} values of 1.7×10^{-6} M or 2.3×10^{-4} uCi/mL

SwRI Project No.: 20.01402.871

Received by SwRI Lab (Signature): Mike Dammann

Samples Disposed by:

Date/Time: 9-4-01 / 15:20

Page ___ of ___

Analyses Requested: ICP analysis of Ca, Na, Mg, Mn, K, Sr

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time (mm/dd/yy)	Site/Zone ID	Matrix Type	Sample Type	# of Containers	
NpCA4A1	8-30-01			W	DW	1	X
NpCA4B1				W	DM	1	X
NpCA4C1				W	DM	1	X
NpCA4D1				W	DM	1	X
NpCA4E1				W	DM	1	X
NpCA4F1				W	DM	1	X
NpCA4G1				W	DM	1	X
NpCA4H1				W	DM	1	X
NpCA5A2				W	DM	1	X
NpCA6B2	↓			W	DM	1	X

Client Name/Address: Bradley Werling CNWRA/Div 20 Bld 57

Client Purchase Order/Other ID

Matrix Types: **A** - Air; **P** - Product; **S** - Soil; **T** - Tissue; **W** - Water

Sample Types: **DM** - Dissolved Metals; **ER** - Equipment Rinsate; **FB** - Field Blank; **MSD** - Matrix Spike Duplicate; **MS** - Matrix Spike; **TB** - Trip Blank; **TM** - Total Metals; **ES** - Environmental Samples; **FD** - Field Duplicate

Relinquished by (Signature): Bradley A Werling

Received by (Signature):

Relinquished by (Signature): Mike Dammann

Received by (Signature)

Relinquished by (Signature)

Comments:

Div 01 COC Form 01-01-001, Rev 1/97

04 Sept 01 CONT BAW

Client Name/Address: Bradley Werling CNWRA/Div 20 Bld 57

SAMPLE LIST/CHAIN OF CUSTODY

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

Requested Turnaround:
- ☐ 1 Week
- ☐ 2 Weeks (Normal)
- ☑ 3 Weeks if possible
- ☐ Other:_____

Client Purchase Order/Other ID | Site/Zone ID | Analyses Requested

SwRI Contact: Mike Dammann

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time (mm/dd/yy)	Matrix Type	Sample Type	# of Containers	ICP analysis of 6 cations: Ca, Na, Mg, NH4, K, + Sr
NpCA5C2	8-30-01		W	DM	1	X
NpCA6D2	"		W	DM	1	X
NpCA5E2	"		W	DM	1	X
NpCA6F2	"		W	DM	1	X
NpCA5G2	"		W	DM	1	X
NpCA6H2	"		W	DM	1	X
NpCA6A3	"		W	DM	1	X
NpCA5B3	"		W	DM	1	X
NpCA6C3	"		W	DM	1	X
NpCA5D3	"		W	DM	1	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 = Other (Specify)

Project is nuclear safety related - 10CFR Part 21 - Appendix B

POC for questions is Bradley Werling X6585 - fax 5184

Radioactive - max Np^{237} values of 1.7×10^{-6} Max 2.8×10^{-4} μCi/mL

Matrix Types: **A** - Air; **P** - Product; **S** - Soil; **T** - Tissue; **W** - Water

Sample Types: **DM** - Dissolved Metals; **ER** - Equipment Rinsate; **FB** - Field Blank; **MSD** - Matrix Spike Duplicate; **MS** - Matrix Spike; **TB** - Trip Blank; **TM** - Total Metals; **ES** - Environmental Samples; **FD** - Field Duplicate

Relinquished by (Signature):

Received by (Signature)

Relinquished by Sampler (Signature): Bradley A Werling

Received by (Signature):

Relinquished by (Signature)

Comments:

SwRI Project No. 20.01402.871

Received by SwRI Lab (Signature): Marie L Falcone

Samples Disposed by:

Date/Time: 9-4-01 15:20

Div 01 COC Form 01-01-001, Rev 1/97

Page ____ of ____

04 Sept 01 CONT BAW

Client Name/Address: Bradley Werling CNWRA/Div 20 Bld 57

SAMPLE LIST/CHAIN OF CUSTODY

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

Requested Turnaround:
- ☐ 1 Week
- ☐ 2 Weeks (Normal)
- ☑ 3 Weeks if possible
- ☐ Other:_____

Client Purchase Order/Other ID | Site/Zone ID | Analyses Requested

SwRI Contact: Mike Dammann

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time (mm/dd/yy)	Matrix Type	Sample Type	# of Containers	ICP analysis of 6 cations: Ca, Na, Mg, NH4, K, + Sr
NpCA6E3	8-30-01		W	DM	1	
NpCA5F3	"		W	DM	1	
NpCA6G3	"		W	DM	1	
NpCA5H3	"		W	DM	1	
NpCAQA*	"		W	DM	1	
*does not contain Np^{237}						

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 = Other (Specify)

Project is nuclear safety related - 10CFR Part 21 - Appendix B

POC for questions is Bradley Werling X6585 - fax 5184

Radioactive - max Np^{237} values of 1.7×10^{-6} Max 2.8×10^{-4} μCi/mL

Matrix Types: **A** - Air; **P** - Product; **S** - Soil; **T** - Tissue; **W** - Water

Sample Types: **DM** - Dissolved Metals; **ER** - Equipment Rinsate; **FB** - Field Blank; **MSD** - Matrix Spike Duplicate; **MS** - Matrix Spike; **TB** - Trip Blank; **TM** - Total Metals; **ES** - Environmental Samples; **FD** - Field Duplicate

Relinquished by (Signature):

Received by (Signature)

Relinquished by Sampler (Signature): Bradley A Werling

Received by (Signature):

Relinquished by (Signature)

Comments:

SwRI Project No. 20.01402.871

Received by SwRI Lab (Signature): Marie L Falcone

Samples Disposed by:

Date/Time: 9-4-01 15:20

Div 01 COC Form 01-01-001, Rev 1/97

Page ____ of ____

05Sept01 BAW

0.1N HNO_3 Solution

Added 10mL (oxford pipette) of 1.0N HNO_3 (309/254) to 90mL (graduated cylinder) of nanopure water in a 125mL polypropylene bottle.

Mass + pH Measurement of NpCA desorb solutions

Calcite test tube solutions (463/83)
0.1N HNO_3 - 463/94
pH meter - orion 920A serial # 039522
Orion 8103 combo electrode 3C w/ ATC probe
Calibrated with
pH 7 (8-29-01) Fisher SB108-500, lot # 000749-24
pH 9 (8-29-01) Fisher SB114-500, lot # 007377-24
Cal temp at 21.2 Cal setpts at 7.03, 9.04
Cal curve slope = 98.7%
Mettler AE240 balance
30mL beaker (spout to right) used as holder. Test tubes tilted to right inside of holder.

LSA samples done in duplicate (lower case a/b). Suffix "3" indicates third sampling set (first desorb). Set 1 = 463/57-66. Second set = 463/67-77.

Test tube weighed. LSA vials labeled, 0.5mL of 0.1N HNO_3 added (eppend pipette) and then BW 9-5-01 weighed. Test tubes swirled. 0.5mL of NpCA samples added to each LSA vial. LSA vials re weighed. pH measured from test tubes. Test tubes reweighed.

Challange mass (target 20.0001g) measurements
start of analysis = 20.0002g end of analysis = 20.0001g

Challange pH (pH7 set pt at 7.03)
end of analysis ~ 7.06

05Sept01 CONT BAW

Date Measured →	9-5-2001	9-5-2001	9-5-2001
Test Tube ID	Mass (g) before measuring pH	pH	Mass (g) after measuring pH
NpCA4A1	44.1625	6.88	43.1030
NpCA4B1	42.8734	7.45	41.8498
NpCA4C1	43.6305	7.57	42.6134
NpCA4D1	42.2312	7.84	41.2113
NpCA4E1	42.1607	8.14	41.1393
NpCA4F1	41.3685	8.32	40.3500
NpCA4G1	41.9490	8.66	40.9231
NpCA4H1	42.4946	8.90	41.4774
NpCA5A2	43.5072	6.84	42.4614
NpCA6B2	42.3079	7.41	41.2951
NpCA5C2	42.1709	7.58	41.1558
NpCA6D2	43.0620	7.77	42.0424
NpCA5E2	42.2161	8.09	41.2037
NpCA6F2	42.2918	8.32	41.2733
NpCA5G2	42.4934	8.64	41.4876
NpCA6H2	43.6340	8.87	42.6131
NpCA6A3	45.5237	6.86	44.4843
NpCA5B3	42.9094	7.41	41.8956
NpCA6C3	42.9608	7.56	41.9427
NpCA5D3	43.0291	7.82	42.0182
NpCA6E3	42.6724	8.06	41.6512
NpCA5F3	41.8805	8.32	40.8672
NpCA6G3	42.8131	8.60	41.8024
NpCA5H3	43.0601	8.85	42.0433

05 Sept 2001
CONT BAW

Date Measured →	9-5-2001	9-5-2001
Test Tube ID	Mass (g) of Vial and HNO3	Mass (g) after adding sample
NpCA4A1a3	7.8343	8.3422
NpCA4A1b3	7.8838	8.3941
NpCA4B1a3	7.8314	8.3284
NpCA4B1b3	7.8013	8.2964
NpCA4C1a3	7.7839	8.2806
NpCA4C1b3	7.8213	8.3135
NpCA4D1a3	7.8325	8.3249
NpCA4D1b3	7.8109	8.3076
NpCA4E1a3	7.8697	8.3661
NpCA4E1b3	7.8304	8.3244
NpCA4F1a3	7.8059	8.3042
NpCA4F1b3	7.7847	8.2807
NpCA4G1a3	7.8341	8.3295
NpCA4G1b3	7.8596	8.3533
NpCA4H1a3	7.8796	8.3745
NpCA4H1b3	7.7897	8.2854
NpCA5A2a3	7.8259	8.3320
NpCA5A2b3	7.8505	8.3572
NpCA6B2a3	7.8143	8.3074
NpCA6B2b3	7.8298	8.3223
NpCA5C2a3	7.8656	8.3584
NpCA5C2b3	7.8378	8.3307
NpCA6D2a3	7.8351	8.3291
NpCA6D2b3	7.8848	8.3816

05 SEPT 2001
CONT BAW

Date Measured →	9-5-2001	9-5-2001
Test Tube ID	Mass (g) of Vial and HNO3	Mass (g) after adding sample
NpCA5E2a3	7.8411	8.3307
NpCA5E2b3	7.7906	8.2831
NpCA6F2a3	7.8198	8.3164
NpCA6F2b3	7.8496	8.3415
NpCA5G2a3	7.8301	8.3200
NpCA5G2b3	7.8197	8.3070
NpCA6H2a3	7.8460	8.3408
NpCA6H2b3	7.8172	8.3117
NpCA6A3a3	7.8219	8.3247
NpCA6A3b3	7.8334	8.3337
NpCA5B3a3	7.7855	8.2797
NpCA5B3b3	7.7698	8.2600
NpCA6C3a3	7.7765	8.2702
NpCA6C3b3	7.8017	8.2977
NpCA5D3a3	7.7996	8.2903
NpCA5D3b3	7.8582	8.3505
NpCA6E3a3	7.8681	8.3635
NpCA6E3b3	7.8798	8.3754
NpCA5F3a3	7.8822	8.3724
NpCA5F3b3	7.8618	8.3544
NpCA6G3a3	7.8768	8.3712
NpCA6G3b3	7.8926	8.3868
NpCA5H3a3	7.8228	8.3154
NpCA5H3b3	7.8444	8.3382

26 Sept 2001
BAW

Preparation of NpCA solns for LSA Analysis

Added 5mL (bottle top dispenser) of Ultima Gold AB (Packard cat# 6013309, lot# 91-9031) to each LSA vial of NpCA samples (desorb set from 463/96+7).

0.1N HNO_3 soln - for radioactive soln glassware rinsing

- conc HNO_3 - ACS grade Fisher A200C-212 lot# 993617
- nanopure water

Added 12.5mL (extra 10+2.5mL) of conc HNO_3 (16M) to a 2L vol flask and diluted to mark with nanopure water.

BAW
6 Sept 01

13 Sept 01
BAW

LSA results for NpCA4 to NpCA6 Sorption Experiments

9/10/01 1:44:32 AM QuantaSmart (TM) - 1.10 Page # 1
Protocol# 15 - Pa_Np_Exp_AB.lsa Serial# 405314 User: Bertetti

Assay Definition-

Assay Description:

Assay Type: Alpha/Beta
Report Name: Np_Pa_Exp
Output Data Path: C:\Packard\Tricarb\Results\Bertetti\Pa_Np_Exp_AB
Raw Results Path: C:\Packard\Tricarb\Results\Bertetti\Pa_Np_Exp_AB
Comma-Delimited File Name: C:\Packard\Tricarb\Results\Bertetti\Pa_Np_Exp_AB\Np_Pa_AB.002

Count Conditions-

Nuclide: Manual Np/Pa
Quench Indicator: SIS
External Std Terminator (sec): n/a
Pre-Count Delay (min): 0.00
Quench Set:
Count Time (min): 120.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: On - 1st Vial
Low CPM Threshold: Off
2 Sigma % Terminator: On - Any Region

In Use Discriminator: 143

Regions	LL	UL	Bkg Subtract	2Sigma % Terminator
Beta A	0.0	400.0	1st Vial	0.00
Beta B	0.0	2000.0	1st Vial	0.00
Alpha	100.0	400.0	1st Vial	2.00

Count Corrections-

Static Controller: On Luminescence Correction: Off
Colored Samples: n/a Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
Beta A				
Beta B				
Alpha				

IPA Block Data
Software Version IC: 2.09
Software Version EC: 1.10
Instrument Model: Tri-Carb 3100TR
Instrument Serial Number: 405314
3H Chi Square: 21.18 Date Processed: 8/30/01 4:09:08 PM
14C Chi Square: 22.35 Date Processed: 8/30/01 4:09:08 PM
3H E^2/B (0-18.6 keV and 1-18.6 keV): 259.79 Date Processed: 8/30/01 4:09:08 PM
14C B^2/B (0-156 keV and 1-156 keV): 489.32 Date Processed: 8/30/01 4:09:08 PM
3H Efficiency (0-18.6 keV): 65.67 Date Processed: 8/30/01 4:09:08 PM
14C Efficiency (0-156 keV): 96.48 Date Processed: 8/30/01 4:09:08 PM
IPA Background Date Processed: 8/30/01 4:09:08 PM
3H Background CPM (0-18.6 keV): 16.53 Date Processed: 8/30/01 4:09:08 PM
14C Background CPM (0-156 keV): 24.35 Date Processed: 8/30/01 4:09:08 PM
3H Calibration DPM: 285000
3H Reference Date: 10/29/99
14C Calibration DPM: 134100

Sample list

1- blank
2 to 17 - NpCA41ab
19 to 34 - NpCA42ab
37 to 52 - NpCA43ab
55 to 70 - ~~NpCA43~~ BAW 13 Sept 01 NpCA51ab
73 to 88 NpCA52ab
91 to 106 NpCA53ab
109 to 124 NpCA61ab
127 to 142 NpCA62ab
145 to 160 NpCA63ab
163 to 178 NpCA41ab2
181 to 196 NpCA42ab2
199 to 214 - NpCA43ab2
217 to 232 - NpCA51ab2
235 to 250 - NpCA52ab2
253 to 268 - NpCA53ab2
271 to 286 - NpCA61ab2
289 to 304 - NpCA62ab2
307 to 322 - NpCA63ab2

========== Errors and Warnings ==========
========== End of Errors and Warnings ==========

Cycle 1 Results

S#	Count Time	CPMA	A:2S%	CPMB	B:2S%	CPMa	alpha2S%	SIS	MESSAGES
1	120.00	19.86	4.10	23.89	3.74	0.68	22.22	754.7	B Blank
2	34.45	108.73	3.63	109.55	3.68	289.66	2.01	230.1	
3	35.16	112.71	3.52	112.03	3.60	283.74	2.01	179.5	
4	45.25	82.26	3.78	82.80	3.86	220.36	2.01	222.9	
5	45.72	79.66	3.84	79.98	3.93	218.05	2.01	206.2	
6	39.35	103.70	3.51	103.88	3.57	253.48	2.01	206.6	
7	40.22	97.60	3.60	98.49	3.66	247.96	2.01	232.7	
8	48.93	78.65	3.75	78.87	3.85	203.74	2.01	198.0	
9	49.09	79.22	3.73	79.98	3.80	203.09	2.01	229.2	
10	49.07	79.80	3.71	80.47	3.79	203.12	2.01	223.3	
11	48.09	74.19	3.93	74.55	4.02	207.29	2.01	228.8	
12	40.30	108.58	3.37	108.86	3.43	247.49	2.01	204.0	
13	39.61	108.22	3.41	108.73	3.46	251.86	2.01	216.0	
14	36.70	131.01	3.16	131.26	3.21	271.80	2.01	197.3	
15	35.33	134.01	3.17	133.99	3.22	282.46	2.01	198.4	
16	35.35	219.80	2.40	219.81	2.42	282.32	2.01	179.9	
17	35.40	216.61	2.42	217.24	2.44	281.90	2.01	190.6	
Missing vial 18.									
19	35.32	96.56	3.85	97.31	3.92	282.45	2.01	243.8	
20	36.36	98.32	3.76	98.72	3.83	274.41	2.01	227.5	
21	48.58	74.05	3.91	75.26	3.98	205.25	2.01	249.7	
22	48.91	70.27	4.03	70.51	4.14	203.78	2.01	214.0	
23	48.50	74.55	3.90	75.16	3.98	205.53	2.01	236.7	
24	48.65	74.94	3.88	74.94	3.99	204.90	2.01	208.3	
25	51.97	67.98	4.01	68.14	4.12	191.82	2.01	209.1	
26	52.91	67.80	3.98	68.08	4.09	188.38	2.01	215.1	
27	43.02	85.49	3.78	85.52	3.87	231.78	2.01	210.2	
28	42.99	85.98	3.77	85.88	3.86	231.94	2.01	214.1	
29	39.11	98.45	3.63	98.56	3.70	255.12	2.01	208.1	
30	39.54	101.39	3.55	102.11	3.60	252.28	2.01	221.2	
31	37.48	129.95	3.14	130.00	3.19	266.24	2.01	201.1	
32	36.76	130.63	3.16	130.57	3.21	271.44	2.01	184.4	
33	38.08	173.08	2.64	173.40	2.68	262.01	2.01	195.7	
34	36.35	175.13	2.69	175.56	2.72	274.51	2.01	192.5	
Missing vial 35.									
Missing vial 36.									
37	51.88	71.49	3.88	71.98	3.98	192.08	2.01	250.8	
38	51.18	69.61	3.97	70.85	4.04	194.71	2.01	274.1	
39	66.63	51.40	4.32	51.70	4.47	149.41	2.01	219.2	
40	68.32	50.60	4.32	50.45	4.50	145.74	2.01	202.3	
41	85.85	38.74	4.75	38.72	4.98	115.81	2.02	210.1	
42	84.77	40.66	4.61	41.00	4.79	117.29	2.02	245.6	
43	98.47	35.59	4.80	36.29	4.96	100.88	2.02	279.1	
44	101.11	34.48	4.86	34.85	5.07	98.23	2.02	238.1	
45	101.81	36.72	4.63	37.30	4.80	97.55	2.02	271.3	
46	100.69	37.08	4.61	37.24	4.82	98.65	2.02	214.5	
47	83.60	45.08	4.31	45.24	4.48	118.97	2.02	215.3	
48	80.42	43.04	4.52	43.67	4.67	123.67	2.01	255.1	
49	59.75	67.79	3.77	67.86	3.88	166.71	2.01	220.3	
50	59.32	66.28	3.84	66.48	3.95	167.94	2.01	230.4	
51	37.64	170.39	2.68	170.37	2.72	265.00	2.01	196.5	
52	37.12	174.24	2.67	174.44	2.70	268.75	2.01	199.1	
Missing vial 53.									
Missing vial 54.									
55	36.31	109.17	3.53	109.68	3.59	274.73	2.01	241.3	
56	37.31	108.79	3.49	109.69	3.54	267.38	2.01	237.9	
57	45.61	79.42	3.85	80.34	3.92	218.58	2.01	246.3	
58	45.63	78.63	3.88	79.20	3.96	218.54	2.01	233.4	
59	44.84	85.45	3.71	85.90	3.79	222.36	2.01	231.3	

NpCA41ab
NpCA42ab
NpCA43ab
NpCA51ab

60	44.53	86.54	3.69	87.40	3.76	223.92	2.01	251.5
61	48.00	75.06	3.90	75.32	4.00	207.76	2.01	228.5
62	49.08	79.59	3.72	79.74	3.81	203.07	2.01	234.9
63	52.53	72.11	3.84	71.75	3.96	189.75	2.01	207.6
64	53.11	69.58	3.91	70.08	4.00	187.65	2.01	238.8
65	43.97	91.79	3.58	92.05	3.66	226.82	2.01	241.2
66	43.33	90.00	3.65	91.06	3.71	230.25	2.01	252.9
67	42.47	105.15	3.35	105.52	3.42	234.83	2.01	219.7
68	42.13	105.11	3.37	105.92	3.42	236.80	2.01	229.4
69	42.75	127.67	2.98	128.41	3.02	233.31	2.01	218.7
70	43.71	129.03	2.93	129.05	2.98	228.15	2.01	209.4
Missing vial 71.								
Missing vial 72.								
73	36.47	110.39	3.50	111.18	3.55	273.55	2.01	240.4
74	36.58	107.73	3.55	107.79	3.62	272.70	2.01	216.6
75	40.88	90.24	3.75	90.79	3.82	243.97	2.01	234.1
76	41.12	89.36	3.76	89.63	3.84	242.52	2.01	221.2
77	47.47	78.92	3.80	79.35	3.88	209.98	2.01	241.4
78	47.48	79.53	3.78	80.24	3.86	210.00	2.01	247.0
79	47.92	75.80	3.88	75.86	3.98	208.03	2.01	224.2
80	46.58	78.06	3.86	78.36	3.95	214.01	2.01	242.5
81	46.65	79.84	3.80	79.77	3.90	213.75	2.01	217.7
82	46.38	79.90	3.81	80.29	3.90	214.96	2.01	232.4
83	42.48	89.79	3.69	90.30	3.76	234.75	2.01	240.9
84	43.78	90.76	3.62	90.89	3.70	227.76	2.01	227.3
85	41.99	105.43	3.37	105.26	3.44	237.60	2.01	212.1
86	41.50	104.21	3.41	104.71	3.47	240.31	2.01	230.9
87	40.42	138.50	2.92	138.87	2.96	246.73	2.01	210.6
88	40.22	141.26	2.89	142.19	2.93	248.03	2.01	228.0
Missing vial 89.								
Missing vial 90.								
91	36.48	107.25	3.56	107.52	3.63	273.50	2.01	234.7
92	35.64	105.62	3.64	105.71	3.71	279.94	2.01	238.7
93	44.98	83.32	3.76	84.09	3.83	221.69	2.01	255.8
94	45.27	84.52	3.72	84.57	3.81	220.29	2.01	217.8
95	55.96	66.26	3.94	66.53	4.05	178.04	2.01	226.1
96	50.71	74.46	3.82	74.35	3.93	196.52	2.01	222.6
97	55.90	65.40	3.98	66.07	4.07	178.22	2.01	254.0
98	56.57	64.46	3.99	64.32	4.12	176.11	2.01	220.8
99	51.75	73.80	3.81	73.91	3.91	192.60	2.01	232.3
100	54.09	70.58	3.84	70.71	3.95	184.20	2.01	239.8
101	55.24	68.18	3.89	68.67	3.99	180.41	2.01	246.5
102	59.66	62.63	3.97	62.56	4.10	166.96	2.01	216.0
103	41.64	108.24	3.33	107.86	3.40	239.50	2.01	206.0
104	41.58	107.10	3.35	107.45	3.41	239.87	2.01	232.9
105	40.47	142.71	2.87	143.44	2.90	246.45	2.01	221.0
106	40.48	141.53	2.88	141.89	2.92	246.39	2.01	210.1
Missing vial 107.								
Missing vial 108.								
109	39.05	100.76	3.58	101.79	3.63	255.43	2.01	253.4
110	40.16	101.71	3.51	102.25	3.57	248.33	2.01	236.5
111	52.79	74.16	3.76	74.54	3.85	188.79	2.01	224.6
112	53.21	74.69	3.73	74.92	3.83	187.28	2.01	228.9
113	59.73	63.97	3.92	64.25	4.03	166.78	2.01	240.6
114	60.03	66.20	3.82	66.80	3.92	165.93	2.01	242.4
115	58.13	65.50	3.90	65.48	4.03	171.39	2.01	234.8
116	59.90	63.43	3.93	63.27	4.07	166.29	2.01	205.2
117	61.92	63.10	3.89	63.56	3.99	160.89	2.01	251.3
118	62.13	65.40	3.79	66.26	3.88	160.28	2.01	255.8
119	59.35	66.70	3.82	67.04	3.93	167.83	2.01	241.7
120	59.50	64.83	3.89	65.07	4.00	167.41	2.01	237.4
121	53.38	82.07	3.51	82.68	3.58	186.66	2.01	241.6
122	53.94	81.50	3.51	81.73	3.59	184.75	2.01	217.0
123	54.58	97.91	3.11	97.98	3.18	182.60	2.01	205.5
124	54.71	100.36	3.06	100.13	3.14	182.11	2.01	192.3

NpCA51ab
NpCA52ab
NpCA53ab
NpCA61ab

100

Missing vial 125.								
Missing vial 126.								
127	40.59	101.87	3.49	101.88	3.56	245.79	2.01	231.4
128	40.52	99.79	3.54	100.02	3.61	246.14	2.01	237.5
129	52.14	77.13	3.69	77.78	3.77	191.14	2.01	240.6
130	51.73	76.82	3.71	77.25	3.80	192.71	2.01	255.6
131	59.42	67.13	3.80	67.53	3.90	167.62	2.01	246.7
132	59.46	67.91	3.77	68.04	3.88	167.52	2.01	227.1
133	66.12	53.77	4.21	53.95	4.35	150.57	2.01	246.1
134	68.09	54.75	4.10	55.62	4.20	146.20	2.01	279.8
135	61.37	64.11	3.86	64.87	3.96	162.30	2.01	245.8
136	59.64	63.73	3.93	64.15	4.04	167.01	2.01	242.7
137	67.10	58.71	3.94	58.91	4.06	148.39	2.01	236.5
138	67.10	56.10	4.06	56.72	4.17	148.43	2.01	264.7
139	53.63	80.96	3.53	81.33	3.62	185.81	2.01	224.3
140	54.34	82.11	3.48	82.20	3.57	183.44	2.01	224.2
141	51.71	100.04	3.15	100.65	3.21	192.73	2.01	229.4
142	52.83	101.51	3.09	102.02	3.15	188.63	2.01	219.4
Missing vial 143.								
Missing vial 144.								
145	39.92	100.96	3.54	101.16	3.61	249.85	2.01	237.0
146	40.47	106.19	3.41	106.58	3.47	246.45	2.01	241.7
147	56.18	75.66	3.61	75.79	3.71	177.36	2.01	240.9
148	54.64	76.33	3.64	76.97	3.72	182.34	2.01	264.5
149	58.07	66.35	3.87	66.79	3.97	171.55	2.01	253.4
150	57.65	67.46	3.84	67.68	3.95	172.80	2.01	234.4
151	62.84	62.22	3.90	62.49	4.02	158.46	2.01	249.5
152	62.83	63.53	3.85	64.12	3.95	158.48	2.01	260.4
153	78.77	50.09	4.10	50.72	4.22	126.29	2.01	255.0
154	78.25	51.48	4.03	51.83	4.17	127.12	2.01	264.5
155	72.25	56.70	3.90	57.22	4.02	137.76	2.01	260.9
156	72.49	56.48	3.91	56.85	4.03	137.30	2.01	248.4
157	55.80	81.04	3.47	81.72	3.54	178.54	2.01	258.9
158	55.25	79.51	3.53	79.85	3.61	180.32	2.01	226.4
159	54.29	95.80	3.16	95.74	3.24	183.52	2.01	213.7
160	53.85	96.24	3.17	96.42	3.24	185.06	2.01	209.4
Missing vial 161.								
Missing vial 162.								
163	35.44	115.33	3.46	115.27	3.52	281.49	2.01	236.0
164	34.37	114.56	3.52	114.92	3.58	290.28	2.01	260.5
165	45.26	83.41	3.75	83.84	3.83	220.34	2.01	243.5
166	44.64	86.97	3.68	87.20	3.76	223.41	2.01	240.8
167	38.75	99.57	3.62	99.75	3.69	257.44	2.01	247.1
168	38.71	102.80	3.55	103.49	3.63	257.71	2.01	257.7
169	47.96	80.10	3.75	80.26	3.84	207.85	2.01	237.8
170	49.08	81.38	3.67	81.77	3.75	203.16	2.01	250.4
171	48.18	83.25	3.65	83.83	3.72	206.88	2.01	259.0
172	48.72	87.74	3.51	88.30	3.58	204.58	2.01	258.5
173	39.63	112.34	3.33	112.27	3.40	251.68	2.01	231.9
174	39.46	115.39	3.29	115.97	3.34	252.77	2.01	241.9
175	35.67	138.01	3.11	138.12	3.15	279.78	2.01	231.7
176	34.97	140.79	3.10	141.36	3.14	285.37	2.01	230.7
177	35.39	221.37	2.39	221.52	2.41	281.95	2.01	206.7
178	35.07	222.91	2.39	223.30	2.41	284.47	2.01	209.7
Missing vial 179.								
Missing vial 180.								
181	35.27	109.40	3.58	109.71	3.64	282.91	2.01	265.0
182	36.07	104.12	3.65	104.66	3.71	276.59	2.01	265.4
183	47.59	75.43	3.90	76.15	3.98	209.47	2.01	253.7
184	46.88	79.91	3.79	80.18	3.88	212.64	2.01	247.7
185	47.72	78.65	3.80	79.02	3.88	208.94	2.01	259.7
186	47.67	80.04	3.76	80.60	3.84	209.14	2.01	274.4
187	50.24	74.57	3.84	75.39	3.91	198.41	2.01	281.7
188	50.27	74.97	3.82	74.97	3.93	198.31	2.01	256.8
189	42.01	93.19	3.63	93.20	3.71	237.36	2.01	264.7

NpCA62ab

NpCA63ab

NpCA41ab2

NpCA42ab2

190	41.31	99.75	3.51	100.56	3.56	241.47	2.01	292.3
191	37.64	110.59	3.45	111.15	3.50	265.03	2.01	265.6
192	37.87	111.12	3.43	111.62	3.48	263.52	2.01	264.7
193	36.31	138.64	3.07	139.15	3.11	274.73	2.01	247.5
194	35.66	134.24	3.16	134.41	3.20	279.81	2.01	235.2
195	36.24	183.98	2.62	184.41	2.64	275.29	2.01	236.1
196	36.89	182.96	2.60	183.73	2.63	270.40	2.01	239.1
Missing vial 197.								
Missing vial 198.								
199	50.73	76.12	3.77	76.21	3.87	196.47	2.01	263.1
200	50.80	79.69	3.66	79.97	3.75	196.27	2.01	276.5
201	63.73	58.90	4.02	58.99	4.15	156.25	2.01	253.4
202	63.17	56.81	4.13	56.80	4.28	157.66	2.01	234.9
203	79.79	46.68	4.28	46.72	4.46	124.67	2.01	262.5
204	79.76	47.64	4.22	48.22	4.36	124.70	2.01	293.2
205	89.39	43.88	4.27	43.83	4.46	111.21	2.02	252.1
206	88.68	43.00	4.35	43.30	4.52	112.11	2.02	269.9
207	85.69	45.83	4.21	46.10	4.37	116.02	2.02	275.5
208	85.44	44.98	4.27	45.19	4.44	116.38	2.02	273.4
209	70.33	56.78	3.95	56.70	4.09	141.53	2.01	257.6
210	70.81	55.77	3.98	56.08	4.11	140.56	2.01	271.6
211	58.99	77.62	3.47	77.82	3.56	168.85	2.01	261.7
212	58.82	74.67	3.57	75.16	3.65	169.37	2.01	254.6
213	36.55	175.16	2.68	175.78	2.71	272.98	2.01	226.5
214	35.92	175.02	2.70	175.19	2.74	277.72	2.01	216.2
Missing vial 215.								
Missing vial 216.								
217	36.49	113.30	3.45	113.63	3.51	273.40	2.01	244.9
218	36.80	117.21	3.37	118.47	3.40	271.20	2.01	285.7
219	44.44	86.33	3.70	86.84	3.78	224.35	2.01	262.9
220	45.00	86.52	3.68	86.80	3.76	221.59	2.01	256.9
221	43.47	87.62	3.71	87.75	3.79	229.37	2.01	261.4
222	42.30	92.77	3.63	92.66	3.71	235.76	2.01	241.3
223	48.73	84.18	3.60	84.67	3.68	204.58	2.01	260.9
224	47.32	82.02	3.71	82.28	3.80	210.67	2.01	263.7
225	51.67	79.23	3.64	79.40	3.73	192.88	2.01	246.5
226	51.47	81.27	3.59	81.78	3.67	193.67	2.01	263.2
227	42.93	95.66	3.53	95.65	3.61	232.31	2.01	247.6
228	43.52	98.02	3.46	98.83	3.52	229.13	2.01	272.5
229	42.56	108.78	3.28	109.12	3.34	234.38	2.01	242.9
230	41.72	112.24	3.25	112.28	3.31	239.07	2.01	224.4
231	42.96	131.72	2.92	132.02	2.96	232.15	2.01	240.1
232	42.93	135.67	2.87	136.25	2.91	232.29	2.01	228.8
Missing vial 233.								
Missing vial 234.								
235	35.40	117.88	3.42	117.72	3.48	281.84	2.01	239.0
236	35.38	117.87	3.42	118.11	3.48	282.06	2.01	248.2
237	39.81	96.14	3.65	96.63	3.72	250.54	2.01	264.8
238	39.35	97.35	3.64	96.95	3.73	253.51	2.01	230.4
239	46.33	84.33	3.69	84.57	3.77	215.23	2.01	259.7
240	46.81	86.51	3.61	86.68	3.69	213.02	2.01	268.7
241	46.60	83.98	3.68	84.01	3.78	213.96	2.01	261.0
242	46.77	84.55	3.66	84.96	3.74	213.14	2.01	273.5
243	45.38	89.71	3.58	90.30	3.65	219.71	2.01	279.7
244	45.33	89.19	3.60	89.68	3.67	219.97	2.01	272.1
245	42.97	96.20	3.52	96.54	3.59	232.07	2.01	253.5
246	42.49	93.96	3.59	93.88	3.67	234.75	2.01	230.6
247	41.08	113.27	3.26	113.74	3.31	242.80	2.01	255.4
248	41.08	113.10	3.26	113.06	3.32	242.83	2.01	232.8
249	39.60	144.31	2.88	144.62	2.92	251.88	2.01	249.4
250	40.26	144.82	2.85	145.11	2.89	247.76	2.01	235.1
Missing vial 251.								
Missing vial 252.								
253	35.69	115.39	3.45	115.45	3.51	279.52	2.01	267.2
254	35.63	117.22	3.42	117.48	3.48	280.13	2.01	274.8

NpCA42ab2

NpCA43ab2

NpCA51ab2

NpCA52ab2

NpCA53ab2

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Protocol# 15 - Pa_Np_Exp_AB.lsa Serial# 405314 User: Bertetti

320	54.75	85.31	3.39	86.46	3.44	182.01	2.01	300.6
321	55.82	102.05	3.00	102.46	3.06	178.47	2.01	252.1
322	55.28	100.20	3.05	100.60	3.11	180.26	2.01	256.7

← NpCA63ab2

9/10/01 1:44:32 AM QuantaSmart (TM) - 1.10 Page # 6
Protocol# 15 - Pa_Np_Exp_AB.lsa Serial# 405314 User: Bertetti

255	43.63	91.49	3.60	91.65	3.68	228.57	2.01	249.5
256	42.99	91.52	3.63	91.69	3.71	231.98	2.01	260.0
257	47.07	83.20	3.69	83.46	3.77	211.80	2.01	263.1
258	46.84	84.43	3.66	84.99	3.74	212.88	2.01	278.9
259	55.31	76.29	3.62	76.40	3.71	180.14	2.01	276.2
260	54.75	71.94	3.77	72.16	3.87	182.03	2.01	272.9
261	48.44	85.45	3.58	85.58	3.66	205.77	2.01	268.2
262	48.08	87.21	3.55	87.63	3.62	207.33	2.01	267.1
263	47.13	93.23	3.44	93.55	3.51	211.53	2.01	253.3
264	46.66	92.23	3.47	92.44	3.55	213.66	2.01	265.6
265	41.09	114.85	3.23	114.22	3.30	242.69	2.01	226.3
266	41.36	114.21	3.23	114.19	3.29	241.10	2.01	244.3
267	40.41	144.09	2.85	144.24	2.90	246.79	2.01	245.0
268	40.75	143.72	2.84	143.59	2.89	244.80	2.01	226.5
Missing vial 269.								
Missing vial 270.								
271	40.86	107.04	3.38	107.43	3.44	244.09	2.01	267.1
272	40.08	108.44	3.38	108.59	3.45	248.83	2.01	260.4
273	51.90	79.20	3.64	79.38	3.73	192.00	2.01	252.6
274	51.18	78.87	3.67	79.53	3.75	194.73	2.01	273.9
275	58.03	70.32	3.73	70.94	3.82	171.67	2.01	259.6
276	58.42	70.68	3.71	70.97	3.80	170.53	2.01	265.3
277	59.02	68.20	3.78	68.45	3.88	168.78	2.01	265.3
278	58.01	72.88	3.64	72.94	3.75	171.73	2.01	239.6
279	63.67	68.47	3.64	68.57	3.75	156.40	2.01	253.0
280	62.81	67.36	3.70	67.77	3.80	158.58	2.01	269.6
281	59.75	70.99	3.66	71.49	3.75	166.71	2.01	264.5
282	59.90	69.52	3.70	69.98	3.80	166.27	2.01	268.6
283	55.95	85.49	3.35	85.38	3.44	178.07	2.01	238.3
284	55.21	84.87	3.38	85.42	3.46	180.49	2.01	271.2
285	56.49	99.84	3.03	99.63	3.10	176.37	2.01	228.0
286	56.15	100.75	3.02	101.52	3.07	177.47	2.01	252.8
Missing vial 287.								
Missing vial 288.								
289	40.11	107.32	3.40	108.22	3.45	248.64	2.01	273.7
290	39.60	105.77	3.45	106.64	3.51	251.85	2.01	281.5
291	51.31	82.11	3.57	83.16	3.64	194.24	2.01	296.0
292	50.94	80.87	3.62	81.19	3.70	195.67	2.01	264.6
293	58.69	69.77	3.73	69.70	3.84	169.75	2.01	267.2
294	57.36	73.12	3.66	73.21	3.76	173.66	2.01	262.8
295	66.96	62.59	3.78	62.71	3.90	148.70	2.01	269.0
296	67.30	60.13	3.87	60.51	3.98	147.91	2.01	270.8
297	59.52	70.11	3.69	70.38	3.79	167.35	2.01	290.1
298	60.54	72.08	3.60	72.71	3.69	164.51	2.01	282.0
299	68.96	65.03	3.63	65.59	3.73	144.39	2.01	270.1
300	67.39	62.25	3.78	62.92	3.88	147.71	2.01	312.6
301	54.09	84.49	3.43	84.54	3.51	184.26	2.01	237.4
302	53.77	87.41	3.36	87.47	3.45	185.30	2.01	256.2
303	54.77	103.46	3.01	103.70	3.07	181.91	2.01	244.1
304	53.83	103.90	3.02	104.35	3.08	185.11	2.01	245.1
Missing vial 305.								
Missing vial 306.								
307	39.21	112.61	3.34	112.68	3.41	254.39	2.01	262.0
308	38.91	113.78	3.34	113.91	3.40	256.33	2.01	270.4
309	53.52	78.27	3.61	78.31	3.71	186.17	2.01	254.5
310	54.03	80.25	3.54	80.79	3.62	184.41	2.01	276.1
311	56.10	75.24	3.63	75.32	3.72	177.60	2.01	261.1
312	55.79	73.42	3.69	74.06	3.78	178.62	2.01	277.6
313	61.76	70.01	3.64	70.25	3.74	161.29	2.01	270.7
314	60.53	70.66	3.65	70.82	3.75	164.55	2.01	266.8
315	77.24	54.93	3.88	55.26	4.00	128.79	2.01	266.0
316	77.68	57.25	3.76	57.75	3.87	128.06	2.01	272.5
317	72.12	62.50	3.66	63.07	3.76	138.00	2.01	285.0
318	71.32	61.51	3.72	61.68	3.84	139.57	2.01	274.1
319	56.23	81.67	3.44	82.03	3.52	177.20	2.01	263.0

NpCA53ab2 (vials 255–268) ; NpCA61ab2 (vials 271–286) ; NpCA62ab2 (vials 289–304) ; NpCA63ab2 (vials 307–319) →

Copied to page 107 for 6 month QA Records 9-17-01 BW

9-18-2001
BAW

Potassium ISE Testing

Potassium ISE: Cole Parmer ~~27-503~~ 27-502-39 electrode w/ ATC (BW 9-18-01)
Ref fill soln (0.1M NaCl): Cole Parmer 27-503-78, lot # HH11, rec 9/6/01, openned 9/18/01
Potassium Std - 0.1M K^+ Orion cat # 921906, lot # F41
Potassium ISA - Orion cat # 931911, lot # EV1
Nanopure water
Mettler AE240

Standards + Samples made from same solution

Serial dilution of 0.1M K^+ Std

K-01; Target 0.01M K^+
Added 10mL (vol pipet) of 0.1M K^+ to a 100mL vol flask and diluted to mark with nanopure water
K-02; Target 0.001M K^+
Added 10mL (vol pipet) of K-01 (0.01M K^+) to a 100mL vol flask + diluted to mark with nanopure water
K-03; Target 0.0001 M K^+
Added 10mL (vol pipet) of K-02 (0.001M K^+) to a 100mL vol flask + diluted to mark with nanopure H_2O

K-Store; Target 0.01M K^+
~~using 0.1MK Potassium Std~~ BW 9/18/01
Added 3mL (vol pipet) of 0.1M K^+ to a 30ml pp bottle and added 27mL (grad cylinder) of nanopure water.

S-01; Target 195.5PPM K^+
Added 5mL of (vol pipet) K-01 (463/103) to a 10 mL vol flask and diluted to mark with nanopure water

9-18-01 BAW

S-02; Target 19.55mM K^+
Added 5mL (vol pipet) of K-02 (463/103) to a 10mL vol flask and diluted to mark with nanopure water.

Sample made from KCl solid

KCl - Fisher P217-500, lot# 006242

$0.7456g \left(\frac{1mol}{74.56g}\right)$ BW 9-18-01

$0.7456g\ KCl \left(\frac{1mol}{74.56g}\right) / 0.100L = 0.1M\ KCl$

K-04
KCl placed in tared wt dish - 0.7462g Transferred to 100mL and diluted to mark with nanopure water

S-03 - Target 0.005M KCl (195.5 ppm K)
Added 5mL (vol pipet) of 0.1M KCl above to a 100mL vol flask and diluted to mark.

K ISE Analysis

Orion 920A meter serial # 039518

Emptied fill soln from electrode and rinsed inside of electrode with nanopure water twice. Filled with Cole Parmer 27503-78, lot# HH11 Ref Fill soln. Soaked electrode for 1 hour in nanopure water. Soaked for 2 hours in 0.01M K^+ (K-Store 463/103).

3 pt calibration @ 21.2°C - insulation pad used - fisher cat# 2-544-36 Micro beaker, magnetic stir bars with stir setting at 8.5. 0.2mL of K ISA added to 10mL (oxford pipette)

9-18-01 BAW

Cal Curve Pts K-01 (391 ppm)
K-02 (39.1 ppm)
K-03 (3.91 ppm)

Electronic Slope Check

K-02 at -58.4
K-01 at -1.4
diff = 57.6mV Target 56 ± 2 mV ∴ OK

Samples	Target Conc ppm	Measured Conc ppm
S-01 (463/103)	195.5	190
S-02 (463/104)	19.5	18.8
S-03 (463/104)	195.1	191
K-02 (463/103)	39.1	38.9

9-18-01 BAW

1-24-01 BAW

Div 01 Results for NpCA Solns

Analysis: ICP for 6 cations
Samples: Selected NpCA 41 to 63 Solns
Chain of Custody 463/91 to 93
Sampling 463/ 80
These samples represent the end of the sorption exp (aliquots taken before the start of the desorption trial exp.)

Summary of Div 01 Results for NpCA solns 463/91-93

Element	Sample Conc (ppm) 4A1	4B1	4C1	4D1	4EE1	4F1	4G1	4H1
Ca	7583	1608	481	150	47.6	19.9	5.00	1.75
Mg	*	*	*	*	*	*	*	*
Mn	*	*	*	*	*	*	*	*
K	29.7	17.2	25.0	29.0	20.7	19.6	31.4	25.4
Na	292	275	2391	2363	2253	2334	2430	2469
Sr	0.755	0.177	0.067	0.027	0.016	0.012	0.009	0.007

Element	Sample Conc (ppm) 5A2	5B3	5C2	5D3	5EE2	5F3	5G2	5H3
Ca	7637	1575	483	148	47.3	20.4	4.74	1.77
Mg	*	*	*	*	*	*	*	*
Mn	*	*	*	*	*	*	*	*
K	18.6	16.8	27.1	22.3	30.3	29.7	24.4	32.2
Na	290	267	2388	2297	2302	2320	2336	2530
Sr	0.753	0.194	0.069	0.028	0.015	0.013	0.009	0.008

Element	Sample Conc (ppm) 6A3	6B2	6C3	6D2	6EE3	6F2	6G3	6H2
Ca	7544	1572	481	144	46.8	18.7	4.55	1.66
Mg	*	*	*	*	*	*	*	*
Mn	*	*	*	*	*	*	*	*
K	18.7	21.6	17.9	20.9	22.0	23.7	25.8	20.0
Na	285	265	2269	2308	2327	2332	2406	2486
Sr	0.763	0.198	0.070	0.027	0.017	0.013	0.009	0.008

Element	QA Sample Conc (ppm) QA	Target	% diff
Ca	118	120	1.67
Mg	*	na	na
Mn	*	na	na
K	*	na	na
Na	*	na	na
Sr	0.007	na	na

* sample below reporting limit

Element	Reporting limit (ppm)
Ca	0.05
Mg	0.05
Mn	0.005
K	0.1
Na	0.1
Sr	0.005

MS, Dup, LCS, and Blank samples not included in these summary tables

9-24-01 IONT BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: NPCA4A1

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 167126

Client: Division 20
Date Received: 09/04/01
Project No.: 20.01402.871
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	7583	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	29.7	0.2
Sodium	292	0.1
Strontium	0.755	0.005

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: NPCA4B1

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 167127

Client: Division 20
Date Received: 09/04/01
Project No.: 20.01402.871
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	1608	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	17.2	0.2
Sodium	275	0.1
Strontium	0.177	0.005

-24-01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: NPCA4C1

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 167128

Client: Division 20
Date Received: 09/04/01
Project No.: 20.01402.871
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	481	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	25.0	0.2
Sodium	2391	0.1
Strontium	0.067	0.005

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: NPCA4D1

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 167129

Client: Division 20
Date Received: 09/04/01
Project No.: 20.01402.871
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	150	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	29.0	0.2
Sodium	2363	0.1
Strontium	0.027	0.005

9-24-01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: NPCA4E1

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 167130

Client: Division 20
Date Received: 09/04/01
Project No.: 20.01402.871
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	47.6	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	20.7	0.2
Sodium	2253	0.1
Strontium	0.016	0.005

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: NPCA4F1

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 167131

Client: Division 20
Date Received: 09/04/01
Project No.: 20.01402.871
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	19.9	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	19.6	0.2
Sodium	2334	0.1
Strontium	0.012	0.005

-24-01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
NPCA4G1

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 09/04/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 167132
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	5.00	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	31.4	0.2
Sodium	2430	0.1
Strontium	0.009	0.005

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
NPCA4H1

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 09/04/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 167133
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	1.75	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	25.4	0.2
Sodium	2469	0.1
Strontium	0.007	0.005

9-24-01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
NPCA5A2

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 09/04/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 167134
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	7637	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	18.6	0.2
Sodium	290	0.1
Strontium	0.753	0.005

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
NPCA5B3

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 09/04/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 167135
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	1575	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	16.8	0.2
Sodium	267	0.1
Strontium	0.194	0.005

-24-01
ONT BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
NPCA5C2

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 09/04/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 167125
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	483	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	27.1	0.2
Sodium	2388	0.1
Strontium	0.069	0.005

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
NPCA5D3

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 09/04/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 167136
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	148	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	22.3	0.2
Sodium	2297	0.1
Strontium	0.028	0.005

9-24-01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
NPCA5E2

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 09/04/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 167137
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	47.3	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	30.3	0.2
Sodium	2302	0.1
Strontium	0.015	0.005

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
NPCA5F3

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: 09/04/01

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: 167138
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	20.4	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	29.7	0.2
Sodium	2320	0.1
Strontium	0.013	0.005

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AW cont

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: NPCA5G2

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 167139

Client: Division 20
Date Received: 09/04/01
Project No.: 20.01402.871
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	4.74	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	24.4	0.2
Sodium	2336	0.1
Strontium	0.009	0.005

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: NPCA5H3

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 167140

Client: Division 20
Date Received: 09/04/01
Project No.: 20.01402.871
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	1.77	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	32.2	0.2
Sodium	2530	0.1
Strontium	0.008	0.005

9-21-01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: NPCA6A3

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 167141

Client: Division 20
Date Received: 09/04/01
Project No.: 20.01402.871
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	7544	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	18.7	0.2
Sodium	285	0.1
Strontium	0.763	0.005

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: NPCA6B2

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 167142

Client: Division 20
Date Received: 09/04/01
Project No.: 20.01402.871
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	1572	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	21.6	0.2
Sodium	265	0.1
Strontium	0.198	0.005

9-24-01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: NPCA6C3

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 167143

Client: Division 20
Date Received: 09/04/01
Project No.: 20.01402.871
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	481	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	17.9	0.2
Sodium	2269	0.1
Strontium	0.070	0.005

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: NPCA6D2

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 167144

Client: Division 20
Date Received: 09/04/01
Project No.: 20.01402.871
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	144	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	20.9	0.2
Sodium	2308	0.1
Strontium	0.027	0.005

9-24-01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: NPCA6E3

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 167145

Client: Division 20
Date Received: 09/04/01
Project No.: 20.01402.871
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	46.8	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	22.0	0.2
Sodium	2327	0.1
Strontium	0.017	0.005

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: NPCA6F2

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 167146

Client: Division 20
Date Received: 09/04/01
Project No.: 20.01402.871
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	18.7	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	23.7	0.2
Sodium	2332	0.1
Strontium	0.013	0.005

7-24-01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
NPCA6G3

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 167147

Client: Division 20
Date Received: 09/04/01
Project No.: 20.01402.871
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	4.55	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	25.8	0.2
Sodium	2406	0.1
Strontium	0.009	0.005

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
NPCA6H2

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 167148

Client: Division 20
Date Received: 09/04/01
Project No.: 20.01402.871
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	1.66	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	20.0	0.2
Sodium	2486	0.1
Strontium	0.008	0.005

9-24-01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID
NPCAQA

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 167149

Client: Division 20
Date Received: 09/04/01
Project No.: 20.01402.871
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	118	0.1
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	<0.2	0.2
Sodium	<0.1	0.1
Strontium	0.007	0.005

SOUTHWEST RESEARCH INSTITUTE
MATRIX SPIKE SUMMARY

Sample ID
NPCA4B1

Lab Name: Southwest Research Institute
Lab Code: SwRI
Matrix: Liquid
Lab System ID: 167127

Client: Division 20
Date Received: 09/04/01
Project No.: 20.01402.871
Work Order: 20850

Analysis	Sample Result (mg/L)	Spike Result (mg/L)	Spike Added (mg/L)	Recovery
Calcium	1608	5699	4000	102.3%
Magnesium	<0.05	19.6	20.0	98.0%
Manganese	<0.005	0.494	0.500	98.9%
Potassium	----	----	----	----
Sodium	275	4055	4000	94.5%
Strontium	0.177	2.09	2.00	95.8%

NA- Not Applicable.

9-24-01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
MATRIX SPIKE SUMMARY

Sample ID: NPCA5D3

Lab Name: Southwest Research Institute
Client: Division 20
Lab Code: SwRI
Date Received: 09/04/01
Matrix: Liquid
Project No.: 20.01402.871
Lab System ID: 167136
Work Order: 20850

Analysis	Sample Result (mg/L)	Spike Result (mg/L)	Spike Added (mg/L)	Recovery
Calcium	----	----	----	----
Magnesium	----	----	----	----
Manganese	----	----	----	----
Potassium	22.3	46.4	20.0	120.4%
Sodium	----	----	----	----
Strontium	----	----	----	----

NA- Not Applicable.

SOUTHWEST RESEARCH INSTITUTE
DUPLICATE SUMMARY

Sample ID: NPCA4A1

Lab Name: Southwest Research Institute
Client: Division 20
Lab Code: SwRI
Date Received: 09/04/01
Matrix: Liquid
Project No.: 20.01402.871
Lab System ID: 167126
Work Order: 20850

Analysis	Sample Result (mg/L)	Duplicate Result (mg/L)	RPD
Calcium	7583	7642	0.78%
Magnesium	<0.05	<0.05	0.00%
Manganese	<0.005	<0.005	0.00%
Potassium	----	----	----
Sodium	292	289	0.76%
Strontium	0.755	0.758	0.38%

9-24-01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
DUPLICATE SUMMARY

Sample ID: NPCA5B3

Lab Name: Southwest Research Institute
Client: Division 20
Lab Code: SwRI
Date Received: 09/04/01
Matrix: Liquid
Project No.: 20.01402.871
Lab System ID: 167135
Work Order: 20850

Analysis	Sample Result (mg/L)	Duplicate Result (mg/L)	RPD
Calcium	----	----	----
Magnesium	----	----	----
Manganese	----	----	----
Potassium	16.8	16.9	0.45%
Sodium	----	----	----
Strontium	----	----	----

SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: LCSW

Lab Name: Southwest Research Institute
Client: Division 20
Lab Code: SwRI
Date Received: NA
Matrix: Liquid
Project No.: 20.01402.871
Lab System ID: NA
Work Order: 20850

Analysis	Sample Result (mg/L)	True Value (mg/L)	Recovery
Calcium	20.7	20.0	103.3%
Magnesium	20.0	20.0	100.1%
Manganese	0.500	0.500	99.9%
Potassium	19.7	20.0	98.6%
Sodium	18.5	20.0	92.5%
Strontium	1.93	2.00	96.7%

NA- Not Applicable.

9-24-01
CONT BAW

SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID
PBW

Lab Name: Southwest Research Institute
Client: Division 20

Lab Code: SwRI
Date Received: NA

Matrix: Liquid
Project No.: 20.01402.871

Lab System ID: NA
Work Order: 20850

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Calcium	<0.05	0.05
Magnesium	<0.05	0.05
Manganese	<0.005	0.005
Potassium	<0.1	0.1
Sodium	<0.1	0.1
Strontium	<0.005	0.005

NA- Not Applicable.

5Sep01 BAW

LSA results selected NpCA41 to NpCA63 Desorp Exp

Desorp Samples from 463/94 to 98

Sample list
~~#8 blank~~ BW 9/25/01 1 - blank
2 to 17 = NpCA4x1ab3 where x = A to H
19 to 26 = NpCA5x2ab3 where x = A, C, E, G
37 to 44 = NpCA5x3ab3 where x = B, D, F, H
55 to 62 = NpCA6x2ab3 where x = B, D, F, H
73 to 80 = NpCA6x3ab3 where x = A, C, E, G

25 Sep 01 BW

25Sept01
CONT BAW

9/23/01 9:22:03 PM QuantaSmart (TM) - 1.10 Page # 1
Protocol# 15 - Pa_Np_Exp_AB.lsa Serial# 405314 User: Bertetti

```
Assay Definition-

Assay Description:


Assay Type: Alpha/Beta
Report Name: Np_Pa_Exp
Output Data Path: C:\Packard\Tricarb\Results\Bertetti\Pa_Np_Exp_AB
Raw Results Path: C:\Packard\Tricarb\Results\Bertetti\Pa_Np_Exp_AB
Comma-Delimited File Name: C:\Packard\Tricarb\Results\Bertetti\Pa_Np_Exp_AB\Np_Pa_AB.003

Count Conditions-

Nuclide: Manual Np/Pa
   Quench Indicator: SIS
   External Std Terminator (sec): n/a
   Pre-Count Delay (min): 0.00
Quench Set:
Count Time (min): 120.00
Count Mode: Normal
Assay Count Cycles: 1          Repeat Sample Count: 1
#Vials/Sample: 1               Calculate % Reference: Off

Background Subtract: On - 1st Vial
Low CPM Threshold: Off
2 Sigma % Terminator: On - Any Region

In Use Discriminator: 143

Regions          LL       UL  Bkg Subtract  2Sigma % Terminator
Beta A          0.0    400.0       1st Vial                0.00
Beta B          0.0   2000.0       1st Vial                0.00
Alpha         100.0    400.0       1st Vial                2.00

Count Corrections-

Static Controller: On          Luminescence Correction: Off
Colored Samples: n/a           Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18    Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off
Regions    Half Life           Units       Reference Date      Reference Time
Beta A
Beta B
Alpha

IPA Block Data
Software Version IC: 2.09
Software Version EC: 1.10
Instrument Model: Tri-Carb 3100TR
Instrument Serial Number: 405314
3H Chi Square: 16.28    Date Processed: 9/19/01 6:25:08 PM
14C Chi Square: 12.36   Date Processed: 9/19/01 6:25:08 PM
3H E^2/B (0-18.6 keV and 1-18.6 keV): 283.47  Date Processed: 9/19/01 6:25:08 PM
14C E^2/B (0-156 keV and 1-156 keV): 525.81   Date Processed: 9/19/01 6:25:08 PM
3H Efficiency (0-18.6 keV): 66.12  Date Processed: 9/19/01 6:25:08 PM
14C Efficiency (0-156 keV): 97.16  Date Processed: 9/19/01 6:25:08 PM
IPA Background Date Processed: 9/19/01 6:25:08 PM
3H Background CPM (0-18.6 keV): 15.38  Date Processed: 9/19/01 6:25:08 PM
14C Background CPM (0-156 keV): 23.28  Date Processed: 9/19/01 6:25:08 PM
3H Calibration DPM: 285000
3H Reference Date: 10/29/99
14C Calibration DPM: 134100
```

5 Sep 01
CONT BAW

========== Errors and Warnings ==========
========== End of Errors and Warnings ==========

Cycle 1 Results

S#	Count Time	CPMA	A:2S%	CPMB	B:2S%	CPMa	alpha2S%	SIS	MESSAGES
1	120.00	20.19	4.06	24.44	3.69	0.43	27.74	785.8	B Blank
2	120.00	8.36	15.25	8.48	16.30	19.07	4.28	184.4	
3	120.00	8.19	15.53	8.02	17.18	19.62	4.21	134.2	
4	120.00	15.43	8.84	15.27	9.58	40.72	2.89	205.3	
5	120.00	14.72	9.21	15.00	9.73	41.24	2.87	271.6	
6	120.00	13.24	10.10	13.42	10.74	33.36	3.20	228.9	
7	120.00	13.12	10.18	12.79	11.21	33.02	3.22	153.5	
8	120.00	16.37	8.40	16.33	9.03	42.03	2.84	239.6	
9	120.00	16.75	8.24	17.14	8.65	42.95	2.81	283.0	
10	120.00	16.86	8.19	16.84	8.79	44.40	2.77	206.7	
11	120.00	16.91	8.17	16.95	8.74	44.04	2.78	243.4	
12	120.00	19.17	7.35	19.72	7.67	45.71	2.73	312.4	
13	120.00	18.02	7.74	18.08	8.26	45.21	2.74	229.7	
14	120.00	20.95	6.83	20.84	7.31	35.08	3.12	187.3	
15	120.00	20.37	6.99	20.48	7.42	34.42	3.15	210.0	
16	120.00	55.67	3.21	55.99	3.34	36.85	3.04	219.1	
17	120.00	56.57	3.18	56.91	3.30	36.79	3.05	225.5	
Missing vial 18.									
19	120.00	13.14	10.16	13.36	10.78	31.02	3.32	267.0	> A
20	120.00	12.74	10.44	13.23	10.87	30.61	3.35	330.6	
21	120.00	18.52	7.56	18.52	8.09	48.90	2.63	208.2	> C
22	120.00	19.97	7.10	20.02	7.57	48.71	2.64	229.4	
23	120.00	23.35	6.24	23.28	6.66	56.07	2.46	232.6	> E
24	120.00	22.59	6.41	22.50	6.86	56.30	2.45	217.2	
25	120.00	22.22	6.50	22.33	6.90	48.25	2.65	238.0	> G
26	120.00	23.08	6.30	23.34	6.65	48.36	2.65	240.0	
Missing vial 27.									
Missing vial 28.									
Missing vial 29.									
Missing vial 30.									
Missing vial 31.									
Missing vial 32.									
Missing vial 33.									
Missing vial 34.									
Missing vial 35.									
Missing vial 36.									
37	120.00	18.97	7.42	19.25	7.83	49.64	2.61	264.9	> B
38	120.00	19.59	7.22	19.80	7.64	49.12	2.63	266.8	
39	120.00	18.00	7.75	18.20	8.22	45.90	2.72	301.0	> D
40	120.00	17.53	7.92	17.37	8.56	46.22	2.71	225.1	
41	120.00	20.97	6.82	21.30	7.18	51.80	2.56	308.5	> F
42	120.00	22.97	6.33	22.97	6.74	52.77	2.53	241.4	
43	120.00	52.14	3.37	52.20	3.52	74.43	2.13	217.6	> H
44	120.00	53.18	3.32	53.02	3.48	72.57	2.16	218.9	
Missing vial 45.									
Missing vial 46.									
Missing vial 47.									
Missing vial 48.									
Missing vial 49.									
Missing vial 50.									
Missing vial 51.									
Missing vial 52.									
Missing vial 53.									
Missing vial 54.									
55	120.00	24.44	6.01	24.38	6.41	60.48	2.36	212.4	> B
56	120.00	23.45	6.22	23.47	6.62	60.65	2.36	249.7	
57	120.00	24.41	6.02	24.37	6.41	61.32	2.35	220.3	> D
58	120.00	24.55	5.99	24.69	6.34	62.40	2.33	271.6	
59	120.00	27.12	5.53	26.82	5.92	67.77	2.23	203.9	— F

NpCA4/4b3

NpCA5x2a3

NpCA5x3ab3

NpCA6x2ab3

25 Sep 01
CONT BAW

60	120.00	27.12	5.53	27.47	5.81	66.01	2.26	284.5 — F
61	116.43	47.30	3.66	47.25	3.83	85.46	2.01	228.1 > H
62	115.00	47.98	3.64	48.32	3.79	86.54	2.01	265.0
Missing vial 63.								
Missing vial 64.								
Missing vial 65.								
Missing vial 66.								
Missing vial 67.								
Missing vial 68.								
Missing vial 69.								
Missing vial 70.								
Missing vial 71.								
Missing vial 72.								
73	120.00	22.14	6.52	22.46	6.87	53.17	2.52	267.4 > A
74	120.00	23.30	6.25	23.37	6.64	54.71	2.49	226.2
75	120.00	24.76	5.95	24.86	6.31	61.93	2.34	258.6 > C
76	120.00	25.64	5.79	25.56	6.16	61.57	2.34	229.0
77	120.00	26.23	5.68	26.30	6.02	60.58	2.36	275.0 > E
78	120.00	25.53	5.81	25.72	6.13	61.82	2.34	263.0
79	120.00	27.33	5.50	27.32	5.83	64.19	2.29	232.8 > G
80	120.00	29.19	5.22	29.47	5.48	63.97	2.30	268.4

NpCA6x2a3

NpCA6x3ab3

03/08/02 PB entry and correction check review by principal investigator.

3/21/02 BAW Copy made for QA ~~Archive~~ Archieves. BW 3-21-02

04/01/02 PB monthly review and error check.

4/17/02 BAW Calcite Solution Preparation for Np/Ca Experiments

Calcium Perchlorate: Aldrich 40,142-0, lot#08524MI
5/1/02 PB opened ~~opened~~ 4/23/01
Sodium Perchlorate: Mallinckrodt cat # 1190, lot# KTKJ
Sodium Hydroxide dilute-it 46687-01, lot# H33121
Calcite: Fisher C64-500, lot# 986396

BW 4-17-02

17Apr02
CONT
BAW

Various calcite solutions in equilibrium with atmospheric PCO_2.

Calculated additions of calcium perchlorate, sodium perchlorate, and sodium hydroxide will be used to bring the solution chemistry close to equilibrium conditions. Solid calcite (30 g) will be added to each solution (final volume at two liters) and air will be bubbled to ensure equilibrium with atmosphere.

Reagents: Sodium perchlorate (anhydrous): dried at 49°C for over 24 hours
1M Calcium solution made with calcium perchlorate
0.1M Sodium hydroxide solution
Calcite
Super Q water

A 1M calcium solution was made. Approximately 100mL of super Q water was added to a 250mL beaker and tared. 62.21g (Mettler PM4600) of calcium perchlorate was added. This solution was transferred to a 200mL volumetric flask. The beaker was carefully rinsed several times and the rinsate was transferred to the 200mL vol flask. Next, 1000mL of 0.1M NaOH was made with a dilute-it cartridge. Next, the appropriate amount of sodium perchlorate was weighed (Mettler AE 240) in a weighing boat and transferred to a 600mL beaker. The weighing boat was carefully rinsed several times and the rinsate was transferred to the 600mL beaker. The beaker with the sodium perchlorate solution was placed on the Mettler PM4600 balance and tared to zero. Next, the appropriate amount of sodium hydroxide solution was added by weight (Mettler PM4600). The solution was tared again. Then the appropriate amount of calcium perchlorate solution was added. For solutions B to E, the calcium perchlorate solution was added by weight. For solution F, the calcium perchlorate was added by volume (micropipette). The solution in the 600mL beaker was transferred to the appropriate 2L volumetric flask and diluted to mark with super Q water. This 2L solution was transferred to an appropriately labeled 2L polycarbonate container that contained 30.00g of calcite (see table for ID of calcite containers). Gas bubblers were inserted into each container to ensure equilibrium with atmosphere.

Target pH Of solution	Mass of NaClO4 (g)	Mass of 0.1M NaOH soln (g)	Amount of 1M $Ca(ClO_4)_2$ $4H_2O$	Calcite container ID
7.50	2.3826	5.40	86.71 g	B
7.75	24.3670	10.00	27.49 g	C
8.00	24.2925	16.00	8.19 g	D
8.25	24.1737	26.02	2.58 g	E
8.50	24.3682	42.01	0.94 mL	F

4-17-02 BW

17Apr02
CONT
BAW

1M Calcium Solution

Followed procedure on 463/126
Mass of $Ca(ClO_4)_2 \cdot 4H_2O$ = 62.36 g

0.1M NaOH Solution

Followed dilut-it instructions below. Reagent (44L BW 4-17-02 463-125) into 1000mL Vol flask.

Labeled = 0.1M NaOH

Actual amounts of reagents used

Soln ID	Target pH	Mass Calcite (g)	Mass(g) $NaClO_4$	BW 4-17-02 Mass(g) 0.1M NaOH	Mass(g) $Ca(ClO_4)_2 \cdot 4H_2O$
Soln B	7.5	30.01	2.3824	5.40g	86.72
Soln C	7.75	30.00	24.3680	10.03	27.49
Soln D	8.00	30.00	24.2946	16.00	8.20
Soln E	8.25	30.00	24.1739	26.03	2.58
Soln F	8.50	30.01	24.3690	42.01	0.100 mL

Soln D notes - During the 2000mL mixing stage, some soln (~7 drops) leaked out. Some calcite was also noted on the outside of the 2L polycarb container

4/23/02 BAW — Soln F (463/127) was not bubbling when ~~ck~~ BW 4/23/02 checked at 10:00 am. Teflon tubing was detatched from glass tube w/ frit inside soln. Reattached tubing to glassware and bubbling started again

01 May 02 BAW — Monthly notebook review completed.

5/22/02 BAW — **Preparation of Neptunium/Calcite Series 7+8 Test Tubes**

Reagents: calcite 309/14651 prepared previously and stored in dessicator.
Solns B to ~~F 494~~ F BW 5-22-02 463/127

40 polycarbonate test tubes ~~were~~ BW 5/22/02 with drilled holes in the caps were appropriately labeled (see following tables). The NpCA label prefix used on all test tubes represented neptunium/calcite. Two different calcite masses were used: NpCA series 7 (0.1g) and NpCA series 8 (0.4g). Five different pH solutions were used: B(7.5), C(7.75), D(8.0) E(8.25), ~~and~~ BW 5/22/02 F(8.5). Each test was prepared in quadruplicate as represented by the suffix 1 to 4. Within a quadruplicate set two test tubes would have magnetic stirring bars placed inside (suffix 1+2) while the remaining ~~two~~ BW 5-22-02 two would not (suffix 3+4)

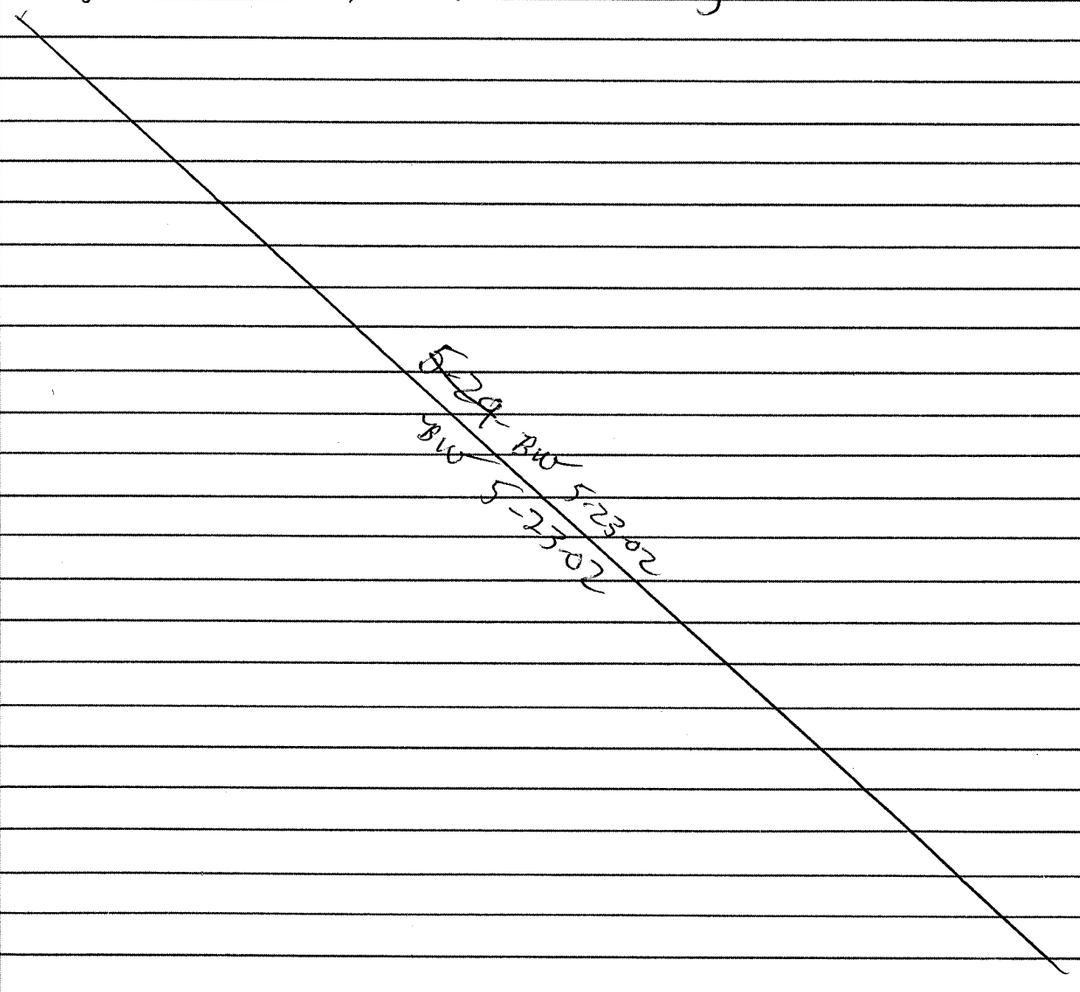
A 30 mL glass beaker was used to stabilize the test tubes on the Mettler AE240 balance. Test tubes were tilted to the right and the beakers spout was also directed to the right. ~~Each test~~ BW 5-23-02 ~~tube with cap and half with stir bars (suffix~~ BW 5-23-02 ~~1 and 2) were weighed. The caps were removed.~~ BW 5-23-02 ~~The appropriate amount of calcite was added~~

5-22-02 COINT BAW — ~~to a tared weighing paper and transfered to~~ BW 5-23-02 ~~a test tube. The test tube with calcite~~ BW 5-23-02 ~~was reweighed.~~ BW 5-23-02

Target mass (calcite) for series 7 = 0.1g
suffix 1+2 has stirring bar; suffix 3+4 does not

Added the appropriate amount of calcite to a tared weighing paper. Recorded the weight and transfered into the appropriate test tube.

Target mass (calcite) for series 8 = 0.4g



22MAY02 cont BAW

Calcite target mass for Series 8 is 0.4g
Suffix 1+2 has stirring bar; suffix 3+4 does not

Test Tube ID	Mass (g) of calcite	Test Tube ID	Mass (g) of calcite
NPCA7B1	0.1004	NPCA8B1	0.4007
NPCA7B2	0.1000	NPCA8B2	0.4016
NPCA7B3	0.1003	NPCA8B3	0.4007
NPCA7B4	0.1012	NPCA8B4	0.4002
NPCA7C1	0.1006	NPCA8C1	0.4016
NPCA7C2	0.1003	NPCA8C2	0.4008
NPCA7C3	0.1006	NPCA8C3	0.4004
NPCA7C4	0.1014	NPCA8C4	0.4005
NPCA7D1	0.1003	NPCA8D1	0.4010
NPCA7D2	0.1000	NPCA8D2	0.4004
NPCA7D3	0.1004	NPCA8D3	0.4012
NPCA7D4	0.1000	NPCA8D4	0.4014
NPCA7E1	0.1003	NPCA8E1	0.4013
NPCA7E2	0.1000	NPCA8E2	0.4007
NPCA7E3	0.1004	NPCA8E3	0.4015
NPCA7E4	0.1003	NPCA8E4	0.4007
NPCA7F1	0.1006	NPCA8F1	0.4004
NPCA7F2	0.1003	NPCA8F2	0.4014
NPCA7F3	0.1008	NPCA8F3	0.4007
NPCA7F4	0.1000	NPCA8F4	0.4008

23MAY02 BAW

Filtering + Addition of pre-equilibrated Reference solns to Series 7+8 Test Tubes

Approximately 250mL of each reference was removed from the 2L bottle and filtered using the Masterflex Portable Sampler
Ref. Solns: B to F from 463/127
Filter: AquaPrep 600 capsule 0.45μm PN 12176
Tubing: L/S 24 PN 06429-24
Each reference soln was collected in a labeled 400mL glass beaker.

The forty experimental test tubes (463/130) with calcite (suffix 1+2 w stirers as well) were weighed on the Mettler AE240. Their masses were recorded. 30mL of the appropriate, filtered reference soln was add to each test tube BAW 5-23-02 using an oxford pipet (10mL disposable tip)
Then the 48 test tubes with solutions were reweighed + recorded.

BAW 5-23-02

23 MAY 02
CONT
BW

Test Tube ID	Mass (g) of test tube + calcite	Mass (g) of test tube + calcite + solution
NPCA7B1	22.2976	52.5007
NPCA7B2	22.2844	52.4744
NPCA7B3	22.0717	52.2165
NPCA7B4	22.3150	52.4223
NPCA7C1	22.3334	52.4827
NPCA7C2	22.2790	52.4388
NPCA7C3	22.1554	52.2564
NPCA7C4	22.3218	52.4080
NPCA7D1	22.3263	52.4027
NPCA7D2	22.1837	52.2536
NPCA7D3	22.2195	52.2241
NPCA7D4	22.2856	52.3100
NPCA7E1	22.2682	52.3226
NPCA7E2	22.2674	52.2871
NPCA7E3	22.0433	52.0470
NPCA7E4	22.1014	52.0744
NPCA7F1	22.2753	52.3033
NPCA7F2	22.2060	52.2305
NPCA7F3	22.2309	52.2501
NPCA7F4	22.1460	52.1649

5-23-02 BW

23 May 02
CONT
BW

Test Tube ID	Mass (g) of test tube + calcite	Mass (g) of test tube + calcite + solution
NPCA8B1	22.4989	52.6424
NPCA8B2	22.4325	52.5509
NPCA8B3	22.4519	52.5292
NPCA8B4	22.3467	52.4168
NPCA8C1	22.5293	52.5644
NPCA8C2	22.5174	52.6063
NPCA8C3	22.4478	52.5247
NPCA8C4	22.3738	52.4258
NPCA8D1	22.5002	52.5259
NPCA8D2	22.6534	52.6277
NPCA8D3	22.4400	52.4178
NPCA8D4	22.3832	52.3604
NPCA8E1	22.4422	52.4484
NPCA8E2	22.6078	52.6014
NPCA8E3	22.5475	52.5272
NPCA8E4	22.7501	52.6390
NPCA8F1	22.4892	52.4818
NPCA8F2	22.4379	52.4452
NPCA8F3	22.2987	52.2191
NPCA8F4	22.3836	52.3773

BW 5-23-02

24MAY02
BAW

0.32 N NaOH Solution Preparation

To Make 50mL of 0.32N NaOH

$$\frac{(0.64\,g\,NaOH)\left(\frac{1\,mol}{40.00\,g\,NaOH}\right)}{0.050\,L} = 0.32\,N\,NaOH$$

Reagents: NaOH pellets ~ Fisher S318-1,
lot # 976631
Super Q water
balance: Mettler AE240

Added NaOH pellets to a taved 50mL vol flask.
Record mass of NaOH and diluted to mark with
~~nanopure H_2O~~ Super Q water.
BW 5-24-02

Mass of NaOH = 0.6428g

Normality of Soln

$$\frac{(0.6428g)\left(\frac{1\,mol}{40.00g}\right)}{0.050\,L} = 0.3214\,N$$

Labeled: Base A

Neptunium Spiking of Series 7+8 Np/Calcite experimental solns

Mettler AE240 balance used for measurements
Test tubes held in 50mL beaker (spout right)
Np spike = #46A 118ppm ^{237}Np 29 Nov 99
Spike volume = 100μL
Base Spike: Base A 463/134 0.3214N NaOH
Spike volume = 100μL.

24 May 02
CONT
BW

Test Tube ID	Initial Mass (g) of container	Mass (g) after Np spike	Mass (g) after Base spike
NPCA7B1	52.4346	52.5351	52.6357
NPCA7B2	52.4159	52.5159	52.6169
NPCA7B3	52.1411	52.2409	52.3419
NPCA7B4	52.3696	52.4704	52.5715
NPCA7C1	52.4315	52.5323	52.6333
NPCA7C2	52.3708	52.4714	52.5724
NPCA7C3	52.2043	52.3046	52.4057
NPCA7C4	52.3573	52.4575	52.5587
NPCA7D1	52.3489	52.4489	52.5498
NPCA7D2	52.2012	52.3009	52.4016
NPCA7D3	52.1712	52.2704	52.3715
NPCA7D4	52.2592	52.3582	52.4596
NPCA7E1	52.2705	52.3700	52.4711
NPCA7E2	52.2237	52.3225	52.4238
NPCA7E3	51.9877	52.0867	52.1881
NPCA7E4	52.0192	52.1185	52.2193
NPCA7F1	52.2486	52.3480	52.4485
NPCA7F2	52.1810	52.2808	52.3782
NPCA7F3	52.1995	52.2995	52.4003
NPCA7F4	52.1060	52.2058	52.3070

4 MAY 02
CONT
BAW

Test Tube ID	Initial Mass (g) of container	Mass (g) after Np spike	Mass (g) after Base spike
NPCA8B1	52.5861	52.6850	52.7858
NPCA8B2	52.4891	52.5877	52.6891
NPCA8B3	52.4703	52.5694	52.6706
NPCA8B4	52.3529	52.4522	52.5539
NPCA8C1	~~52.6~~ 52.5004 BW 5-24-02	52.6000	52.7005
NPCA8C2	52.5453	52.6444	52.7426
NPCA8C3	52.4683	52.5668	52.6680
NPCA8C4	52.3717	52.4707	52.5723
NPCA8D1	52.4481	52.5467	52.6477
NPCA8D2	52.5575	52.6562	52.7574
NPCA8D3	52.3574	52.4566	52.5575
NPCA8D4	52.2999	52.3997	52.5009
NPCA8E1	52.3832	52.4826	52.5838
NPCA8E2	52.5484	52.6478	52.7488
NPCA8E3	52.4740	52.5733	52.6745
NPCA8E4	52.5789	52.6784	52.7794
NPCA8F1	52.4316	52.5314	52.6320
NPCA8F2	52.3841	52.4825	52.5831
NPCA8F3	52.1617	52.2611	52.3618
NPCA8F4	52.3157	52.4153	52.5164

24 MAY 02
CONT
BAW

Each test tube was vortexed after the base spike.
The test tubes were placed on a gyratory shaker inside of an atmosbag. Inside the bag was also placed about 600mL of saltin a 1L beaker.

5-28-02
BAW

0.1N HNO_3 Soln

Conc Nitric - Trace Metal Grade
Fisher A509-212 Lot# ~~H000146~~ 1100040
BW 5-28-02
Super Q water

Added 500µL (eppendorf pipet w/ disposable tip) HNO_3 to 79.5mL (graduated cylinder) of Super Q water.

LSA - pH Sampling of Series 7 NpCA Experimental Solns

All 20 Series 7 NpCA experimental solns (463/135) were sampled in duplicate for LSA analysis (suffix a1 and b1).
Masses recorded using Mettler AE240
Experimental solution weighed. LSA vials weighed after being labeled and having 0.5mL 0.1N HNO_3 (463/137) added using eppendorf pipet. Then 0.5mL (eppendorf pipet) of sample was added to LSA vial. The ~~LSA~~ LSA vials were reweighed
BW 5-28-02

Only 15 Series 7 NpCA experimental solns (463/135) were ICP analyzed. A ~~sample~~ BW 5-28-02 sampling scheme was devised to identify the ~~pass~~ BW 5-28-02 potassium source seen in a previous set (463/102-122). Two sources were suggested

5-28-02
CONT
BAW

Test Tube ID	Mass (g) before pH and LSA sampling	pH
NpCA7B1	52.5788	6.43
NpCA7B2	52.5559	6.99
NpCA7B3	52.2667	
NpCA7B4	52.4675	6.96
NpCA7C1	52.5665	
NpCA7C2	52.5046	7.41
NpCA7C3	52.3364	
NpCA7C4	52.4997	7.42
NpCA7D1	52.4925	
NpCA7D2	52.3350	7.63
NpCA7D3	52.3008	
NpCA7D4	52.3763	7.65
NpCA7E1	52.3794	
NpCA7E2	52.3520	7.81
NpCA7E3	52.0756	
NpCA7E4	52.1307	7.81
NpCA7F1	52.3872	
NpCA7F2	52.3095	8.09
NpCA7F3	52.3123	
NpCA7F4	52.2145	8.13

Do not use these pH values →
See 463/143

Mass values are good

Test Tube ID	Mass (g) of Vial and HNO3	Mass (g) after adding sample
NpCA7B1a1	7.8001	8.2951
NpCA7B1b1	7.8157	8.3101
NpCA7B2a1	7.8020	8.2971
NpCA7B2b1	7.8412	8.3368
NpCA7B3a1	7.7779	8.2736
NpCA7B3b1	7.8140	8.3110
NpCA7B4a1	7.8475	8.3428
NpCA7B4b1	7.8585	8.3551
NpCA7C1a1	7.8149	8.3130
NpCA7C1b1	7.8303	8.3301
NpCA7C2a1	7.8177	8.3160
NpCA7C2b1	7.9023	8.4015
NpCA7C3a1	7.8129	8.3114
NpCA7C3b1	7.8329	8.3315
NpCA7C4a1	7.8092	8.3109
NpCA7C4b1 7.8881	BAW 5-28-02 ~~7.8020~~	8.3895
NpCA7D1a1	7.8214	8.3208
NpCA7D1b1	7.8269	8.3252
NpCA7D2a1	7.8381	8.3371
NpCA7D2b1	7.8571	8.3562

5-28-02
cont
BW

Date Measured →	5-28-02	5-28-02
Test Tube ID	Mass (g) of Vial and HNO3	Mass (g) after adding sample
NpCA7D3a1	7.8688	8.3669
NpCA7D3b1	7.8201	8.3189
NpCA7D4a1	7.8840	8.3807
NpCA7D4b1	7.7831	8.2816
NpCA7E1a1	7.8506	8.3462
NpCA7E1b1	7.8500	8.3467
NpCA7E2a1	7.8130	8.3088
NpCA7E2b1	7.8770	8.3727
NpCA7E3a1	7.7763	8.2728
NpCA7E3b1	7.9130	8.4103
NpCA7E4a1	7.7616	8.2578
NpCA7E4b1	7.8227	8.3196
NpCA7F1a1	7.9050	8.4029
NpCA7F1b1	7.8271	8.3249
NpCA7F2a1	7.8502	8.3478
NpCA7F2b1	7.8138	8.3125
NpCA7F3a1	7.8351	8.3361
NpCA7F3b1	7.7892	8.2901
NpCA7F4a1	7.9152	8.4123
NpCA7F4b1	7.8140	8.3112

28May02
cont
BAW

pH meter and the HNO_3 preservative. Ten solutions will be sampled before measuring pH and five solns will be sampled after measuring pH. The first ten solutions ~~&~~ BW 5-28-02 will be divided between ones with stir bars (suffix 1) and ones without stir ~~bars~~ BW (suffix 3). The ones without stir bars bars 5-28-02 will have 50 µL (eppendorf pipet) of trace metal conc HNO_3 (Fisher A509-212, lot 110040) added. The five solns sampled after pH measurement will have no ~~50~~ BW 2-28-02 stir bars (suffix 4) and no HNO_3 preservation. Samples will be removed with a 10mL oxford pipet (~20 mL total removed) and dispensed into an ~~appropriated~~ pw 5-28-02 appropriately labeled 30mL pp bottle. See table below for details

Test Tube ID	LSA	Div 01 sample taken Before pH	Div 01 sample taken After pH	Div 01 sample preserved With HNO3
NpCA7B1	X	X		
NpCA7B2	X			
NpCA7B3	X	X		X
NpCA7B4	X		X	
NpCA7C1	X	X		
NpCA7C2	X			
NpCA7C3	X	X		X
NpCA7C4	X		X	
NpCA7D1	X	X		
NpCA7D2	X			
NpCA7D3	X	X		X
NpCA7D4	X		X	
NpCA7E1	X	X		
NpCA7E2	X			
NpCA7E3	X	X		X
NpCA7E4	X		X	
NpCA7F1	X	X		
NpCA7F2	X			
NpCA7F3	X	X		X
NpCA7F4	X		X	

28MAY02 CONT BW

pH meter: Orion 920A serial #039522
Orion 8103 combo electrode 3B w ATC probe
Calibrated with
pH7 (5-28-02) Fisher SB108-500 lot#012717
pH10 (5-28-02) Fisher SB116-500 lot#012607
Cal temp = 21.0°C cal setpts 7.03, 10.07
Slope = 105.9

Concerned about accuracy of pH readings.
Possible "static" issues concerning gloves
Decided to measure pH using stirbars and
letting top of pH electrode "hold" 50mL test
tube (hands free)

Recalibrated with pH7 (above) and

pH9 (5-28-02) Fisher SB114 lot#007377
Cal temp = 20.9°C cal setpts 7.03, 9.00
Slope = 98.6

Measurement of pH7 at end of analysis = 6.98

5-28-02 BW

28MAY02 CONT BAW

Test Tube ID	Mass (g) before pH and LSA sampling	pH
NpCA7B1	see 463/138	7.54
NpCA7B2	for masses	7.50
NpCA7B3		7.57
NpCA7B4		7.50
NpCA7C1		7.83
NpCA7C2		7.67
NpCA7C3		7.76
NpCA7C4		7.69
NpCA7D1		7.97
NpCA7D2		7.97
NpCA7D3		8.01
NpCA7D4		7.95
NpCA7E1		8.19
NpCA7E2		8.20
NpCA7E3		8.20
NpCA7E4		8.18
NpCA7F1		8.39
NpCA7F2		8.33
NpCA7F3		8.35
NpCA7F4		8.38

5-28-02 BW

29MAY02 BAW

LSA - pH Sampling of Series 7 NpCA Experimental Solutions

All 20 Series 8 NpCA experimental salns (463/136) were sampled in duplicate for LSA analysis (suffix a1 and b1.
Masses recorded using Mettler AE240

Experimental test tube solution weighed, LSA vials weighed after being labeled and having 0.5mL HNO_3 (463/137) added using eppendorf pipet. Then, 0.5mL (eppendorf pipet) of sample was added to LSA vial. The LSA vials were reweighed.

15 Series 8 NpCA experimental solutions were sent for ICP analysis. The same procedure used for Series 7 (463/137+142) was used for Series 8 in order to investigated the source of potassium. See table below for details

Test Tube ID	LSA	Div 01 sample taken Before pH	Div 01 sample taken After pH	Div 01 sample preserved With HNO3
NpCA8B1	X	X		
NpCA8B2	X			
NpCA8B3	X	X		X
NpCA8B4	X		X	
NpCA8C1	X	X		
NpCA8C2	X			
NpCA8C3	X	X		X
NpCA8C4	X		X	
NpCA8D1	X	X		
NpCA8D2	X			
NpCA8D3	X	X		X
NpCA8D4	X		X	
NpCA8E1	X	X		
NpCA8E2	X			
NpCA8E3	X	X		X
NpCA8E4	X		X	
NpCA8F1	X	X		
NpCA8F2	X			
NpCA8F3	X	X		X
NpCA8F4	X		X	

29May02 CONT BAW

Test Tube ID	Mass (g) before pH and LSA sampling	pH
NpCA8B1	52.6841	7.32
NpCA8B2	52.5683	7.32
NpCA8B3	52.5669	7.11
NpCA8B4	52.4159	
NpCA8C1	52.5929	
NpCA8C2	52.6294	
NpCA8C3	52.5528	
NpCA8C4	52.4797	
NpCA8D1	52.5564	
NpCA8D2	52.6535	
NpCA8D3	52.4450	
NpCA8D4	52.3831	
NpCA8E1	52.4484	
NpCA8E2	52.6239	
NpCA8E3	52.5465	
NpCA8E4	52.6665	
NpCA8F1	52.5465	
NpCA8F2	52.4680	
NpCA8F3	52.2465	
NpCA8F4	52.4034	

6/11/02 BA not used

Do not use these pH values. See 463/149

Mass values are good.

29MAY02
CONT
BLW

Test Tube ID	Mass (g) of Vial and HNO3	Mass (g) after adding sample
NpCA8D3a1	7.8730	8.3691
NpCA8D3b1	7.8324	8.3305
NpCA8D4a1	7.8469	8.3427
NpCA8D4b1	7.8164	8.3153
NpCA8E1a1	7.8676	8.3642
NpCA8E1b1	7.8555	8.3534
NpCA8E2a1	7.8161	8.3124
NpCA8E2b1	7.8480	8.3463
NpCA8E3a1	7.8881	8.3841
NpCA8E3b1	7.8668	8.3652
NpCA8E4a1	7.8434	8.3406
NpCA8E4b1	7.8394	8.3385
NpCA8F1a1	7.8478	8.3444
NpCA8F1b1	7.8197	8.3184
NpCA8F2a1	7.8207	8.3178
NpCA8F2b1	7.8707	8.3702
NpCA8F3a1	7.8573	8.3547
NpCA8F3b1	7.8624	8.3613
NpCA8F4a1	7.7403	8.2370
NpCA8F4b1	7.8505	8.3493

29MAY02
CONT
BLW

Test Tube ID	Mass (g) of Vial and HNO3	Mass (g) after adding sample
NpCA8B1a1	7.8289	8.3285
NpCA8B1b1	7.8518	8.3520
NpCA8B2a1	7.7637	8.2608
NpCA8B2b1	7.8001	8.2993
NpCA8B3a1	7.8709	8.3681
NpCA8B3b1	7.8724	8.3717
NpCA8B4a1	7.8652	8.3618
NpCA8B4b1	7.8318	8.3303
NpCA8C1a1	7.8055	8.3039
NpCA8C1b1	7.7942	8.2945
NpCA8C2a1	7.8206	8.3164
NpCA8C2b1	7.8661	8.3669
NpCA8C3a1	7.8262 → BLW 5-29-03 7.8262	8.3204
NpCA8C3b1	7.8175	8.3157
NpCA8C4a1	7.8485	8.3436
NpCA8C4b1	7.8246	8.3234
NpCA8D1a1	7.8712	8.3683
NpCA8D1b1	7.7955	8.2939
NpCA8D2a1	7.8584	8.3548
NpCA8D2b1	7.7813	8.2790

29 May02 BAW CONT

pH meter: Orion 920A Serial #039522
Orion 8103 combo electrode 3B w/ ATC probe
Calibrated with
pH 7 (5-28-02) Fisher SB108-500, lot# 012717
pH 9 (5-28-02) Fisher SB114-500, lot# 007377
Cal Temp = 20.4 cal set pts, 7.03, 9.00
slope = 96.5

Followed procedure in 463/142. Used stir bars in all solutions and let pH probe ~~to~~ "hold" 50mL test tube (hands free) BAW 5-29-02

Suspected electrode problem after 1st 3 readings (463-145). Cleaned electrode (½ hour in 0.1N HNO_3) after replacing inner fill soln. Soaking in pH electrode storing solution overnight.

30 May02 BAW

pH measurement of Series 8 NpCA Experimental solutions

pH meter: Orion 920A Serial # 039522
Orion 8103 combo electrode 3B w/ ATC probe
Calibrated with
pH 7 (5-29-02) Fisher SB108-500, lot # 012717
pH 9 (5-29-02) Fisher SB114-500, lot # 007377
Cal Temp 20.1°C Cal set pts = 7.03, 9.00
slope = 98.8

5-30-02 BAW

Z BAW 5-30-02
30MA402
BAW
CONT

Test Tube ID	Mass (g) before pH and LSA sampling	pH
NpCA8B1	see 463/145 for masses	7.56
NpCA8B2		7.51
NpCA8B3		7.62
NpCA8B4		7.52
NpCA8C1		7.84
NpCA8C2		7.85
NpCA8C3		7.86
NpCA8C4		7.87
NpCA8D1		8.10
NpCA8D2		7.96
NpCA8D3		8.00
NpCA8D4		8.03
NpCA8E1		8.25
NpCA8E2		8.23
NpCA8E3		8.26
NpCA8E4		8.27
NpCA8F1		8.51
NpCA8F2		8.55
NpCA8F3		8.56
NpCA8F4		8.56

30 MAY 02 CONT BAW

Preparation of Series 7+8 NpCA Experimental Solutions for LSA Analysis

Added 5 mL (bottle top dispensor) of Ultima Gold AB (Packard cat# 6013309, lot# ~~91-9031~~ BW 5-30-02 91-9031) to each 5-30-02 BW LSA vial of NpCA Series 7 (463/139+140) and Series 8 (463/146+147).

Soak electrode in 0.1N HNO_3 for 30 min after analysis ~~s~~ BW 5-30-02 completed.

31 MAY 02 BAW

pH + ICP sampling of NpCA Series 7+8 stock solns

Sampled calcium stock solutions B-E (463/127) used for NpCA Series 7+8

~30mL aliquot of each solution was transferred to a 30mL pp bottle using an orford pipet with a 10mL tip. This was not filtered. It was saved for ICP analysis.

~10mL aliquot of each solution was transfered to a 10mL micro beaker w/ stir bar. These were used for the pH measurement

pH meter: Orion 920A Serial# 039522
Orion 8103 combo electrode 3B with ATC probe
Calibrated with
pH 7 (5-29-02) Fisher SB108-500 lot# 012717
pH 9 (5-29-02) Fisher SB114-500 lot# 007377
Cal temp 21°C Cal Setpts: 7.03, 9
Slope = 96.1

31 May 02 CONT BAW

ID	pH
soln B	7.45
soln C	2.74
soln D	8.00
soln E	8.26
soln F	8.54
pH 7.00	7.03

3 JUNE 02 BAW

Filtering of NpCA Series 7+8 ICP Samples

Samples: Calcium stock solutions B-E
~30 mL aliquots for ICP analysis (463/150)
New 20mL BD syringes
Gelman "screw together" filter holders with o-rings
Gelman 60300 filters - 0.2μm, 25mm
lot 012006

Transfered ~10mL of sample into micro beaker, Drew up into syringe (no filter). Repeated so approximately 20mL in syringe. Placed cap on end of syringe. Dispensed into appropriately labeled pp bottle

5 JUNE 02 BAW

LSA results for NpA Series 7+8

Source: 463/139-150

6/3/02 3:41:12 PM QuantaSmart (TM) - 1.31 - Serial# 405314 Page # 1

Protocol# 15 - Pa_Np_Exp_AB.lsa User: Bertetti

Assay Definition-

Assay Description:

Assay Type: Alpha/Beta
Report Name: Np_Pa_Exp
Output Data Path: C:\Packard\Tricarb\Results\Bertetti\Pa_Np_Exp_AB
Raw Results Path: C:\Packard\Tricarb\Results\Bertetti\Pa_Np_Exp_AB\20020531_1015.results
Comma-Delimited File Name: C:\Packard\Tricarb\Results\Bertetti\Pa_Np_Exp_AB\Np_Pa_AB.004
Assay File Name: C:\Packard\TriCarb\Assays\Pa_Np_Exp_AB.lsa

Count Conditions-

Nuclide: Manual Np/Pa
Quench Indicator: SIS
External Std Terminator (sec): n/a
Pre-Count Delay (min): 0.00
Alpha/Beta Standards:
Count Time (min): 120.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: On - 1st Vial
Low CPM Threshold: Off
2 Sigma % Terminator: On - Any Region

In Use Discriminator: 143

Regions	LL	UL	Bkg Subtract	2Sigma % Terminator
Beta A	0.0	400.0	1st Vial	0.00
Beta B	0.0	2000.0	1st Vial	0.00
Alpha	100.0	400.0	1st Vial	2.00

Count Corrections-

Static Controller: On Luminescence Correction: Off
Colored Samples: n/a Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
Beta A				
Beta B				
Alpha				

IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: Tri-Carb 3100TR
Instrument Serial Number: 405314
3H Chi Square: 10.61 Date Processed: 5/31/02 10:15:45 AM
14C Chi Square: 11.14 Date Processed: 5/31/02 10:15:45 AM
3H E^2/B (1-18.6 keV): 265.79 Date Processed: 5/31/02 10:15:45 AM
14C E^2/B (4-156 keV): 490.31 Date Processed: 5/31/02 10:15:45 AM
3H Efficiency (0-18.6 keV): 65.86 Date Processed: 5/31/02 10:15:45 AM
14C Efficiency (0-156 keV): 96.58 Date Processed: 5/31/02 10:15:45 AM
IPA Background Date Processed: 5/31/02 10:15:45 AM
3H Background CPM (0-18.6 keV): 16.38 Date Processed: 5/31/02 10:15:45 AM

5 JUNE 02 CONT BAW

6/3/02 3:41:13 PM QuantaSmart (TM) - 1.31 - Serial# 405314 Page # 2

Protocol# 15 - Pa_Np_Exp_AB.lsa User: Bertetti

14C Background CPM (0-156 keV): 24.17 Date Processed: 5/31/02 10:15:45 AM
3H Calibration DPM: 285000
3H Reference Date: 10/29/99
14C Calibration DPM: 134100

Cycle 1 Results

S#	Count Time	CPMA	A:2S%	CPMB	B:2S%	CPMa	alpha2S%	SIS	MESSAGES
1	120.00	21.02	3.98	25.51	3.61	0.28	34.30	743.3	BLANK
2	49.33	22.56	9.12	22.41	9.71	202.51	2.00	300.6	>1 NpCA7Bxab1
3	48.97	23.80	8.78	23.97	9.23	203.94	2.00	337.1	
4	46.12	26.55	8.28	26.92	8.63	216.56	2.00	359.8	>2
5	45.87	26.94	8.20	27.14	8.59	217.75	2.00	325.4	
6	47.73	26.12	8.26	26.53	8.60	209.23	2.00	362.6	>3
7	48.51	24.78	8.54	24.87	8.99	205.88	2.00	298.2	
8	43.52	29.80	7.78	29.50	8.24	229.52	2.00	263.3	>4
9	43.80	30.87	7.56	31.25	7.86	228.05	2.00	309.6	
Missing vial 10.									
11	45.54	32.71	7.12	32.75	7.46	219.35	2.00	296.3	NpCA7Cxab1
12	45.65	31.40	7.33	31.32	7.71	218.77	2.00	251.8	>1
13	40.01	36.11	7.01	35.98	7.35	249.70	2.00	286.7	
14	39.61	38.33	6.75	38.89	6.97	252.18	2.00	327.1	>2
15	54.82	24.27	8.25	24.33	8.71	182.19	2.00	306.1	
16	54.17	22.67	8.74	22.36	9.37	184.34	2.00	240.8	>3
17	44.76	34.63	6.88	34.99	7.15	223.20	2.00	314.7	
18	44.89	34.35	6.91	34.24	7.26	222.51	2.00	263.7	>4
Missing vial 19.									
20	41.14	33.81	7.26	33.70	7.63	242.81	2.00	264.0	>1 NpCA7Dxab1
21	41.44	35.61	6.97	35.62	7.29	241.05	2.00	286.7	
22	44.96	31.53	7.35	31.30	7.76	222.14	2.00	274.8	
23	45.27	31.66	7.31	31.79	7.65	220.66	2.00	327.4	>2
24	42.38	36.27	6.81	35.82	7.19	235.70	2.00	238.5	
25	41.89	33.71	7.22	33.53	7.60	238.44	2.00	255.4	>3
26	45.51	30.96	7.41	30.90	7.80	219.49	2.00	285.1	
27	45.56	31.67	7.29	31.27	7.72	219.23	2.00	229.9	>4
Missing vial 28.									
29	39.03	41.36	6.44	41.49	6.70	256.03	2.00	281.4	>1 NpCA7Exab1
30	38.56	41.73	6.43	41.97	6.68	259.13	2.00	284.5	
31	39.48	40.91	6.46	40.98	6.72	253.01	2.00	282.4	
32	39.40	40.09	6.55	39.95	6.85	253.55	2.00	281.0	>2
33	36.82	41.79	6.56	41.87	6.83	271.34	2.00	259.4	
34	36.43	45.79	6.19	45.78	6.43	274.35	2.00	286.2	>3
35	36.25	43.58	6.42	43.54	6.68	275.72	2.00	268.5	
36	36.12	44.15	6.37	43.98	6.65	276.60	2.00	243.7	>4
Missing vial 37.									
38	37.32	50.33	5.74	50.56	5.93	267.75	2.00	285.0	>1 NpCA7Fxab1
39	37.24	53.92	5.49	53.76	5.69	268.27	2.00	217.0	
40	36.36	54.50	5.51	54.58	5.69	274.77	2.00	280.5	
41	36.56	53.76	5.54	53.43	5.76	273.35	2.00	226.2	>2
42	36.49	51.05	5.75	50.95	5.96	273.82	2.00	268.9	
43	36.23	52.06	5.69	52.16	5.89	275.76	2.00	265.1	>3
44	36.83	52.96	5.58	52.77	5.80	271.32	2.00	258.7	
45	37.34	50.27	5.74	50.68	5.92	267.61	2.00	281.4	>4
Missing vial 46.									
Missing vial 47.									
Missing vial 48.									
Missing vial 49.									
Missing vial 50.									
Missing vial 51.									
Missing vial 52.									
Missing vial 53.									
Missing vial 54.									
Missing vial 55.									

05 JUNE 02
CONT
BAW

6-5-02
BW

6/3/02 3:41:13 PM QuantaSmart (TM) - 1.31 - Serial# 405314 Page # 3

Protocol# 15 - Pa_Np_Exp_AB.1sa User: Bertetti

56	64.84	15.03	11.38	14.82	12.33	153.94	2.00	307.5
57	65.39	16.49	10.50	16.23	11.37	152.65	2.00	281.5
58	65.25	16.57	10.46	16.38	11.29	152.97	2.00	299.8
59	65.77	18.45	9.55	18.42	10.19	151.79	2.00	334.5
60	63.67	15.82	10.98	15.45	11.97	156.78	2.00	283.2
61	63.59	18.67	9.58	18.49	10.29	156.99	2.00	322.9
62	67.95	20.33	8.71	20.54	9.19	146.88	2.00	331.5
63	68.51	18.30	9.46	18.66	9.92	145.68	2.00	395.8
Missing vial 64.								
65	78.22	15.60	10.28	15.50	11.07	127.59	2.01	308.0
66	79.72	14.51	10.86	14.19	11.88	125.18	2.01	246.2
67	73.28	17.77	9.45	17.53	10.20	136.18	2.01	266.0
68	71.46	18.24	9.33	18.25	9.95	139.67	2.01	373.9
69	77.42	18.36	9.01	18.25	9.66	128.90	2.01	295.9
70	74.11	17.01	9.75	17.05	10.41	134.69	2.01	334.8
71	69.80	18.33	9.38	18.13	10.10	143.00	2.01	278.4
72	67.99	18.57	9.37	18.62	9.97	146.83	2.00	344.8
Missing vial 73.								
74	89.27	15.12	10.07	15.47	10.60	111.76	2.01	389.2
75	88.28	14.93	10.22	14.97	10.95	113.00	2.01	373.1
76	91.75	14.54	10.32	14.40	11.17	108.72	2.01	322.0
77	92.82	14.97	10.02	15.01	10.73	107.45	2.01	369.7
78	83.56	17.37	9.17	16.86	10.06	119.40	2.01	249.4
79	80.78	19.05	8.60	18.92	9.23	123.53	2.01	275.9
80	86.33	20.84	7.80	20.01	8.60	115.55	2.01	184.8
81	84.26	16.96	9.33	16.72	10.11	118.40	2.01	246.4
Missing vial 82.								
83	57.98	24.13	8.10	23.94	8.62	172.22	2.00	279.8
84	56.61	25.52	7.83	25.49	8.28	176.36	2.00	303.4
85	61.09	25.05	7.70	24.96	8.17	163.43	2.00	291.6
86	60.43	28.65	6.97	28.45	7.39	165.20	2.00	276.1
87	54.24	26.52	7.73	26.41	8.19	184.17	2.00	289.8
88	53.51	28.85	7.29	28.89	7.67	186.60	2.00	287.2
89	56.41	25.39	7.87	25.44	8.30	176.99	2.00	348.1
90	56.34	27.47	7.41	27.56	7.80	177.25	2.00	329.0
Missing vial 91.								
92	61.93	25.77	7.49	25.53	7.98	161.19	2.00	253.3
93	61.62	26.38	7.37	25.76	7.94	162.03	2.00	190.7
94	65.01	25.32	7.44	24.73	8.03	153.55	2.00	248.8
95	64.78	26.64	7.16	26.28	7.66	154.10	2.00	252.0
96	61.12	26.19	7.43	26.54	7.77	163.35	2.00	354.9
97	59.95	28.48	7.03	28.62	7.38	166.54	2.00	330.2
98	59.01	27.42	7.28	27.75	7.61	169.20	2.00	354.6
99	59.12	28.54	7.06	28.80	7.38	168.88	2.00	340.4

NpCA8BX.qbl
NpCA8CX.qbl
NpCA8DX.qbl
NpCA8EX.qbl
NpCA8FX.qbl

6-5-02
BW

05 JUNE 02
CONT
BAW

6/3/02 5:09:46 PM QuantaSmart (TM) - 1.31 - Serial# 405314 Page # 1

SNC Protocol

Calibration Information
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: Tri-Carb 3100TR
Instrument Serial Number: 405314
3H Chi Square: 25.28 Date Processed: 6/3/02 5:09:45 PM
14C Chi Square: 19.87 Date Processed: 6/3/02 5:09:45 PM
3H E^2/B (1-18.6 keV): 265.28 Date Processed: 6/3/02 5:09:45 PM
14C E^2/B (4-156 keV): 506.71 Date Processed: 6/3/02 5:09:45 PM
3H Efficiency (0-18.6 keV): 65.83 Date Processed: 6/3/02 5:09:45 PM
14C Efficiency (0-156 keV): 96.47 Date Processed: 6/3/02 5:09:45 PM
IPA Background Date Processed: 6/3/02 5:09:45 PM
3H Background CPM (0-18.6 keV): 16.23 Date Processed: 6/3/02 5:09:45 PM
14C Background CPM (0-156 keV): 23.17 Date Processed: 6/3/02 5:09:45 PM
3H Calibration DPM: 285000
3H Reference Date: 10/29/99
14C Calibration DPM: 134100

11 Jun 02
BW Monthly review completed.

17 JUN 02
BAW

QA Sample for NpCA Series 7 & 8 ICP Samples

Reagents

1000 ppm Sodium: Spex Certiprep PLNA2-2Y, lot# 8-66NA, Rec 1/4/02, Open 6-17-02 BW 6-17-02

1000 ppm Magnesium: Spex Certiprep PLMG2-2Y lot# 8-155MG, Rec 1/4/02, open 6-17-02

1000 ppm Calcium: Spex Certiprep PLCA2-2Y lot# 8-140CA, Rec 1/4/02, open 1/14/02

Added 3mL (vol pipet) of 1000 ppm Na, 3mL (vol pipet) of 1000 ppm Mg, and 3mL (vol pipet) of 1000 ppm ~~Ca~~ BW 6-17-02 Ca into a 25mL vol flask and ~~st~~ BW 6-17-02 diluted to mark with typel water, Labeled NpCA78Q

19 June 02
BAW

Div01 ICP R. Bud 6-19-02 Chain of Custody
Paperwork for NpCA series 7 + 8

Shipper Name/ Address: BRADLEY WERLING
CNWRA- DIV 20
BLD 57

Client:

SAMPLE LIST/CHAIN OF CUSTODY

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

Client Purchase Order/Other ID:

Site/Zone ID:

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

SwRI Contact: Mike Dammann

Analyses Requested

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers	Ca, Na, K, Mn, Mg, Sr by ICP
NpCA7B1	5-28-02		W		1	X
NpCA7B3						X
NpCA7B4						X
NpCA7K1						X
NpCA7C3						X
NpCA7C4						X
NpCA7D1						X
NpCA7D3						X
NpCA7D4						X
NpCA7E1						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: 5784

20.01402.871

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

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

Temp:

Therm #:

Comments: RADIOACTIVE- max Np237 values 1.7×10⁻⁶ M or 2.8×10⁻⁴ μCi/mL
463 | 141+144+151

	Date	Time
Relinquished by (Print/Signature): Brad Werling / Brad Werling		
Received by (Print/Signature):		
Relinquished by (Print/Signature):		
Received by (Print/Signature):		
Relinquished by (Print/Signature):		

SwRI Project#:

Received by SwRI Lab: (Signature)

Date: 6/19/02 Time: 10:30

Samples Disposed: Date / Time

Samples Disposed by:

Div 01 COC Form 01-01-001, Rev 4/02

Page 1 of 4

19 CONT BLD

6-19-02 MW

Shipper Name/ Address	BRADLEY WERLING CNWRA-DIV 20 BLD 57
Client	

SAMPLE LIST/CHAIN OF CUSTODY

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

Client Purchase Order/Other ID	Site/Zone ID

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

SwRI Contact: Mike Dammann

Analyses Requested

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers	Ca, Na, K, Mn, Mg, Sr by ICP
NpCA7E3	5-28-02		W		1	X
NpCA7E4	"		"		"	X
NpCA7F1	"		"		"	X
NpCA7F3	"		"		"	X
NpCA7F4	"		"		"	X
NpCA8B1	5-29-02		"		"	X
NpCA8B3	"		"		"	X
NpCA8B4	"		"		"	X
NpCA8C1	"		"		"	X
NpCA8C3	"		"		"	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

20.01402.871

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

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

Relinquished by (Print/Signature)	Date	Time
Brad Werling / Brad Werling		
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#:

Received by SwRI Lab: (Signature)

Date: 6/19/02 Time: 10:30

Samples Disposed: Date / Time

Samples Disposed by:

Temp: Therm #:

Comments: RADIOACTIVE - max Np237 values 1.7×10^{-6} Mar 2.8×10^{-4} µci/mL

463/141+144+15

158

19 JUNE 02 CONT BLW

SAMPLE LIST/CHAIN OF CUSTODY

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

Shipper Name/Address: BRADLEY WERLING
CNWRA- DIV 20
BLD 57

Client:

Client Purchase Order/Other ID:

Site/Zone ID:

Requested Turnaround:
☐ 2 Weeks
☐ 3 Weeks
☒ Other: 4 wks

SwRI Contact: Mike Dammann

Analyses Requested

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers	Ca, Na, K, Mn, Mg, Sr by ICP
NpCA8C4	5-29-02		W		1	X
NpCA8D1						X
NpCA8D3						X
NpCA8D4						X
NpCA8E1						X
NpCA8E3						X
NpCA8E4						X
NpCA8F1						X
NpCA8F3						X
NpCA8F4						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

20.01402.871

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

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

Relinquished by (Print/Signature)	Brad Werling / Brad Werling	Date	Time
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#:
Received by SwRI Lab: (Signature)
Date: 6/19/02 Time: 10:30
Samples Disposed: Date / Time
Samples Disposed by:

Temp: Therm #:

Comments: RADIOACTIVE - max Np237 values 1.7×10⁻⁶M or 2.8×10⁻⁴ MCi/mL

463 | 141+144+15

Div 01 COC Form 01-01-001, Rev 4/02

19 JUNE 02 CENT BLD

Shipper Name/ Address	BRADLEY WERLING CNWRA- DIV 20 BLD 57
Client	

SAMPLE LIST/CHAIN OF CUSTODY

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

Client Purchase Order/Other ID:

Site/Zone ID:

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

SwRI Contact: Mike Damman

Analyses Requested

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers	Ca, Na, K, Mn, Mg, Sr by ICP								
SOLN B	6-3-02		W		1	X								
SOLN C	"		"		"	X								
SOLN D	"		"		"	X								
SOLN E	"		"		"	X								
SOLN F	"		"		"	X								
NpCA78Q	6-17-02		W		1	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

20,014|02,871

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

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

Temp: Therm #:

Comments: ~~RADIOA~~ ~~BW~~ 6-10-02 NOT RADIOACTIVE
4163/141+144+151

	Date	Time
Relinquished by (Print/Signature): Brad Werling / Bradley Werling		
Received by (Print/Signature):		
Relinquished by (Print/Signature):		
Received by (Print/Signature):		
Relinquished by (Print/Signature):		

SwRI Project#:

Received by SwRI Lab: (Signature)

Date: 6/19/02 Time: 10:30

Samples Disposed: Date / Time

Samples Disposed by:

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25 June 02 BAW — End of notebook entries continued in scientific notebook #523

06 Aug 02 — Periodic notebook review completed by principal investigator. MB

NO FURTHER ENTRIES IN THIS BOOK
MB 06 AUG 02

I have reviewed this scientific notebook and find it in agreement with QAP-001. There is sufficient information regarding methods used for conducting tests, acquiring and analyzing data so that another qualified individual could repeat the activity.

E.C. Pe
10/21/2002