010002

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050119-1
SRR: 27044
SDG: 257326
CASE: CNWRA
VTSR: January 06, 2005
PROJECT#: 06002.01.211

FINAL REPORT

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010003

Sample ID
Dust-0404-T14/T3

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 12/29/04

Matrix: Dust

Project No.: 06002.01.211

Lab System ID: 257326

SRR: 27044

Task Order: 050119-1

Analysis	Sample Result (mg/Kg)	Reporting Limit (mg/Kg)
Aluminum	60200	960
Antimony	<6.94	6.94
Arsenic	9.69	2.31
Barium	718	96
Beryllium	<2.31	2.31
Bismuth	<6.94	6.94
Boron	<2130	2130
Cadmium	<2.31	2.31
Calcium	17500	960
Chromium	104	96
Cobalt	7.57	2.31
Copper	220	96
Iron	24000	960
Lanthanum	27.8	2.31
Lead	38.3	2.31
Lithium	62.7	48.4
Magnesium	11500	960
Manganese	608	96
Molybdenum	<2.31	2.31
Nickel	33.8	2.31
Palladium	<6.94	6.94
Phosphorus	1780	384
Potassium	22400	1920
Selenium	<2.31	2.31
Silicon	234000	384
Silver	<2.31	2.31
Sodium	12800	3840
Strontium	288	96
Sulfur	1060	580
Thallium	<4.63	4.63
Thorium	<46.3	46.3
Tin	<46.3	46.3
Titanium	3780	96
Tungsten	<4.63	4.63
Uranium	<46.3	46.3
Vanadium	44.3	48.0
Yttrium	13.1	2.31
Zinc	1110	96.7
Zirconium	183	96

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SOUTHWEST RESEARCH INSTITUTE

LABORATORY CONTROL SAMPLE

010004

Sample ID
SRM - 278

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Solid

Project No.: 06002.01.211

Lab System ID: SRM 278 - Obsidian Rock

SRR: 27044

Task Order: 050119-1

Analysis	Sample Result (mg/Kg)	True Value (mg/Kg)	Recovery
Aluminum	73400	74888	98.0%
Arsenic - xx	1.84	2.50	73.6%
Barium - xx	939	1100	85.4%
Calcium	6620	7025	94.2%
Cobalt - xx	2.37	2.10	112.9%
Iron	14000	14269	98.1%
Lanthanum - xx	50.1	33.0	151.8%
Lead	27.1	16.4	165.2%
Lithium - xx	61.6	47.0	131.1%
Magnesium	1280	1387	92.3%
Manganese	386	329	117.5%
Molybdenum - xx	7.08	3.00	236.0%
Nickel	6.12	3.60	170.0%
Potassium	37000	34534	107.1%
Silicon	348000	341483	101.9%
Sodium	34900	35905	97.2%
Strontium	66.1	63.5	104.1%
Titanium	1370	1469	93.3%
Yttrium - xx	59.4	41.0	144.9%
Zinc - xx	62.6	54.0	115.9%
Zirconium - xx	276	295	93.6%

NA- Not Applicable.

xx - True Values are reference values only - not certified values.

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SOUTHWEST RESEARCH INSTITUTE

LABORATORY CONTROL SAMPLE 010005

Sample ID
SRM - 688

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Solid

Project No.: 06002.01.211

Lab System ID: SRM 688 - Basalt Rock

SRR: 27044

Task Order: 050119-1

Analysis	Sample Result (mg/Kg)	True Value (mg/Kg)	Recovery
Aluminum	93400	91876	101.7%
Barium - xx	194	200	97.0%
Calcium -xx	86100	86978	99.0%
Chromium	358	332	107.8%
Cobalt - xx	33.5	49.0	68.4%
Copper - xx	91.8	96.0	95.6%
Iron	72400	72393	100.0%
Lanthanum - xx	3.71	5.30	70.0%
Magnesium - xx	49700	50657	98.1%
Manganese	1290	1055	122.2%
Nickel - xx	110	158	69.6%
Phosphorus	654	585	111.8%
Potassium	1640	1552	105.6%
Silicon	238000	226253	105.2%
Sodium	15400	15950	96.6%
Strontium	177	169	104.6%
Titanium	6930	7014	98.8%
Vanadium - xx	262	242	108.3%
Yttrium - xx	13.0	17.0	76.5%
Zinc - xx	76.5	84.0	91.1%
Zirconium - xx	54.4	61.0	89.2%

NA- Not Applicable.

xx - True Values are reference values only - not certified values.

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SOUTHWEST RESEARCH INSTITUTE

LABORATORY CONTROL SAMPLE 010006

Sample ID
LCSW - B10W4

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Solid

Project No.: 06002.01.211

Lab System ID: LCSW

SRR: 27044

Task Order: 050119-1

Analysis	Sample Result (mg/L)	True Value (mg/L)	Recovery
Antimony	1.05	1.00	105.0%
Arsenic	4.19	4.00	104.8%
Beryllium	0.108	0.100	108.0%
Cadmium	0.103	0.100	103.0%
Cobalt	1.00	1.00	100.0%
Lead	1.04	1.00	104.0%
Nickel	1.02	1.00	102.0%
Selenium	4.44	4.00	111.0%
Silver	0.104	0.100	104.0%
Thallium	4.20	4.00	105.0%

NA- Not Applicable.

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SOUTHWEST RESEARCH INSTITUTE

BLANK SUMMARY

010007

Sample ID
PBW - B10W1 / B10W4 / B10W6

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Solid

Project No.: 06002.01.211

Lab System ID: PBW

SRR: 27044

Task Order: 050119-1

Analysis	Sample Result (mg/Kg)	Reporting Limit (mg/Kg)
Aluminum	<1000	1000
Antimony	<7.50	7.50
Arsenic	<2.50	2.50
Barium	<100	100
Beryllium	<2.50	2.50
Bismuth	<7.50	7.50
Boron	<2200	2200
Cadmium	<2.50	2.50
Calcium	<1000	1000
Chromium	<100	100
Cobalt	<2.50	2.50
Copper	<100	100
Iron	<1000	1000
Lanthanum	<2.50	2.50
Lead	<2.50	2.50
Lithium	<50	50
Magnesium	<1000	1000
Manganese	<100	100
Molybdenum	<2.50	2.50
Nickel	<2.50	2.50
Palladium	<7.50	7.50
Phosphorus	<400	400
Potassium	<2000	2000
Selenium	<2.50	2.50
Silicon	<400	400
Silver	<2.50	2.50
Sodium	<4000	4000
Strontium	<100	100
Sulfur	<600	600
Thallium	<5.00	5.00
Thorium	<50.0	50.0
Tin	<50.0	50.0
Titanium	<100	100
Tungsten	<5.00	5.00
Uranium	<50.0	50.0
Vanadium	<50	50
Yttrium	<2.50	2.50
Zinc	<100	100
Zirconium	<100	100

NA- Not Applicable.

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET 010008

Sample ID
Dust-T14+T13 Soluble

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 12/29/04

Matrix: Filter

Project No.: 06002.01.211

Lab System ID: 257327

SRR: 27044

Task Order: 050119-1

Analysis	Sample Result (ug/sample)	Reporting Limit (ug/sample)
Aluminum	<1.25	1.25
Antimony	<0.250	0.250
Arsenic	0.465	0.125
Barium	1.14	0.125
Beryllium	<0.125	0.125
Bismuth	<0.375	0.375
Boron	10.7	0.500
Cadmium	<0.125	0.125
Calcium	2160	1.25
Chromium	<0.125	0.125
Cobalt	<0.125	0.125
Copper	2.35	0.125
Iron	<1.25	1.25
Lanthanum	<0.125	0.125
Lead	<0.250	0.250
Lithium	0.194	0.125
Magnesium	33.5	1.25
Manganese	<0.125	0.125
Molybdenum	0.140	0.125
Nickel	0.198	0.125
Palladium	<0.125	0.125
Phosphorus	22.7	0.500
Potassium	407	2.50
Selenium	<0.250	0.250
Silicon	145	0.500
Silver	<0.125	0.125
Sodium	597	5.00
Strontium	15.7	0.125
Sulfur	1370	0.500
Thallium	<0.250	0.250
Thorium	<0.375	0.375
Tin	<1.00	1.00
Titanium	<0.125	0.125
Tungsten	<0.250	0.250
Uranium	<2.50	2.50
Vanadium	0.182	0.125
Yttrium	<0.125	0.125
Zinc	<0.125	0.125
Zirconium	<0.125	0.125

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET 010009

Sample ID
Whatman Paper Blk.

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 12/29/04

Matrix: Filter

Project No.: 06002.01.211

Lab System ID: 257328

SRR: 27044

Task Order: 050119-1

Analysis	Sample Result (ug/sample)	Reporting Limit (ug/sample)
Aluminum	<1.25	1.25
Antimony	<0.250	0.250
Arsenic	<0.125	0.125
Barium	<0.125	0.125
Beryllium	<0.125	0.125
Bismuth	<0.375	0.375
Boron	<0.500	0.500
Cadmium	<0.125	0.125
Calcium	1.56	1.25
Chromium	<0.125	0.125
Cobalt	<0.125	0.125
Copper	0.149	0.125
Iron	<1.25	1.25
Lanthanum	<0.125	0.125
Lead	<0.250	0.250
Lithium	<0.125	0.125
Magnesium	<1.25	1.25
Manganese	<0.125	0.125
Molybdenum	<0.125	0.125
Nickel	<0.125	0.125
Palladium	<0.125	0.125
Phosphorus	<0.500	0.500
Potassium	3.76	2.50
Selenium	<0.250	0.250
Silicon	2.19	0.500
Silver	<0.125	0.125
Sodium	44.5	5.00
Strontium	<0.125	0.125
Sulfur	6.99	0.500
Thallium	<0.250	0.250
Thorium	<0.375	0.375
Tin	<1.00	1.00
Titanium	<0.125	0.125
Tungsten	<0.250	0.250
Uranium	<2.50	2.50
Vanadium	<0.125	0.125
Yttrium	<0.125	0.125
Zinc	<0.125	0.125
Zirconium	<0.125	0.125

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SOUTHWEST RESEARCH INSTITUTE

LABORATORY CONTROL SAMPLE 010010

Sample ID
LCSW - B10W2

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Filter

Project No.: 06002.01.211

Lab System ID: NA

SRR: 27044

Task Order: 050119-1

Analysis	Sample Result (ug/sample)	True Value (ug/sample)	Recovery
Aluminum	93.9	100	93.9%
Antimony	24.2	25.0	96.8%
Arsenic	99.0	100	99.0%
Barium	95.9	100	95.9%
Beryllium	2.38	2.50	95.2%
Bismuth	NA	NA	NA
Boron	NA	NA	NA
Cadmium	2.42	2.50	96.8%
Calcium	482	500	96.4%
Chromium	9.79	10.0	97.9%
Cobalt	23.9	25.0	95.6%
Copper	12.2	12.5	97.6%
Iron	50.1	50.0	100.2%
Lanthanum	NA	NA	NA
Lead	24.5	25.0	98.0%
Lithium	NA	NA	NA
Magnesium	476	500	95.2%
Manganese	24.2	25.0	96.8%
Molybdenum	NA	NA	NA
Nickel	24.2	25.0	96.8%
Palladium	NA	NA	NA
Phosphorus	NA	NA	NA
Potassium	419	500	83.8%
Selenium	107	100	107.0%
Silicon	NA	NA	NA
Silver	2.39	2.50	95.6%
Sodium	420	500	84.0%
Strontium	NA	NA	NA
Sulfur	NA	NA	NA
Thallium	99.0	100	99.0%
Thorium	NA	NA	NA
Tin	NA	NA	NA
Titanium	NA	NA	NA
Tungsten	NA	NA	NA
Uranium	NA	NA	NA
Vanadium	23.9	25.0	95.6%
Yttrium	NA	NA	NA
Zinc	24.8	25.0	99.2%
Zirconium	NA	NA	NA

NA- Not Applicable.

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SOUTHWEST RESEARCH INSTITUTE

BLANK SUMMARY

010011

Sample ID
PBW - B10W5

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Filter

Project No.: 06002.01.211

Lab System ID: NA

SRR: 27044

Task Order: 050119-1

Analysis	Sample Result (ug/sample)	Reporting Limit (ug/sample)
Aluminum	<1.25	1.25
Antimony	<0.250	0.250
Arsenic	<0.125	0.125
Barium	<0.125	0.125
Beryllium	<0.125	0.125
Bismuth	<0.375	0.375
Boron	<0.500	0.500
Cadmium	<0.125	0.125
Calcium	<1.25	1.25
Chromium	<0.125	0.125
Cobalt	<0.125	0.125
Copper	<0.125	0.125
Iron	<1.25	1.25
Lanthanum	<0.125	0.125
Lead	<0.250	0.250
Lithium	<0.125	0.125
Magnesium	<1.25	1.25
Manganese	<0.125	0.125
Molybdenum	<0.125	0.125
Nickel	<0.125	0.125
Palladium	<0.125	0.125
Phosphorus	<0.500	0.500
Potassium	<2.50	2.50
Selenium	<0.250	0.250
Silicon	<0.500	0.500
Silver	<0.125	0.125
Sodium	<5.00	5.00
Strontium	<0.125	0.125
Sulfur	<0.500	0.500
Thallium	<0.250	0.250
Thorium	<0.375	0.375
Tin	<1.00	1.00
Titanium	<0.125	0.125
Tungsten	<0.250	0.250
Uranium	<2.50	2.50
Vanadium	<0.125	0.125
Yttrium	<0.125	0.125
Zinc	<0.125	0.125
Zirconium	<0.125	0.125

NA- Not Applicable.

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010012

Sample ID
Dust-0404-T14/T3

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Dust

Lab System ID: 257326

Client: Division 20

Date Received: 12/29/04

Project No.: 06002.01.211

SRR: 27044

Task Order: 050119-1

Analysis	Sample Result (mg/Kg)	Reporting Limit (mg/Kg)
Bromide	<9.56	9.56
Chloride	<47.8	47.8
Fluoride	17.9	9.56
Nitrate-N	20.6	9.56
Nitrite-N	<9.56	9.56
Phosphate-P	413	9.56
Sulfate	94.8	9.56

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SOUTHWEST RESEARCH INSTITUTE

LABORATORY CONTROL SAMPLE 010013

Sample ID
LCSW

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Dust

Lab System ID: NA

Client: Division 20

Date Received: NA

Project No.: 06002.01.211

SRR: 27044

Task Order: 050119-1

Analysis	Sample Result (mg/Kg)	True Value (mg/Kg)	Recovery
Bromide	410	400	103%
Chloride	204	200	102%
Fluoride	97.8	100	97.8%
Nitrate-N	88.7	90.4	98.1%
Nitrite-N	98.8	100	98.8%
Phosphate-P	189	191	99.0%
Sulfate	405	400	101%

NA- Not Applicable.

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SOUTHWEST RESEARCH INSTITUTE

BLANK SUMMARY

010014

Sample ID
PBW

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Dust

Lab System ID: NA

Client: Division 20

Date Received: NA

Project No.: 06002.01.211

SRR: 27044

Task Order: 050119-1

Analysis	Sample Result (mg/Kg)	Reporting Limit (mg/Kg)
Bromide	<9.56	9.56
Chloride	<47.8	47.8
Fluoride	<9.56	9.56
Nitrate-N	<9.56	9.56
Nitrite-N	<9.56	9.56
Phosphate-P	<9.56	9.56
Sulfate	<9.56	9.56

NA- Not Applicable.

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET 010015

Sample ID
Dust-T14+T13 Soluble

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 12/29/04

Matrix: Filter

Project No.: 06002.01.211

Lab System ID: 257327

SRR: 27044

Task Order: 050119-1

Analysis	Sample Result (ug/sample)	Reporting Limit (ug/sample)
Bromide	3.33	2.5
Chloride	313	2.5
Fluoride	12.8	2.5
Nitrate-N	464	25
Nitrite-N	2.78	2.5
Phosphate-P	36.9	2.5
Sulfate	3780	25

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SOUTHWEST RESEARCH INSTITUTE

DUPLICATE SUMMARY

010016

Sample ID
Dust-T14+T13 Soluble

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 12/29/04

Matrix: Filter

Project No.: 06002.01.211

Lab System ID: 257327

SRR: 27044

Task Order: 050119-1

Analysis	Sample Result (ug/sample)	Duplicate Result (ug/sample)	RPD
Bromide	3.33	3.23	3.05%
Chloride	313	314	0.32%
Fluoride	12.8	12.5	2.37%
Nitrate-N	464	488	5.04%
Nitrite-N	2.78	2.90	4.23%
Phosphate-P	36.9	37.0	0.27%
Sulfate	3780	3920	3.64%

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SOUTHWEST RESEARCH INSTITUTE

MATRIX SPIKE SUMMARY

010017

Sample ID
Dust-T14+T13 Soluble

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 12/29/04

Matrix: Filter

Project No.: 06002.01.211

Lab System ID: 257327

SRR: 27044

Task Order: 050119-1

Analysis	Sample Result (ug/sample)	Spike Result (ug/sample)	Spike Added (ug/sample)	Recovery
Bromide	3.33	103	100	99.7%
Chloride	313	358	50.0	90.0%
Fluoride	12.8	33.5	25.0	82.8%
Nitrate-N	464	678	226	94.7%
Nitrite-N	2.78	27.4	25.0	98.5%
Phosphate-P	36.9	82.3	47.8	95.0%
Sulfate	3780	4720	1000	94.0%

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010018

Sample ID
Whatman Paper Blk.

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Filter

Lab System ID: 257328

Client: Division 20

Date Received: 12/29/04

Project No.: 06002.01.211

SRR: 27044

Task Order: 050119-1

Analysis	Sample Result (ug/sample)	Reporting Limit (ug/sample)
Bromide	<2.5	2.5
Chloride	30.7	2.5
Fluoride	<2.5	2.5
Nitrate-N	2.70	2.5
Nitrite-N	<2.5	2.5
Phosphate-P	<2.5	2.5
Sulfate	22.9	2.5

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SOUTHWEST RESEARCH INSTITUTE

LABORATORY CONTROL SAMPLE 010019

Sample ID
LCSW

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Filter

Lab System ID: NA

Client: Division 20

Date Received: NA

Project No.: 06002.01.211

SRR: 27044

Task Order: 050119-1

Analysis	Sample Result (ug/sample)	True Value (ug/sample)	Recovery
Bromide	401	400	100%
Chloride	195	200	97.5%
Fluoride	95.7	100	95.7%
Nitrate-N	86.3	90.4	95.5%
Nitrite-N	98.1	100	98.1%
Phosphate-P	186	191	97.4%
Sulfate	396	400	99.0%

NA- Not Applicable.

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SOUTHWEST RESEARCH INSTITUTE

BLANK SUMMARY

010020

Sample ID
PBW

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Filter

Project No.: 06002.01.211

Lab System ID: NA

SRR: 27044

Task Order: 050119-1

Analysis	Sample Result (ug/sample)	Reporting Limit (ug/sample)
Bromide	<2.5	2.5
Chloride	<2.5	2.5
Fluoride	<2.5	2.5
Nitrate-N	<2.5	2.5
Nitrite-N	<2.5	2.5
Phosphate-P	<2.5	2.5
Sulfate	<2.5	2.5

NA- Not Applicable.

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SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050119-1
SRR: 27044
SDG: 257326
CASE: CNWRA
VTSR: January 06, 2005
PROJECT#: 06002.01.211

010021

Task Orders/01-QPP-015

Southwest Research Institute

Laboratory Task Order

TO #: 050119-1 Revision: 0

010022

Project(s): 06002.01.211
Manager(s): RANGER, JACKIE
To PM: 01/28/05
To QA: 02/03/05
To Client: 02/03/05

SDG: 257326
VTSR: 12/29/04
CASE: CNWRA

SRR #'s: 27044
Client(s): Div. 20

Instructions

DIVISION 20 - CNWRA. 2-WEEK TAT, subject to change.
Point of Contact is Lietai Yang, lietai.yang@swri.org, ext. 2483, fax 6081.
THREE overall samples for various testing: ICP for all three, whole rock digestion for the combined dust samples; IC for all three.
SEE GROUP LEADER BEFORE STARTING.
Work is 10 CFR 50 Appendix B, 10 CFR Part 21. CONTACT Charlie Butcher (ext. 5928, pager 271-5172) BEFORE STARTING ANY WORK ON THIS TASK ORDER. If Charlie Butcher is not available, contact Rod Weber (ext. 3161) or Jo Ann Boyd (ext. 2169).
CONTACT PM WITH ANY ADDITIONAL QUESTIONS

Documents Related to this task order: 15124[COC 27044]

Test: DIG-ROCK
Section: METALPREP
Holding: 180 days from CED
Digestion Method Whole Rock Total Metals - SEE GROUP LEADER BEFORE STARTING
Cnt: 1

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
257326	combine	1	Dust	Dust-0404-T14/T3	04 Apr 04	01 Oct 04
257326	combine	2	Dust	Dust-0404-T14/T3	04 Apr 04	01 Oct 04

Test: DIG-TEFLON
Section: METALPREP
Holding: 180 days from CED
Digestion Method Teflon Beaker Total Metals - SEE GROUP LEADER BEFORE STARTING
Cnt: 1

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
257326	combine	1	Dust	Dust-0404-T14/T3	04 Apr 04	01 Oct 04
257326	combine	2	Dust	Dust-0404-T14/T3	04 Apr 04	01 Oct 04

Test: FUS-80/20
Section: METALPREP
Holding: 180 days from CED
Fusion Method 80/20 Meta/Tetraborate Total Metals - SEE GROUP LEADER BEFORE STARTING
Cnt: 1

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
257326	combine	1	Dust	Dust-0404-T14/T3	04 Apr 04	01 Oct 04
257326	combine	2	Dust	Dust-0404-T14/T3	04 Apr 04	01 Oct 04

Test: IC-SWRI
Section: WETCHEM
Holding: 28 days from CED
Ion Chromatography by SwRI Method
Cnt: 3

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
257326	combine	1	Dust	Dust-0404-T14/T3	04 Apr 04	02 May 04
257326	combine	2	Dust	Dust-0404-T14/T3	04 Apr 04	02 May 04
257327		1	Filter	Dust-T14+T13 Soluble	04 Apr 04	02 May 04
257328		1	Filter	Whatman Paper Blk.		

Test: ICP-SWRI
Section: METALS
Holding: 180 days from CED
ICP Analysis by SwRI Method
Cnt: 3

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
257326	combine	1	Dust	Dust-0404-T14/T3	04 Apr 04	01 Oct 04
257326	combine	2	Dust	Dust-0404-T14/T3	04 Apr 04	01 Oct 04
257327		1	Filter	Dust-T14+T13 Soluble	04 Apr 04	01 Oct 04
257328		1	Filter	Whatman Paper Blk.		

ver 5/1/2005

Southwest Research Institute

Laboratory Task Order

TO #: 050119-1 Revision: 0

SDG: 257326
VTSR: 12/29/04
CASE: CNWRA

SRR #'s: 27044
Client(s): Div. 20

Project(s): 06002.01.211
Manager(s): RANGER, JACKIE
To PM: 01/28/05
To QA: 02/03/05
To Client: 02/03/05

010023

Test: LEACH-DIWATER
Section: METALPREP

Holding: 180 days from CED

LEACH DI WATER - SEE GROUP LEADER BEFORE STARTING

Cnt: 2

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
257327		1	Filter	Dust-T14+T13 Soluble	04 Apr 04	01 Oct 04
257328		1	Filter	Whatman Paper Blk.		

Test: LOI-METALS
Section: METALPREP

Holding: 180 days from CED

Loss on Ignition at 1000 C - SEE GROUP LEADER BEFORE STARTING

Cnt: 1

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
257326	combine	1	Dust	Dust-0404-T14/T3	04 Apr 04	01 Oct 04
257326	combine	2	Dust	Dust-0404-T14/T3	04 Apr 04	01 Oct 04

ver 5/1/2005

010024

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IF STAMP IS NOT RED, THIS DOCUMENT IS UNCONTROLLED

01-QPP-015
Division 01
Revision 4
November 2002

Document No. 3

Division 01

Chemistry and Chemical
Engineering Division

QUALITY PROJECT PLAN FOR

PERFORMANCE OF CHEMICAL ANALYSES FOR COMMERCIAL NUCLEAR POWER PLANTS WITHIN THE DEPARTMENT OF ANALYTICAL AND ENVIRONMENTAL CHEMISTRY

SOUTHWEST RESEARCH INSTITUTE
Chemistry and Chemical Engineering Division
6220 CULEBRA ROAD, SAN ANTONIO, TEXAS 78238

010025

QUALITY PROJECT PLAN FOR PERFORMANCE OF CHEMICAL ANALYSES FOR COMMERCIAL NUCLEAR POWER PLANTS WITHIN THE DEPARTMENT OF ANALYTICAL AND ENVIONMENTAL CHEMISTRY

SwRI AUTHORIZATION SIGNATORIES

This is to certify that this Quality Project Plan of Southwest Research Institute (SwRI) has been reviewed and approved by the following personnel:

JoAnn Boyd — 10/30/02
JOANN BOYD (210) 522-2169 — **DATE**
Quality Assurance Manager

R. Karimi — 10/30/02
REZA KARIMI (210) 522-2412 — **DATE**
Director, Department of Analytical and Environmental Chemistry

for **MICHAEL G. MACNAUGHTON** (210) 522-5162 — 10/30/02 **DATE**
Vice President, Chemistry and Chemical Engineering Division

Christopher Hobson — 10/30/02
CHRISTOPHER HOBSON (210) 522-5838 — **DATE**
Quality Assurance Engineer

010026

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PERFORMANCE OF CHEMICAL ANALYSES FOR COMMERCIAL NUCLEAR POWER PLANTS WITHIN THE DEPARTMENT OF ANALYTICAL AND ENVIRONMENTAL CHEMISTRY

1.0 INTRODUCTION

This Quality Project Plan (QPP) defines the Quality Assurance (QA) program requirements for personnel providing the chemical analyses for commercial nuclear power plants. Southwest Research Institute (SwRI) ***Program Quality Plan (PQP-Nuclear)***, *Nuclear Services* shall implement the QA requirements. Project activities controlled by the PQP-Nuclear shall be accomplished as specified by the appropriate sections of **01-QAP-004**, *Quality Assurance Plan for Analytical and Environmental Services* and/or nationally recognized testing methods as specified on individual purchase orders. This QPP shall be applied to all projects initiated for nuclear utilities in the Department of Analytical and Environmental Chemistry. If, as a result of complexity, duration, or other factors, it is determined that a unique, project-specific quality plan is required, the project QAE shall notify the Project Manager and a project-specific quality plan shall be generated in accordance with **SOP-01-4.2.1**, *Preparation and Revision of Documented Procedures*.

2.0 SCOPE

This Quality Project Plan shall be applied to the chemical analyses performed for commercial nuclear power plants by the Department of Analytical and Environmental Chemistry within the Chemistry and Chemical Engineering Division. Although the majority of the work performed for nuclear facilities resides within the Department of Analytical and Environmental Chemistry, other departments within the division may utilize this Quality Project Plan as deemed necessary when nuclear projects are conducted.

3.0 REFERENCES

3.1 *SwRI Quality System Manual – 2000*

3.2 *10 CFR 50, Appendix B, ASME NQA-1*

3.3 *SwRI Program Quality Plan (PQP-Nuclear), Nuclear Services*

3.4 01-QAP-004, *Quality Assurance Plan for Analytical and Environmental Services*

4.0 APPLICABLE SECTIONS OF SwRI PROGRAM QUALITY PLAN (PQP-NUCLEAR)

4.1 Indoctrination and Training

4.1.1 Personnel performing duties affecting quality shall receive quality training to the *SwRI Program Quality Plan (PQP-Nuclear), Nuclear Services* prior to performing any work on projects for nuclear utilities. Institute Quality Systems (IQS) personnel shall perform this training and documentation shall be evident in the personnel training files maintained in Division Quality Assurance.

4.1.2 Indoctrination and training of personnel shall be conducted in accordance with **SOP-01-6.2.1**, *Qualification and Training.*

4.2 Qualification of Personnel

4.2.1 Testing personnel shall be designated as qualified to perform applicable project activities as specified in **SOP-01-6.2.1**, *Qualification and Training*.

4.2.2 During the performance of each testing process, testing personnel shall have access to the necessary documented procedures, i.e., QPP, QAP, Work Order, Division Quality System Standard Operating Procedures (SOPs), and applicable test/analytical procedures (TAPs) available for ready reference.

4.2.3 Any person who has not performed testing activities associated with any particular method being used for nuclear utilities projects for a period of one year shall be reevaluated prior to the conduct of the test.

4.2.4 Quality Assurance personnel witnessing the testing process for nuclear utilities shall have documented evidence of qualifications maintained by Institute Quality Systems.

4.3 Design Control

Not applicable to activities conducted within the Department of Analytical and Environmental Chemistry.

4.4 Right of Access

4.4.1 Procurement documents shall provide for access to the suppliers' facilities and records for surveillance, inspection, or audit by SwRI and clients.

4.4.2 Where appropriate, quality clause **Q32** shall be noted on the procurement documents to indicate that right of access for inspection and surveillance of activities associated with the order shall be afforded to SwRI and clients.

4.5 Control of Supplier-Generated Documents

4.5.1 Client documents shall be controlled in accordance with **SOP-01-4.2.1**, *Preparation and Revision of Documented Procedures*. These procedures provide the requirements for the preparation, review, approval, issue, distribution, and revision of documents controlled by the Chemistry and Chemical Engineering Division.

4.5.2 Documents may be controlled as Plans or Work Instructions and shall be accessible through the Division Intranet link, ***Contract Requirements*** as PDF files.

4.5.3 Nationally recognized test methods shall be of the most current issue or as specified in the purchase order. Work orders shall identify the applicable test methods to be used on the nuclear project.

4.6 Acceptance of Services Only

Not applicable to activities conducted within the Department of Analytical and Environmental Chemistry.

4.7 Commercial Grade Items

4.7.1 Where an item is to be incorporated into a test or deliverable to a client, and that item is not subject to design or specification requirements that are unique to nuclear facilities, used in applications other then nuclear facilities, and procured from the supplier on the specifications set forth in the manufacturers' published product and description, the item shall be considered "commercial grade".

4.7.2 Chemical reagents and standards used for testing purposes shall be ordered to specific chemical grades and certificates of analysis shall be required with each lot.

4.7.3 Controls for procurement planning, supplier selection, supplier performance evaluation, and acceptance of procured items and services other than chemical reagents and standards shall be as identified in **SOP-01-7.4.1**, *Purchasing*, and any referenced document within that procedure.

4.7.4 Receipt inspection of chemical reagents, standards, and test items for use on nuclear safety-related projects shall be performed by department personnel and documented on the *SwRI Receipt Traveler* or **FRM-109**, *Item Receipt Report*, as specified in **SOP-01-8.2.4**, *Monitoring and Measurement*. Any discrepancy such as a damaged container or container label shall be documented on the form and the client shall be contacted for disposition.

4.7.5 Prior or acceptance of a commercial grade item, the receipt inspection shall determine the following:

(a) Damage was not sustained during shipment;

(b) The item has satisfied the specified acceptance criteria; and

(c) Specified documentation, as applicable to the item, was received and is acceptable.

4.7.6 Receipt inspection of chemical reagents and standards shall also consist of verification of chemical type, grade, container integrity, certificate of analysis, and shelf life, where applicable. Upon acceptance of chemical reagents and standards, the containers shall be labeled with the following:

(a) Chemical name;

(b) Chemical grade;

(c) Lot code;

(d) Date received; and

(e) Shelf life, when applicable.

4.7.7 Expired shelf life items shall not be used for testing purposes.

4.7.8 Lot codes of chemical reagents and standards used during equipment standardization and testing shall be recorded on the individual testing data sheets to provide traceability.

4.7.9 Samples supplied to SwRI for testing shall be received by the Sample Custodian and logged into the laboratory logbook. Sample documentation and sample custody shall be maintained in accordance with **TAP-01-0407-001**, *Sample Receipt Inspection*, and **TAP-01-0407-035**, *Organic and Inorganic Sample Security.*

4.7.10 Samples supplied to SwRI for testing shall be labeled with the following:

(a) Sample control number;

(b) Purchase order number;

(c) Purchase order line item number, as applicable;

(d) Work order number;

(e) Nuclear QA label; and

(f) Sample retention date, when applicable.

4.7.11 In the event that samples are damaged upon receipt, a ***Sample Discrepancy Record*** shall be generated from the Division Intranet.

4.7.12 The testing work order shall list the project number, tests required, test methods required, and shall be labeled *Nuclear Quality.*

4.7.13 Identification and traceability shall be maintained in accordance with **SOP-01-7.5.1**, *Item Identification and Traceability.*

4.8 Inspection

4.8.1 Inspection for acceptance shall be performed by qualified persons other than those who conduct or directly supervise the work being inspected.

4.8.2 Institute Quality System (IQS) personnel shall perform surveillance activities as required to ensure compliance with the contract and this Quality Project Plan. Specific areas in which IQS may perform surveillance activities include, but are not limited to, the following:

(a) Receiving inspection and labeling of chemical reagents, standards, and testing samples;

(b) Testing processes;

(c) Calibration and major equipment;

(d) Sample and record retention; and

(e) Test records.

4.9 Inspection and Testing

4.9.1 Required tests for acceptance shall be conducted under appropriate environmental conditions using the tools and equipment necessary to conduct the test in a manner to fulfill test requirements and acceptance criteria.

4.9.2 Tests shall be conducted, controlled, and verified in accordance with **SOP-01-8.2.4**, *Monitoring and Measurement*.

4.9.3 Controls for measuring and test equipment shall be as specified in **SOP-01-7.6.1**, *Control of Measuring and Test Equipment*.

4.9.4 Controls for identification, segregation, reporting, and resolution of nonconforming items and conditions shall be as specified in **SOP-01-8.3.1**, *Nonconformance Reporting*.

4.10 Handling, Storage, Packaging, Preservation, and Delivery

4.10.1 Controls for handling, storage, packaging, preservation, and delivery of items are identified in **SOP-01-7.5.3**, *Handling, Storage, Packaging, Protection, and Delivery of Items*.

4.10.2 Samples specified on the purchase order to be returned to the client shall be prepared and packaged as specified on the purchase order. Each package shall be marked legibly and indelibly with the purchase order/release number and line item number(s) relevant to the package.

4.11 Quality Assurance Records

4.11.1 Quality assurance records shall furnish documentary evidence that items or activities meet specified quality requirements. Documents that ensure this evidence include **TAP-01-0407-014**, *Inventory of Case File Purges*, and **SOP-01-4.2.4**, *Storage and Maintenance of Quality Records*. These documents and this QPP ensure that QA records shall be legible, identifiable, retrievable, and maintained in dual storage.

4.11.2 Records shall be traceable to associated items and activities and shall accurately reflect the work accomplished or information required.

4.11.3 Documents shall be considered valid records only if stamped, initialed or signed and dated by authorized personnel or otherwise authenticated.

4.11.4 Records of test analyses performed by the Department of Analytical and Environmental Chemistry are classified as *nonpermanent* and shall be retained for a minimum of five years. Nonpermanent records are those required to show evidence that an activity was performed in accordance with the applicable requirements, but need not be retained for the life of the item. Based on the use of the final data, the client shall be responsible for determining and implementing permanent storage requirements.

4.11.5 In order to satisfy duplicate storage requirements, one copy of the QA record shall maintained by the Project Manager in Building 70 and a separate copy shall be maintained in the Division Quality Assurance Archives in Building 201. Storage requirements shall be as stated in **SOP-01-4.2.4**, *Storage and Maintenance of Quality Records*, to ensure protection against the risk of damage or destruction.

4.12 10 CFR, Part 21

4.12.1 SwRI procurement documents shall include requirements for reporting and approving disposition of supplier nonconformances and, when required, compliance to 10 CFR, Part 21.

4.12.2 The Manager of Institute Quality Assurance or Director of Institute Quality Systems shall determine if a nonconforming condition is reportable under 10 CFR, Part 21, and initiate reporting and condition in accordance with the SwRI Operating Policies and Procedures (OPP). Safety hazards or defects that could create a substantial safety hazard shall be reported. Substantial safety hazard means a loss of safety function to the extent that there is a major reduction in the degree of protection provided to public health and safety.

4.13 Certified Test Report

The Project Manager and Institute Quality Assurance Manager as complying with all contractual requirements shall certify test reports. The certified test report shall reference the purchase order/release number, the test methods performed, and the purchase order/release line item number.

4.14 Valid Documents List

The Department of Analytical and Environmental Chemistry work order shall specify all applicable documents and appropriate document revision level for each document. The work order shall then serve as the Valid Documents List (VDL) for each individual project.

5.0 HISTORY OF REVISIONS

Revision 4
Title of document changed from the Standard Project Quality Plan *SPQP-CHIAN* to Quality Project Plan, *QPP-015*
Extensive revision to comply with Project Quality Plan PQP-Nuclear, *Nuclear Services*, which replaces SwRI NQAPM, *Nuclear Quality Assurance Program Manual.*

010033

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050119-1
SRR: 27044
SDG: 257326
CASE: CNWRA
VTSR: January 06, 2005
PROJECT#: 06002.01.211

Chain of Custody/Login Paperwork

15124

SAMPLE LIST/CHAIN OF CUSTODY

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

Requested Turnaround:
- [x] 2 Weeks
- [ ] 3 Weeks
- [ ] Other:

Shipper Name/Address:

Client: Lietai Yang, Division 20.

Client Purchase Order/Other ID: 06002.01.211, 1.20

Site/Zone ID:

SwRI Contact:

Analyses Requested

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers
Dust-0404-T14	04/04			Dust	1
Dust-0404-T3	04/04			Dust	1
Dust-T14+T3 Soluble				Soluble on filtration paper	
Dust-T14+T3 Soluble	04/04				
Whatman Paper Blank					

Blend T14 and T3. Do a complete analysis on all cations and all anions after fully dissolve the solid.

Dissolve everything on filtration paper in water at room temperature. Analyze all cation, all anions in water. 12/29/04

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)

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

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

Temp: 22.0°C Therm. #: 027

Comments:

Relinquished by (Print/Signature)	Date	Time
Lietai Yang	12/29/04	12:00
Received by (Print/Signature)	**Date**	**Time**
J. Ranger / J. Ranger	12/29/04	11:45
Relinquished by (Print/Signature)	**Date**	**Time**
Received by (Print/Signature)	**Date**	**Time**
Relinquished by (Print/Signature)	**Date**	**Time**

SwRI Project#: 06002.01.211

Received by SwRI Lab. (Signature):

Date: 1/6/05 Time: 1734

Samples Disposed: Date: Time:

Samples Disposed by:

010034

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

SAMPLE LOG-IN SHEET

010035

Lab Name: Southwest Research Institute

Page 1 of 1

Received By (Print Name): DINO ROMAN

Log-in Date: 01/06/2005

Received By (Signature): [signature]

Case Number: CNWRA

Sample Delivery Group No.

SAS Number: N/A

Remarks: 06002.01.211

			EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc
1.	Custody Seal(s)	Present/Absent* Intact/Broken	Dust-0404-T14/T	None	257326	Intact
2.	Custody Seal Nos.	N/A	Dust-T14+T13 Soluble	None	257327	Intact
			Whatman Paper Blk.	None	257328	Intact
3.	Chain-of Custody Records	Present/Absent*				
4.	Traffic Reports or Packing Lists	Present/Absent				
5.	Airbill	Airbill/Sticker Present/Absent*				
6.	Airbill No.	HAND DELIVERED				
7.	Sample Tags	Present/Absent				
	Sample Tag Numbers	Listed/Not listed on Chain of Custody				
8.	Sample Condition	Intact/Broken*/ Leaking				
9.	Cooler Temperature	22.0C				
10.	Does Information on custody records, traffic reports, and sample tags agree?	Yes/No*				
11.	Date Received at Lab	01/06/2005				
12.	Time Received	17:34:00				

Sample Transfer

Fraction: Inorg	Fraction:
Area #: Inorg. Cab.	Area #:
By: DINO ROMAN	By:
On: 01/06/2005	On:

01.10.2005

* Contact SMO and attach record of resolution

Reviewed By: CYNTHIA A. SALLEDA

Date: 01.10.2005

Logbook No.: Sample Receipt (27044)

Logbook Page No.: 5309 (SECTION 1 OF 1)

FORM DC-1

OLMO4.2

010036

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050119-1
SRR: 27044
SDG: 257326
CASE: CNWRA
VTSR: January 06, 2005
PROJECT#: 06002.01.211

Copies of Login Book

Sample Login Book

Jan 06, 2005

SwRI Login Area
Division 1

Sample Receipt: 27042 | Project: 03162.24.10X | Client: HEB
VTSR Date: Jan 06, 2005 | VTSR Time: 08:25:00 | Manager: SCHATTENBERG, HERB

System ID	Customer Sample ID	Matrix
257309	(24-A)Cucumbers	PRODUCE
257310	(MT-A)Tangelos, Mineola	PRODUCE
257311	(29-A)Grapes, Red (Chilean)	PRODUCE
257312	(GC-A)Cabbage, Green	PRODUCE
257313	(AGI-A)yellow onions	PRODUCE
257314	(29-B)Grapes, Red (Chilean)	PRODUCE
257315	(ALK-A)Roma Tomatoes	PRODUCE
257316	(24-B)Cucumbers	PRODUCE
257317	(ASG-A)Romanito Tomatoes	PRODUCE
257318	(MN-A)Mangos, Pacifico	PRODUCE

Sample Receipt: 27043 | Project: 10374.01.00X | Client: BATTELLE PNNL
VTSR Date: Jan 06, 2005 | VTSR Time: 09:00:00 | Manager: DAMMANN, MIKE

System ID	Customer Sample ID	Matrix
257320	BV-ES31E-S-W-11	Wipe
257321	BV-ES31E-S-W-12	Wipe
257322	BV-ES31E-S-W-13	Wipe
257323	BV-ES31E-S-W-14	Wipe
257324	BV-ES31E-S-W-15	Wipe
257325	BV-ES31E-S-W-16	Wipe

Sample Receipt: 27044 | Project: 06002.01.211 | Client: Div. 20
VTSR Date: Jan 06, 2005 | VTSR Time: 17:34:00 | Manager: RANGER, JACKIE

System ID	Customer Sample ID	Matrix
257326	Dust-0404-T14/T3	Dust
257327	Dust-T14+T13 Soluble	Filter
257328	Whatman Paper Blk.	Filter

Number of samples for today: 19

Number of Containers for today: 20

010038

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050119-1
SRR: 27044
SDG: 257326
CASE: CNWRA
VTSR: January 06, 2005
PROJECT#: 06002.01.211

RAW DATA

Div 20
to#050119-1
06002.01.211

Shanyk 3/14/05

257326 for Ba

R Zapien 4/7/05

$0.03743\ ug/ml \times DF\ 10 \times \frac{100ml}{0.0521g} = 718\ mg/kg$

Sample ID	SRM#	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	prep	rl	mg/kg	sigwt	Dilution	Calc RL	ug/ml
257326		Ag3280	2.31	U		mg/kg	2.31				teflon	0.005	0.6296296	0.63	1	2.31481	0.00136
257326		Al3082	60200			mg/kg	960				fusion	0.05	60249.904	60200	10	959.693	3.13902
257326		As1890	9.69			mg/kg	2.31				teflon	0.005	9.6944444	9.69	1	2.31481	0.02094
257326		B_2496	2130	U		mg/kg	2130				rock	0.11	856.09284	856	10	2127.66	0.04426
257326		Ba4934	718	✓		mg/kg	96				fusion	0.005	718.4261	718	10	95.9693	0.03743
257326		Be3130	2.31	U		mg/kg	2.31				teflon	0.005	1.4074074	1.41	1	2.31481	0.00304
257326		Bi2230	6.94	U		mg/kg	6.94				teflon	0.015	-3.037037	-3.04	1	6.94444	-0.00656
257326		Ca3179	17500			mg/kg	960				fusion	0.05	17546.833	17500	10	959.693	0.91419
257326		Cd2265	2.31	U		mg/kg	2.31				teflon	0.005	0.7453704	0.745	1	2.31481	0.00161
257326		Co2286	7.57			mg/kg	2.31				teflon	0.005	7.5694444	7.57	1	2.31481	0.01635
257326		Cr2677	104			mg/kg	96				fusion	0.005	104.41459	104	10	95.9693	0.00544
257326		Cu3247	220			mg/kg	96				fusion	0.005	219.57774	220	10	95.9693	0.01144
257326		Fe2714	24000			mg/kg	960				fusion	0.05	23994.05	24000	10	959.693	1.25009
257326		K_7664	22400			mg/kg	1920				fusion	0.1	22365.067	22400	10	1919.39	1.16522
257326		La3988	27.8			mg/kg	2.31				teflon	0.005	27.814815	27.8	1	2.31481	0.06008
257326		Li6707	62.7			mg/kg	48.4				rock	0.005	62.669246	62.7	10	96.7118	0.00324
257326		Mg2790	11500			mg/kg	960				fusion	0.05	11487.716	11500	10	959.693	0.59851
257326		Mn2576	608			mg/kg	96				fusion	0.005	608.4453	608	10	95.9693	0.0317
257326		Mo2020	2.31	U		mg/kg	2.31				teflon	0.005	2.0972222	2.1	1	2.31481	0.00453
257326		Na3302	12800			mg/kg	3840				fusion	0.2	12755.662	12800	10	3838.77	0.66457
257326		Ni2316	33.8			mg/kg	2.31				teflon	0.005	33.824074	33.8	1	2.31481	0.07306
257326		P_1782	1780			mg/kg	384				fusion	0.02	1776.9674	1780	10	383.877	0.09258
257326		Pb220	38.3			mg/kg	2.31				teflon	0.005	38.328704	38.3	1	2.31481	0.08279
257326		Pd3404	6.94	U		mg/kg	6.94				teflon	0.015	2.9351852	2.94	1	6.94444	0.00634
257326		S_1820	1060			mg/kg	580				rock	0.03	1061.7021	1060	10	580.271	0.05489
257326		Sb2068	6.94	U		mg/kg	6.94				teflon	0.015	6.8101852	6.81	1	6.94444	0.01471
257326		Se196	2.31	U		mg/kg	2.31				teflon	0.005	-0.111111	-0.111	1	2.31481	-0.00024
257326		Si2881	234000			mg/kg	384				fusion	0.02	233807.68	234000	10	383.877	12.18138
257326		Sn1899	46.3	U		mg/kg	46.3				teflon	0.1	38.532407	38.5	1	46.2963	0.08323
257326		Sr4215	288			mg/kg	96				fusion	0.005	288.48369	288	10	95.9693	0.01503
257326		Th2837	46.3	U		mg/kg	46.3				teflon	0.1	4.4074074	4.41	1	46.2963	0.00952
257326		Ti3349	3780			mg/kg	96				fusion	0.005	3776.0077	3780	10	95.9693	0.19673
257326		Tl1908	4.63	U		mg/kg	4.63				teflon	0.01	2.7175926	2.72	1	4.62963	0.00587
257326		U_4090	46.3	U		mg/kg	46.3				teflon	0.1	1.3935185	1.39	1	46.2963	0.00301
257326		V_2924	44.3			mg/kg	48.0				fusion	0.005	44.337812	44.3	10	95.9693	0.00231
257326		W_2079	4.63	U		mg/kg	4.63				teflon	0.01	1.2777778	1.28	1	4.62963	0.00276
257326		Y_3710	13.1			mg/kg	2.31				teflon	0.005	13.055556	13.1	1	2.31481	0.0282
257326		Zn2062	1110			mg/kg	96.7				rock	0.005	1111.2186	1110	10	96.7118	0.05745
257326		Zr3496	183			mg/kg	96				fusion	0.005	183.1094	183	10	95.9693	0.00954
lcsw-B10W4		Ag3280	0.104			mg/L	0.005		104.0%	0.1	teflon	0.005	0.10378	0.104	1	0.005	0.10378
lcsw-B10W4		As1890	4.19			mg/L	0.005		104.8%	4	teflon	0.005	4.19256	4.19	1	0.005	4.19256
lcsw-B10W4		Be3130	0.108			mg/L	0.005		108.0%	0.1	teflon	0.005	0.10772	0.108	1	0.005	0.10772

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to#050119-1
06002.01.211

Sample ID	SRM#	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	prep	rl	mg/kg	sigwt	Dilution	Calc RL	ug/ml
lcsw-B10W4		Cd2265	0.103			mg/L	0.005		103.0%	0.1	teflon	0.005	0.10277	0.103	1	0.005	0.10277
lcsw-B10W4		Co2286	1.00			mg/L	0.005		100.0%	1	teflon	0.005	1.00294	1	1	0.005	1.00294
lcsw-B10W4		Ni2316	1.02			mg/L	0.005		102.0%	1	teflon	0.005	1.02021	1.02	1	0.005	1.02021
lcsw-B10W4		Pb220	1.04			mg/L	0.005		104.0%	1	teflon	0.005	1.03703	1.04	1	0.005	1.03703
lcsw-B10W4		Sb2068	1.05			mg/L	0.015		105.0%	1	teflon	0.015	1.04876	1.05	1	0.015	1.04876
lcsw-B10W4		Se196	4.44			mg/L	0.005		111.0%	4	teflon	0.005	4.44055	4.44	1	0.005	4.44055
lcsw-B10W4		Tl1908	4.20			mg/L	0.01		105.0%	4	teflon	0.01	4.19844	4.2	1	0.01	4.19844
pbw-B10W6		Ag3280	2.50	U		mg/kg	2.5				teflon	0.005	0.725	0.725	1	2.5	0.00145
pbw-B10W4		Al3082	1000	U		mg/kg	1000				fusion	0.05	150.2	150	10	1000	0.00751
pbw-B10W6		As1890	2.50	U		mg/kg	2.5				teflon	0.005	-1.185	-1.19	1	2.5	-0.00237
pbw-B10W1		B_2496	2200	U		mg/kg	2200				rock	0.11	2117.8	2120	10	2200	0.10589
pbw-B10W4		Ba4934	100	U		mg/kg	100				fusion	0.005	39.6	39.6	10	100	0.00198
pbw-B10W6		Be3130	2.50	U		mg/kg	2.5				teflon	0.005	0	0	1	2.5	0
pbw-B10W6		Bi2230	7.50	U		mg/kg	7.5				teflon	0.015	0.245	0.245	1	7.5	0.00049
pbw-B10W4		Ca3179	1000	U		mg/kg	1000				fusion	0.05	-7.4	-7.4	10	1000	-0.00037
pbw-B10W6		Cd2265	2.50	U		mg/kg	2.5				teflon	0.005	0.03	0.03	1	2.5	0.00006
pbw-B10W6		Co2286	2.50	U		mg/kg	2.5				teflon	0.005	0.425	0.425	1	2.5	0.00085
pbw-B10W4		Cr2677	100	U		mg/kg	100				fusion	0.005	33.4	33.4	10	100	0.00167
pbw-B10W4		Cu3247	100	U		mg/kg	100				fusion	0.005	23.8	23.8	10	100	0.00119
pbw-B10W4		Fe2714	1000	U		mg/kg	1000				fusion	0.05	-55.6	-55.6	10	1000	-0.00278
pbw-B10W4		K_7664	2000	U		mg/kg	2000				fusion	0.1	86.6	86.6	10	2000	0.00433
pbw-B10W6		La3988	2.50	U		mg/kg	2.5				teflon	0.005	0.635	0.635	1	2.5	0.00127
pbw-B10W1		Li6707	50	U		mg/kg	50				rock	0.005	34.4	34.4	10	100	0.00172
pbw-B10W4		Mg2790	1000	U		mg/kg	1000				fusion	0.05	-84	-84	10	1000	-0.0042
pbw-B10W4		Mn2576	100	U		mg/kg	100				fusion	0.005	5.4	5.4	10	100	0.00027
pbw-B10W6		Mo2020	2.50	U		mg/kg	2.5				teflon	0.005	0.72	0.72	1	2.5	0.00144
pbw-B10W4		Na3302	4000	U		mg/kg	4000				fusion	0.2	1796	1800	10	4000	0.0898
pbw-B10W6		Ni2316	2.50	U		mg/kg	2.5				teflon	0.005	1.74	1.74	1	2.5	0.00348
pbw-B10W4		P_1782	400	U		mg/kg	400				fusion	0.02	155.4	155	10	400	0.00777
pbw-B10W6		Pb220	2.50	U		mg/kg	2.5				teflon	0.005	-0.72	-0.72	1	2.5	-0.00144
pbw-B10W6		Pd3404	7.50	U		mg/kg	7.5				teflon	0.015	2.35	2.35	1	7.5	0.0047
pbw-B10W1		S_1820	600	U		mg/kg	600				rock	0.03	408.4	408	10	600	0.02042
pbw-B10W6		Sb2068	7.50	U		mg/kg	7.5				teflon	0.015	2.515	2.52	1	7.5	0.00503
pbw-B10W6		Se196	2.50	U		mg/kg	2.5				teflon	0.005	0.925	0.925	1	2.5	0.00185
pbw-B10W4		Si2881	400	U		mg/kg	400				fusion	0.02	210.8	211	10	400	0.01054
pbw-B10W6		Sn1899	50.0	U		mg/kg	50				teflon	0.1	48.42	48.4	1	50	0.09684
pbw-B10W4		Sr4215	100	U		mg/kg	100				fusion	0.005	2.8	2.8	10	100	0.00014
pbw-B10W6		Th2837	50.0	U		mg/kg	50				teflon	0.1	-0.815	-0.815	1	50	-0.00163
pbw-B10W4		Ti3349	100	U		mg/kg	100				fusion	0.005	1.8	1.8	10	100	0.00009
pbw-B10W6		Tl1908	5.00	U		mg/kg	5				teflon	0.01	2.135	2.14	1	5	0.00427
pbw-B10W6		U_4090	50.0	U		mg/kg	50				teflon	0.1	12.255	12.3	1	50	0.02451
pbw-B10W4		V_2924	50	U		mg/kg	50				fusion	0.005	-17.2	-17.2	10	100	-0.00086

010040

Div 20
to#050119-1
06002.01.211

Sample ID	SRM#	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	prep	rl	mg/kg	sigwt	Dilution	Calc RL	ug/ml
pbw-B10W6		W_2079	5.00	U		mg/kg	5				teflon	0.01	-1.655	-1.66	1	5	-0.00331
pbw-B10W6		Y_3710	2.50	U		mg/kg	2.5				teflon	0.005	-0.055	-0.055	1	2.5	-0.00011
pbw-B10W1		Zn2062	100	U		mg/kg	100				rock	0.005	5.8	5.8	10	100	0.00029
pbw-B10W4		Zr3496	100	U		mg/kg	100				fusion	0.005	-10.4	-10.4	10	100	-0.00052
srm-B10W5	278	Al3082	73400			mg/kg	489		98.0%	74888	fusion	0.05	73360.02	73400	10	488.759	7.50473
srm-B10W8	278	As1890	1.84			mg/kg	1.19		73.7%	2.5	teflon	0.005	1.84173	1.84	1	1.18821	0.00775
srm-B10W5	278	Ba4934	939			mg/kg	48.9		85.3%	1100	fusion	0.005	938.80743	939	10	48.8759	0.09604
srm-B10W5	278	Ca3179	6620			mg/kg	489		94.3%	7025	fusion	0.05	6624.5357	6620	10	488.759	0.67769
srm-B10W7	278	Co2286	2.37			mg/kg	1.23		113.0%	2.1	teflon	0.005	2.372549	2.37	1	1.22549	0.00968
srm-B10W5	278	Fe2714	14000			mg/kg	489		98.3%	14269	fusion	0.05	14027.566	14000	10	488.759	1.43502
srm-B10W5	278	K_7664	37000			mg/kg	978		107.1%	34534	fusion	0.1	36974.487	37000	10	977.517	3.78249
srm-B10W7	278	La3988	50.1			mg/kg	1.23		151.9%	33	teflon	0.005	50.122549	50.1	1	1.22549	0.2045
srm-B10W1	278	Li6707	61.6			mg/kg	24.8		131.1%	47	rock	0.005	61.607143	61.6	10	49.6032	0.00621
srm-B10W5	278	Mg2790	1280			mg/kg	489		92.5%	1387	fusion	0.05	1282.7957	1280	10	488.759	0.13123
srm-B10W5	278	Mn2576	386			mg/kg	48.9		117.4%	329	fusion	0.005	385.92375	386	10	48.8759	0.03948
srm-B10W7	278	Mo2020	7.08			mg/kg	1.23		236.1%	3	teflon	0.005	7.0833333	7.08	1	1.22549	0.0289
srm-B10W5	278	Na3302	34900			mg/kg	1960		97.2%	35905	fusion	0.2	34883.382	34900	10	1955.03	3.56857
srm-B10W7	278	Ni2316	6.12			mg/kg	1.23		169.9%	3.6	teflon	0.005	6.1151961	6.12	1	1.22549	0.02495
srm-B10W7	278	Pb220	27.1			mg/kg	1.23		165.1%	16.4	teflon	0.005	27.068627	27.1	1	1.22549	0.11044
srm-B10W5	278	Si2881	348000			mg/kg	196		101.9%	341483	fusion	0.02	347976.64	348000	10	195.503	35.59801
srm-B10W5	278	Sr4215	66.1			mg/kg	48.9		104.1%	63.5	fusion	0.005	66.080156	66.1	10	48.8759	0.00676
srm-B10W5	278	Ti3349	1370			mg/kg	48.9		93.4%	1469	fusion	0.005	1371.1632	1370	10	48.8759	0.14027
srm-B10W7	278	Y_3710	59.4			mg/kg	1.23		144.9%	41	teflon	0.005	59.421569	59.4	1	1.22549	0.24244
srm-B10W1	278	Zn2062	62.6			mg/kg	49.6		115.9%	54	rock	0.005	62.599206	62.6	10	49.6032	0.00631
srm-B10W5	278	Zr3496	276			mg/kg	48.9		93.5%	295	fusion	0.005	275.75758	276	10	48.8759	0.02821
srm-B10W6	688	Al3082	93400			mg/kg	469		101.7%	91876	fusion	0.05	93449.343	93400	10	469.043	9.9617
srm-B10W6	688	Ba4934	194			mg/kg	46.9		96.9%	200	fusion	0.005	193.80863	194	10	46.9043	0.02066
srm-B10W6	688	Ca3179	86100			mg/kg	469		99.0%	86978	fusion	0.05	86094.371	86100	10	469.043	9.17766
srm-B10W8	688	Co2286	33.5			mg/kg	1.19		68.4%	49	teflon	0.005	33.514734	33.5	1	1.18821	0.14103
srm-B10W6	688	Cr2677	358			mg/kg	46.9		107.7%	332	fusion	0.005	357.5985	358	10	46.9043	0.03812
srm-B10W6	688	Cu3247	91.8			mg/kg	46.9		95.7%	96	fusion	0.005	91.838649	91.8	10	46.9043	0.00979
srm-B10W6	688	Fe2714	72400			mg/kg	469		100.0%	72393	fusion	0.05	72420.732	72400	10	469.043	7.72005
srm-B10W6	688	K_7664	1640			mg/kg	938		105.7%	1552	fusion	0.1	1641.2758	1640	10	938.086	0.17496
srm-B10W8	688	La3988	3.71			mg/kg	1.19		70.0%	5.3	teflon	0.005	3.7119772	3.71	1	1.18821	0.01562
srm-B10W6	688	Mg2790	49700			mg/kg	469		98.1%	50657	fusion	0.05	49717.824	49700	10	469.043	5.29992
srm-B10W6	688	Mn2576	1290			mg/kg	46.9		122.5%	1055	fusion	0.005	1292.5891	1290	10	46.9043	0.13779
srm-B10W6	688	Na3302	15400			mg/kg	1880		96.6%	15950	fusion	0.2	15400.094	15400	10	1876.17	1.64165
srm-B10W8	688	Ni2316	110			mg/kg	1.19		69.5%	158	teflon	0.005	109.74097	110	1	1.18821	0.46179
srm-B10W6	688	P_1782	654			mg/kg	188		111.9%	585	fusion	0.02	654.12758	654	10	187.617	0.06973
srm-B10W6	688	Si2881	238000			mg/kg	188		105.1%	226253	fusion	0.02	237872.42	238000	10	187.617	25.3572
srm-B10W6	688	Sr4215	177			mg/kg	46.9		104.3%	169	fusion	0.005	176.54784	177	10	46.9043	0.01882
srm-B10W6	688	Ti3349	6930			mg/kg	46.9		98.8%	7014	fusion	0.005	6927.1107	6930	10	46.9043	0.73843

010041

Div 20
to#050119-1
06002.01.211

Sample ID	SRM#	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	prep	rl	mg/kg	sigwt	Dilution	Calc RL	ug/ml
srm-B10W6	688	V_2924	262			mg/kg	23.5		108.4%	242	fusion	0.005	262.38274	262	10	46.9043	0.02797
srm-B10W8	688	Y_3710	13.0			mg/kg	1.19		76.5%	17	teflon	0.005	12.996673	13	1	1.18821	0.05469
srm-B10W3	688	Zn2062	76.5			mg/kg	47		91.0%	84	rock	0.005	76.481656	76.5	10	47.0367	0.00813
srm-B10W6	688	Zr3496	54.4			mg/kg	46.9		89.2%	61	fusion	0.005	54.409006	54.4	10	46.9043	0.0058

010042

Div 20
to#050119-1
06002.01.211

3/14/05

257327 for Ba
0.04558 ug/ml x 25ml/1sample = 1.14 ug/sample

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	ug/sample	sigwt	Dilution	Calc RL	ug/ml	Date	Time
pbw-B10W5	Ag3280	0.125	U		ug/sample	0.125				0.005	0.01075	0.0108	1	0.125	0.00043	02/15/05	17:47
pbw-B10W5	Al3082	1.25	U		ug/sample	1.25				0.05	-0.1105	-0.111	1	1.25	-0.00442	02/15/05	17:47
pbw-B10W5	As1890	0.125	U		ug/sample	0.125				0.005	-0.01475	-0.0148	1	0.125	-0.00059	02/15/05	17:47
pbw-B10W5	B_2496	0.500	U		ug/sample	0.5				0.02	0.0785	0.0785	1	0.5	0.00314	02/15/05	17:47
pbw-B10W5	Ba4934	0.125	U		ug/sample	0.125				0.005	0.0025	0.0025	1	0.125	0.0001	02/15/05	17:47
pbw-B10W5	Be3130	0.125	U		ug/sample	0.125				0.005	0.0005	0.0005	1	0.125	0.00002	02/15/05	17:47
pbw-B10W5	Bi2230	0.375	U		ug/sample	0.375				0.015	-0.25875	-0.259	1	0.375	-0.01035	02/15/05	17:47
pbw-B10W5	Ca3179	1.25	U		ug/sample	1.25				0.05	0.062	0.062	1	1.25	0.00248	02/15/05	17:47
pbw-B10W5	Cd2265	0.125	U		ug/sample	0.125				0.005	-0.00025	-0.00025	1	0.125	-0.00001	02/15/05	17:47
pbw-B10W5	Co2286	0.125	U		ug/sample	0.125				0.005	0.00425	0.00425	1	0.125	0.00017	02/15/05	17:47
pbw-B10W5	Cr2677	0.125	U		ug/sample	0.125				0.005	-0.00025	-0.00025	1	0.125	-0.00001	02/15/05	17:47
pbw-B10W5	Cu3247	0.125	U		ug/sample	0.125				0.005	0.003	0.003	1	0.125	0.00012	02/15/05	17:47
pbw-B10W5	Fe2714	1.25	U		ug/sample	1.25				0.05	0.06725	0.0673	1	1.25	0.00269	02/15/05	17:47
pbw-B10W5	K_7664	2.50	U		ug/sample	2.5				0.1	-0.1255	-0.126	1	2.5	-0.00502	02/15/05	17:47
pbw-B10W5	La3988	0.125	U		ug/sample	0.125				0.005	0.01725	0.0173	1	0.125	0.00069	02/15/05	17:47
pbw-B10W5	Li6707	0.125	U		ug/sample	0.125				0.005	-0.00275	-0.00275	1	0.125	-0.00011	02/15/05	17:47
pbw-B10W5	Mg2790	1.25	U		ug/sample	1.25				0.05	0.10375	0.104	1	1.25	0.00415	02/15/05	17:47
pbw-B10W5	Mn2576	0.125	U		ug/sample	0.125				0.005	-0.00025	-0.00025	1	0.125	-0.00001	02/15/05	17:47
pbw-B10W5	Mo2020	0.125	U		ug/sample	0.125				0.005	0.03525	0.0353	1	0.125	0.00141	02/15/05	17:47
pbw-B10W5	Na5889	5.00	U		ug/sample	5				0.2	-0.1625	-0.163	1	5	-0.0065	02/15/05	17:47
pbw-B10W5	Ni2316	0.125	U		ug/sample	0.125				0.005	-0.026	-0.026	1	0.125	-0.00104	02/15/05	17:47
pbw-B10W5	P_1782	0.500	U		ug/sample	0.5				0.02	-0.18775	-0.188	1	0.5	-0.00751	02/15/05	17:47
pbw-B10W5	Pd3404	0.125	U		ug/sample	0.125				0.005	0.00675	0.00675	1	0.125	0.00027	02/15/05	17:47
pbw-B10W5	S_1820	0.500	U		ug/sample	0.5				0.02	0.307	0.307	1	0.5	0.01228	02/15/05	17:47
pbw-B10W5	Sb2068	0.250	U		ug/sample	0.25				0.01	0.077	0.077	1	0.25	0.00308	02/15/05	17:47
pbw-B10W5	Si2881	0.500	U		ug/sample	0.5				0.02	0.32	0.32	1	0.5	0.0128	02/15/05	17:47
pbw-B10W5	Pb220	0.250	U		ug/sample	0.25				0.01	0.20925	0.209	1	0.25	0.00837	02/15/05	17:47
pbw-B10W5	Se196	0.250	U		ug/sample	0.25				0.01	-0.044	-0.044	1	0.25	-0.00176	02/15/05	17:47
pbw-B10W5	Sn1899	1.00	U		ug/sample	1				0.04	0.8835	0.884	1	1	0.03534	02/15/05	17:47
pbw-B10W5	Sr4215	0.125	U		ug/sample	0.125				0.005	0.00025	0.00025	1	0.125	0.00001	02/15/05	17:47
pbw-B10W5	Th2837	0.375	U		ug/sample	0.375				0.015	0.024	0.024	1	0.375	0.00096	02/15/05	17:47
pbw-B10W5	Ti3349	0.125	U		ug/sample	0.125				0.005	0	0	1	0.125	0	02/15/05	17:47
pbw-B10W5	Tl1908	0.250	U		ug/sample	0.25				0.01	0.06	0.06	1	0.25	0.0024	02/15/05	17:47
pbw-B10W5	U_4090	2.50	U		ug/sample	2.5				0.1	0.5035	0.504	1	2.5	0.02014	02/15/05	17:47
pbw-B10W5	V_2924	0.125	U		ug/sample	0.125				0.005	0	0	1	0.125	0	02/15/05	17:47
pbw-B10W5	W_2079	0.250	U		ug/sample	0.25				0.01	-0.06375	-0.0638	1	0.25	-0.00255	02/15/05	17:47
pbw-B10W5	Y_3710	0.125	U		ug/sample	0.125				0.005	0	0	1	0.125	0	02/15/05	17:47
pbw-B10W5	Zn2062	0.125	U		ug/sample	0.125				0.005	0.0105	0.0105	1	0.125	0.00042	02/15/05	17:47
pbw-B10W5	Zr3496	0.125	U		ug/sample	0.125				0.005	0.007	0.007	1	0.125	0.00028	02/15/05	17:47
lcsw-B10W2	Ag3280	2.39			ug/sample	0.125		95.6%	2.5	0.005	2.39425	2.39	1	0.125	0.09577	02/15/05	17:51
lcsw-B10W2	Al3082	93.9			ug/sample	1.25		93.9%	100	0.05	93.8655	93.9	1	1.25	3.75462	02/15/05	17:51

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4/7/05

Div 20
to#050119-1
06002.01.211

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	ug/sample	sigwt	Dilution	Calc RL	ug/ml	Date	Time
lcsw-B10W2	As1890	99.0			ug/sample	0.125		99.0%	100	0.005	99.0435	99	1	0.125	3.96174	02/15/05	17:51
lcsw-B10W2	B_2496	0.500	U		ug/sample	0.5			0	0.02	0.04925	0.0493	1	0.5	0.00197	02/15/05	17:51
lcsw-B10W2	Ba4934	95.9			ug/sample	0.125		95.9%	100	0.005	95.91575	95.9	1	0.125	3.83663	02/15/05	17:51
lcsw-B10W2	Be3130	2.38			ug/sample	0.125		95.2%	2.5	0.005	2.3815	2.38	1	0.125	0.09526	02/15/05	17:51
lcsw-B10W2	Bi2230	0.375	U		ug/sample	0.375			0	0.015	-0.23175	-0.232	1	0.375	-0.00927	02/15/05	17:51
lcsw-B10W2	Ca3179	482			ug/sample	1.25		96.4%	500	0.05	482.31325	482	1	1.25	19.29253	02/15/05	17:51
lcsw-B10W2	Cd2265	2.42			ug/sample	0.125		96.8%	2.5	0.005	2.4175	2.42	1	0.125	0.0967	02/15/05	17:51
lcsw-B10W2	Co2286	23.9			ug/sample	0.125		95.6%	25	0.005	23.8625	23.9	1	0.125	0.9545	02/15/05	17:51
lcsw-B10W2	Cr2677	9.79			ug/sample	0.125		97.9%	10	0.005	9.79325	9.79	1	0.125	0.39173	02/15/05	17:51
lcsw-B10W2	Cu3247	12.2			ug/sample	0.125		97.6%	12.5	0.005	12.1685	12.2	1	0.125	0.48674	02/15/05	17:51
lcsw-B10W2	Fe2714	50.1			ug/sample	1.25		100.2%	50	0.05	50.10075	50.1	1	1.25	2.00403	02/15/05	17:51
lcsw-B10W2	K_7664	419			ug/sample	2.5		83.8%	500	0.1	419.157	419	1	2.5	16.76628	02/15/05	17:51
lcsw-B10W2	La3988	0.125	U		ug/sample	0.125			0	0.005	0.01425	0.0143	1	0.125	0.00057	02/15/05	17:51
lcsw-B10W2	Li6707	0.125	U		ug/sample	0.125			0	0.005	-0.0025	-0.0025	1	0.125	-0.0001	02/15/05	17:51
lcsw-B10W2	Mg2790	476			ug/sample	1.25		95.2%	500	0.05	476.48875	476	1	1.25	19.05955	02/15/05	17:51
lcsw-B10W2	Mn2576	24.2			ug/sample	0.125		96.8%	25	0.005	24.168	24.2	1	0.125	0.96672	02/15/05	17:51
lcsw-B10W2	Mo2020	0.125	U		ug/sample	0.125			0	0.005	0.03525	0.0353	1	0.125	0.00141	02/15/05	17:51
lcsw-B10W2	Na3302	420			ug/sample	5		84.0%	500	0.2	419.52575	420	1	5	16.78103	02/15/05	17:51
lcsw-B10W2	Ni2316	24.2			ug/sample	0.125		96.8%	25	0.005	24.1575	24.2	1	0.125	0.9663	02/15/05	17:51
lcsw-B10W2	P_1782	0.500	U		ug/sample	0.5			0	0.02	0.1825	0.183	1	0.5	0.0073	02/15/05	17:51
lcsw-B10W2	Pd3404	0.125	U		ug/sample	0.125			0	0.005	-0.03525	-0.0353	1	0.125	-0.00141	02/15/05	17:51
lcsw-B10W2	S_1820	0.500	U		ug/sample	0.5			0	0.02	0.069	0.069	1	0.5	0.00276	02/15/05	17:51
lcsw-B10W2	Sb2068	24.2			ug/sample	0.25		96.8%	25	0.01	24.245	24.2	1	0.25	0.9698	02/15/05	17:51
lcsw-B10W2	Si2881	0.500	U		ug/sample	0.5			0	0.02	0.36325	0.363	1	0.5	0.01453	02/15/05	17:51
lcsw-B10W2	Pb220	24.5			ug/sample	0.25		98.0%	25	0.01	24.526	24.5	1	0.25	0.98104	02/15/05	17:51
lcsw-B10W2	Se196	107			ug/sample	0.25		107.0%	100	0.01	106.7515	107	1	0.25	4.27006	02/15/05	17:51
lcsw-B10W2	Sn1899	1.00	U		ug/sample	1			0	0.04	0.22575	0.226	1	1	0.00903	02/15/05	17:51
lcsw-B10W2	Sr4215	0.125	U		ug/sample	0.125			0	0.005	0.016	0.016	1	0.125	0.00064	02/15/05	17:51
lcsw-B10W2	Th2837	0.375	U		ug/sample	0.375			0	0.015	-0.32925	-0.329	1	0.375	-0.01317	02/15/05	17:51
lcsw-B10W2	Ti3349	0.125	U		ug/sample	0.125			0	0.005	0.001	0.001	1	0.125	0.00004	02/15/05	17:51
lcsw-B10W2	Tl1908	99.0			ug/sample	0.25		99.0%	100	0.01	99.04275	99	1	0.25	3.96171	02/15/05	17:51
lcsw-B10W2	U_4090	2.50	U		ug/sample	2.5			0	0.1	0.44475	0.445	1	2.5	0.01779	02/15/05	17:51
lcsw-B10W2	V_2924	23.9			ug/sample	0.125		95.6%	25	0.005	23.87575	23.9	1	0.125	0.95503	02/15/05	17:51
lcsw-B10W2	W_2079	0.250	U		ug/sample	0.25			0	0.01	-0.08575	-0.0858	1	0.25	-0.00343	02/15/05	17:51
lcsw-B10W2	Y_3710	0.125	U		ug/sample	0.125			0	0.005	-0.00125	-0.00125	1	0.125	-0.00005	02/15/05	17:51
lcsw-B10W2	Zn2062	24.8			ug/sample	0.125		99.2%	25	0.005	24.816	24.8	1	0.125	0.99264	02/15/05	17:51
lcsw-B10W2	Zr3496	0.125	U		ug/sample	0.125			0	0.005	0.0095	0.0095	1	0.125	0.00038	02/15/05	17:51
257327	Ag3280	0.125	U		ug/sample	0.125				0.005	-0.00925	-0.00925	1	0.125	-0.00037	02/15/05	17:56
257327	Al3082	1.25	U		ug/sample	1.25				0.05	-0.09475	-0.0948	1	1.25	-0.00379	02/15/05	17:56
257327	As1890	0.465			ug/sample	0.125				0.005	0.46475	0.465	1	0.125	0.01859	02/15/05	17:56
257327	B_2496	10.7			ug/sample	0.5				0.02	10.68325	10.7	1	0.5	0.42733	02/15/05	17:56

010044

Div 20
to#050119-1
06002.01.211

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	ug/sample	sigwt	Dilution	Calc RL	ug/ml	Date	Time
257327	Ba4934	1.14			ug/sample	0.125				0.005	1.1395	1.14	1	0.125	0.04558	02/15/05	17:56
257327	Be3130	0.125	U		ug/sample	0.125				0.005	0.0015	0.0015	1	0.125	0.00006	02/15/05	17:56
257327	Bi2230	0.375	U		ug/sample	0.375				0.015	-0.24375	-0.244	1	0.375	-0.00975	02/15/05	17:56
257327	Ca3179	2160			ug/sample	1.25				0.05	2157.995	2160	1	1.25	86.3198	02/15/05	17:56
257327	Cd2265	0.125	U		ug/sample	0.125				0.005	-0.00175	-0.00175	1	0.125	-0.00007	02/15/05	17:56
257327	Co2286	0.125	U		ug/sample	0.125				0.005	0.0335	0.0335	1	0.125	0.00134	02/15/05	17:56
257327	Cr2677	0.125	U		ug/sample	0.125				0.005	0.005	0.005	1	0.125	0.0002	02/15/05	17:56
257327	Cu3247	2.35			ug/sample	0.125				0.005	2.3525	2.35	1	0.125	0.0941	02/15/05	17:56
257327	Fe2714	1.25	U		ug/sample	1.25				0.05	-0.0755	-0.0755	1	1.25	-0.00302	02/15/05	17:56
257327	K_7664	407			ug/sample	2.5				0.1	406.92325	407	1	2.5	16.27693	02/15/05	17:56
257327	La3988	0.125	U		ug/sample	0.125				0.005	-0.016	-0.016	1	0.125	-0.00064	02/15/05	17:56
257327	Li6707	0.194			ug/sample	0.125				0.005	0.19375	0.194	1	0.125	0.00775	02/15/05	17:56
257327	Mg2790	33.5			ug/sample	1.25				0.05	33.4525	33.5	1	1.25	1.3381	02/15/05	17:56
257327	Mn2576	0.125	U		ug/sample	0.125				0.005	0.06	0.06	1	0.125	0.0024	02/15/05	17:56
257327	Mo2020	0.140			ug/sample	0.125				0.005	0.13975	0.14	1	0.125	0.00559	02/15/05	17:56
257327	Na3302	597			ug/sample	5				0.2	596.92125	597	1	5	23.87685	02/15/05	17:56
257327	Ni2316	0.198			ug/sample	0.125				0.005	0.198	0.198	1	0.125	0.00792	02/15/05	17:56
257327	P_1782	22.7			ug/sample	0.5				0.02	22.6655	22.7	1	0.5	0.90662	02/15/05	17:56
257327	Pd3404	0.125	U		ug/sample	0.125				0.005	-0.1095	-0.11	1	0.125	-0.00438	02/15/05	17:56
257327	S_1820	1370			ug/sample	0.5				0.02	1373.785	1370	1	0.5	54.9514	02/15/05	17:56
257327	Sb2068	0.250	U		ug/sample	0.25				0.01	0.2345	0.235	1	0.25	0.00938	02/15/05	17:56
257327	Si2881	145			ug/sample	0.5				0.02	145.1585	145	1	0.5	5.80634	02/15/05	17:56
257327	Pb220	0.250	U		ug/sample	0.25				0.01	0.11775	0.118	1	0.25	0.00471	02/15/05	17:56
257327	Se196	0.250	U		ug/sample	0.25				0.01	0.127	0.127	1	0.25	0.00508	02/15/05	17:56
257327	Sn1899	1.00	U		ug/sample	1				0.04	0.22	0.22	1	1	0.0088	02/15/05	17:56
257327	Sr4215	15.7			ug/sample	0.125				0.005	15.65975	15.7	1	0.125	0.62639	02/15/05	17:56
257327	Th2837	0.375	U		ug/sample	0.375				0.015	0.0725	0.0725	1	0.375	0.0029	02/15/05	17:56
257327	Ti3349	0.125	U		ug/sample	0.125				0.005	-0.002	-0.002	1	0.125	-0.00008	02/15/05	17:56
257327	Tl1908	0.250	U		ug/sample	0.25				0.01	0.03025	0.0303	1	0.25	0.00121	02/15/05	17:56
257327	U_4090	2.50	U		ug/sample	2.5				0.1	-0.83925	-0.839	1	2.5	-0.03357	02/15/05	17:56
257327	V_2924	0.182			ug/sample	0.125				0.005	0.182	0.182	1	0.125	0.00728	02/15/05	17:56
257327	W_2079	0.250	U		ug/sample	0.25				0.01	-0.06275	-0.0628	1	0.25	-0.00251	02/15/05	17:56
257327	Y_3710	0.125	U		ug/sample	0.125				0.005	-0.00675	-0.00675	1	0.125	-0.00027	02/15/05	17:56
257327	Zn2062	0.125	U		ug/sample	0.125				0.005	0.044	0.044	1	0.125	0.00176	02/15/05	17:56
257327	Zr3496	0.125	U		ug/sample	0.125				0.005	0.0265	0.0265	1	0.125	0.00106	02/15/05	17:56
257328	Ag3280	0.125	U		ug/sample	0.125				0.005	-0.0105	-0.0105	1	0.125	-0.00042	02/15/05	18:01
257328	Al3082	1.25	U		ug/sample	1.25				0.05	0.08025	0.0803	1	1.25	0.00321	02/15/05	18:01
257328	As1890	0.125	U		ug/sample	0.125				0.005	-0.0485	-0.0485	1	0.125	-0.00194	02/15/05	18:01
257328	B_2496	0.500	U		ug/sample	0.5				0.02	0.17125	0.171	1	0.5	0.00685	02/15/05	18:01
257328	Ba4934	0.125	U		ug/sample	0.125				0.005	0.0035	0.0035	1	0.125	0.00014	02/15/05	18:01
257328	Be3130	0.125	U		ug/sample	0.125				0.005	0.00175	0.00175	1	0.125	0.00007	02/15/05	18:01

010045

Div 20
to#050119-1
06002.01.211

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	ug/sample	sigwt	Dilution	Calc RL	ug/ml	Date	Time
257328	Bi2230	0.375	U		ug/sample	0.375				0.015	-0.304	-0.304	1	0.375	-0.01216	02/15/05	18:01
257328	Ca3179	1.56			ug/sample	1.25				0.05	1.563	1.56	1	1.25	0.06252	02/15/05	18:01
257328	Cd2265	0.125	U		ug/sample	0.125				0.005	-0.003	-0.003	1	0.125	-0.00012	02/15/05	18:01
257328	Co2286	0.125	U		ug/sample	0.125				0.005	0.0005	0.0005	1	0.125	0.00002	02/15/05	18:01
257328	Cr2677	0.125	U		ug/sample	0.125				0.005	-0.01025	-0.0103	1	0.125	-0.00041	02/15/05	18:01
257328	Cu3247	0.149			ug/sample	0.125				0.005	0.14925	0.149	1	0.125	0.00597	02/15/05	18:01
257328	Fe2714	1.25	U		ug/sample	1.25				0.05	-0.0505	-0.0505	1	1.25	-0.00202	02/15/05	18:01
257328	K_7664	3.76			ug/sample	2.5				0.1	3.75575	3.76	1	2.5	0.15023	02/15/05	18:01
257328	La3988	0.125	U		ug/sample	0.125				0.005	-0.02175	-0.0218	1	0.125	-0.00087	02/15/05	18:01
257328	Li6707	0.125	U		ug/sample	0.125				0.005	-0.001	-0.001	1	0.125	-0.00004	02/15/05	18:01
257328	Mg2790	1.25	U		ug/sample	1.25				0.05	0.151	0.151	1	1.25	0.00604	02/15/05	18:01
257328	Mn2576	0.125	U		ug/sample	0.125				0.005	0.0015	0.0015	1	0.125	0.00006	02/15/05	18:01
257328	Mo2020	0.125	U		ug/sample	0.125				0.005	0.0295	0.0295	1	0.125	0.00118	02/15/05	18:01
257328	Na5889	44.5			ug/sample	5				0.2	44.49075	44.5	1	5	1.77963	02/15/05	18:01
257328	Ni2316	0.125	U		ug/sample	0.125				0.005	0.0265	0.0265	1	0.125	0.00106	02/15/05	18:01
257328	P_1782	0.500	U		ug/sample	0.5				0.02	0.16925	0.169	1	0.5	0.00677	02/15/05	18:01
257328	Pd3404	0.125	U		ug/sample	0.125				0.005	-0.033	-0.033	1	0.125	-0.00132	02/15/05	18:01
257328	S_1820	6.99			ug/sample	0.5				0.02	6.98925	6.99	1	0.5	0.27957	02/15/05	18:01
257328	Sb2068	0.250	U		ug/sample	0.25				0.01	-0.0155	-0.0155	1	0.25	-0.00062	02/15/05	18:01
257328	Si2881	2.19			ug/sample	0.5				0.02	2.18725	2.19	1	0.5	0.08749	02/15/05	18:01
257328	Pb220	0.250	U		ug/sample	0.25				0.01	0.09125	0.0913	1	0.25	0.00365	02/15/05	18:01
257328	Se196	0.250	U		ug/sample	0.25				0.01	-0.09025	-0.0903	1	0.25	-0.00361	02/15/05	18:01
257328	Sn1899	1.00	U		ug/sample	1				0.04	0.2185	0.219	1	1	0.00874	02/15/05	18:01
257328	Sr4215	0.125	U		ug/sample	0.125				0.005	0.0025	0.0025	1	0.125	0.0001	02/15/05	18:01
257328	Th2837	0.375	U		ug/sample	0.375				0.015	0.06125	0.0613	1	0.375	0.00245	02/15/05	18:01
257328	Ti3349	0.125	U		ug/sample	0.125				0.005	0.0035	0.0035	1	0.125	0.00014	02/15/05	18:01
257328	Tl1908	0.250	U		ug/sample	0.25				0.01	0.0755	0.0755	1	0.25	0.00302	02/15/05	18:01
257328	U_4090	2.50	U		ug/sample	2.5				0.1	-0.78825	-0.788	1	2.5	-0.03153	02/15/05	18:01
257328	V_2924	0.125	U		ug/sample	0.125				0.005	0.004	0.004	1	0.125	0.00016	02/15/05	18:01
257328	W_2079	0.250	U		ug/sample	0.25				0.01	-0.14625	-0.146	1	0.25	-0.00585	02/15/05	18:01
257328	Y_3710	0.125	U		ug/sample	0.125				0.005	-0.001	-0.001	1	0.125	-0.00004	02/15/05	18:01
257328	Zn2062	0.125	U		ug/sample	0.125				0.005	0.102	0.102	1	0.125	0.00408	02/15/05	18:01
257328	Zr3496	0.125	U		ug/sample	0.125				0.005	0.004	0.004	1	0.125	0.00016	02/15/05	18:01

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

BOOK / PAGE: 59 201

010047

CLIENT(S): DIV 20
TASK ORDER(S): 050119-1 SDG(S): 257326
PROJECT NO(S): 06002.01.211
METHOD: 3005A___ 3050B___ 3050B-7.5___ 3010A___ 3020A___ 7760A___ 7740A___ $HClO_4$___ $HClO_4/H_2SO_4$___
Microwave___ Fusion___ Teflon___ Rock ✓ OTHER___
MATRIX: Water___ Soil___ Biota___ Solid___ Liquid___ TCLP Ext___ OTHER Dust
INSTRUMENT: GFAA___ ICP ✓ ICP-MS___ IC___ FLAA___ HYDRIDE___ OTHER___
ACID INORG #: HNO_3# 4981 HCl# 4993 H_2SO_4#___ $HClO_4$#___ HF# 4897
INTERNAL STD: Sc @ 10 PPM___ Be @ 10 PPM___ SOURCE:___ INORG#___ EXP:___ AMT:___
Oven/Hotplate/Block ID: #1 Temperature (°C): 95

SAMPLE IDENTIFICATION	pH	WT (g)	I.V. (mL)	F.V. (mL)	
PBW-B10W1				100	
PBW-B10W2				↓	
SRM-B10W1 #278		.1008			
SRM-B10W2 ↓		.1040			
SRM-B10W3 #688		.1063			
SRM-B10W4 ↓		.1044			
257326		0.0517			
#278 is Obsidian					
#688 is Basalt					
Note: A small amount of sample recieved, wts. were adjusted to perform preps. Amount recieved = 240 mg. Two samples recieved for 257326, contents of both were thoroughly mixed into container 1.					
					LOCATION: 1731

PREPARED BY: John Willis DATE: 2-10-05
REVIEWED BY: Orduña DATE: 2/11/05
DISPOSAL INT/DATE/LOC: ___

FRM-191 (Rev 3/Aug 04)

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

BOOK / PAGE: 59 203

CLIENT(S): DIV 30 010048
TASK ORDER(S): 050119-1 SDG(S): 257326
PROJECT NO(S): 06002.01.211
METHOD: 3005A ___ 3050B ___ 3050B-7.5 ___ 3010A ___ 3020A ___ 7760A ___ 7740A ___ $HClO_4$ ___ $HClO_4/H_2SO_4$ ___
Microwave ___ Fusion ✓ Teflon ___ Rock ___ OTHER ___
MATRIX: Water ___ Soil ___ Biota ___ Solid ___ Liquid ___ TCLP Ext ___ OTHER Dust
INSTRUMENT: GFAA ___ ICP ✓ ICP-MS ___ IC ___ FLAA ___ HYDRIDE ___ OTHER ___
ACID INORG #: HNO_3# ___ HCl# 4993 H_2SO_4# ___ $HClO_4$# ___ HF# ___
INTERNAL STD: Sc @ 10 PPM ✓ Be @ 10 PPM ___ SOURCE: 1U INORG# 4761 EXP: 10/05 AMT: 100 rL
Oven/Hotplate/ Block ID: M.F. Temperature (°C): 1050

SAMPLE IDENTIFICATION	pH	WT (g)	I.V. (mL)	F.V. (mL)	
PBW - B10W4				100	
SRM - B10W5 #278		.1023		↓	
SRM - B10W6 #688		.1066			
257326		0.0521		↓	
100 mg sample + 1 g flux + 40 mg LiBr mixed thoroughly					
together in a graphite crucible, topped with 0.5 g flux,					
placed in muffle furnace for 30 min swirl @ 10					
min intervals, poured molten into 125 mL Nalgene bottle					
filled with 80 mLs di water + 10 mLs HCl, placed on					
shaker for samples to go in solution, F.V. to 100 mLs					
with di water.					
Note: 2 257326 samples recieved, container #2 was mixed					
thoroughly into container #1, total wt 240 mg, wts					
for prep were lowered for prep.					
#278 is Obsidian					
#688 is Basalt					
		Jec 2-10-05			
					LOCATION:
					17 B1

PREPARED BY: John Willis DATE: 2-10-05
REVIEWED BY: Ordura DATE: 2/11/05
DISPOSAL INT/DATE/LOC: ___

FRM-191 (Rev 3/Aug 04)

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

BOOK / PAGE: 59 204

CLIENT(S): DIV 20
TASK ORDER(S): 050119-1 SDG(S): 257326 010049
PROJECT NO(S): 06002.01.211
METHOD: 3005A___3050B___3050B-7.5___3010A___3020A___7760A___7740A___$HClO_4$___$HClO_4/H_2SO_4$___
Microwave___Fusion___Teflon___Rock___OTHER di water leach
MATRIX: Water___Soil___Biota___Solid___Liquid___TCLP Ext___OTHER JW 2-10-05 ~~Dust~~ filter
INSTRUMENT: GFAA___ICP ✓ ICP-MS___IC ✓ FLAA___HYDRIDE___OTHER___
ACID INORG #: HNO_3#___HCl#___H_2SO_4#___$HClO_4$#___HF#___
INTERNAL STD: Sc @ 10 PPM___Be @ 10 PPM___SOURCE:___INORG#___EXP:___AMT:___
Oven/Hotplate/ Block ID: Shaker Temperature (°C): Ambient

SAMPLE IDENTIFICATION	pH	WT (g)	I.V. (mL)	F.V. (mL)	
PBW-B10W5				25	
LCSW-B10W2 *				↓	
LCSW-B10W3 **				27	JW 3-14-05
257326 7 JW 2-10-05		.1736		25	
↓ 7328		.1491		↓	
* Spike 500 uL Spike 1		Spex#4836	Exp 10/05		
↓ 100 uL I-CAL 1		Spex#4837	↓ ↓		
** Spike 1mL IC Inst		Check Std.	Spex#4870	Exp. 11/05	
↓ 1mL Nitrite-N		#42-01-	165	Exp. 03/15/05	
Samples were cut into small pieces, ~ ½ cm x ½ cm and					
placed into 60mL Nalgene bottles, 25 mLs di water					
was added and samples were placed on a shaker for					
3 hours.					
Note: Sample blank was first cut down to length of actual sample then					
to ~½ cm x ½ cm etc.					
		2-10-05			
					LOCATION:
					17 B1

PREPARED BY: John Willis DATE: 2-10-05
REVIEWED BY: Ordiña DATE: 2/11/05
DISPOSAL INT/DATE/LOC: ___

FRM-191 (Rev 3/Aug 04)

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

BOOK / PAGE: 59 205

CLIENT(S): Div 20 — 010050
TASK ORDER(S): 050119-1 SDG(S): 257326
PROJECT NO(S): 06002.01.211
METHOD: 3005A___ 3050B___ 3050B-7.5___ 3010A___ 3020A___ 7760A___ 7740A___ $HClO_4$___ $HClO_4/H_2SO_4$___
Microwave___ Fusion___ Teflon ✓ Rock___ OTHER___
MATRIX: Water___ Soil___ Biota___ Solid___ Liquid___ TCLP Ext___ OTHER Dust
INSTRUMENT: GFAA___ ICP ✓ ICP-MS___ IC___ FLAA___ HYDRIDE___ OTHER___
ACID INORG #: HNO_3# 4981 HCl# 4993 H_2SO_4#___ $HClO_4$# 4646 HF# 4897
INTERNAL STD: Sc @ 10 PPM ✓ Be @ 10 PPM___ SOURCE: IV INORG# 4761 EXP: 10/05 AMT: 25 ul
Oven/(Hotplate)/ Block ID: #1 Temperature (°C): 95-200

SAMPLE IDENTIFICATION	pH	WT (g)	I.V. (mL)	F.V. (mL)	
PBW-B10W6				25	
LCSW-B10W4 *				↓	
SRM-B10W7 #278		.1020		↓	
SRM-B10W8 #688		.1052		↓	
257326		.0540	(0.0540) JW 2-10-05	↓	
* Spike 500uL Spike-1		Spex#4836	Exp. 10/05		
↓ 100uL I-CAL 1		Spex#4837	↓ ↓		

wt. ~ 100mg sample into a small teflon beaker, add 5mL HNO_3, heat @ 95°C for ~ 30 min, cool, add 5mLs HNO_3, 5mLs $HClO_4$ and 10 mLs HF, heat @ 200°C until dryness, cool, add 5mLs di water and 5mLs HCL, heat until warmness, transfer to a 60mL Nalgene bottle, F.V. to 25mls with di water.

JW 2-10-05

LOCATION: 520 B1.

PREPARED BY: John Wilke DATE: 2-10-05
REVIEWED BY: Orduna DATE: 2/11/05
DISPOSAL INT/DATE/LOC: ___

42 PROJECT NO. –
BOOK NO. 1C5

TITLE Nitrite-N QC Std.

Work continued from Page

010051

42-01-1C5 Nitrite N 100ppm QC Exp. 3/12/05

5ml Nitrite N 1000ppm Std (Inorg # 4954)
diluted to 50mL F.V. w/ DI H_2O

RSS

www.scientificbindery88yrs.com

Work continued to Page

SIGNATURE

DATE 1/12/05

DISCLOSED TO AND UNDERSTOOD BY

DATE 3/28/05

WITNESS

DATE

BOOK/ PAGE 09 082

SOUTHWEST RESEARCH INSTITUTE®

6220 Culebra Rd
San Antonio, Texas 78228

010052

TJA_2 TRACE ICP DAILY LOG

ANALYST [signature]

DATE 2-15-05

As 189.042 Profile Line

As Intensity: 413,488

PEAK POSITION -.023254

VERNIER POSITION 737

STDs PREP DATE:	
CLP_STD1_SC	05B02Z1
CLP_STD2_SC	
CLP_STD3_SC	
CLP_STD4_SC	
CLP_STD5_SC	
CLP_STD6_SC	05B02Z1
BLK_SC	05B14

QC PREP DATE:		
CCV/ICV	~~05B02~~	05B01
CRI		
ICSA		
ICSAB	~~05B02~~ 05B01	

DH 3-25-05

COMMENTS	FILE	CLIENT	TO#	PROJECT NO.	METHOD
B502083	Yosfeb	Nebraska P.P.	0502083-3	10939.06.007	6010B 60-043
B501191+A		Divco	050119-1	06002.01.211	59201
B501191+A					59202
B501191+A					59203
B501191+A	Yosfeb	Divco	050119-1	06002.01.211	59204

[signature] 2-15-05

COMMENTS:

MAINTENANCE:

REVIEWED BY: Ordeña

DATE: 3/22/05

13 004

ICP Calibration Blank/ICB/CCB Solution

010053

ID: BLK- 05B14

Date Prepared: 2-14-05 Prepared By: [signature]

Make up as needed in 1000ml volumetric flask.

Added ✓ 10 ml HNO3 INORG #: 4983

Added ✓ 50 ml HCL INORG #: 4993

Added ✓ 1000ul of 10000ppm Sc (INORG. VENT.) EXP. Date: 10-1-05 INORG #: 4761

ICP Calibration Blank/ICB/CCB Solution

ID: BLK- 05C01

Date Prepared: 3-1-05 Prepared By: [signature]

Make up as needed in 1000ml volumetric flask.

Added ✓ 10 ml HNO3 INORG #: 4979

Added ✓ 50 ml HCL INORG #: 4996

Added ✓ 1000ul of 10000ppm Sc (INORG. VENT.) EXP. Date: ~~4-1-05~~ 10-1-05 INORG #: 4761

ICP Calibration Blank/ICB/CCB Solution

ID: BLK-

Date Prepared:_____ Prepared By:_____

Make up as needed in 1000ml volumetric flask.

Added_____ 10 ml HNO3 INORG #:_____

Added_____ 50 ml HCL INORG #:_____

Added_____ 1000ul of 10000ppm Sc (INORG. VENT.) EXP. Date: _____ INORG #:_____

ICP Calibration Blank/ICB/CCB Solution

ID: BLK-

Date Prepared:_____ Prepared By:_____

Make up as needed in 1000ml volumetric flask.

Added_____ 10 ml HNO3 INORG #:_____

Added_____ 50 ml HCL INORG #:_____

Added_____ 1000ul of 10000ppm Sc (INORG. VENT.) EXP. Date: _____ INORG #:_____

13 016

ICP ICV/CCV SOLUTION

010054

CCV- 05B01

Date Prepared: 2-1-05 Prepared By: [signature]

HNO3 INORG #: 4936 HCl INORG #: 4991

Make up as needed in 1000ml volumetric flask in 1% HNO3 AND 5% HCl.

Element	Std Conc (ppm)	Amt added	Check	Source	Inorg #	Stock Conc (ppm)	Exp Date
Sc	10	1ml	✓	INORGVENT	4761	10000	10-30-05
B	5	5ml	✓	SPEX	4997	1000	1-30-06
Li	5	5ml	✓	SPEX	4846	1000	10-30-05
Mo	5	5ml	✓	SPEX	4847	1000	10-30-05
P	5	5ml	✓	SPEX	4758	1000	8-30-05
Si	5	5ml	✓	SPEX	4616	1000	6-30-05
Ti	5	5ml	✓	SPEX	4618	1000	6-30-05
Sr	5	5ml	✓	SPEX	4759	1000	8-30-05
Sn	5	5ml	✓	SPEX	4565	1000	4-30-05
Bi	5	5ml	✓	SPEX	4912	1000	11-30-05
La	5	5ml	✓	SPEX	4845	1000	10-30-05
Y	5	5ml	✓	SPEX	4913	1000	11-30-05
Pd	1	1ml	✓	SPEX	4967	1000	1-15-06
S	1	1ml	✓	SPEX	4617	1000	6-30-05
Th	1	1ml	✓	SPEX	4760	1000	8-30-05
U	1	1ml	✓	SPEX	4619	1000	6-30-05
W	1	1ml	✓	SPEX	4661	1000	7-30-05
Zr	5	5ml	✓	SPEX	4566	1000	4-30-05
Na	10	1ml	✓	SPEX	4998	10000	1-30-06
ICV-2A	vary	10ml	✓	SPEX	4909	mix	11-30-05
ICV-2B	vary	1ml	✓	SPEX	4911	mix	11-30-05
ICV-2C	vary	10ml	✓	SPEX	4910	mix	11-30-05

Expiration Date: 4-30-05

13 026

ICP Calibration Standards

Date Prepared: 2-1-05 Prepared By: [illegible]

HNO3 INORG #: 4936 HCl INORG #: 4991

010055

Make up as needed in 500 ml volumetric flasks in 1% HNO3 and 5% HCl.

Prepared	Standard Name	Element	Std Conc (ppm)	Added ml	Check	Source	INORG #	Stock Conc (ppm)	Exp Date
2-1-05	STD1- 05B01	Al	50	2.50	✓	INORVENT	4762	10000	10-1-05
		Ca	50	2.50	✓	INORVENT	4988	10000	2-1-06
		Fe	50	2.50	✓	INORVENT	4470	10000	3-1-05
		K	50	2.50	✓	INORVENT	4907	10000	12-1-05
		Mg	25	1.25	✓	INORVENT	4656	10000	8-1-05
		Na	50	2.50	✓	INORVENT	4657	10000	8-1-05
		Li	10	5.00	✓	INORVENT	4628	1000	8-1-05
		Sc	10	0.500	✓	INORVENT	4761	10000	10-1-05
	STD2- 05B01	Ba	10	5.00	✓	INORVENT	4465	1000	3-1-05
		Be	5	2.50	✓	INORVENT	4592	1000	6-1-05
		Cr	10	5.00	✓	INORVENT	4906	1000	12-1-05
		Cu	10	5.00	✓	INORVENT	4469	1000	3-1-05
		Ni	10	5.00	✓	INORVENT	4472	1000	3-1-05
		Sc	10	0.500	✓	INORVENT	4761	10000	10-1-05
	STD3- 05B01	Cd	10	5.00	✓	INORVENT	4467	1000	3-1-05
		Co	10	5.00	✓	INORVENT	4468	1000	3-1-05
		Mn	10	5.00	✓	INORVENT	4989	1000	2-1-06
		V	10	5.00	✓	INORVENT	4916	1000	1-1-06
		Zn	10	5.00	✓	INORVENT	4915	1000	1-1-06
		Sc	10	0.500	✓	INORVENT	4761	10000	10-1-05
	STD4- 05B01	Ag	2	1.00	✓	INORVENT	4764	1000	10-1-05
		As	10	5.00	✓	INORVENT	4987	1000	2-1-06
		Pb	10	5.00	✓	INORVENT	4774	1000	10-1-05
		Sb	10	5.00	✓	INORVENT	4464	1000	3-1-05
		Se	10	5.00	✓	INORVENT	4630	1000	8-1-05
		TL	10	5.00	✓	INORVENT	4990	1000	2-1-06
		Sc	10	0.500	✓	INORVENT	4761	10000	10-1-05
	STD5- 05B01	B	10	5.00	✓	INORVENT	4466	1000	3-1-05
		Mo	10	5.00	✓	INORVENT	4471	1000	3-1-05
		P	10	5.00	✓	INORVENT	4593	1000	6-1-05
		Si	10	5.00	✓	INORVENT	4999	1000	3-1-06
		Ti	10	5.00	✓	INORVENT	4908	1000	12-1-05
		Sr	10	5.00	✓	INORVENT	4635	1000	8-1-05
		Sn	10	5.00	✓	INORVENT	4572	1000	4-1-05
		Bi	5	2.50	✓	INORVENT	4658	1000 DH	8-1-05
		Sc	10	0.500	✓	INORVENT	4761	10000	10-1-05
2-1-05	STD6- 05B01	La	10	5.00	✓	INORVENT	4763	1000	10-1-05
		Na	1	0.05	~~4657~~	INORVENT	4657	10000	8-1-05
		Pd	10	5.00	✓	INORVENT	4477	1000	3-1-05
		S	10	5.00	✓	INORVENT	4917	1000	1-1-06
		Th	10	5.00	✓	INORVENT	4844	1000	12-1-05
		U	10	5.00	✓	INORVENT	4828	1000	11-1-05
		W	5	2.50	✓	INORVENT	4660	1000	8-1-05
		Y	10	5.00	✓	INORVENT	5000	1000	5-1-06
		Zr	10	5.00	✓	INORVENT	4442	1000	8-1-05
		SC	10	0.500	✓	INORVENT	4761	10000	10-1-05

Expiration Dates:

STD1: 3-1-05 **STD4:** 3-1-05

STD2: 3-1-05 **STD5:** 3-1-05

STD3: 3-1-05 **STD6:** 3-1-05

010056

ICP ANALYSIS

PROJ. NO.	PROJECT	TO#	DATE	MATRIX	LOGBK PG
06002.01.211	Div 20	050119-1	2-15-05	Dust	59201
				Dust	59203
				Filter	59204
06002.01.211	Div 20	050119-1	2-15-05	Dust	59205

INSTRUMENT: TRACE 2 FILENAME: B501191+A

INSTRUMENT DL: _____

Method: DAILY2 Standard: blk
Run Time: 02/15/05 15:27:09

010057

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Avge	-.0000	.0002	-.0000	.0002	.0000	.0001	.0000
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	2.706	1.079	77.68	1.844	20.03	1.427	100.9
#1	-.0000	.0002	-.0000	.0002	.0000	.0001	.0001
#2	-.0000	.0002	-.0000	.0002	.0000	.0001	.0000

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Avge	.0000	.0000	-.0000	.0000	.0004	.0000	.0003
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	13.04	141.4	197.8	1869.	2.728	35.52	12.98
#1	.0000	.0000	.0000	.0000	.0004	.0000	.0003
#2	.0000	.0000	-.0000	-.0000	.0004	.0000	.0004

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Avge	-.0000	.0000	-.0000	.0000	-.0000	-.0002	-.0146
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0002
%RSD	235.4	25.21	7.623	330.8	70.58	2.065	1.429
#1	.0000	.0000	-.0000	.0000	-.0001	-.0002	-.0148
#2	-.0000	.0000	-.0000	-.0000	-.0000	-.0002	-.0145

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Avge	.0000	.0000	.0000	.0000	.0000	.0002	-.0011
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	70.85	3.269	181.9	71.91	45.97	3.214	3.702
#1	.0000	.0000	.0000	.0001	.0000	.0002	-.0010
#2	.0000	.0000	-.0000	.0000	.0001	.0002	-.0011

Elem	Sc3613	1960/1	1960/2	Si2881	Sn1899	Sr4215	Th2837
Avge	72.09	-.0001	.0000	.0017	-.0000	-.0000	.0000
SDev	.13	.0001	.0000	.0000	.0001	.0000	.0000
%RSD	.1817	73.65	70.58	1.002	1461.	111100.	60.76
#1	72.18	-.0002	.0001	.0017	-.0000	.0000	.0000
#2	72.00	-.0001	.0000	.0016	.0000	-.0000	.0000

Elem	Ti3349	Tl1908	U_4090	V_2924	W_2079	Y_3710	Zn2062
Avge	-.0001	-.0002	-.0003	-.0000	.0002	.0000	-.0000
SDev	.0000	.0000	.0001	.0000	.0000	.0000	.0000
%RSD	13.93	.7819	36.01	17.32	11.65	89.89	111100.
#1	-.0001	-.0002	-.0002	-.0000	.0002	.0000	.0000
#2	-.0001	-.0002	-.0004	-.0001	.0002	.0000	-.0000

Elem	Zr3496
Avge	.0002
SDev	.0000
%RSD	19.72
#1	.0002
#2	.0002

DL 2-15-05

2/16/05

010058

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	720852	10000	--	--	--	--	--
SDev	1298.248	.0000000	--	--	--	--	--
%RSD	.1800991	.0000000	--	--	--	--	--
#1	721770	10000	--	--	--	--	--
#2	719934	10000	--	--	--	--	--

Method: DAILY2 Standard: clp_std4
Run Time: 02/15/05 15:31:54

010059

Elem	Ag3280	As1890	2203/1	2203/2	Sb2068	1960/1	1960/2
Avge	.0738	.0959	.2817	.2443	.1393	.2182	.2046
SDev	.0003	.0001	.0027	.0031	.0003	.0012	.0009
%RSD	.3426	.1367	.9513	1.266	.2442	.5612	.4508
#1	.0739	.0958	.2836	.2465	.1391	.2191	.2052
#2	.0736	.0960	.2798	.2421	.1395	.2174	.2039

Elem	Tl1908
Avge	.1867
SDev	.0008
%RSD	.4204
#1	.1873
#2	.1862

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	747097	10000	--	--	--	--	--
SDev	16337.00	.0000000	--	--	--	--	--
%RSD	2.186730	.0000000	--	--	--	--	--
#1	735545	10000	--	--	--	--	--
#2	758649	10000	--	--	--	--	--

Method: DAILY2 Standard: clp_std1
Run Time: 02/15/05 15:36:17

010060

Elem	Al3082	Ca3179	Fe2714	K_7664	Li6707	Mg2790	Na3302
Avge	.1006	.2124	.0941	.2067	3.612	.0842	.0087
SDev	.0002	.0001	.0001	.0007	.005	.0000	.0000
%RSD	.2159	.0550	.1636	.3419	.1457	.0412	.0138
#1	.1004	.2125	.0942	.2062	3.609	.0842	.0087
#2	.1007	.2123	.0940	.2072	3.616	.0841	.0087

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	727571	10000	--	--	--	--	--
SDev	305.4701	.0000000	--	--	--	--	--
%RSD	.0419849	.0000000	--	--	--	--	--
#1	727787	10000	--	--	--	--	--
#2	727355	10000	--	--	--	--	--

Method: DAILY2 Standard: clp_std5 010061
Run Time: 02/15/05 15:39:58

Elem	B_2496	Bi2230	Mo2020	P_1782	Si2881	Sn1899	Sr4215
Avge	.1402	.0281	.3187	.0278	.1538	.1467	2.483
SDev	.0008	.0001	.0006	.0001	.0003	.0003	.002
%RSD	.6032	.2593	.2016	.2855	.1773	.1689	.0607
#1	.1396	.0280	.3182	.0278	.1540	.1465	2.484
#2	.1408	.0281	.3191	.0277	.1536	.1468	2.481

Elem	Ti3349
Avge	2.573
SDev	.001
%RSD	.0386
#1	2.572
#2	2.573

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	731692	10000	--	--	--	--	--
SDev	3208.144	.0000000	--	--	--	--	--
%RSD	.4384558	.0000000	--	--	--	--	--
#1	733960	10000	--	--	--	--	--
#2	729423	10000	--	--	--	--	--

Method: DAILY2 Standard: clp_std2
Run Time: 02/15/05 15:43:38

010062

Elem	Ba4934	Be3130	Cr2677	Cu3247	Ni2316
Avge	1.119	1.402	.3871	.2744	.2918
SDev	.000	.001	.0001	.0004	.0003
%RSD	.0113	.1025	.0163	.1392	.1155
#1	1.119	1.401	.3871	.2741	.2916
#2	1.118	1.403	.3870	.2746	.2921

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	743230	10000	--	--	--	--	--
SDev	2988.233	.0000000	--	--	--	--	--
%RSD	.4020604	.0000000	--	--	--	--	--
#1	745343	10000	--	--	--	--	--
#2	741117	10000	--	--	--	--	--

Method: DAILY2 Standard: clp_std3
Run Time: 02/15/05 15:46:56

010063

Elem	Cd2265	Co2286	Mn2576	V_2924	Zn2062
Avge	.9390	.1948	.8330	.1819	.2947
SDev	.0013	.0001	.0003	.0001	.0002
%RSD	.1390	.0334	.0374	.0395	.0726
#1	.9399	.1949	.8328	.1818	.2945
#2	.9381	.1948	.8332	.1819	.2948

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	740807	10000	--	--	--	--	--
SDev	5918.484	.0000000	--	--	--	--	--
%RSD	.7989238	.0000000	--	--	--	--	--
#1	744992	10000	--	--	--	--	--
#2	736622	10000	--	--	--	--	--

Method: DAILY2 Standard: clp_std6
Run Time: 02/15/05 15:50:37

010064

Elem	La3988	Na5889	Pd3404	S_1820	Th2837	U_4090	W_2079
Avge	.4842	.0518	.2073	.0326	.1036	.0746	.1541
SDev	.0009	.0006	.0002	.0001	.0000	.0002	.0007
%RSD	.1888	1.175	.0821	.2211	.0095	.3100	.4402
#1	.4835	.0514	.2072	.0325	.1036	.0744	.1546
#2	.4848	.0522	.2074	.0326	.1035	.0747	.1536

Elem	Y_3710	Zr3496
Avge	.7963	2.026
SDev	.0004	.004
%RSD	.0506	.1931
#1	.7966	2.023
#2	.7960	2.029

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	730034	10000	--	--	--	--	--
SDev	7723.727	.0000000	--	--	--	--	--
%RSD	1.057996	.0000000	--	--	--	--	--
#1	724572	10000	--	--	--	--	--
#2	735495	10000	--	--	--	--	--

Standardization Report 02/15/05 03:54:27 PM page 1

Method: DAILY2 Slope = Conc(SIR)/IR

010065

Element	Wavelen	High std	Low std	Slope	Y-intercept	Date Standardized
Ag3280	328.068	clp_std4	blk	27.1061	.000921	02/15/05 03:50:37
Al3082	308.215	clp_std1	blk	498.261	-.116468	02/15/05 03:50:37
As1890	189.042	clp_std4	blk	104.213	.002242	02/15/05 03:50:37
B_2496	249.678	clp_std5	blk	71.4274	-.012634	02/15/05 03:50:37
Ba4934	493.409	clp_std2	blk	8.94044	-.000043	02/15/05 03:50:37
Be3130	313.042	clp_std2	blk	3.56596	-.000435	02/15/05 03:50:37
Bi2230	223.061	clp_std5	blk	176.922	-.006008	02/15/05 03:50:37
Ca3179	317.933	clp_std1	blk	235.444	-.001797	02/15/05 03:50:37
Cd2265	226.502	clp_std3	blk	10.6467	-.000022	02/15/05 03:50:37
Co2286	228.616	clp_std3	blk	51.3246	.000357	02/15/05 03:50:37
Cr2677	267.716	clp_std2	blk	25.8337	-.000053	02/15/05 03:50:37
Cu3247	324.753	clp_std2	blk	36.4957	-.013543	02/15/05 03:50:37
Fe2714	271.441	clp_std1	blk	531.765	-.005903	02/15/05 03:50:37
K_7664	766.491	clp_std1	blk	242.251	-.081673	02/15/05 03:50:37
La3988	398.853	clp_std6	blk	20.6725	.000129	02/15/05 03:50:37
Li6707	670.784	clp_std1	blk	2.76831	-.000075	02/15/05 03:50:37
Mg2790	279.078	clp_std1	blk	296.922	.003913	02/15/05 03:50:37
Mn2576	257.610	clp_std3	blk	12.0059	-.000025	02/15/05 03:50:37
Mo2020	202.030	clp_std5	blk	31.3812	.001305	02/15/05 03:50:37
Na3302	330.232	clp_std1	blk	5621.75	.982625	02/15/05 03:50:37
Na5889	588.991	clp_std6	blk	15.1341	.221429	02/15/05 03:50:37
Ni2316	231.604	clp_std2	blk	34.2677	-.000476	02/15/05 03:50:37
P_1782	178.287	clp_std5	blk	360.509	-.010252	02/15/05 03:50:37
2203/1	220.351	clp_std4	blk	35.5007	-.000688	02/15/05 03:50:37
2203/2	220.352	clp_std4	blk	40.9436	-.001504	02/15/05 03:50:37
Pd3404	340.458	clp_std6	blk	49.5435	-.002441	02/15/05 03:50:37
S_1820	182.040	clp_std6	blk	308.456	-.053487	02/15/05 03:50:37
Sb2068	206.838	clp_std4	blk	71.2416	.075410	02/15/05 03:50:37
Sc3613	361.384	blk	dark	1.38717	.000000	02/15/05 03:50:37
1960/1	196.021	clp_std4	blk	45.8030	.005842	02/15/05 03:50:37
1960/2	196.022	clp_std4	blk	48.8974	-.002440	02/15/05 03:50:37
Si2881	288.158	clp_std5	blk	65.4809	-.108642	02/15/05 03:50:37
Pb220	220.353	NONE	NONE	1.00000	.000000	*NOT STANDARDIZED
Se196	196.026	NONE	NONE	1.00000	.000000	*NOT STANDARDIZED
Sn1899	189.989	clp_std5	blk	68.2287	.000234	02/15/05 03:50:37
Sr4215	421.552	clp_std5	blk	4.02818	.000000	02/15/05 03:50:37
Th2837	283.730	clp_std6	blk	100.813	-.000980	02/15/05 03:50:37
Ti3349	334.941	clp_std5	blk	3.88674	.000388	02/15/05 03:50:37
Tl1908	190.864	clp_std4	blk	53.4950	.008720	02/15/05 03:50:37
U_4090	409.014	clp_std6	blk	141.265	.042539	02/15/05 03:50:37
V_2924	292.402	clp_std3	blk	54.9688	.002517	02/15/05 03:50:37
W_2079	207.914	clp_std6	blk	32.4729	-.006668	02/15/05 03:50:37
Y_3710	371.030	clp_std6	blk	12.5556	-.000096	02/15/05 03:50:37
Zn2062	206.200	clp_std3	blk	33.9392	.000000	02/15/05 03:50:37
Zr3496	349.621	clp_std6	blk	5.39512	-.000984	02/15/05 03:50:37

Analysis Report QC Standard 02/15/05 04:01:03 PM page 1

Method: DAILY2 Sample Name: ICV/CCV Operator:
Run Time: 02/15/05 15:56:29
Comment:
Mode: CONC Corr. Factor: 1

010066

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.002	9.834	5.106	4.854	10.18	.9802	5.060
SDev	.000	.007	.007	.015	.02	.0011	.002
%RSD	.0019	.0751	.1444	.3152	.1577	.1153	.0431
#1	1.002	9.840	5.100	4.844	10.19	.9794	5.062
#2	1.002	9.829	5.111	4.865	10.17	.9810	5.059
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1.000	10.00	5.000	5.000	10.00	1.000	5.000
Range	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	20.14	.9849	5.009	2.007	2.064	10.12	18.44
SDev	.04	.0012	.003	.002	.007	.01	.09
%RSD	.1950	.1212	.0554	.1160	.3241	.1050	.5070
#1	20.11	.9841	5.007	2.005	2.069	10.11	18.51
#2	20.17	.9858	5.011	2.009	2.059	10.13	18.38
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	20.00	1.000	5.000	2.000	2.000	10.00	20.00
Range	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.977	4.757	19.88	1.009	5.035	28.38	Q41.04
SDev	.001	.018	.01	.000	.006	.02	.24
%RSD	.0142	.3835	.0510	.0198	.1268	.0773	.5859
#1	4.976	4.770	19.88	1.009	5.030	28.40	Q41.21
#2	4.977	4.744	19.89	1.010	5.039	28.37	Q40.87
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Fail
Value	5.000	5.000	20.00	1.000	5.000	30.00	30.00
Range	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.022	5.116	4.992	5.040	1.011	1.001	1.004
SDev	.026	.025	.001	.027	.003	.009	.005
%RSD	.5080	.4813	.0156	.5263	.2652	.9178	.5156
#1	5.004	5.133	4.992	5.021	1.009	1.008	1.007
#2	5.040	5.098	4.993	5.059	1.012	.9945	.9999
Errors	QC Pass	QC Pass	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass
Value	5.000	5.000			1.000	1.000	1.000
Range	10.00	10.00			10.00	10.00	10.00

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010067

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.8	5.199	5.276	5.138	5.024	5.250	5.042
SDev	1.3	.002	.011	.009	.018	.007	.016
%RSD	1.320	.0346	.2057	.1739	.3571	.1264	.3251
#1	101.7	5.200	5.268	5.144	5.011	5.245	5.031
#2	99.86	5.198	5.283	5.131	5.037	5.255	5.054
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	QC Pass
Value				5.000	5.000	5.000	5.000
Range				10.00	10.00	10.00	10.00

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.098	.9738	4.960	5.200	1.024	4.967	1.076
SDev	.009	.0029	.000	.015	.002	.002	.004
%RSD	.1711	.3021	.0080	.2904	.2369	.0320	.3971
#1	5.104	.9759	4.960	5.190	1.026	4.968	1.073
#2	5.091	.9717	4.959	5.211	1.023	4.966	1.079
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	5.000	1.000	5.000	5.000	1.000	5.000	1.000
Range	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	4.835	1.018	4.906
SDev	.010	.003	.000
%RSD	.1972	.2628	.0078
#1	4.841	1.016	4.906
#2	4.828	1.020	4.906
Errors	QC Pass	QC Pass	QC Pass
Value	5.000	1.000	5.000
Range	10.00	10.00	10.00

010068

IntStd	1	2	3	4	5	6	
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	726673	10000	--	--	--	--	--
SDev	9582.711	.0000000	--	--	--	--	--
%RSD	1.318710	.0000000	--	--	--	--	--
#1	733449	10000	--	--	--	--	--
#2	719897	10000	--	--	--	--	--

Analysis Report Blank Sample 02/15/05 04:07:39 PM page 1

Method: DAILY2 Sample Name: ICB/CCB Operator:
Run Time: 02/15/05 16:03:05
Comment:
Mode: CONC Corr. Factor: 1

010069

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	-.0012	-.0026	.0152	.0002	-.0000	-.0063
SDev	.0003	.0008	.0021	.0032	.0001	.0000	.0025
%RSD	54.40	68.17	79.63	21.32	78.41	133.3	39.23
#1	.0006	-.0017	-.0041	.0175	.0002	-.0000	-.0045
#2	.0003	-.0006	-.0012	.0129	.0001	-.0000	-.0080
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0500	.0050	.0500	.0050	.0050	.0100
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0100

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	.0000	-.0003	-.0000	-.0003	-.0017	-.0076
SDev	.0009	.0001	.0002	.0002	.0001	.0015	.0213
%RSD	60.63	483.9	69.05	472.6	30.30	85.07	279.8
#1	.0009	-.0000	-.0004	-.0002	-.0004	-.0007	-.0226
#2	.0022	.0001	-.0001	.0001	-.0003	-.0028	.0074
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0001	.0046	.0000	.0011	-.0039	.0036
SDev	.0000	.0000	.0041	.0000	.0004	.0255	.0007
%RSD	9.291	9.806	88.67	.1080	32.63	653.3	19.26
#1	.0002	.0001	.0075	.0000	.0009	-.0219	.0041
#2	.0003	.0001	.0017	.0000	.0014	.0141	.0031
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0008	-.0002	.0043	-.0033	.0010	.0029	.0017
SDev	.0001	.0015	.0004	.0008	.0010	.0023	.0047
%RSD	8.483	677.8	10.24	23.25	96.26	79.24	283.3
#1	-.0008	-.0013	.0040	-.0028	.0003	.0046	.0050
#2	-.0009	.0008	.0046	-.0039	.0017	.0013	-.0017
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	.0050	.0100			.0050	.0100	.0100
Low	-.0050	-.0100			-.0050	-.0100	-.0100

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010070

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.69	.0024	-.0023	.0010	-.0007	-.0007	.0014
SDev	.71	.0011	.0016	.0027	.0004	.0007	.0024
%RSD	.7118	45.45	69.99	283.0	49.13	99.71	165.7
#1	100.2	.0016	-.0011	-.0010	-.0005	-.0002	-.0002
#2	99.18	.0032	-.0034	.0029	-.0010	-.0012	.0031
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	-.0007	.0000	.0025	.0140	.0003	-.0006
SDev	.0000	.0037	.0002	.0001	.0035	.0010	.0009
%RSD	62.54	504.9	1997.	2.124	25.25	375.3	155.6
#1	.0001	.0019	.0001	.0024	.0165	.0010	-.0012
#2	.0000	-.0033	-.0001	.0025	.0115	-.0005	.0001
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	-.0001	.0003
SDev	.0001	.0001	.0002
%RSD	247.6	69.63	47.36
#1	.0000	-.0001	.0005
#2	-.0001	-.0000	.0002
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010071

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	718566	10000	--	--	--	--	--
SDev	5060.056	.0000000	--	--	--	--	--
%RSD	.7041881	.0000000	--	--	--	--	--
#1	722144	10000	--	--	--	--	--
#2	714988	10000	--	--	--	--	--

Analysis Report QC Standard 02/15/05 04:12:24 PM page 1

Method: DAILY2 Sample Name: CRI Operator:
Run Time: 02/15/05 16:07:50
Comment:
Mode: CONC Corr. Factor: 1

010072

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0204	.0938	.0168	.1084	.0206	.0098	-.0071
SDev	.0005	.0015	.0012	.0021	.0000	.0000	.0081
%RSD	2.544	1.603	7.385	1.906	.1108	.1528	115.2
#1	.0208	.0927	.0159	.1069	.0206	.0098	-.0128
#2	.0201	.0949	.0177	.1099	.0205	.0098	-.0013
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	NOCHECK
Value	.0200	.1000	.0200	.1000	.0200	.0100	
Range	50.00	50.00	50.00	50.00	50.00	50.00	

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0008	.0101	.0994	.0198	.0499	.0940	-.0126
SDev	.0000	.0003	.0002	.0002	.0004	.0130	.0090
%RSD	2.119	2.877	.2294	.8267	.8819	13.87	71.50
#1	.0008	.0099	.0995	.0197	.0503	.1032	-.0062
#2	.0008	.0103	.0992	.0199	.0496	.0848	-.0190
Errors	NOCHECK	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	NOCHECK
Value		.0100	.1000	.0200	.0500	.1000	
Range		50.00	50.00	50.00	50.00	50.00	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	.0704	.0040	.0304	.0209	-.0534	.0030
SDev	.0007	.0001	.0021	.0001	.0003	.1866	.0013
%RSD	135.6	.0799	52.02	.3002	1.199	349.2	45.36
#1	.0000	.0705	.0025	.0305	.0211	-.1854	.0020
#2	.0010	.0704	.0054	.0303	.0207	.0785	.0039
Errors	NOCHECK	QC Pass	NOCHECK	QC Pass	QC Pass	NOCHECK	NOCHECK
Value		.1000		.0300	.0200		
Range		50.00		50.00	50.00		

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0819	.1053	.0062	.0053	-.0004	.0006	.1265
SDev	.0008	.0007	.0007	.0036	.0019	.0067	.0023
%RSD	.9285	.7021	11.36	67.41	430.0	1133.	1.800
#1	.0824	.1059	.0057	.0078	.0009	.0053	.1249
#2	.0814	.1048	.0066	.0028	-.0018	-.0041	.1281
Errors	QC Pass	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	QC Pass
Value	.0800	.1000					.1200
Range	50.00	50.00					50.00

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010073

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.2	.0112	.0105	.1117	.0056	.0107	.0985
SDev	.0	.0049	.0053	.0008	.0022	.0019	.0022
%RSD	.0274	43.73	50.92	.6743	38.33	17.86	2.197
#1	100.2	.0078	.0142	.1122	.0071	.0121	.1000
#2	100.3	.0147	.0067	.1111	.0041	.0094	.0970
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	QC Pass
Value				.1000	.0060	.0100	.1000
Range				50.00	50.00	50.00	50.00

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0208	.0012	.0200	.0254	.2006	.0990	.0016
SDev	.0000	.0007	.0000	.0016	.0058	.0003	.0018
%RSD	.1056	54.36	.1514	6.369	2.877	.3505	109.2
#1	.0208	.0017	.0199	.0243	.1965	.0992	.0004
#2	.0209	.0008	.0200	.0266	.2047	.0987	.0028
Errors	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass	QC Pass	NOCHECK
Value	.0200		.0200	.0200	.2000	.1000	
Range	50.00		50.00	50.00	50.00	50.00	

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0405	.0971
SDev	.0001	.0001	.0005
%RSD	259.6	.2723	.5078
#1	.0000	.0405	.0968
#2	-.0001	.0404	.0975
Errors	NOCHECK	QC Pass	QC Pass
Value		.0400	.1000
Range		50.00	50.00

010074

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	722584	10000	--	--	--	--	--
SDev	188.0904	.0000000	--	--	--	--	--
%RSD	.0260303	.0000000	--	--	--	--	--
#1	722451	10000	--	--	--	--	--
#2	722717	10000	--	--	--	--	--

Analysis Report QC Standard 02/15/05 04:17:09 PM page 1

Method: DAILY2 Sample Name: ICSA Operator: 010075
Run Time: 02/15/05 16:12:35
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	497.4	-.0002	-.0149	.0010	.0000	-.0041
SDev	.0000	.4	.0003	.0000	.0001	.0000	.0028
%RSD	3.822	.0836	173.7	.2079	6.622	14.69	67.41
#1	.0008	497.1	.0000	-.0149	.0011	.0001	-.0060
#2	.0007	497.7	-.0004	-.0149	.0010	.0000	-.0021
Errors	NOCHECK	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value		500.0					
Range		20.00					

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	451.1	-.0000	.0004	.0005	.0011	188.3	-.0120
SDev	2.0	.0002	.0001	.0001	.0003	.3	.0238
%RSD	.4500	10450.	29.06	17.31	29.58	.1395	198.2
#1	452.5	-.0002	.0004	.0005	.0009	188.5	.0048
#2	449.6	.0001	.0003	.0004	.0013	188.2	-.0288
Errors	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	QC Pass	NOCHECK
Value	500.0					200.0	
Range	20.00					20.00	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0013	.0003	525.5	-.0009	-.0006	.1896	-.0124
SDev	.0003	.0001	1.1	.0000	.0002	.1429	.0007
%RSD	23.02	29.79	.2066	5.194	31.83	75.37	5.947
#1	-.0011	.0004	526.3	-.0009	-.0007	.2906	-.0119
#2	-.0015	.0003	524.7	-.0010	-.0005	.0885	-.0130
Errors	NOCHECK	NOCHECK	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value			500.0				
Range			20.00				

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0018	-.0226	.0389	-.0326	.0011	.0194	.0067
SDev	.0004	.0071	.0001	.0024	.0024	.0041	.0011
%RSD	22.75	31.57	.2191	7.230	219.6	20.98	16.91
#1	.0021	-.0175	.0389	-.0343	.0029	.0165	.0075
#2	.0015	-.0276	.0388	-.0309	-.0006	.0222	.0059
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value							
Range							

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010076

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	95.74	.0028	-.0067	.0209	-.0088	-.0035	.0034
SDev	1.32	.0051	.0024	.0040	.0015	.0033	.0005
%RSD	1.377	180.5	36.53	18.95	17.61	94.59	14.58
#1	94.81	.0064	-.0050	.0181	-.0099	-.0012	.0030
#2	96.67	-.0008	-.0084	.0237	-.0077	-.0059	.0037
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value							
Range							

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0132	.0290	-.0016	-.0078	.0228	-.0010	.0040
SDev	.0000	.0032	.0002	.0020	.0070	.0004	.0007
%RSD	.1872	10.87	9.642	26.12	30.67	43.33	18.06
#1	.0132	.0313	-.0015	-.0064	.0278	-.0007	.0045
#2	.0132	.0268	-.0017	-.0093	.0179	-.0013	.0035
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value							
Range							

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0006	.0208	-.0004
SDev	.0000	.0002	.0000
%RSD	8.026	1.082	13.25
#1	-.0005	.0206	-.0003
#2	-.0006	.0209	-.0004
Errors	NOCHECK	NOCHECK	NOCHECK
Value			
Range			

010077

IntStd	1	2	3	4	5	6	
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	690136	10000	--	--	--	--	--
SDev	9486.545	.0000000	--	--	--	--	--
%RSD	1.374591	.0000000	--	--	--	--	--
#1	683428	10000	--	--	--	--	--
#2	696844	10000	--	--	--	--	--

Analysis Report QC Standard 02/15/05 04:21:54 PM page 1

Method: DAILY2 Sample Name: ICSAB Operator:
Run Time: 02/15/05 16:17:20
Comment:
Mode: CONC Corr. Factor: 1

010078

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.090	502.3	1.040	1.035	.5347	.4794	-.0022
SDev	.002	.5	.002	.004	.0002	.0006	.0095
%RSD	.1677	.0993	.2251	.3447	.0359	.1155	425.8
#1	1.091	502.6	1.042	1.032	.5346	.4790	.0045
#2	1.088	501.9	1.038	1.037	.5348	.4798	-.0089
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	NOCHECK
Value	1.000	500.0	1.000	1.000	.5000	.5000	
Range	20.00	20.00	20.00	20.00	20.00	20.00	

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	456.0	.9339	.4745	.4873	.5573	190.2	-.0141
SDev	1.0	.0017	.0006	.0002	.0017	.3	.0220
%RSD	.2189	.1789	.1176	.0476	.3015	.1389	155.4
#1	455.3	.9328	.4748	.4872	.5585	190.0	-.0297
#2	456.7	.9351	.4741	.4875	.5561	190.4	.0014
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	NOCHECK
Value	500.0	1.000	.5000	.5000	.5000	200.0	
Range	20.00	20.00	20.00	20.00	20.00	20.00	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0013	1.197	531.9	.4871	1.033	.4003	-.0147
SDev	.0000	.005	.4	.0007	.001	.0942	.0022
%RSD	1.387	.4526	.0792	.1439	.1237	23.54	15.02
#1	-.0013	1.201	531.6	.4866	1.033	.4669	-.0132
#2	-.0013	1.194	532.2	.4876	1.032	.3336	-.0163
Errors	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	NOCHECK	NOCHECK
Value			500.0	.5000	1.000		
Range			20.00	20.00	20.00		

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9452	1.018	1.025	.9574	.0062	.0141	1.077
SDev	.0015	.004	.009	.0026	.0037	.0096	.009
%RSD	.1544	.4328	.8671	.2682	59.50	68.34	.8719
#1	.9463	1.015	1.019	.9592	.0036	.0073	1.083
#2	.9442	1.021	1.032	.9555	.0088	.0209	1.070
Errors	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	QC Pass
Value	1.000						1.000
Range	20.00						20.00

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010079

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	94.92	1.034	1.036	1.075	.9801	1.035	1.017
SDev	.97	.002	.005	.002	.0012	.003	.004
%RSD	1.025	.1780	.4988	.1582	.1259	.2736	.3685
#1	95.60	1.032	1.040	1.073	.9792	1.037	1.019
#2	94.23	1.035	1.033	1.076	.9809	1.033	1.014
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	QC Pass
Value				1.000	1.000	1.000	1.000
Range				20.00	20.00	20.00	20.00

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.077	.0250	.9876	.9919	1.009	.4943	.0006
SDev	.001	.0042	.0009	.0062	.024	.0006	.0026
%RSD	.0500	16.66	.0919	.6243	2.352	.1196	428.3
#1	1.077	.0280	.9882	.9875	.9920	.4947	.0024
#2	1.077	.0221	.9869	.9963	1.026	.4939	-.0012
Errors	QC Pass	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	NOCHECK
Value	1.000			1.000	1.000	.5000	
Range	20.00			20.00	20.00	20.00	

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0005	.9739	.9887
SDev	.0000	.0018	.0010
%RSD	8.368	.1886	.0985
#1	-.0005	.9726	.9880
#2	-.0006	.9752	.9894
Errors	NOCHECK	QC Pass	QC Pass
Value		1.000	1.000
Range		20.00	20.00

010080

IntStd	1	2	3	4	5	6	
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	684169	10000	--	--	--	--	--
SDev	7048.440	.0000000	--	--	--	--	--
%RSD	1.030219	.0000000	--	--	--	--	--
#1	689153	10000	--	--	--	--	--
#2	679185	10000	--	--	--	--	--

Analysis Report QC Standard 02/15/05 04:30:20 PM page 1

Method: DAILY2 Sample Name: ICV/CCV Operator:
Run Time: 02/15/05 16:25:46 010081
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.003	9.780	5.111	4.867	10.23	.9807	5.053
SDev	.001	.012	.006	.023	.03	.0016	.002
%RSD	.0864	.1225	.1239	.4667	.2929	.1602	.0407
#1	1.002	9.788	5.107	4.851	10.25	.9818	5.052
#2	1.004	9.771	5.116	4.883	10.21	.9795	5.055
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1.000	10.00	5.000	5.000	10.00	1.000	5.000
Range	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	20.06	.9884	5.005	2.008	2.066	10.04	18.44
SDev	.01	.0004	.007	.002	.004	.03	.03
%RSD	.0356	.0445	.1461	.1138	.2120	.2829	.1408
#1	20.06	.9887	5.010	2.010	2.063	10.06	18.42
#2	20.05	.9880	5.000	2.006	2.069	10.02	18.46
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	20.00	1.000	5.000	2.000	2.000	10.00	20.00
Range	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.996	4.776	19.86	1.010	5.045	28.20	Q41.06
SDev	.005	.004	.01	.002	.007	.13	.01
%RSD	.0905	.0850	.0720	.1835	.1486	.4627	.0242
#1	4.993	4.773	19.85	1.011	5.050	28.10	Q41.05
#2	4.999	4.779	19.87	1.009	5.039	28.29	Q41.07
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Fail
Value	5.000	5.000	20.00	1.000	5.000	30.00	30.00
Range	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.019	5.070	5.001	5.050	1.005	1.006	1.0000
SDev	.004	.047	.005	.013	.000	.010	.00301
%RSD	.0730	.9300	.0922	.2528	.0465	1.039	.3013
#1	5.016	5.037	4.998	5.059	1.006	.9989	1.002
#2	5.021	5.103	5.004	5.041	1.005	1.014	.9978
Errors	QC Pass	QC Pass	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass
Value	5.000	5.000			1.000	1.000	1.000
Range	10.00	10.00			10.00	10.00	10.00

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010082

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	102.7	5.233	5.286	5.140	5.034	5.269	5.032
SDev	.1	.019	.031	.005	.007	.014	.011
%RSD	.0939	.3632	.5896	.0947	.1386	.2741	.2092
#1	102.8	5.220	5.308	5.144	5.039	5.279	5.039
#2	102.7	5.247	5.264	5.137	5.029	5.258	5.024
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	QC Pass
Value				5.000	5.000	5.000	5.000
Range				10.00	10.00	10.00	10.00

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.109	.9787	4.975	5.207	1.005	4.981	1.073
SDev	.010	.0032	.004	.008	.012	.000	.003
%RSD	.1868	.3292	.0817	.1625	1.219	.0023	.2355
#1	5.115	.9764	4.978	5.213	.9965	4.981	1.071
#2	5.102	.9810	4.973	5.201	1.014	4.981	1.075
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	5.000	1.000	5.000	5.000	1.000	5.000	1.000
Range	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	4.844	1.016	4.913
SDev	.003	.002	.002
%RSD	.0599	.2365	.0347
#1	4.842	1.017	4.912
#2	4.846	1.014	4.915
Errors	QC Pass	QC Pass	QC Pass
Value	5.000	1.000	5.000
Range	10.00	10.00	10.00

010083

IntStd	1	2	3	4	5	6	
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	740506	10000	--	--	--	--	--
SDev	751.6545	.0000000	--	--	--	--	--
%RSD	.1015055	.0000000	--	--	--	--	--
#1	741038	10000	--	--	--	--	--
#2	739975	10000	--	--	--	--	--

Analysis Report Blank Sample 02/15/05 04:36:56 PM page 1

Method: DAILY2 Sample Name: ICB/CCB Operator:
Run Time: 02/15/05 16:32:22
Comment:
Mode: CONC Corr. Factor: 1

010084

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	-.0021	-.0006	.0151	.0003	.0000	-.0028
SDev	.0008	.0002	.0002	.0036	.0003	.0000	.0031
%RSD	491.8	9.973	25.06	23.56	97.91	182.5	110.1
#1	.0007	-.0023	-.0005	.0176	.0004	.0001	-.0006
#2	-.0004	-.0020	-.0007	.0125	.0001	-.0000	-.0051
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0500	.0050	.0500	.0050	.0050	.0100
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0100

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0016	-.0001	.0000	.0002	.0001	.0032	-.0109
SDev	.0016	.0004	.0002	.0002	.0002	.0190	.0297
%RSD	102.0	619.1	3943.	75.89	189.4	594.0	271.1
#1	.0027	-.0003	-.0001	.0001	-.0000	.0166	.0100
#2	.0004	.0002	.0001	.0003	.0003	-.0102	-.0319
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	.0000	.0055	.0000	.0023	.0008	.0040
SDev	.0006	.0002	.0038	.0001	.0014	.1918	.0004
%RSD	95.47	449.4	70.32	294.2	61.95	22850.	10.98
#1	.0010	.0002	.0027	.0001	.0013	H.1364	.0037
#2	.0002	-.0001	.0082	-.0000	.0033	L-.1348	.0043
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0015	.0035	.0017	-.0006	-.0029	-.0020	.0039
SDev	.0010	.0019	.0013	.0022	.0041	.0139	.0017
%RSD	63.25	53.02	79.00	349.1	142.7	707.2	44.04
#1	-.0009	.0022	.0026	-.0022	.0000	.0079	.0051
#2	-.0022	.0048	.0007	.0009	L-.0058	L-.0118	.0027
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	.0050	.0100			.0050	.0100	.0100
Low	-.0050	-.0100			-.0050	-.0100	-.0100

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010085

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.6	-.0028	.0005	.0005	.0002	-.0006	.0033
SDev	1.6	.0023	.0016	.0005	.0010	.0018	.0021
%RSD	1.596	80.57	302.8	101.5	633.4	315.0	62.58
#1	100.4	-.0045	-.0006	.0001	-.0006	-.0019	.0018
#2	102.7	-.0012	.0017	.0008	.0009	.0007	.0047
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0007	.0001	.0025	.0003	.0003	-.0019
SDev	.0001	.0032	.0003	.0047	.0079	.0002	.0012
%RSD	123.8	466.1	329.5	187.2	2571.	80.74	62.03
#1	.0002	.0029	.0003	-.0008	-.0053	.0004	-.0011
#2	.0000	-.0016	-.0001	.0058	.0059	.0001	-.0027
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0000	.0006
SDev	.0003	.0001	.0003
%RSD	732.8	140.9	57.17
#1	.0002	.0001	.0008
#2	-.0001	.0000	.0003
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010086

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	732032	10000	--	--	--	--	--
SDev	11723.12	.0000000	--	--	--	--	--
%RSD	1.601449	.0000000	--	--	--	--	--
#1	723743	10000	--	--	--	--	--
#2	740322	10000	--	--	--	--	--

Method: DAILY2 Sample Name: pbw-B15E2 pg60-043 Operator:
Run Time: 02/15/05 16:37:08
Comment:
Mode: CONC Corr. Factor: 1

010087

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	-.0030	.0003	.0086	.0000	.0000	-.0077
SDev	.0019	.0065	.0035	.0009	.0000	.0000	.0024
%RSD	11930.	216.5	1260.	10.04	20.95	170.0	31.48
#1	-.0013	-.0076	.0028	.0092	.0000	-.0000	-.0094
#2	.0014	.0016	-.0022	.0080	.0000	.0000	-.0060
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0500	.0050	.0500	.0050	.0050	.0100
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0100

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0102	-.0000	.0000	.0001	.0002	.0075	-.0135
SDev	.0016	.0001	.0003	.0001	.0008	.0253	.0294
%RSD	15.26	759.6	440500.	157.8	341.0	338.9	217.1
#1	.0091	.0000	.0002	.0001	-.0003	-.0104	-.0343
#2	.0114	-.0001	-.0002	-.0000	.0008	H.0254	.0072
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	.0000	.0029	-.0001	.0008	L-.1447	-.0011
SDev	.0019	.0001	.0068	.0001	.0013	.1665	.0040
%RSD	1204.	161.3	235.0	167.2	169.6	115.1	361.0
#1	-.0012	-.0000	-.0019	.0000	-.0002	L-.2624	-.0039
#2	.0015	.0001	.0077	-.0001	.0017	-.0270	.0017
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Low	LC Pass
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	-.0015	.0037	-.0008	-.0000	.0065	.0048
SDev	.0008	.0040	.0031	.0007	.0045	.0007	.0013
%RSD	78.67	257.6	82.88	84.65	13190.	10.51	27.01
#1	.0015	-.0043	.0015	-.0013	-.0032	.0060	.0039
#2	.0004	.0013	.0059	-.0003	.0031	.0070	.0057
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	.0050	.0100			.0050	.0100	.0100
Low	-.0050	-.0100			-.0050	-.0100	-.0100

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010088

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.6	-.0025	-.0069	-.0009	.0007	L-.0055	H.0083
SDev	1.2	.0070	.0011	.0042	.0015	.0031	.0005
%RSD	1.151	280.3	15.41	495.0	211.0	56.02	5.835
#1	101.4	-.0075	-.0077	-.0038	-.0003	L-.0076	H.0080
#2	99.79	.0025	-.0062	.0021	.0018	-.0033	H.0087
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Low	LC High
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0003	.0000	-.0003	.0058	-.0002	-.0008
SDev	.0001	.0000	.0000	.0009	.0223	.0008	.0050
%RSD	482.5	1.137	11.07	275.8	387.2	368.2	658.6
#1	-.0000	.0003	.0000	.0003	-.0100	.0003	-.0043
#2	.0000	.0003	.0000	-.0009	.0215	-.0007	.0028
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0005	.0002
SDev	.0001	.0003	.0002
%RSD	64.83	55.94	103.5
#1	-.0001	.0003	.0001
#2	-.0002	.0008	.0004
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010089

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	725216	10000	--	--	--	--	--
SDev	8353.053	.0000000	--	--	--	--	--
%RSD	1.151803	.0000000	--	--	--	--	--
#1	731122	10000	--	--	--	--	--
#2	719309	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: lcsw-B15E2 Operator: 010090
Run Time: 02/15/05 16:41:54
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.1022	3.898	4.075	.0068	4.059	.1007	-.0084
SDev	.0010	.008	.014	.0007	.011	.0000	.0017
%RSD	.9728	.2063	.3413	10.76	.2797	.0107	20.30
#1	.1029	3.892	4.066	.0073	4.067	.1007	-.0096
#2	.1015	3.903	4.085	.0063	4.051	.1007	-.0072

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	20.17	.1001	.9909	.4054	.5132	2.085	16.14
SDev	.02	.0007	.0030	.0007	.0015	.025	.00
%RSD	.1228	.6624	.3046	.1633	.2965	1.180	.0110
#1	20.16	.1005	.9930	.4058	.5143	2.067	16.14
#2	20.19	.0996	.9888	.4049	.5122	2.102	16.14

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0012	.0002	19.96	1.005	.0010	17.74	25.44
SDev	.0004	.0000	.01	.000	.0010	.26	.03
%RSD	30.70	2.307	.0402	.0364	96.40	1.441	.1219
#1	.0009	.0002	19.95	1.005	.0017	17.56	25.46
#2	.0014	.0002	19.96	1.006	.0003	17.92	25.42

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.004	.0043	1.008	1.017	.0013	.0000	.9733
SDev	.002	.0059	.003	.003	.0024	.0115	.0196
%RSD	.2109	137.0	.2869	.3363	186.0	31920.	2.018
#1	1.003	.0001	1.006	1.019	-.0004	.0082	.9594
#2	1.006	.0084	1.010	1.014	.0030	-.0081	.9871

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.49	4.189	4.270	.0060	1.014	4.243	1.979
SDev	.87	.005	.020	.0001	.001	.015	.005
%RSD	.8793	.1300	.4631	2.132	.1297	.3537	.2314
#1	99.10	4.192	4.284	.0061	1.015	4.254	1.982
#2	97.88	4.185	4.256	.0059	1.013	4.232	1.976

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	-.0156	-.0001	4.132	.0061	.9910	-.0036
SDev	.0000	.0002	.0001	.000	.0053	.0005	.0026
%RSD	1.346	1.293	42.22	.0110	87.17	.0485	72.13
#1	.0007	-.0157	-.0002	4.132	.0098	.9913	-.0018
#2	.0007	-.0154	-.0001	4.132	.0023	.9906	-.0054

010091

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0002	1.008	.0005
SDev	.0001	.002	.0000
%RSD	31.85	.1770	.4997
#1	-.0002	1.006	.0005
#2	-.0003	1.009	.0005

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	709919	10000	--	--	--	--	--
SDev	6233.854	.0000000	--	--	--	--	--
%RSD	.8781077	.0000000	--	--	--	--	--
#1	714327	10000	--	--	--	--	--
#2	705511	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 258609-1 Operator:
Run Time: 02/15/05 16:46:39
Comment:
Mode: CONC Corr. Factor: 1

010092

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0035	.0002	.0046	.0069	.0002	.0000	.0227
SDev	.0010	.0081	.0006	.0004	.0000	.0000	.0077
%RSD	28.38	3708.	13.30	5.944	3.174	104.0	33.92
#1	.0028	-.0055	.0050	.0072	.0002	.0000	.0173
#2	.0042	.0060	.0042	.0066	.0002	.0000	.0281

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0801	.0002	.0056	.0013	.0330	.0155	-.0241
SDev	.0015	.0001	.0000	.0000	.0000	.0212	.0372
%RSD	1.825	63.30	.1685	1.582	.0094	137.3	154.3
#1	-.0811	.0003	.0056	.0013	.0330	.0004	-.0504
#2	-.0790	.0001	.0056	.0014	.0330	.0305	.0022

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	.0001	.0018	.0001	.0017	-.0754	.0222
SDev	.0020	.0001	.0100	.0000	.0002	.2368	.0086
%RSD	625.1	106.4	552.3	18.14	10.47	314.1	38.84
#1	-.0017	.0000	-.0052	.0002	.0018	-.2428	.0161
#2	.0011	.0002	.0088	.0001	.0016	.0921	.0282

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0016	.0541	681.6	668.3	-.0008	.0289	-5.621
SDev	.0015	.0025	4.7	3.5	.0041	.0287	.070
%RSD	89.04	4.587	.6839	.5207	522.9	99.12	1.248
#1	-.0027	.0524	678.3	670.8	-.0037	.0492	-5.670
#2	-.0006	.0559	684.9	665.9	.0021	.0087	-5.571

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	105.2	-.0169	.0041	.0026	672.8	-.0029	698.3
SDev	.3	.0008	.0022	.0034	.8	.0012	3.1
%RSD	.2647	4.906	53.11	129.3	.1139	40.95	.4378
#1	105.4	-.0175	.0057	.0002	673.3	-.0020	696.2
#2	105.0	-.0163	.0026	.0050	672.2	-.0037	700.5

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	-.0015	.0005	.0034	.0289	.0006	.0001
SDev	.0001	.0006	.0002	.0037	.0275	.0003	.0027
%RSD	735.0	43.51	47.33	110.9	95.21	40.61	2986.
#1	-.0001	-.0020	.0006	.0060	.0094	.0008	-.0018
#2	.0000	-.0010	.0003	.0007	.0483	.0004	.0020

010093

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	-.0135	.0013
SDev	.0000	.0001	.0003
%RSD	27.97	.5433	20.29
#1	.0001	-.0135	.0015
#2	.0001	-.0134	.0011

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	758174	10000	--	--	--	--	--
SDev	2062.630	.0000000	--	--	--	--	--
%RSD	.2720526	.0000000	--	--	--	--	--
#1	759632	10000	--	--	--	--	--
#2	756715	10000	--	--	--	--	--

Method: DAILY2 Sample Name: 258609-1d Operator: 010094
Run Time: 02/15/05 16:51:24
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0043	.0009	.0082	.0038	-.0000	-.0000	.0345
SDev	.0009	.0065	.0016	.0018	.0002	.0000	.0034
%RSD	21.96	689.5	20.01	47.61	758.5	282.8	9.770
#1	.0049	.0055	.0094	.0051	.0001	.0000	.0369
#2	.0036	-.0037	.0070	.0025	-.0002	-.0000	.0321

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0807	.0003	.0055	.0000	.0357	.0248	-.0161
SDev	.0007	.0004	.0004	.0015	.0014	.0011	.0012
%RSD	.8883	110.7	6.995	3049.	3.842	4.304	7.625
#1	-.0802	.0001	.0058	.0011	.0367	.0255	-.0170
#2	-.0812	.0006	.0053	-.0010	.0347	.0240	-.0153

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0001	.0049	-.0002	.0022	.1336	.0340
SDev	.0005	.0000	.0039	.0001	.0012	.1269	.0062
%RSD	167.6	22.47	79.92	83.02	54.59	94.98	18.22
#1	.0006	.0002	.0077	-.0001	.0030	.2233	.0296
#2	-.0001	.0001	.0021	-.0003	.0013	.0439	.0383

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0031	.0406	742.9	738.3	-.0019	.0349	-6.986
SDev	.0009	.0047	10.1	4.2	.0013	.0193	.016
%RSD	28.68	11.48	1.362	.5724	68.18	55.48	.2327
#1	-.0025	.0439	750.0	735.3	-.0010	.0485	-6.998
#2	-.0037	.0373	735.7	741.3	-.0028	.0212	-6.975

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	107.7	-.0124	-.0014	-.0005	739.8	-.0051	728.5
SDev	.6	.0133	.0019	.0016	.6	.0057	5.9
%RSD	.5352	106.7	137.6	305.4	.0751	112.6	.8118
#1	108.1	-.0218	-.0028	-.0016	740.2	-.0091	732.7
#2	107.3	-.0031	-.0000	.0006	739.4	-.0010	724.3

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	-.0102	-.0001	-.0017	.0528	-.0002	-.0012
SDev	.0000	.0039	.0004	.0130	.0249	.0013	.0037
%RSD	56.47	38.42	662.2	749.6	47.12	717.0	306.1
#1	.0000	-.0075	.0003	.0074	.0704	.0008	.0014
#2	.0000	-.0130	-.0004	-.0109	.0352	-.0011	-.0038

010095

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0002	-.0142	.0003
SDev	.0003	.0014	.0019
%RSD	153.2	10.08	616.8
#1	.0000	-.0132	.0016
#2	-.0004	-.0152	-.0010

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	776242	10000	--	--	--	--	--
SDev	4109.705	.0000000	--	--	--	--	--
%RSD	.5294360	.0000000	--	--	--	--	--
#1	779148	10000	--	--	--	--	--
#2	773336	10000	--	--	--	--	--

Method: DAILY2 Sample Name: 258609-1L df5 Operator:
Run Time: 02/15/05 16:56:10
Comment:
Mode: CONC Corr. Factor: 1

010096

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	-.0028	.0001	.0048	.0001	.0000	-.0002
SDev	.0003	.0019	.0023	.0001	.0001	.0000	.0005
%RSD	69.46	65.84	2256.	2.926	66.78	52.34	203.8
#1	.0007	-.0041	.0017	.0049	.0002	.0000	-.0006
#2	.0002	-.0015	-.0015	.0047	.0001	.0000	.0001

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0193	.0000	.0007	.0003	.0065	.0145	-.0042
SDev	.0000	.0001	.0001	.0008	.0009	.0188	.0038
%RSD	.0648	2123.	7.006	263.3	14.29	129.8	89.46
#1	-.0194	.0001	.0007	.0008	.0071	.0012	-.0069
#2	-.0193	-.0001	.0008	-.0003	.0058	.0278	-.0016

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0008	.0001	.0023	.0001	.0006	-.0495	.0071
SDev	.0001	.0000	.0035	.0001	.0001	.1321	.0055
%RSD	7.728	18.76	151.8	128.4	20.14	266.8	77.83
#1	-.0008	.0001	.0048	.0002	.0005	-.1429	.0032
#2	-.0009	.0001	-.0002	.0000	.0007	.0439	.0110

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0105	142.2	141.2	-.0001	.0001	-.1173
SDev	.0022	.0060	.1	1.2	.0010	.0011	.0063
%RSD	249000.	57.12	.0790	.8473	642.5	1236.	5.386
#1	.0016	.0147	142.3	142.1	-.0008	.0009	-.1217
#2	-.0016	.0063	142.2	140.4	.0005	-.0007	-.1128

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.3	.0045	.0008	-.0034	141.6	.0021	206.7
SDev	.0	.0008	.0064	.0007	.8	.0040	.2
%RSD	.0068	16.99	773.0	21.69	.5900	192.7	.1068
#1	100.3	.0040	.0054	-.0029	142.1	.0049	206.9
#2	100.3	.0051	-.0037	-.0039	141.0	-.0008	206.5

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0034	.0001	-.0023	-.0063	.0000	-.0020
SDev	.0000	.0013	.0003	.0046	.0077	.0003	.0003
%RSD	38.17	39.60	260.3	204.0	122.4	627.6	15.79
#1	-.0000	.0043	.0003	-.0055	-.0009	.0002	-.0018
#2	-.0000	.0024	-.0001	.0010	-.0118	-.0001	-.0022

010097

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	-.0037	.0002
SDev	.0001	.0002	.0007
%RSD	158.9	5.361	334.4
#1	.0001	-.0035	.0007
#2	-.0000	-.0038	-.0003

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	722750	10000	--	--	--	--	--
SDev	55.86144	.0000000	--	--	--	--	--
%RSD	.0077290	.0000000	--	--	--	--	--
#1	722789	10000	--	--	--	--	--
#2	722710	10000	--	--	--	--	--

Analysis Report 02/15/05 05:05:29 PM

Method: DAILY2 Sample Name: 258609-1aspk Operator:
Run Time: 02/15/05 17:00:55
Comment:
Mode: CONC Corr. Factor: 1

010098

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0552	1.972	2.005	.0046	2.001	.0487	.0285
SDev	.0017	.010	.009	.0017	.004	.0002	.0082
%RSD	3.064	.5290	.4458	35.91	.2137	.3896	28.79
#1	.0540	1.965	2.012	.0058	1.998	.0489	.0227
#2	.0564	1.980	1.999	.0035	2.004	.0486	.0344

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.37	.0493	.4967	.2010	.2988	1.095	18.35
SDev	.07	.0003	.0005	.0021	.0005	.006	.10
%RSD	.3449	.5986	.0950	1.027	.1709	.5704	.5715
#1	19.41	.0495	.4971	.2025	.2992	1.091	18.27
#2	19.32	.0491	.4964	.1996	.2984	1.100	18.42

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0008	.0001	19.00	.4921	.0022	18.26	28.06
SDev	.0023	.0001	.05	.0009	.0001	.23	.04
%RSD	283.2	57.69	.2540	.1876	3.795	1.239	.1470
#1	-.0008	.0001	19.03	.4928	.0021	18.10	28.03
#2	.0025	.0002	18.96	.4915	.0022	18.42	28.09

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4924	.0404	678.6	664.2	-.0016	.0418	-5.438
SDev	.0009	.0127	5.8	8.0	.0057	.0003	.044
%RSD	.1875	31.56	.8597	1.211	365.4	.7924	.8141
#1	.4931	.0494	682.7	658.5	-.0056	.0416	-5.469
#2	.4918	.0313	674.5	669.9	.0025	.0421	-5.407

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	104.6	2.094	2.096	.0016	669.0	2.095	698.9
SDev	.4	.002	.050	.0090	3.4	.033	5.3
%RSD	.3729	.0953	2.393	564.3	.5106	1.564	.7559
#1	104.4	2.096	2.061	-.0048	666.6	2.072	702.6
#2	104.9	2.093	2.132	.0080	671.4	2.119	695.1

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	-.0202	.0005	2.070	.0638	.4932	-.0002
SDev	.0001	.0044	.0006	.010	.0663	.0028	.0010
%RSD	14.43	21.87	125.2	.4787	103.9	.5642	480.3
#1	.0006	-.0171	.0010	2.077	.0169	.4951	.0005
#2	.0008	-.0233	.0001	2.063	.1107	.4912	-.0009

010099

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.4784	.0018
SDev	.0004	.0036	.0011
%RSD	440.6	.7601	60.50
#1	.0004	.4810	.0026
#2	-.0002	.4758	.0010

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	754324	10000	--	--	--	--	--
SDev	2827.720	.0000000	--	--	--	--	--
%RSD	.3748683	.0000000	--	--	--	--	--
#1	752324	10000	--	--	--	--	--
#2	756323	10000	--	--	--	--	--

Method: DAILY2 Sample Name: 258609-2 Operator:
Run Time: 02/15/05 17:05:40
Comment:
Mode: CONC Corr. Factor: 1

010100

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0044	.0028	.0037	.0043	.0006	.0001	.0327
SDev	.0012	.0079	.0009	.0003	.0004	.0000	.0004
%RSD	27.90	285.2	23.82	7.901	68.97	29.26	1.086
#1	.0036	-.0028	.0043	.0045	.0009	.0001	.0329
#2	.0053	.0083	.0031	.0041	.0003	.0001	.0324

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0757	.0004	.0051	.0013	.0367	.0652	.0167
SDev	.0006	.0006	.0008	.0004	.0012	.0277	.0358
%RSD	.7718	145.2	15.23	33.62	3.248	42.42	214.7
#1	-.0753	-.0000	.0046	.0017	.0375	.0456	-.0086
#2	-.0761	.0008	.0057	.0010	.0358	.0848	.0420

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	.0002	.0101	.0002	.0022	.2553	.0244
SDev	.0022	.0001	.0038	.0001	.0003	.4276	.0024
%RSD	482.9	59.78	37.67	43.88	14.60	167.5	9.846
#1	-.0011	.0001	.0074	.0003	.0024	-.0470	.0227
#2	.0020	.0003	.0127	.0001	.0020	.5577	.0261

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0017	.0405	707.5	696.3	.0041	.0263	-5.751
SDev	.0009	.0203	5.3	4.2	.0075	.0227	.467
%RSD	51.40	50.17	.7460	.6006	183.8	86.42	8.122
#1	-.0011	.0262	703.8	693.4	-.0012	.0424	-5.421
#2	-.0023	.0549	711.2	699.3	.0093	.0102	-6.082

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.2	-.0150	.0011	.0036	700.0	-.0043	728.8
SDev	2.1	.0013	.0014	.0046	4.5	.0006	8.8
%RSD	2.049	8.362	131.8	126.4	.6496	12.91	1.213
#1	102.6	-.0141	.0001	.0004	696.8	-.0046	722.6
#2	99.70	-.0159	.0021	.0069	703.3	-.0039	735.1

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	-.0021	.0003	.0056	.0484	.0008	-.0032
SDev	.0001	.0048	.0002	.0011	.0712	.0009	.0023
%RSD	269.1	233.6	62.19	19.62	147.2	116.5	71.55
#1	-.0000	.0013	.0005	.0048	-.0020	.0014	-.0049
#2	.0001	-.0055	.0002	.0064	.0987	.0001	-.0016

010101

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0002	-.0126	.0017
SDev	.0001	.0003	.0006
%RSD	101.0	2.706	35.65
#1	.0003	-.0124	.0022
#2	.0000	-.0128	.0013

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	729256	10000	--	--	--	--	--
SDev	14907.23	.0000000	--	--	--	--	--
%RSD	2.044169	.0000000	--	--	--	--	--
#1	739797	10000	--	--	--	--	--
#2	718715	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: cri Operator: 010102
Run Time: 02/15/05 17:15:56
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0212	.0923	.0195	.1024	.0204	.0099	-.0037
SDev	.0013	.0035	.0011	.0009	.0000	.0000	.0049
%RSD	6.021	3.777	5.404	.8421	.1461	.0542	133.6
#1	.0203	.0898	.0203	.1018	.0204	.0099	-.0002
#2	.0221	.0947	.0188	.1030	.0204	.0099	-.0072
Errors	LC Pass	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High	.0300		.0300	.1500	.0300	.0150	
Low	.0100		.0100	.0500	.0100	.0050	

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0014	.0101	.1002	.0199	.0509	.0966	-.0060
SDev	.0028	.0003	.0002	.0001	.0008	.0235	.0397
%RSD	198.2	3.407	.1580	.3329	1.595	24.34	660.7
#1	-.0006	.0098	.1003	.0199	.0515	.0800	-.0340
#2	.0034	.0103	.1001	.0199	.0503	.1132	.0220
Errors	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High		.0150	.1500	.0300	.0750	.1500	
Low		.0050	.0500	.0100	.0250	.0500	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	.0700	.0063	.0307	.0219	-.1331	.0113
SDev	.0014	.0001	.0026	.0001	.0009	.3321	.0041
%RSD	131.1	.2012	40.71	.2402	4.353	249.4	35.94
#1	.0001	.0699	.0045	.0307	.0225	-.3679	.0084
#2	.0020	.0701	.0081	.0306	.0212	.1017	.0142
Errors	NOCHECK	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK	NOCHECK
High		.1500		.0450	.0300		
Low		.0500		.0150	.0100		

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0804	.1001	.0091	.0052	-.0002	-.0014	.1267
SDev	.0012	.0014	.0014	.0049	.0069	.0111	.0056
%RSD	1.474	1.412	15.35	94.71	4471.	778.0	4.417
#1	.0813	.0991	.0082	.0087	-.0050	-.0093	.1306
#2	.0796	.1011	.0101	.0017	.0047	.0064	.1227
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	.1200	.1500					.1800
Low	.0400	.0500					.0600

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010103

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.4	.0136	.0125	.1155	.0065	.0129	H.4938
SDev	1.3	.0095	.0009	.0040	.0028	.0038	.0260
%RSD	1.278	69.68	7.139	3.417	43.11	29.19	5.267
#1	102.3	.0069	.0119	.1127	.0085	.0102	H.5122
#2	100.4	.0203	.0131	.1183	.0045	H.0155	H.4754
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC High
High				.1500	.0090	.0150	.1500
Low				.0500	.0030	.0050	.0500

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0208	.0011	.0199	.0212	.2068	.0996	-.0011
SDev	.0000	.0032	.0001	.0007	.0225	.0012	.0028
%RSD	.0492	304.8	.3859	3.101	10.87	1.200	266.3
#1	.0208	.0033	.0200	.0217	.1909	.0988	-.0030
#2	.0208	-.0012	.0199	.0207	.2227	.1005	.0009
Errors	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK	LC Pass	NOCHECK
High	.0300		.0300	.0300		.1500	
Low	.0100		.0100	.0100		.0500	

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0407	.0976
SDev	.0001	.0006	.0002
%RSD	536.5	1.528	.1736
#1	.0001	.0402	.0975
#2	-.0000	.0411	.0977
Errors	NOCHECK	LC Pass	NOCHECK
High		.0600	
Low		.0200	

010104

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	730636	10000	--	--	--	--	--
SDev	9402.398	.0000000	--	--	--	--	--
%RSD	1.286879	.0000000	--	--	--	--	--
#1	737284	10000	--	--	--	--	--
#2	723987	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: icsa Operator:
Run Time: 02/15/05 17:20:41
Comment:
Mode: CONC Corr. Factor: 1

010105

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	494.7	-.0007	-.0202	.0010	.0001	-.0007
SDev	.0007	.3	.0009	.0006	.0000	.0000	.0002
%RSD	478.9	.0534	117.1	2.945	.9272	12.73	23.77
#1	.0004	494.5	-.0001	-.0206	.0010	.0001	-.0008
#2	-.0007	494.9	-.0014	-.0197	.0010	.0001	-.0006
Errors	NOCHECK	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High		600.0					
Low		400.0					

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	454.3	-.0003	-.0006	-.0003	.0016	188.7	.0004
SDev	1.7	.0003	.0009	.0002	.0003	.5	.0325
%RSD	.3781	97.53	152.5	71.80	16.42	.2804	7645.
#1	453.1	-.0005	-.0012	-.0005	.0014	188.4	-.0226
#2	455.5	-.0001	.0000	-.0002	.0018	189.1	.0234
Errors	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass	NOCHECK
High	600.0					240.0	
Low	400.0					160.0	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0016	.0003	526.2	-.0011	.0002	.1389	-.0273
SDev	.0012	.0001	1.5	.0001	.0010	.2903	.0010
%RSD	75.80	13.58	.2932	5.071	675.6	209.0	3.491
#1	-.0024	.0003	525.2	-.0011	.0009	-.0664	-.0280
#2	-.0007	.0004	527.3	-.0010	-.0006	.3441	-.0266
Errors	NOCHECK	NOCHECK	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High			600.0				
Low			400.0				

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	-.0174	.0464	-.0275	.0056	.0158	.0082
SDev	.0003	.0121	.0064	.0016	.0044	.0024	.0041
%RSD	33.80	69.30	13.82	5.816	79.90	15.36	50.03
#1	.0013	-.0260	.0510	-.0264	.0024	.0176	.0053
#2	.0008	-.0089	.0419	-.0287	.0087	.0141	.0112
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010106

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	91.31	-.0004	-.0017	.0246	-.0029	-.0012	.4005
SDev	1.17	.0020	.0022	.0027	.0032	.0022	.0153
%RSD	1.281	454.5	135.0	10.98	111.9	173.8	3.828
#1	92.14	.0010	-.0001	.0227	-.0006	.0003	.4113
#2	90.48	-.0018	-.0033	.0265	-.0051	-.0028	.3897
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0131	.0247	-.0016	-.0141	.0041	-.0004	-.0041
SDev	.0000	.0054	.0000	.0024	.0040	.0006	.0010
%RSD	.2807	21.89	3.045	16.76	97.27	148.0	25.38
#1	.0130	.0208	-.0015	-.0158	.0013	-.0009	-.0049
#2	.0131	.0285	-.0016	-.0124	.0070	.0000	-.0034
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0006	.0199	-.0001
SDev	.0001	.0001	.0002
%RSD	13.78	.4057	217.7
#1	-.0006	.0198	-.0003
#2	-.0005	.0199	.0001
Errors	NOCHECK	NOCHECK	NOCHECK
High			
Low			

010107

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	658204	10000	--	--	--	--	--
SDev	8392.650	.0000000	--	--	--	--	--
%RSD	1.275082	.0000000	--	--	--	--	--
#1	664139	10000	--	--	--	--	--
#2	652270	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: icsab Operator:
Run Time: 02/15/05 17:25:27
Comment:
Mode: CONC Corr. Factor: 1

010108

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.087	499.9	1.049	1.032	.5304	.4837	-.0029
SDev	.000	.3	.003	.006	.0018	.0016	.0002
%RSD	.0047	.0671	.2439	.5563	.3389	.3367	5.307
#1	1.087	499.7	1.047	1.028	.5291	.4849	-.0030
#2	1.087	500.2	1.051	1.036	.5316	.4826	-.0028
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High	1.200	600.0	1.200	1.200	.6000	.6000	
Low	.8000	400.0	.8000	.8000	.4000	.4000	

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	461.2	.9423	.4789	.4900	.5547	191.1	-.0206
SDev	2.4	.0040	.0007	.0012	.0009	.5	.0220
%RSD	.5261	.4193	.1418	.2499	.1617	.2527	107.0
#1	462.9	.9450	.4794	.4909	.5541	191.4	-.0050
#2	459.5	.9395	.4784	.4891	.5553	190.7	-.0361
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High	600.0	1.200	.6000	.6000	.6000	240.0	
Low	400.0	.8000	.4000	.4000	.4000	160.0	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0016	1.173	534.5	.4906	1.044	.1393	-.0432
SDev	.0012	.006	1.8	.0014	.002	.3355	.0041
%RSD	74.49	.4966	.3418	.2844	.2062	241.0	9.594
#1	-.0025	1.169	535.8	.4916	1.045	.3765	-.0461
#2	-.0008	1.178	533.2	.4897	1.042	-.0980	-.0403
Errors	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK
High		1.200	600.0	.6000	1.200		
Low		.8000	400.0	.4000	.8000		

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9495	1.050	1.032	.9600	.0018	.0188	1.069
SDev	.0049	.007	.002	.0043	.0037	.0036	.004
%RSD	.5193	.6389	.1934	.4516	202.1	19.01	.3639
#1	.9530	1.046	1.030	.9631	.0044	.0213	1.072
#2	.9460	1.055	1.033	.9570	-.0008	.0163	1.066
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	1.200	1.200					1.200
Low	.8000	.8000					.8000

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010109

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	89.57	1.037	1.048	1.079	.9839	1.044	H1.365
SDev	1.50	.035	.008	.002	.0022	.006	.030
%RSD	1.670	3.415	.7613	.1745	.2262	.6211	2.231
#1	88.51	1.012	1.053	1.080	.9855	1.039	H1.386
#2	90.63	1.062	1.042	1.077	.9823	1.049	H1.343
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC High
High					1.200	1.200	1.200
Low					.8000	.8000	.8000

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.072	.0252	.9898	1.003	.9624	.4956	-.0044
SDev	.000	.0094	.0004	.004	.0121	.0029	.0075
%RSD	.0036	37.23	.0442	.4306	1.261	.5755	170.7
#1	1.072	.0186	.9901	.9998	.9710	.4976	-.0097
#2	1.072	.0318	.9895	1.006	.9538	.4935	.0009
Errors	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK	LC Pass	NOCHECK
High	1.200		1.200	1.200		.6000	
Low	.8000		.8000	.8000		.4000	

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0006	.9883	.9914
SDev	.0001	.0054	.0022
%RSD	24.13	.5436	.2271
#1	-.0005	.9921	.9898
#2	-.0007	.9845	.9930
Errors	NOCHECK	LC Pass	NOCHECK
High		1.200	
Low		.8000	

010110

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	645643	10000	--	--	--	--	--
SDev	10806.01	.0000000	--	--	--	--	--
%RSD	1.673681	.0000000	--	--	--	--	--
#1	638002	10000	--	--	--	--	--
#2	653284	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccv2 Operator: 010111
Run Time: 02/15/05 17:33:52
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.002	9.738	5.129	4.852	10.10	.9844	5.060
SDev	.001	.008	.014	.025	.02	.0002	.014
%RSD	.1293	.0828	.2762	.5166	.1513	.0213	.2716
#1	1.001	9.744	5.119	4.834	10.09	.9846	5.069
#2	1.003	9.732	5.139	4.869	10.11	.9843	5.050
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	1.100	11.00	5.500	5.500	11.00	1.100	5.500
Low	.9000	9.000	4.500	4.500	9.000	.9000	4.500

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	20.08	.9901	5.024	2.008	2.059	10.08	18.17
SDev	.01	.0005	.003	.001	.001	.03	.08
%RSD	.0416	.0518	.0608	.0285	.0263	.2877	.4201
#1	20.07	.9897	5.022	2.008	2.059	10.11	18.12
#2	20.08	.9905	5.026	2.009	2.060	10.06	18.23
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	22.00	1.100	5.500	2.200	2.200	11.00	22.00
Low	18.00	.9000	4.500	1.800	1.800	9.000	18.00

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.963	4.700	19.94	1.013	5.063	28.04	H40.33
SDev	.010	.005	.03	.000	.006	.05	.02
%RSD	.1975	.0996	.1366	.0098	.1177	.1740	.0417
#1	4.956	4.704	19.96	1.013	5.059	28.08	H40.34
#2	4.970	4.697	19.93	1.013	5.068	28.01	H40.32
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC High
High	5.500	5.500	22.00	1.100	5.500	33.00	33.00
Low	4.500	4.500	18.00	.9000	4.500	27.00	27.00

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.007	5.124	4.973	4.979	1.003	1.016	1.006
SDev	.007	.059	.007	.022	.006	.014	.004
%RSD	.1434	1.149	.1332	.4434	.5897	1.426	.4390
#1	5.012	5.083	4.968	4.964	.9986	1.027	1.002
#2	5.002	5.166	4.978	4.995	1.007	1.006	1.009
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	5.500	5.500			1.100	1.100	1.100
Low	4.500	4.500			.9000	.9000	.9000

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010112

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.97	5.258	5.293	5.175	4.977	5.281	5.232
SDev	.19	.014	.017	.012	.017	.007	.002
%RSD	.1917	.2590	.3140	.2270	.3401	.1239	.0329
#1	99.10	5.267	5.282	5.183	4.965	5.277	5.233
#2	98.83	5.248	5.305	5.166	4.989	5.286	5.230
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				5.500	5.500	5.500	5.500
Low				4.500	4.500	4.500	4.500

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.081	.9757	4.962	5.189	1.003	4.966	1.075
SDev	.004	.0008	.005	.002	.004	.002	.002
%RSD	.0767	.0818	.0996	.0353	.4460	.0477	.2029
#1	5.078	.9762	4.959	5.188	1.000	4.964	1.074
#2	5.084	.9751	4.966	5.191	1.006	4.967	1.077
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500	5.500	1.100	5.500	1.100
Low	4.500	.9000	4.500	4.500	.9000	4.500	.9000

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	4.825	1.023	4.913
SDev	.012	.003	.004
%RSD	.2490	.2623	.0826
#1	4.834	1.021	4.910
#2	4.817	1.025	4.916
Errors	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500
Low	4.500	.9000	4.500

010113

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	713354	10000	--	--	--	--	--
SDev	1378.858	.0000000	--	--	--	--	--
%RSD	.1932923	.0000000	--	--	--	--	--
#1	714329	10000	--	--	--	--	--
#2	712379	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccb2 Operator:
Run Time: 02/15/05 17:40:27 **010114**
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	-.0061	.0034	.0143	.0001	.0000	-.0054
SDev	.0005	.0005	.0008	.0010	.0000	.0000	.0061
%RSD	145.0	8.509	22.59	7.207	29.75	48.40	112.5
#1	.0007	-.0064	.0040	.0150	.0001	.0000	-.0097
#2	-.0000	-.0057	.0029	.0136	.0002	.0000	-.0011
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0500	.0050	.0500	.0050	.0050	.0100
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0100

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	-.0001	-.0004	.0006	.0002	.0020	-.0105
SDev	.0008	.0002	.0002	.0008	.0002	.0081	.0084
%RSD	126.4	406.7	57.40	146.2	82.99	407.6	79.73
#1	.0011	-.0002	-.0005	-.0000	.0001	-.0037	-.0164
#2	.0001	.0001	-.0002	.0012	.0003	.0077	-.0046
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0008	.0001	-.0009	.0001	.0010	L-.1043	.0027
SDev	.0007	.0000	.0006	.0000	.0002	.0359	.0009
%RSD	87.21	9.523	66.55	69.90	18.47	34.43	34.16
#1	-.0003	.0001	-.0014	.0001	.0009	L-.0789	.0020
#2	-.0013	.0001	-.0005	.0000	.0011	L-.1297	.0033
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Low	LC Pass
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0008	.0026	.0006	-.0006	.0094	.0031
SDev	.0006	.0014	.0000	.0002	.0013	.0072	.0006
%RSD	550.4	171.5	1.489	32.43	209.0	76.46	20.33
#1	-.0003	.0018	.0027	.0008	.0003	.0043	.0027
#2	.0005	-.0002	.0026	.0005	-.0015	H.0145	.0036
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	.0050	.0100			.0050	.0100	.0100
Low	-.0050	-.0100			-.0050	-.0100	-.0100

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010115

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.64	-.0016	.0008	-.0008	.0013	-.0000	H.1462
SDev	.36	.0005	.0006	.0004	.0001	.0002	.0066
%RSD	.3639	31.53	79.09	57.10	11.28	828.2	4.505
#1	99.90	-.0013	.0003	-.0011	.0014	-.0002	H.1509
#2	99.39	-.0020	.0012	-.0005	.0012	.0001	H.1416
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC High
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0005	.0002	.0044	-.0172	-.0000	-.0001
SDev	.0000	.0000	.0001	.0006	.0254	.0005	.0017
%RSD	141.3	2.846	37.63	13.90	147.6	10490.	3441.
#1	-.0000	.0005	.0002	.0048	.0007	-.0004	.0012
#2	-.0000	.0005	.0003	.0039	-.0352	.0004	-.0013
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0000	.0005
SDev	.0000	.0000	.0001
%RSD	18.34	148.6	18.35
#1	.0001	.0000	.0005
#2	.0001	-.0000	.0006
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010116

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	718248	10000	--	--	--	--	--
SDev	2583.768	.0000000	--	--	--	--	--
%RSD	.3597320	.0000000	--	--	--	--	--
#1	720075	10000	--	--	--	--	--
#2	716421	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: pbw-B10W5 pg59-204 Operator: 010117
Run Time: 02/15/05 17:47:03
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	-.0044	-.0006	.0031	.0001	.0000	-.0104
SDev	.0001	.0044	.0014	.0003	.0000	.0000	.0069
%RSD	16.95	99.99	229.4	8.580	32.14	13.56	66.42
#1	.0005	-.0076	.0004	.0030	.0001	.0000	-.0152
#2	.0004	-.0013	-.0016	.0033	.0001	.0000	-.0055

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0025	-.0000	.0002	-.0000	.0001	.0027	-.0050
SDev	.0010	.0002	.0001	.0007	.0008	.0048	.0181
%RSD	38.48	1247.	26.31	3991.	691.2	176.3	361.1
#1	.0018	.0001	.0001	-.0005	-.0005	-.0007	-.0178
#2	.0032	-.0002	.0002	.0005	.0007	.0061	.0078

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	-.0001	.0042	-.0000	.0014	-.0664	-.0065
SDev	.0002	.0000	.0024	.0001	.0001	.0969	.0035
%RSD	30.68	7.024	58.25	795.2	6.453	145.8	53.78
#1	.0008	-.0001	.0024	.0001	.0015	.0020	-.0090
#2	.0005	-.0001	.0059	-.0001	.0013	-.1349	-.0040

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0010	-.0075	.0118	.0066	.0003	.0123	.0031
SDev	.0009	.0039	.0074	.0027	.0015	.0022	.0044
%RSD	89.34	51.77	62.72	41.26	551.3	17.74	141.3
#1	-.0017	-.0103	.0065	.0047	-.0008	.0138	.0000
#2	-.0004	-.0048	.0170	.0086	.0013	.0107	.0062

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.5	.0017	-.0035	.0128	.0084	-.0018	.0353
SDev	.8	.0025	.0018	.0006	.0043	.0004	.0148
%RSD	.8250	142.0	51.86	4.636	51.21	22.76	41.95
#1	101.1	.0035	-.0048	.0132	.0053	-.0020	.0458
#2	99.91	-.0000	-.0022	.0124	.0114	-.0015	.0249

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0010	.0000	.0024	.0201	-.0000	-.0026
SDev	.0000	.0015	.0000	.0030	.0062	.0004	.0037
%RSD	29.77	150.3	7647.	125.8	30.57	18080.	144.2
#1	.0000	.0020	.0000	.0045	.0158	-.0003	-.0052
#2	.0000	-.0001	-.0000	.0003	.0245	.0003	.0000

010118

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0004	.0003
SDev	.0001	.0001	.0002
%RSD	896.0	16.44	73.20
#1	.0001	.0004	.0001
#2	-.0000	.0005	.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	724446	10000	--	--	--	--	--
SDev	5993.437	.0000000	--	--	--	--	--
%RSD	.8273132	.0000000	--	--	--	--	--
#1	728684	10000	--	--	--	--	--
#2	720208	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: lcsw-B10W2 Operator:
Run Time: 02/15/05 17:51:48
Comment:
Mode: CONC Corr. Factor: 1

010119

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0958	3.755	3.962	.0020	3.837	.0953	-.0093
SDev	.0012	.001	.015	.0001	.008	.0000	.0029
%RSD	1.246	.0324	.3886	5.321	.2026	.0287	31.30
#1	.0966	3.754	3.973	.0019	3.831	.0952	-.0113
#2	.0949	3.755	3.951	.0020	3.842	.0953	-.0072

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.29	.0967	.9545	.3917	.4867	2.004	16.77
SDev	.01	.0003	.0004	.0002	.0010	.000	.00
%RSD	.0303	.3537	.0447	.0479	.1993	.0108	.0285
#1	19.29	.0969	.9542	.3916	.4874	2.004	16.77
#2	19.30	.0965	.9548	.3919	.4861	2.004	16.76

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	-.0001	19.06	.9667	.0014	16.78	23.55
SDev	.0006	.0000	.02	.0010	.0006	.04	.05
%RSD	96.31	2.726	.0979	.1014	41.27	.2302	.2308
#1	.0010	-.0001	19.05	.9660	.0018	16.75	23.58
#2	.0002	-.0001	19.07	.9674	.0010	16.81	23.51

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9663	.0073	.9862	.9785	-.0014	.0028	.9698
SDev	.0027	.0031	.0133	.0100	.0003	.0024	.0117
%RSD	.2813	41.96	1.351	1.024	18.37	85.67	1.204
#1	.9682	.0095	.9768	.9714	-.0012	.0044	.9615
#2	.9644	.0051	.9956	.9855	-.0016	.0011	.9781

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.90	4.257	4.277	.0145	.9810	4.270	.0090
SDev	.65	.019	.023	.0005	.0111	.022	.0038
%RSD	.6504	.4388	.5427	3.357	1.133	.5081	41.63
#1	100.4	4.244	4.260	.0142	.9732	4.255	.0117
#2	99.44	4.270	4.293	.0149	.9889	4.285	.0064

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	-.0132	.0000	3.962	.0178	.9550	-.0034
SDev	.0000	.0009	.0000	.001	.0114	.0005	.0021
%RSD	1.139	7.018	102.5	.0313	64.24	.0559	60.05
#1	.0007	-.0125	.0001	3.961	.0259	.9547	-.0020
#2	.0006	-.0138	.0000	3.963	.0097	.9554	-.0049

010120

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.9926	.0004
SDev	.0000	.0011	.0001
%RSD	23.24	.1084	32.84
#1	-.0001	.9919	.0003
#2	-.0000	.9934	.0005

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	720134	10000	--	--	--	--	--
SDev	4696.603	.0000000	--	--	--	--	--
%RSD	.6521846	.0000000	--	--	--	--	--
#1	723455	10000	--	--	--	--	--
#2	716813	10000	--	--	--	--	--

Analysis Report 02/15/05 06:01:07 PM

Method: DAILY2 Sample Name: 257327 DI Operator:
Run Time: 02/15/05 17:56:33
Comment:
Mode: CONC Corr. Factor: 1

010121

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	-.0038	.0186	.4273	.0456	.0001	-.0098
SDev	.0019	.0137	.0001	.0035	.0001	.0000	.0084
%RSD	507.7	360.3	.7581	.8136	.2683	12.22	86.27
#1	-.0017	-.0135	.0185	.4249	.0457	.0001	-.0157
#2	.0010	.0059	.0187	.4298	.0455	.0001	-.0038

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	86.32	-.0001	.0013	.0002	.0941	-.0030	16.28
SDev	.30	.0005	.0021	.0008	.0006	.0489	.27
%RSD	.3445	643.1	153.4	382.3	.5915	1614.	1.680
#1	86.11	-.0004	-.0001	.0008	.0937	-.0376	16.08
#2	86.53	.0003	.0028	-.0004	.0945	.0315	16.47

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0006	.0078	1.338	.0024	.0056	23.88	34.40
SDev	.0027	.0003	.023	.0001	.0010	.81	.32
%RSD	418.4	3.295	1.724	5.876	17.51	3.398	.9209
#1	-.0026	.0076	1.322	.0025	.0049	23.30	34.18
#2	.0013	.0079	1.354	.0023	.0063	24.45	34.63

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0079	.9066	.0028	.0057	-.0044	54.95	.0094
SDev	.0002	.0043	.0054	.0005	.0143	.42	.0061
%RSD	2.313	.4719	196.7	9.004	326.9	.7637	65.34
#1	.0081	.9036	-.0011	.0053	-.0145	55.25	.0137
#2	.0078	.9096	.0066	.0060	.0058	54.65	.0051

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	106.7	.0118	.0017	5.806	.0047	.0051	.0088
SDev	.6	.0032	.0065	.017	.0021	.0033	.0018
%RSD	.5390	26.86	386.5	.2860	45.40	64.68	20.05
#1	106.3	.0096	.0063	5.795	.0032	.0074	.0101
#2	107.1	.0141	-.0029	5.818	.0062	.0028	.0076

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.6264	.0029	-.0001	.0012	-.0336	.0073	-.0025
SDev	.0030	.0053	.0002	.0013	.1009	.0001	.0071
%RSD	.4780	181.7	203.9	103.8	300.6	.9323	282.8
#1	.6243	.0066	.0000	.0003	-.1049	.0073	-.0076
#2	.6285	-.0008	-.0002	.0021	.0378	.0072	.0025

010122

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0003	.0018	.0011
SDev	.0001	.0006	.0001
%RSD	41.83	31.12	4.471
#1	-.0002	.0014	.0011
#2	-.0004	.0022	.0010

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	769089	10000	--	--	--	--	--
SDev	4150.717	.0000000	--	--	--	--	--
%RSD	.5396926	.0000000	--	--	--	--	--
#1	766154	10000	--	--	--	--	--
#2	772024	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 257328 DI Operator:
Run Time: 02/15/05 18:01:19
Comment:
Mode: CONC Corr. Factor: 1

010123

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	.0032	-.0019	.0069	.0001	.0001	-.0122
SDev	.0005	.0008	.0006	.0003	.0000	.0000	.0017
%RSD	125.6	23.21	32.28	4.860	6.063	48.70	13.60
#1	-.0008	.0037	-.0015	.0071	.0001	.0000	-.0110
#2	-.0000	.0027	-.0024	.0066	.0002	.0001	-.0133

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0625	-.0001	.0000	-.0004	.0060	-.0020	.1502
SDev	.0028	.0001	.0001	.0002	.0003	.0072	.0183
%RSD	4.526	115.9	214.1	58.78	5.816	357.3	12.17
#1	.0645	-.0002	.0001	-.0006	.0057	-.0071	.1373
#2	.0605	-.0000	-.0000	-.0002	.0062	.0031	.1632

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0009	-.0000	.0060	.0001	.0012	1.199	1.780
SDev	.0003	.0000	.0024	.0001	.0005	.035	.003
%RSD	36.52	41.71	39.95	228.8	41.63	2.911	.1939
#1	-.0007	-.0001	.0043	.0002	.0015	1.174	1.777
#2	-.0011	-.0000	.0078	-.0000	.0008	1.224	1.782

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	.0068	.0053	.0028	-.0013	.2796	-.0006
SDev	.0001	.0045	.0044	.0014	.0050	.0058	.0051
%RSD	9.728	66.18	83.45	48.16	377.1	2.088	829.6
#1	.0010	.0036	.0022	.0019	-.0048	.2754	.0030
#2	.0011	.0099	.0084	.0038	.0022	.2837	-.0043

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	94.04	-.0030	-.0040	.0875	.0037	-.0036	.0087
SDev	.18	.0081	.0000	.0059	.0024	.0027	.0042
%RSD	.1870	273.5	1.015	6.715	64.87	75.30	48.16
#1	93.92	.0028	-.0039	.0833	.0020	-.0017	.0117
#2	94.17	-.0087	-.0040	.0917	.0053	-.0055	.0058

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0025	.0001	.0030	-.0315	.0002	-.0059
SDev	.0000	.0009	.0000	.0049	.0015	.0001	.0008
%RSD	4.144	36.94	15.16	162.8	4.727	70.98	13.96
#1	.0001	.0031	.0001	-.0005	-.0305	.0001	-.0053
#2	.0001	.0018	.0002	.0065	-.0326	.0002	-.0064

010124

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0041	.0002
SDev	.0000	.0002	.0002
%RSD	27.07	5.908	124.6
#1	-.0000	.0039	.0003
#2	-.0001	.0043	.0000

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	677902	10000	--	--	--	--	--
SDev	1203.496	.0000000	--	--	--	--	--
%RSD	.1775324	.0000000	--	--	--	--	--
#1	677051	10000	--	--	--	--	--
#2	678753	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: cri Operator:
Run Time: 02/15/05 18:07:54
Comment:
Mode: CONC Corr. Factor: 1

010125

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0206	.0875	.0195	.1016	.0205	.0099	-.0048
SDev	.0007	.0001	.0055	.0002	.0000	.0000	.0007
%RSD	3.461	.0838	28.27	.1740	.0417	.2324	14.07
#1	.0201	.0875	.0156	.1018	.0204	.0099	-.0043
#2	.0211	.0876	.0233	.1015	.0205	.0099	-.0052
Errors	LC Pass	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High	.0300		.0300	.1500	.0300	.0150	
Low	.0100		.0100	.0500	.0100	.0050	

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	.0100	.0996	.0212	.0498	.0990	-.0091
SDev	.0003	.0003	.0003	.0009	.0000	.0057	.0154
%RSD	44.23	2.691	.3509	4.508	.0336	5.801	168.8
#1	.0004	.0102	.0993	.0205	.0498	.0949	-.0200
#2	.0008	.0098	.0998	.0218	.0498	.1030	.0018
Errors	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High		.0150	.1500	.0300	.0750	.1500	
Low		.0050	.0500	.0100	.0250	.0500	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	.0699	-.0043	.0306	.0212	-.0988	.0047
SDev	.0007	.0001	.0062	.0001	.0006	.3098	.0026
%RSD	193.4	.0872	144.6	.2803	2.872	313.5	55.83
#1	-.0008	.0700	-.0086	.0305	.0207	-.3179	.0028
#2	.0001	.0699	.0001	.0306	.0216	.1202	.0065
Errors	NOCHECK	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK	NOCHECK
High		.1500		.0450	.0300		
Low		.0500		.0150	.0100		

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0827	.1024	.0073	.0046	-.0008	.0050	.1221
SDev	.0004	.0023	.0024	.0001	.0026	.0036	.0023
%RSD	.4557	2.272	33.02	1.749	324.8	71.37	1.919
#1	.0824	.1040	.0056	.0046	-.0026	.0076	.1238
#2	.0829	.1007	.0090	.0045	.0010	.0025	.1205
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	.1200	.1500					.1800
Low	.0400	.0500					.0600

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010126

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.6	.0152	.0054	.1175	.0055	.0087	H.1982
SDev	1.1	.0045	.0006	.0036	.0008	.0019	.0040
%RSD	1.065	29.57	11.81	3.076	13.61	22.13	2.029
#1	101.4	.0120	.0050	.1150	.0050	.0073	H.2010
#2	99.86	.0183	.0059	.1201	.0060	.0100	H.1953
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC High
High				.1500	.0090	.0150	.1500
Low				.0500	.0030	.0050	.0500

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0207	-.0012	.0199	.0192	.2007	.0982	-.0037
SDev	.0000	.0051	.0001	.0046	.0229	.0003	.0024
%RSD	.1880	423.4	.2639	24.24	11.40	.3463	64.44
#1	.0207	.0024	.0199	.0159	.1845	.0980	-.0055
#2	.0208	-.0048	.0198	.0225	.2169	.0984	-.0020
Errors	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK	LC Pass	NOCHECK
High	.0300		.0300	.0300		.1500	
Low	.0100		.0100	.0100		.0500	

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0407	.0977
SDev	.0000	.0002	.0004
%RSD	62.59	.5674	.3967
#1	-.0000	.0408	.0974
#2	-.0001	.0405	.0980
Errors	NOCHECK	LC Pass	NOCHECK
High		.0600	
Low		.0200	

010127

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	725341	10000	--	--	--	--	--
SDev	7698.979	.0000000	--	--	--	--	--
%RSD	1.061429	.0000000	--	--	--	--	--
#1	730785	10000	--	--	--	--	--
#2	719897	10000	--	--	--	--	--

Method: DAILY2 Sample Name: icsa Operator:
Run Time: 02/15/05 18:12:40 010128
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	494.7	.0017	-.0174	.0011	.0001	-.0029
SDev	.0004	.1	.0043	.0012	.0002	.0000	.0002
%RSD	164.2	.0107	252.1	6.652	14.85	16.43	5.476
#1	-.0005	494.8	.0048	-.0165	.0012	.0001	-.0028
#2	.0000	494.7	-.0013	-.0182	.0010	.0001	-.0031
Errors	NOCHECK	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High		600.0					
Low		400.0					

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	452.0	.0008	-.0006	.0007	.0024	188.4	-.0080
SDev	.2	.0001	.0003	.0003	.0001	.3	.0246
%RSD	.0413	16.92	48.76	37.32	2.326	.1529	307.1
#1	452.2	.0009	-.0004	.0005	.0023	188.2	-.0254
#2	451.9	.0007	-.0009	.0009	.0024	188.6	.0094
Errors	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass	NOCHECK
High	600.0					240.0	
Low	400.0					160.0	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0022	.0006	526.1	-.0009	-.0019	.0905	-.0214
SDev	.0006	.0002	.3	.0001	.0004	.1885	.0109
%RSD	28.13	40.65	.0610	10.63	20.15	208.2	51.20
#1	-.0026	.0008	525.9	-.0010	-.0021	-.0427	-.0291
#2	-.0018	.0004	526.4	-.0009	-.0016	.2238	-.0136
Errors	NOCHECK	NOCHECK	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High			600.0				
Low			400.0				

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	-.0215	.0461	-.0337	.0020	.0206	-.0014
SDev	.0004	.0230	.0021	.0036	.0025	.0026	.0101
%RSD	93.40	106.7	4.441	10.64	124.7	12.78	722.5
#1	.0007	-.0378	.0476	-.0363	.0002	.0224	-.0086
#2	.0001	-.0053	.0447	-.0312	.0038	.0187	.0058
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010129

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	92.16	.0072	-.0061	.0240	-.0071	-.0017	.1200
SDev	1.21	.0026	.0101	.0004	.0017	.0059	.0125
%RSD	1.310	36.52	165.3	1.715	24.08	352.7	10.41
#1	91.31	.0091	-.0133	.0237	-.0083	-.0058	.1289
#2	93.02	.0053	.0010	.0243	-.0059	.0025	.1112
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0131	.0242	-.0017	-.0103	-.0074	-.0013	.0015
SDev	.0000	.0019	.0000	.0082	.0063	.0004	.0041
%RSD	.0638	8.057	.2693	79.33	85.59	31.22	266.6
#1	.0131	.0228	-.0017	-.0161	-.0029	-.0016	.0044
#2	.0131	.0255	-.0017	-.0045	-.0119	-.0010	-.0014
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0006	.0205	.0002
SDev	.0002	.0001	.0008
%RSD	27.27	.3938	382.5
#1	-.0005	.0204	.0008
#2	-.0007	.0205	-.0004
Errors	NOCHECK	NOCHECK	NOCHECK
High			
Low			

010130

IntStd	1	2	3	4	5	6	
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	664396	10000	--	--	--	--	--
SDev	8713.677	.0000000	--	--	--	--	--
%RSD	1.311519	.0000000	--	--	--	--	--
#1	658234	10000	--	--	--	--	--
#2	670557	10000	--	--	--	--	--

Analysis Report 02/15/05 06:21:59 PM

Method: DAILY2 Sample Name: icsab Operator: **010131**
Run Time: 02/15/05 18:17:25
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.088	501.5	1.036	1.032	.5293	.4827	-.0037
SDev	.000	.1	.005	.006	.0005	.0004	.0005
%RSD	.0087	.0241	.4610	.5872	.0932	.0771	13.67
#1	1.088	501.4	1.032	1.028	.5297	.4824	-.0033
#2	1.088	501.6	1.039	1.036	.5290	.4830	-.0041
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High	1.200	600.0	1.200	1.200	.6000	.6000	
Low	.8000	400.0	.8000	.8000	.4000	.4000	

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	459.3	.9386	.4765	.4898	.5561	190.9	-.0057
SDev	.8	.0018	.0006	.0003	.0010	.0	.0155
%RSD	.1636	.1914	.1319	.0535	.1814	.0256	272.4
#1	458.8	.9373	.4769	.4899	.5554	190.9	-.0167
#2	459.8	.9398	.4760	.4896	.5568	191.0	.0053
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High	600.0	1.200	.6000	.6000	.6000	240.0	
Low	400.0	.8000	.4000	.4000	.4000	160.0	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0018	1.179	534.1	.4902	1.045	.4266	-.0325
SDev	.0005	.001	.1	.0003	.001	.1750	.0044
%RSD	28.56	.0702	.0273	.0533	.0565	41.03	13.56
#1	-.0021	1.179	534.0	.4900	1.045	.3028	-.0356
#2	-.0014	1.180	534.2	.4903	1.044	.5503	-.0294
Errors	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK
High		1.200	600.0	.6000	1.200		
Low		.8000	400.0	.4000	.8000		

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9481	1.026	1.027	.9559	.0052	.0142	1.065
SDev	.0030	.016	.003	.0031	.0030	.0063	.001
%RSD	.3204	1.587	.2438	.3272	57.10	43.95	.0667
#1	.9460	1.015	1.025	.9581	.0031	.0098	1.066
#2	.9503	1.038	1.029	.9537	.0073	.0187	1.065
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	1.200	1.200					1.200
Low	.8000	.8000					.8000

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010132

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	90.23	1.033	1.043	1.076	.9797	1.040	1.135
SDev	.32	.004	.008	.002	.0013	.007	.002
%RSD	.3526	.3811	.7841	.1638	.1275	.6505	.1677
#1	90.46	1.030	1.037	1.075	.9806	1.035	1.136
#2	90.01	1.036	1.049	1.078	.9788	1.044	1.133
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High					1.200	1.200	1.200
Low					.8000	.8000	.8000

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.072	.0240	.9892	.9952	.9900	.4952	-.0006
SDev	.001	.0032	.0005	.0095	.0421	.0035	.0047
%RSD	.0734	13.26	.0460	.9546	4.250	.7080	803.2
#1	1.071	.0218	.9889	.9885	.9603	.4977	-.0039
#2	1.072	.0263	.9896	1.002	1.020	.4927	.0027
Errors	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK	LC Pass	NOCHECK
High	1.200		1.200	1.200		.6000	
Low	.8000		.8000	.8000		.4000	

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0005	.9857	.9941
SDev	.0001	.0006	.0019
%RSD	21.29	.0627	.1871
#1	-.0004	.9861	.9928
#2	-.0006	.9852	.9954
Errors	NOCHECK	LC Pass	NOCHECK
High		1.200	
Low		.8000	

010133

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	650456	10000	--	--	--	--	--
SDev	2269.106	.0000000	--	--	--	--	--
%RSD	.3488487	.0000000	--	--	--	--	--
#1	652060	10000	--	--	--	--	--
#2	648851	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccv3 Operator: 010134
Run Time: 02/15/05 18:25:51
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.001	9.739	5.136	4.857	10.12	.9863	5.091
SDev	.001	.004	.003	.018	.00	.0013	.010
%RSD	.1139	.0392	.0614	.3662	.0159	.1274	.1928
#1	.9998	9.736	5.133	4.845	10.12	.9855	5.084
#2	1.001	9.741	5.138	4.870	10.12	.9872	5.098
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	1.100	11.00	5.500	5.500	11.00	1.100	5.500
Low	.9000	9.000	4.500	4.500	9.000	.9000	4.500

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	20.11	.9918	5.029	2.011	2.061	10.06	18.19
SDev	.05	.0003	.003	.002	.002	.02	.04
%RSD	.2308	.0259	.0693	.1059	.0898	.2318	.2370
#1	20.08	.9916	5.026	2.009	2.060	10.05	18.16
#2	20.15	.9920	5.031	2.012	2.062	10.08	18.22
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	22.00	1.100	5.500	2.200	2.200	11.00	22.00
Low	18.00	.9000	4.500	1.800	1.800	9.000	18.00

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.973	4.709	19.95	1.014	5.091	27.81	H40.33
SDev	.004	.001	.03	.001	.004	.25	.09
%RSD	.0810	.0129	.1725	.0691	.0846	.8915	.2296
#1	4.970	4.709	19.93	1.013	5.088	27.64	H40.26
#2	4.975	4.709	19.98	1.014	5.094	27.99	H40.39
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC High
High	5.500	5.500	22.00	1.100	5.500	33.00	33.00
Low	4.500	4.500	18.00	.9000	4.500	27.00	27.00

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.024	5.138	4.990	4.992	1.001	1.010	1.005
SDev	.026	.042	.040	.017	.004	.004	.003
%RSD	.5142	.8087	.7925	.3438	.4134	.3975	.3081
#1	5.005	5.167	4.962	4.980	.9981	1.013	1.003
#2	5.042	5.108	5.018	5.004	1.004	1.008	1.008
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	5.500	5.500			1.100	1.100	1.100
Low	4.500	4.500			.9000	.9000	.9000

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010135

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.11	5.265	5.314	5.170	4.991	5.298	5.138
SDev	1.05	.045	.021	.004	.025	.029	.009
%RSD	1.057	.8614	.3951	.0676	.4934	.5496	.1777
#1	99.85	5.233	5.299	5.167	4.974	5.277	5.132
#2	98.37	5.297	5.329	5.172	5.009	5.318	5.145
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				5.500	5.500	5.500	5.500
Low				4.500	4.500	4.500	4.500

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.076	.9709	4.973	5.197	1.020	4.973	1.077
SDev	.004	.0003	.011	.004	.021	.001	.000
%RSD	.0740	.0289	.2246	.0768	2.096	.0238	.0372
#1	5.079	.9707	4.966	5.194	1.005	4.974	1.077
#2	5.074	.9711	4.981	5.200	1.036	4.972	1.077
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500	5.500	1.100	5.500	1.100
Low	4.500	.9000	4.500	4.500	.9000	4.500	.9000

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	4.831	1.027	4.923
SDev	.002	.002	.008
%RSD	.0390	.1716	.1661
#1	4.830	1.025	4.917
#2	4.833	1.028	4.929
Errors	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500
Low	4.500	.9000	4.500

010136

IntStd	1	2	3	4	5	6	
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	714384	10000	--	--	--	--	--
SDev	7552.607	.0000000	--	--	--	--	--
%RSD	1.057219	.0000000	--	--	--	--	--
#1	719725	10000	--	--	--	--	--
#2	709044	10000	--	--	--	--	--

Method: DAILY2 Sample Name: ccb3 Operator:
Run Time: 02/15/05 18:32:27
Comment:
Mode: CONC Corr. Factor: 1

010137

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	-.0043	-.0004	.0149	.0002	.0001	-.0065
SDev	.0002	.0020	.0007	.0025	.0003	.0000	.0045
%RSD	28.90	46.14	163.0	16.60	109.7	14.74	69.36
#1	.0008	-.0057	.0001	.0166	.0004	.0001	-.0097
#2	.0005	-.0029	-.0010	.0131	.0001	.0001	-.0033
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0500	.0050	.0500	.0050	.0050	.0100
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0100

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0046	-.0000	.0009	.0003	.0001	.0139	.0077
SDev	.0002	.0001	.0007	.0005	.0006	.0059	.0105
%RSD	4.045	1719.	82.61	166.5	815.2	42.51	136.8
#1	.0047	.0001	.0013	-.0001	.0005	.0180	.0003
#2	.0044	-.0001	.0004	.0007	-.0004	.0097	.0151
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	.0003	.0047	.0006	.0021	H.1525	.0107
SDev	.0006	.0001	.0003	.0001	.0001	.0997	.0029
%RSD	224.2	21.66	6.927	20.11	7.199	65.34	27.23
#1	.0006	.0003	.0049	.0005	.0023	H.0820	.0086
#2	-.0001	.0002	.0045	.0006	.0020	H.2230	.0127
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC High	LC Pass
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0018	.0047	.0016	-.0001	.0008	-.0012	.0036
SDev	.0007	.0050	.0003	.0006	.0017	.0029	.0015
%RSD	40.29	106.3	21.35	393.2	199.6	249.6	42.51
#1	.0024	.0082	.0014	-.0006	-.0003	-.0033	.0047
#2	.0013	.0012	.0018	.0003	.0020	.0009	.0025
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	.0050	.0100			.0050	.0100	.0100
Low	-.0050	-.0100			-.0050	-.0100	-.0100

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010138

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.6	.0021	-.0010	-.0006	.0005	.0001	H.0730
SDev	.1	.0060	.0052	.0028	.0005	.0015	.0069
%RSD	.1417	279.6	543.5	468.6	110.0	1795.	9.525
#1	100.5	-.0021	.0027	-.0026	.0001	.0011	H.0779
#2	100.7	.0063	-.0046	.0014	.0008	-.0010	H.0681
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC High
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0009	.0001	.0033	.0152	-.0000	-.0047
SDev	.0001	.0002	.0003	.0035	.0129	.0003	.0006
%RSD	113.8	22.39	195.2	105.7	84.90	959.5	13.45
#1	.0002	.0008	.0003	.0058	.0061	.0002	-.0051
#2	.0000	.0011	-.0001	.0008	.0242	-.0003	-.0042
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0002	-.0002	.0006
SDev	.0003	.0001	.0007
%RSD	164.2	56.88	119.7
#1	.0004	-.0003	.0011
#2	-.0000	-.0001	.0001
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010139

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	725172	10000	--	--	--	--	--
SDev	981.4642	.0000000	--	--	--	--	--
%RSD	.1353423	.0000000	--	--	--	--	--
#1	724478	10000	--	--	--	--	--
#2	725866	10000	--	--	--	--	--

Method: DAILY2 Sample Name: pbw-B10W659205 df100 Operator:
Run Time: 02/15/05 18:37:12
Comment:
Mode: CONC Corr. Factor: 1

010140

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	-.0064	-.0036	.0093	-.0000	.0000	-.0064
SDev	.0008	.0009	.0041	.0021	.0000	.0000	.0002
%RSD	7836.	14.90	114.6	22.42	5.582	91.84	2.866
#1	-.0005	-.0070	-.0065	.0107	-.0000	.0000	-.0065
#2	.0005	-.0057	-.0007	.0078	-.0000	.0001	-.0062

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0135	.0000	-.0002	.0001	-.0000	-.0026	-.0008
SDev	.0006	.0004	.0000	.0001	.0001	.0013	.0160
%RSD	4.358	1685.	2.958	150.8	319.2	50.21	2056.
#1	.0131	-.0003	-.0002	-.0000	.0000	-.0017	-.0121
#2	.0139	.0003	-.0002	.0002	-.0001	-.0036	.0105

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0001	.0034	.0000	.0014	-.1391	.0080
SDev	.0001	.0000	.0038	.0000	.0000	.0630	.0009
%RSD	26.94	4.527	109.7	74.63	2.147	45.32	11.03
#1	.0003	.0001	.0008	.0000	.0014	-.1837	.0074
#2	.0004	.0001	.0061	.0000	.0014	-.0945	.0087

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0008	.0002	.0042	-.0012	-.0007	.0013	.0030
SDev	.0012	.0064	.0012	.0013	.0021	.0013	.0025
%RSD	141.3	2771.	27.93	104.8	305.3	99.79	83.11
#1	-.0017	-.0043	.0051	-.0021	-.0022	.0004	.0047
#2	-.0000	.0048	.0034	-.0003	.0008	.0022	.0012

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.4	-.0013	-.0042	.0000	.0006	-.0032	.0692
SDev	.7	.0002	.0006	.0025	.0004	.0004	.0016
%RSD	.7073	16.12	13.09	5612.	71.62	13.54	2.384
#1	100.9	-.0014	-.0046	-.0017	.0003	-.0035	.0704
#2	99.89	-.0011	-.0038	.0018	.0009	-.0029	.0681

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0024	.0001	.0004	-.0023	-.0002	.0012
SDev	.0000	.0002	.0001	.0018	.0113	.0006	.0018
%RSD	104.8	9.395	96.45	447.8	486.6	244.4	154.2
#1	.0000	.0025	.0001	.0017	-.0103	.0002	-.0001
#2	.0000	.0022	.0000	-.0009	.0057	-.0007	.0024

010141

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0002	.0001
SDev	.0000	.0003	.0003
%RSD	32.81	183.0	254.6
#1	.0000	-.0000	.0003
#2	.0000	.0004	-.0001

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	723690	10000	--	--	--	--	--
SDev	5091.169	.0000000	--	--	--	--	--
%RSD	.7035013	.0000000	--	--	--	--	--
#1	727290	10000	--	--	--	--	--
#2	720090	10000	--	--	--	--	--

Method: DAILY2 Sample Name: lcsw-B10W4 df100 Operator:
Run Time: 02/15/05 18:41:58
Comment:
Mode: CONC Corr. Factor: 1

010142

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	.0319	.0402	.0091	.0420	.0011	.0001
SDev	.0008	.0059	.0030	.0011	.0000	.0000	.0061
%RSD	76.34	18.34	7.487	12.20	.0995	1.142	9051.
#1	.0005	.0278	.0423	.0099	.0420	.0011	.0044
#2	.0015	.0360	.0381	.0083	.0421	.0011	-.0042

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.2107	.0009	.0100	.0023	.0054	.0236	.1086
SDev	.0018	.0002	.0001	.0010	.0008	.0077	.0009
%RSD	.8673	19.65	.5462	42.70	14.74	32.60	.7976
#1	.2094	.0010	.0100	.0030	.0060	.0182	.1080
#2	.2120	.0007	.0100	.0016	.0048	.0291	.1092

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0002	.2022	.0105	.0013	.0213	.1924
SDev	.0003	.0001	.0069	.0000	.0014	.0247	.0054
%RSD	279.4	28.64	3.406	.2621	105.0	115.8	2.823
#1	-.0001	.0001	.1974	.0104	.0003	.0388	.1886
#2	.0003	.0002	.2071	.0105	.0023	.0039	.1963

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0105	.0033	.0123	.0089	-.0022	.0060	.0145
SDev	.0010	.0071	.0036	.0010	.0026	.0055	.0006
%RSD	9.919	213.9	28.95	11.25	115.6	92.77	4.330
#1	.0113	.0084	.0098	.0082	-.0040	.0020	.0140
#2	.0098	-.0017	.0148	.0096	-.0004	.0099	.0149

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.34	.0462	.0433	.0034	.0100	.0443	.0686
SDev	.07	.0038	.0056	.0034	.0019	.0050	.0061
%RSD	.0714	8.152	12.86	101.0	18.45	11.22	8.866
#1	99.39	.0435	.0394	.0010	.0087	.0408	.0729
#2	99.29	.0489	.0472	.0058	.0113	.0478	.0643

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0006	.0002	.0412	.0017	.0106	-.0028
SDev	.0000	.0039	.0001	.0016	.0210	.0007	.0036
%RSD	45.07	649.9	61.03	3.795	1251.	6.342	126.2
#1	.0000	.0034	.0003	.0401	-.0132	.0110	-.0053
#2	.0000	-.0022	.0001	.0423	.0165	.0101	-.0003

010143

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0126	.0010
SDev	.0001	.0002	.0002
%RSD	476.4	1.272	18.29
#1	.0001	.0127	.0011
#2	-.0000	.0125	.0008

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	716102	10000	--	--	--	--	--
SDev	559.3215	.0000000	--	--	--	--	--
%RSD	.0781064	.0000000	--	--	--	--	--
#1	716497	10000	--	--	--	--	--
#2	715706	10000	--	--	--	--	--

Method: DAILY2 Sample Name: srm-B10W7 df100 Operator:
Run Time: 02/15/05 18:46:44
Comment:
Mode: CONC Corr. Factor: 1

010144

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	4.684	-.0027	.0043	.0647	.0002	-.0089
SDev	.0009	.000	.0020	.0015	.0001	.0000	.0043
%RSD	314.0	.0060	72.68	35.84	.2152	.7948	48.37
#1	-.0009	4.684	-.0042	.0054	.0648	.0002	-.0120
#2	.0003	4.684	-.0013	.0032	.0646	.0002	-.0059

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4940	.0000	.0001	.0007	.0002	.9884	1.417
SDev	.0023	.0001	.0007	.0012	.0001	.0101	.012
%RSD	.4595	733.4	917.8	170.3	53.60	1.026	.8439
#1	.4924	-.0001	.0005	.0016	.0001	.9812	1.409
#2	.4956	.0001	-.0004	-.0001	.0002	.9956	1.426

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0017	.0027	.1000	.0274	.0018	1.865	2.512
SDev	.0005	.0001	.0003	.0000	.0005	.263	.003
%RSD	27.16	2.616	.2480	.0595	29.45	14.11	.1128
#1	.0014	.0026	.0998	.0274	.0021	1.679	2.514
#2	.0021	.0027	.1002	.0274	.0014	2.051	2.510

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.0139	.0022	.0011	.0006	-.0005	.0049
SDev	.0020	.0033	.0002	.0023	.0045	.0067	.0021
%RSD	1819.	23.96	10.22	207.9	805.5	1423.	42.37
#1	-.0016	.0116	.0020	-.0005	-.0026	-.0052	.0034
#2	.0013	.0163	.0023	.0028	.0037	.0043	.0063

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.7	-.0017	-.0012	.0092	.0015	-.0014	.0596
SDev	.8	.0031	.0017	.0044	.0016	.0001	.0025
%RSD	.7636	177.9	141.4	48.06	108.7	6.767	4.267
#1	101.2	.0004	-.0024	.0061	.0003	-.0014	.0614
#2	100.1	-.0039	.0000	.0124	.0026	-.0013	.0578

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0046	.0033	.0961	.0034	-.0033	.0005	-.0010
SDev	.0000	.0001	.0001	.0010	.0264	.0005	.0011
%RSD	.6662	2.571	.1163	30.34	804.8	95.04	117.2
#1	.0045	.0034	.0962	.0041	-.0219	.0009	-.0002
#2	.0046	.0033	.0960	.0026	.0154	.0002	-.0018

010145

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0024	.0035	.0218
SDev	.0001	.0001	.0002
%RSD	3.201	1.718	1.005
#1	.0025	.0034	.0219
#2	.0024	.0035	.0216

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	725780	10000	--	--	--	--	--
SDev	5562.809	.0000000	--	--	--	--	--
%RSD	.7664589	.0000000	--	--	--	--	--
#1	729714	10000	--	--	--	--	--
#2	721847	10000	--	--	--	--	--

Method: DAILY2 Sample Name: srm-B10W8 df100 Operator:
Run Time: 02/15/05 18:51:29
Comment:
Mode: CONC Corr. Factor: 1

010146

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	2.658	-.0021	.0037	.0060	.0000	-.0097
SDev	.0010	.003	.0012	.0003	.0000	.0000	.0084
%RSD	417.0	.1008	58.16	7.713	.0288	16.43	86.55
#1	-.0005	2.657	-.0030	.0039	.0060	.0000	-.0037
#2	.0009	2.660	-.0012	.0035	.0060	.0000	-.0156

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.724	.0001	.0012	.0103	.0030	2.226	.0206
SDev	.004	.0000	.0006	.0006	.0001	.012	.0155
%RSD	.1409	55.49	48.94	5.507	3.547	.5366	75.43
#1	2.721	.0001	.0016	.0107	.0031	2.217	.0096
#2	2.726	.0000	.0008	.0099	.0029	2.234	.0316

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.0003	1.542	.0399	.0005	.3305	.4922
SDev	.0000	.0000	.004	.0001	.0012	.2140	.0021
%RSD	24.01	8.977	.2686	.2553	219.8	64.74	.4155
#1	-.0001	.0003	1.540	.0400	-.0003	.1792	.4907
#2	-.0001	.0003	1.545	.0398	.0013	.4818	.4936

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0030	.0242	.0012	-.0016	.0001	.0153	.0037
SDev	.0011	.0015	.0041	.0002	.0033	.0037	.0076
%RSD	35.79	6.080	338.2	15.38	2292.	23.79	203.0
#1	.0038	.0252	-.0017	-.0017	-.0022	.0179	.0091
#2	.0022	.0231	.0042	-.0014	.0025	.0128	-.0016

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.3	.0004	.0007	.0030	-.0006	.0006	.0569
SDev	.8	.0057	.0008	.0010	.0015	.0014	.0034
%RSD	.8397	1612.	111.7	34.10	252.2	228.8	5.969
#1	100.9	-.0037	.0013	.0023	-.0017	-.0004	.0593
#2	99.68	.0044	.0001	.0038	.0005	.0016	.0545

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0055	-.0008	.2126	-.0002	-.0142	.0076	-.0034
SDev	.0000	.0027	.0003	.0016	.0012	.0004	.0013
%RSD	.3328	350.2	.1321	1004.	8.285	5.037	38.56
#1	.0055	.0011	.2128	.0010	-.0134	.0073	-.0043
#2	.0055	-.0027	.2124	-.0013	-.0150	.0079	-.0024

010147

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0004	.0025	.0018
SDev	.0001	.0001	.0002
%RSD	26.39	2.107	8.890
#1	.0004	.0025	.0019
#2	.0005	.0025	.0017

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	722830	10000	--	--	--	--	--
SDev	6033.742	.0000000	--	--	--	--	--
%RSD	.8347382	.0000000	--	--	--	--	--
#1	727097	10000	--	--	--	--	--
#2	718564	10000	--	--	--	--	--

Method: DAILY2 Sample Name: 257326 df100 t Operator:
Run Time: 02/15/05 18:58:05
Comment:
Mode: CONC Corr. Factor: 1

010148

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.9548	-.0004	.0034	.0117	.0001	-.0067
SDev	.0008	.0010	.0015	.0002	.0000	.0000	.0024
%RSD	279.9	.1002	408.9	5.007	.0405	10.01	36.00
#1	.0009	.9555	-.0014	.0035	.0117	.0001	-.0050
#2	-.0003	.9542	.0007	.0033	.0117	.0001	-.0084

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.3171	.0001	-.0003	.0010	.0047	.4171	.2087
SDev	.0015	.0000	.0001	.0003	.0002	.0266	.0066
%RSD	.4884	25.17	36.49	24.69	3.333	6.371	3.150
#1	.3182	.0001	-.0002	.0008	.0048	.4359	.2134
#2	.3160	.0001	-.0003	.0012	.0045	.3983	.2041

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	.0008	.2090	.0105	.0010	.2254	.2245
SDev	.0000	.0000	.0066	.0000	.0006	.0499	.0028
%RSD	2.305	1.025	3.147	.2656	59.02	22.12	1.243
#1	.0006	.0008	.2137	.0105	.0006	.2607	.2225
#2	.0006	.0008	.2044	.0105	.0015	.1902	.2265

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0006	.0302	-.0007	.0001	-.0002	.0135	.0023
SDev	.0009	.0064	.0012	.0001	.0015	.0040	.0063
%RSD	151.5	21.28	160.5	50.89	712.7	30.00	271.1
#1	-.0012	.0257	.0001	.0001	.0008	.0164	-.0021
#2	.0000	.0348	-.0016	.0002	-.0013	.0106	.0068

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.3	-.0026	-.0012	.0010	-.0001	-.0016	.0585
SDev	.6	.0010	.0017	.0010	.0003	.0015	.0042
%RSD	.6240	40.79	145.1	103.2	265.6	90.88	7.125
#1	99.91	-.0033	-.0023	.0017	.0001	-.0026	.0615
#2	100.8	-.0018	.0000	.0003	-.0004	-.0006	.0556

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0050	.0023	.0628	.0009	.0155	.0008	-.0005
SDev	.0000	.0016	.0001	.0022	.0005	.0001	.0022
%RSD	.0832	67.86	.1154	255.6	3.320	11.32	422.5
#1	.0050	.0012	.0628	.0024	.0158	.0009	.0010
#2	.0050	.0035	.0629	-.0007	.0151	.0008	-.0020

010149

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0003	.0204	.0027
SDev	.0000	.0001	.0001
%RSD	7.794	.6290	2.611
#1	.0003	.0205	.0027
#2	.0003	.0203	.0026

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	723356	10000	--	--	--	--	--
SDev	4577.102	.0000000	--	--	--	--	--
%RSD	.6327597	.0000000	--	--	--	--	--
#1	720119	10000	--	--	--	--	--
#2	726592	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccv4 Operator:
Run Time: 02/15/05 19:06:30
Comment:
Mode: CONC Corr. Factor: 1

010150

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.001	9.755	5.114	4.858	10.12	.9833	5.064
SDev	.002	.010	.004	.029	.03	.0010	.011
%RSD	.2016	.1032	.0743	.5934	.3197	.1040	.2199
#1	1.002	9.748	5.111	4.838	10.10	.9840	5.056
#2	.9995	9.762	5.116	4.879	10.14	.9826	5.072
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	1.100	11.00	5.500	5.500	11.00	1.100	5.500
Low	.9000	9.000	4.500	4.500	9.000	.9000	4.500

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	20.04	.9903	5.009	2.007	2.062	10.04	18.17
SDev	.07	.0007	.009	.005	.003	.01	.17
%RSD	.3277	.0674	.1729	.2482	.1516	.1118	.9199
#1	20.09	.9908	5.015	2.011	2.060	10.05	18.05
#2	20.00	.9899	5.003	2.004	2.064	10.03	18.29
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	22.00	1.100	5.500	2.200	2.200	11.00	22.00
Low	18.00	.9000	4.500	1.800	1.800	9.000	18.00

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.967	4.715	19.87	1.011	5.063	27.96	H40.48
SDev	.008	.030	.02	.002	.003	.00	.13
%RSD	.1693	.6299	.1220	.1566	.0545	.0025	.3116
#1	4.961	4.694	19.89	1.012	5.065	27.96	H40.39
#2	4.973	4.736	19.86	1.009	5.061	27.96	H40.57
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC High
High	5.500	5.500	22.00	1.100	5.500	33.00	33.00
Low	4.500	4.500	18.00	.9000	4.500	27.00	27.00

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.022	5.036	4.953	4.973	1.003	1.014	1.006
SDev	.002	.004	.010	.000	.003	.007	.004
%RSD	.0328	.0774	.1938	.0040	.2512	.6986	.3879
#1	5.023	5.038	4.946	4.972	1.001	1.009	1.009
#2	5.021	5.033	4.959	4.973	1.005	1.019	1.004
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	5.500	5.500			1.100	1.100	1.100
Low	4.500	4.500			.9000	.9000	.9000

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010151

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.48	5.224	5.259	5.163	4.966	5.248	5.091
SDev	1.16	.053	.016	.001	.003	.029	.031
%RSD	1.182	1.017	.3094	.0178	.0672	.5441	.6085
#1	97.66	5.187	5.248	5.164	4.964	5.227	5.113
#2	99.30	5.262	5.271	5.163	4.968	5.268	5.069
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				5.500	5.500	5.500	5.500
Low				4.500	4.500	4.500	4.500

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.074	.9702	4.962	5.204	1.011	4.961	1.071
SDev	.006	.0036	.001	.017	.025	.003	.010
%RSD	.1091	.3705	.0223	.3253	2.504	.0641	.9255
#1	5.070	.9677	4.962	5.193	.9932	4.963	1.064
#2	5.078	.9728	4.961	5.216	1.029	4.959	1.078
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500	5.500	1.100	5.500	1.100
Low	4.500	.9000	4.500	4.500	.9000	4.500	.9000

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	4.821	1.020	4.913
SDev	.004	.003	.005
%RSD	.0891	.2768	.1011
#1	4.818	1.022	4.909
#2	4.824	1.018	4.916
Errors	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500
Low	4.500	.9000	4.500

010152

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	709900	10000	--	--	--	--	--
SDev	8372.145	.0000000	--	--	--	--	--
%RSD	1.179341	.0000000	--	--	--	--	--
#1	703980	10000	--	--	--	--	--
#2	715820	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccb4 Operator:
Run Time: 02/15/05 19:13:06 010153
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	-.0055	-.0012	.0134	.0002	.0000	-.0039
SDev	.0001	.0029	.0022	.0011	.0002	.0000	.0005
%RSD	29.48	53.37	179.1	8.063	73.60	31.60	13.88
#1	-.0004	-.0034	.0003	.0142	.0004	.0000	-.0035
#2	-.0003	-.0075	-.0028	.0126	.0001	.0000	-.0043
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0500	.0050	.0500	.0050	.0050	.0100
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0100

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0019	.0001	.0004	.0001	-.0001	-.0137	.0020
SDev	.0003	.0000	.0000	.0001	.0003	.0004	.0095
%RSD	14.29	31.48	.3307	99.51	225.4	3.205	463.8
#1	.0021	.0001	.0004	.0000	-.0003	-.0134	-.0047
#2	.0018	.0002	.0004	.0001	.0001	-.0140	.0087
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0002	.0010	.0001	.0021	H.1744	.0059
SDev	.0002	.0001	.0043	.0000	.0006	.0165	.0064
%RSD	78.13	44.87	424.1	20.16	29.89	9.486	110.2
#1	.0004	.0003	-.0020	.0001	.0025	H.1627	.0013
#2	.0001	.0002	.0040	.0000	.0017	H.1861	.0104
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC High	LC Pass
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	.0035	.0040	-.0022	.0003	-.0010	-.0003
SDev	.0003	.0080	.0026	.0003	.0004	.0027	.0007
%RSD	84.57	230.0	64.32	15.51	124.0	274.9	253.9
#1	-.0006	-.0022	.0058	-.0020	.0000	.0009	-.0007
#2	-.0001	.0091	.0022	-.0025	.0007	-.0029	.0002
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	.0050	.0100			.0050	.0100	.0100
Low	-.0050	-.0100			-.0050	-.0100	-.0100

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010154

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.89	-.0008	-.0022	-.0006	-.0001	-.0017	H.0522
SDev	1.18	.0010	.0017	.0018	.0011	.0008	.0067
%RSD	1.180	121.0	75.62	301.3	829.3	45.77	12.85
#1	99.05	-.0001	-.0034	-.0019	.0006	-.0023	H.0570
#2	100.7	-.0015	-.0010	.0007	-.0009	-.0012	H.0475
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC High
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	-.0002	.0002	.0018	-.0028	.0001	-.0007
SDev	.0001	.0036	.0001	.0007	.0079	.0003	.0011
%RSD	105.1	1768.	88.47	39.30	279.6	318.7	157.8
#1	.0002	-.0028	.0003	.0013	.0028	.0003	-.0015
#2	.0000	.0023	.0001	.0023	-.0084	-.0001	.0001
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0001	.0000
SDev	.0001	.0000	.0005
%RSD	545.3	48.94	1068.
#1	.0000	.0001	.0004
#2	-.0000	.0000	-.0003
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010155

IntStd	1	2	3	4	5	6	
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	720058	10000	--	--	--	--	--
SDev	8531.243	.0000000	--	--	--	--	--
%RSD	1.184800	.0000000	--	--	--	--	--
#1	714025	10000	--	--	--	--	--
#2	726090	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: pbw-B10W6 df10 Operator: 010156
Run Time: 02/15/05 19:17:52
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0021	-.0008	.0320	.0001	.0000	-.0043
SDev	.0004	.0029	.0000	.0008	.0000	.0000	.0087
%RSD	116.4	138.7	4.879	2.633	7.937	23.38	201.9
#1	.0001	.0000	-.0007	.0326	.0001	.0000	-.0104
#2	.0006	.0042	-.0008	.0314	.0001	.0000	.0018

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0097	.0001	.0000	.0011	.0016	-.0042	-.0020
SDev	.0007	.0000	.0001	.0003	.0004	.0192	.0017
%RSD	7.270	2.856	396.1	28.28	27.51	453.4	83.90
#1	.0102	.0001	-.0001	.0013	.0013	-.0178	-.0031
#2	.0092	.0001	.0001	.0009	.0019	.0093	-.0008

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.0002	.0054	.0001	.0008	-.0987	.0113
SDev	.0004	.0001	.0008	.0000	.0011	.0332	.0008
%RSD	878.3	22.70	14.15	34.30	126.9	33.59	7.117
#1	-.0004	.0002	.0060	.0001	.0016	-.0753	.0107
#2	.0003	.0002	.0049	.0001	.0001	-.1222	.0119

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0008	.0587	.0015	.0010	-.0011	.0133	.0011
SDev	.0002	.0000	.0004	.0016	.0015	.0015	.0041
%RSD	29.88	.0007	29.41	169.1	137.6	11.31	374.2
#1	.0009	.0587	.0018	-.0002	-.0021	.0123	.0040
#2	.0006	.0587	.0012	.0021	-.0000	.0144	-.0018

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.1	.0045	-.0007	.0070	.0012	.0010	.0549
SDev	.0	.0041	.0009	.0003	.0009	.0008	.0023
%RSD	.0107	89.91	114.7	4.187	80.88	76.85	4.263
#1	100.1	.0074	-.0013	.0073	.0005	.0016	.0566
#2	100.2	.0016	-.0001	.0068	.0018	.0005	.0533

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0033	.0003	-.0014	-.0081	.0002	-.0009
SDev	.0000	.0006	.0000	.0027	.0019	.0003	.0028
%RSD	97.39	19.94	16.08	190.1	23.85	198.8	310.5
#1	.0000	.0037	.0003	.0005	-.0068	-.0001	-.0028
#2	.0001	.0028	.0002	-.0034	-.0095	.0004	.0011

010157

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0001	.0002
SDev	.0000	.0002	.0002
%RSD	95.27	141.3	83.86
#1	-.0000	.0000	.0001
#2	-.0000	.0002	.0003

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	721914	10000	--	--	--	--	--
SDev	30.40559	.0000000	--	--	--	--	--
%RSD	.0042118	.0000000	--	--	--	--	--
#1	721893	10000	--	--	--	--	--
#2	721936	10000	--	--	--	--	--

Method: DAILY2 Sample Name: lcsw-B10W4 df10 Operator:
Run Time: 02/15/05 19:22:37
Comment:
Mode: CONC Corr. Factor: 1

010158

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0099	.3856	.4161	.0391	.4222	.0104	-.0057
SDev	.0010	.0065	.0026	.0021	.0016	.0001	.0059
%RSD	10.58	1.682	.6226	5.321	.3797	.7028	103.6
#1	.0092	.3810	.4180	.0377	.4234	.0104	-.0099
#2	.0106	.3902	.4143	.0406	.4211	.0105	-.0015

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.072	.0100	.1020	.0321	.0516	.2188	1.190
SDev	.009	.0004	.0010	.0009	.0013	.0148	.011
%RSD	.4201	3.832	.9372	2.968	2.437	6.755	.9212
#1	2.066	.0097	.1013	.0314	.0507	.2084	1.182
#2	2.078	.0103	.1026	.0327	.0525	.2293	1.198

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	.0002	2.006	.1048	.0012	1.503	2.073
SDev	.0007	.0000	.004	.0003	.0016	.207	.022
%RSD	206.2	.6944	.1922	.3165	130.7	13.76	1.065
#1	-.0008	.0002	2.004	.1046	.0001	1.357	2.088
#2	.0002	.0002	2.009	.1050	.0024	1.649	2.057

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.1049	.0628	.1054	.1030	.0012	.0044	.1050
SDev	.0002	.0032	.0034	.0039	.0022	.0075	.0025
%RSD	.2234	5.116	3.238	3.819	186.6	170.4	2.375
#1	.1050	.0650	.1078	.1002	-.0004	-.0009	.1032
#2	.1047	.0605	.1030	.1058	.0027	.0097	.1067

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.88	.4342	.4310	.0047	.1038	.4321	.0544
SDev	1.44	.0050	.0036	.0027	.0015	.0041	.0014
%RSD	1.444	1.164	.8382	56.73	1.431	.9472	2.526
#1	100.9	.4306	.4284	.0028	.1028	.4292	.0553
#2	98.86	.4378	.4336	.0066	.1049	.4350	.0534

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0009	.0006	.4148	-.0038	.1024	-.0006
SDev	.0000	.0057	.0004	.0031	.0193	.0013	.0002
%RSD	18.54	646.6	66.13	.7509	514.4	1.261	30.62
#1	.0001	-.0032	.0003	.4170	-.0174	.1015	-.0005
#2	.0001	.0050	.0008	.4126	.0099	.1033	-.0008

010159

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.1042	.0098
SDev	.0002	.0009	.0011
%RSD	324.1	.8982	11.14
#1	-.0003	.1035	.0090
#2	.0001	.1048	.0106

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	719922	10000	--	--	--	--	--
SDev	10381.03	.0000000	--	--	--	--	--
%RSD	1.441966	.0000000	--	--	--	--	--
#1	727263	10000	--	--	--	--	--
#2	712582	10000	--	--	--	--	--

Method: DAILY2 Sample Name: srm-B10W7 df10 t Operator:
Run Time: 02/15/05 19:27:23
Comment:
Mode: CONC Corr. Factor: 1

010160

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	48.07	-.0049	.0027	.6421	.0018	-.0083
SDev	.0004	.03	.0044	.0005	.0012	.0000	.0053
%RSD	191.6	.0696	89.08	18.91	.1869	.0892	64.40
#1	.0005	48.10	-.0018	.0023	.6429	.0018	-.0045
#2	-.0001	48.05	-.0080	.0030	.6412	.0018	-.0120

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.890	-.0001	.0013	.0047	.0044	9.809	19.35
SDev	.003	.0000	.0003	.0008	.0003	.005	.04
%RSD	.0552	20.39	22.46	17.98	7.059	.0531	.2277
#1	4.892	-.0001	.0016	.0053	.0047	9.813	19.32
#2	4.889	-.0001	.0011	.0041	.0042	9.806	19.38

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0209	.0314	.9816	.2714	.0036	22.03	31.74
SDev	.0005	.0001	.0054	.0001	.0011	.29	.03
%RSD	2.253	.2382	.5529	.0387	29.66	1.333	.0887
#1	.0206	.0314	.9777	.2715	.0044	21.83	31.72
#2	.0213	.0315	.9854	.2714	.0028	22.24	31.76

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0024	.1691	.0188	.0066	.0014	.0178	.0032
SDev	.0002	.0083	.0011	.0059	.0040	.0001	.0014
%RSD	10.00	4.907	6.126	88.95	293.8	.2895	43.65
#1	.0025	.1750	.0179	.0108	-.0015	.0178	.0041
#2	.0022	.1633	.0196	.0025	.0042	.0178	.0022

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.7	.0023	.0012	.1213	.0107	.0016	.0528
SDev	.1	.0010	.0005	.0015	.0036	.0000	.0004
%RSD	.0815	41.77	44.90	1.225	33.21	1.307	.6905
#1	100.7	.0017	.0015	.1203	.0132	.0016	.0530
#2	100.6	.0030	.0008	.1224	.0082	.0016	.0525

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0452	.0088	.9598	.0034	-.0079	.0044	-.0047
SDev	.0001	.0021	.0001	.0001	.0225	.0006	.0010
%RSD	.1344	24.37	.0103	1.494	284.4	13.39	21.50
#1	.0452	.0103	.9597	.0034	-.0239	.0048	-.0040
#2	.0453	.0073	.9599	.0033	.0080	.0040	-.0054

010161

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0248	.0340	.2159
SDev	.0000	.0001	.0002
%RSD	.0243	.2167	.1051
#1	.0248	.0340	.2160
#2	.0248	.0339	.2157

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	725718	10000	--	--	--	--	--
SDev	543.7651	.0000000	--	--	--	--	--
%RSD	.0749278	.0000000	--	--	--	--	--
#1	726103	10000	--	--	--	--	--
#2	725334	10000	--	--	--	--	--

Method: DAILY2 Sample Name: srm-B10W8 df10 t Operator:
Run Time: 02/15/05 19:32:09
Comment:
Mode: CONC Corr. Factor: 1

010162

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	27.43	.0005	.0042	.0599	.0000	-.0057
SDev	.0008	.02	.0021	.0015	.0001	.0000	.0028
%RSD	162.2	.0686	425.2	36.00	.0975	73.55	50.38
#1	-.0001	27.41	-.0010	.0053	.0599	.0000	-.0077
#2	.0011	27.44	.0020	.0031	.0600	.0000	-.0036

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	27.10	-.0003	.0153	.0987	.0292	22.38	.3523
SDev	.03	.0004	.0001	.0006	.0001	.04	.0481
%RSD	.1284	135.2	.8934	.5537	.4627	.1885	13.65
#1	27.08	-.0005	.0152	.0983	.0291	22.35	.3183
#2	27.13	-.0000	.0154	.0991	.0293	22.41	.3863

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0021	.0020	15.70	.3992	.0007	3.908	5.966
SDev	.0009	.0001	.02	.0006	.0010	.231	.004
%RSD	45.13	5.805	.0989	.1468	152.3	5.909	.0664
#1	.0014	.0020	15.69	.3988	.0014	3.745	5.969
#2	.0028	.0021	15.71	.3997	-.0001	4.072	5.963

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0470	.2432	.0065	-.0033	-.0003	.0399	.0038
SDev	.0003	.0052	.0050	.0000	.0071	.0093	.0001
%RSD	.5632	2.126	77.24	1.183	2393.	23.34	3.062
#1	.0468	.2468	.0029	-.0034	-.0053	.0465	.0039
#2	.0472	.2395	.0100	-.0033	.0047	.0334	.0037

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.0	.0027	-.0006	.0177	-.0000	.0005	.0509
SDev	1.3	.0022	.0001	.0011	.0017	.0008	.0024
%RSD	1.269	80.61	14.01	6.115	4860.	160.1	4.800
#1	101.9	.0012	-.0007	.0170	-.0012	-.0001	.0492
#2	100.1	.0042	-.0006	.0185	.0012	.0010	.0526

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0553	-.0085	2.150	-.0007	-.0038	.0790	.0019
SDev	.0000	.0026	.002	.0035	.0262	.0005	.0022
%RSD	.0761	30.20	.0815	505.9	686.4	.5806	116.6
#1	.0554	-.0067	2.149	-.0031	-.0223	.0787	.0003
#2	.0553	-.0103	2.151	.0018	.0147	.0793	.0035

010163

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0054	.0244	.0168
SDev	.0001	.0001	.0003
%RSD	2.529	.4601	2.101
#1	.0055	.0243	.0165
#2	.0053	.0245	.0170

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	728186	10000	--	--	--	--	--
SDev	9236.228	.0000000	--	--	--	--	--
%RSD	1.268389	.0000000	--	--	--	--	--
#1	734717	10000	--	--	--	--	--
#2	721655	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 257326 df10 t Operator:
Run Time: 02/15/05 19:38:44
Comment:
Mode: CONC Corr. Factor: 1

010164

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	9.726	.0010	.0059	.1163	.0003	-.0030
SDev	.0002	.035	.0012	.0014	.0004	.0000	.0046
%RSD	38.06	.3547	129.0	23.78	.3373	1.331	154.9
#1	.0007	9.702	.0018	.0069	.1160	.0003	.0003
#2	.0004	9.751	.0001	.0049	.1165	.0003	-.0063

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	3.146	.0001	.0019	.0127	.0721	4.258	2.362
SDev	.011	.0001	.0004	.0002	.0000	.011	.017
%RSD	.3357	118.6	22.74	1.451	.0244	.2617	.7310
#1	3.154	.0002	.0016	.0126	.0721	4.266	2.350
#2	3.139	.0000	.0023	.0128	.0721	4.250	2.374

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0064	.0079	2.079	.1045	.0011	1.568	2.460
SDev	.0009	.0000	.006	.0003	.0010	.139	.030
%RSD	13.69	.4305	.3055	.3082	97.06	8.842	1.205
#1	.0070	.0079	2.084	.1047	.0003	1.666	2.439
#2	.0058	.0079	2.075	.1043	.0018	1.470	2.481

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0084	.3584	.0112	.0048	-.0004	.1438	.0035
SDev	.0000	.0159	.0000	.0006	.0021	.0010	.0039
%RSD	.4614	4.430	.0823	12.37	471.4	.7225	112.8
#1	.0084	.3696	.0112	.0052	.0010	.1445	.0063
#2	.0084	.3472	.0112	.0044	-.0019	.1431	.0007

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.4	.0024	-.0014	.0015	.0069	-.0001	.0566
SDev	1.9	.0054	.0027	.0053	.0004	.0036	.0057
%RSD	1.913	226.8	197.5	351.7	5.725	3483.	10.06
#1	99.03	.0063	.0005	-.0022	.0072	.0025	.0606
#2	101.7	-.0015	-.0033	.0052	.0067	-.0027	.0525

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0494	.0009	.6305	.0003	.0078	.0096	-.0026
SDev	.0003	.0008	.0007	.0028	.0270	.0004	.0013
%RSD	.5052	80.44	.1132	885.3	348.5	4.316	49.34
#1	.0492	.0004	.6300	-.0016	-.0114	.0093	-.0017
#2	.0496	.0015	.6310	.0023	.0269	.0099	-.0035

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Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0029	.2031	.0243
SDev	.0000	.0008	.0002
%RSD	.9937	.4066	.7339
#1	.0029	.2037	.0242
#2	.0029	.2025	.0244

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	723658	10000	--	--	--	--	--
SDev	13811.92	.0000000	--	--	--	--	--
%RSD	1.908626	.0000000	--	--	--	--	--
#1	713891	10000	--	--	--	--	--
#2	733424	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: zzzzzz Operator:
Run Time: 02/15/05 19:47:10 010166
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	-.0062	-.0016	.0019	-.0000	.0000	-.0082
SDev	.0009	.0001	.0009	.0003	.0000	.0000	.0014
%RSD	336.3	1.296	55.61	13.09	103.1	12.97	16.85
#1	-.0004	-.0063	-.0010	.0020	-.0000	.0000	-.0092
#2	.0009	-.0062	-.0022	.0017	-.0000	.0000	-.0072

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	-.0000	-.0003	.0001	-.0004	-.0079	-.0085
SDev	.0003	.0001	.0005	.0002	.0003	.0193	.0184
%RSD	32.67	972.4	178.6	290.3	72.63	245.5	216.1
#1	.0007	-.0001	-.0006	-.0001	-.0007	-.0215	-.0216
#2	.0011	.0001	.0001	.0002	-.0002	.0058	.0045

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	.0001	.0010	-.0000	.0012	.0201	.0022
SDev	.0004	.0001	.0008	.0000	.0009	.0745	.0018
%RSD	97.05	61.62	75.00	896.8	79.46	370.3	83.29
#1	-.0007	.0001	.0005	-.0000	.0019	-.0326	.0009
#2	-.0001	.0001	.0016	.0000	.0005	.0728	.0035

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0005	-.0033	.0050	-.0031	-.0008	.0122	.0023
SDev	.0013	.0007	.0001	.0008	.0024	.0062	.0021
%RSD	245.0	22.53	2.210	26.80	320.5	50.59	89.88
#1	-.0014	-.0038	.0051	-.0025	-.0025	.0078	.0038
#2	.0004	-.0028	.0050	-.0037	.0010	.0165	.0008

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.7	.0029	.0012	.0010	-.0004	.0018	.0440
SDev	.7	.0042	.0043	.0009	.0006	.0043	.0030
%RSD	.6993	145.8	364.0	93.87	158.6	241.8	6.865
#1	101.2	-.0001	-.0018	.0003	.0000	-.0012	.0462
#2	100.2	.0059	.0042	.0017	-.0008	.0048	.0419

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0016	.0002	.0016	-.0167	-.0002	.0010
SDev	.0000	.0002	.0001	.0008	.0189	.0001	.0008
%RSD	142.1	11.55	55.76	50.42	112.6	31.06	88.20
#1	-.0000	.0018	.0003	.0010	-.0301	-.0002	.0004
#2	.0000	.0015	.0001	.0021	-.0034	-.0003	.0016

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Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	-.0001	.0001
SDev	.0001	.0001	.0002
%RSD	1032.	69.22	208.4
#1	.0001	-.0001	-.0000
#2	-.0001	-.0000	.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	726004	10000	--	--	--	--	--
SDev	5073.491	.0000000	--	--	--	--	--
%RSD	.6988236	.0000000	--	--	--	--	--
#1	729592	10000	--	--	--	--	--
#2	722417	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: cri Operator:
Run Time: 02/15/05 19:51:56
Comment:
Mode: CONC Corr. Factor: 1

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Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0201	.0913	.0165	.0998	.0204	.0099	-.0039
SDev	.0008	.0083	.0044	.0009	.0001	.0000	.0030
%RSD	4.098	9.039	26.79	.8891	.3202	.2992	76.17
#1	.0207	.0972	.0133	.1004	.0204	.0099	-.0060
#2	.0195	.0855	.0196	.0991	.0205	.0099	-.0018
Errors	LC Pass	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High	.0300		.0300	.1500	.0300	.0150	
Low	.0100		.0100	.0500	.0100	.0050	

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0025	.0104	.0993	.0197	.0497	.1111	-.0069
SDev	.0001	.0001	.0005	.0003	.0005	.0042	.0067
%RSD	2.532	.7885	.4852	1.744	.9253	3.752	96.65
#1	.0025	.0104	.0996	.0200	.0494	.1140	-.0022
#2	.0024	.0103	.0989	.0195	.0501	.1081	-.0116
Errors	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High		.0150	.1500	.0300	.0750	.1500	
Low		.0050	.0500	.0100	.0250	.0500	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	.0698	.0018	.0306	.0212	-.0688	.0015
SDev	.0006	.0002	.0108	.0001	.0000	.0016	.0006
%RSD	235.0	.2965	589.5	.4678	.0288	2.341	38.65
#1	.0002	.0696	.0094	.0307	.0212	-.0677	.0011
#2	-.0007	.0699	-.0058	.0305	.0212	-.0700	.0019
Errors	NOCHECK	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK	NOCHECK
High		.1500		.0450	.0300		
Low		.0500		.0150	.0100		

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0796	.1018	.0097	.0063	-.0001	.0055	.1264
SDev	.0009	.0065	.0013	.0004	.0000	.0038	.0002
%RSD	1.081	6.355	12.97	5.836	2.394	69.44	.1807
#1	.0790	.0973	.0088	.0060	-.0001	.0082	.1262
#2	.0802	.1064	.0105	.0065	-.0001	.0028	.1265
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	.1200	.1500					.1800
Low	.0400	.0500					.0600

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

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Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.12	.0110	.0121	.1151	.0074	.0117	.1474
SDev	.29	.0014	.0009	.0024	.0007	.0001	.0035
%RSD	.2898	13.00	7.657	2.073	8.909	1.201	2.388
#1	98.92	.0120	.0114	.1168	.0070	.0116	.1498
#2	99.32	.0100	.0127	.1134	.0079	.0118	.1449
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				.1500	.0090	.0150	.1500
Low				.0500	.0030	.0050	.0500

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0207	.0005	.0199	.0168	.2046	.0997	.0003
SDev	.0001	.0001	.0001	.0032	.0200	.0007	.0002
%RSD	.2435	20.52	.4649	19.07	9.792	.6660	59.09
#1	.0207	.0006	.0200	.0191	.2187	.1002	.0002
#2	.0207	.0004	.0199	.0146	.1904	.0992	.0005
Errors	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK	LC Pass	NOCHECK
High	.0300		.0300	.0300		.1500	
Low	.0100		.0100	.0100		.0500	

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0404	.0974
SDev	.0000	.0002	.0004
%RSD	109.9	.4631	.3934
#1	-.0000	.0403	.0977
#2	-.0001	.0406	.0972
Errors	NOCHECK	LC Pass	NOCHECK
High		.0600	
Low		.0200	

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IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	714495	10000	--	--	--	--	--
SDev	2032.225	.0000000	--	--	--	--	--
%RSD	.2844281	.0000000	--	--	--	--	--
#1	713058	10000	--	--	--	--	--
#2	715932	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: icsa Operator: 010171
Run Time: 02/15/05 19:56:42
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	494.0	-.0052	-.0199	.0009	.0001	-.0047
SDev	.0003	.7	.0039	.0003	.0001	.0000	.0013
%RSD	80.28	.1480	75.34	1.664	9.599	5.534	27.79
#1	-.0001	494.5	-.0024	-.0197	.0010	.0001	-.0038
#2	-.0005	493.5	-.0080	-.0202	.0009	.0001	-.0056
Errors	NOCHECK	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High		600.0					
Low		400.0					

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	451.4	-.0001	.0001	-.0005	.0024	188.0	-.0108
SDev	.9	.0002	.0002	.0001	.0003	.2	.0177
%RSD	.2038	344.2	184.2	25.17	10.90	.0908	164.3
#1	450.7	-.0002	.0002	-.0004	.0022	187.8	-.0233
#2	452.0	.0001	-.0000	-.0006	.0025	188.1	.0017
Errors	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass	NOCHECK
High	600.0					240.0	
Low	400.0					160.0	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0015	.0004	524.1	-.0010	.0001	.2810	-.0230
SDev	.0002	.0000	.6	.0001	.0014	.1694	.0035
%RSD	16.92	10.74	.1116	9.292	2580.	60.28	15.17
#1	-.0013	.0003	523.7	-.0009	.0010	.1612	-.0255
#2	-.0016	.0004	524.5	-.0010	-.0009	.4008	-.0205
Errors	NOCHECK	NOCHECK	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High			600.0				
Low			400.0				

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	-.0176	.0424	-.0278	.0034	.0250	.0029
SDev	.0008	.0006	.0022	.0027	.0021	.0170	.0063
%RSD	67.41	3.402	5.177	9.845	60.28	68.03	220.5
#1	.0006	-.0181	.0409	-.0298	.0020	.0130	-.0016
#2	.0017	-.0172	.0440	-.0259	.0049	.0370	.0073
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

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Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	92.51	.0049	-.0112	.0249	-.0044	-.0058	.0533
SDev	.36	.0055	.0023	.0003	.0026	.0003	.0007
%RSD	.3935	112.7	20.53	1.262	58.20	5.320	1.358
#1	92.76	.0088	-.0128	.0251	-.0062	-.0056	.0527
#2	92.25	.0010	-.0095	.0247	-.0026	-.0060	.0538
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0130	.0255	-.0015	-.0077	.0044	-.0009	.0031
SDev	.0000	.0023	.0000	.0038	.0106	.0008	.0011
%RSD	.1624	9.131	1.857	48.85	242.5	92.66	34.81
#1	.0130	.0271	-.0016	-.0050	.0118	-.0014	.0024
#2	.0130	.0239	-.0015	-.0104	-.0031	-.0003	.0039
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0005	.0195	.0001
SDev	.0000	.0010	.0003
%RSD	2.936	5.019	293.5
#1	-.0005	.0188	.0004
#2	-.0005	.0202	-.0001
Errors	NOCHECK	NOCHECK	NOCHECK
High			
Low			

010173

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	666840	10000	--	--	--	--	--
SDev	2600.032	.0000000	--	--	--	--	--
%RSD	.3899037	.0000000	--	--	--	--	--
#1	668678	10000	--	--	--	--	--
#2	665001	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: icsab Operator:
Run Time: 02/15/05 20:01:28 010174
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.086	498.7	1.035	1.031	.5299	.4830	.0012
SDev	.001	.2	.000	.005	.0012	.0002	.0044
%RSD	.0467	.0469	.0023	.4685	.2291	.0348	355.0
#1	1.086	498.9	1.035	1.028	.5308	.4831	.0044
#2	1.086	498.5	1.035	1.035	.5291	.4829	-.0019
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High	1.200	600.0	1.200	1.200	.6000	.6000	
Low	.8000	400.0	.8000	.8000	.4000	.4000	

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	459.4	.9403	.4776	.4897	.5541	190.7	-.0025
SDev	.1	.0013	.0000	.0006	.0000	.1	.0041
%RSD	.0192	.1347	.0038	.1157	.0079	.0555	163.9
#1	459.5	.9412	.4776	.4901	.5542	190.6	-.0053
#2	459.4	.9394	.4776	.4893	.5541	190.8	.0004
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High	600.0	1.200	.6000	.6000	.6000	240.0	
Low	400.0	.8000	.4000	.4000	.4000	160.0	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0009	1.174	533.3	.4896	1.040	.3712	-.0312
SDev	.0007	.002	.3	.0003	.002	.0085	.0002
%RSD	75.39	.1689	.0584	.0553	.1641	2.292	.5820
#1	-.0014	1.175	533.1	.4898	1.039	.3772	-.0311
#2	-.0004	1.173	533.5	.4894	1.041	.3652	-.0314
Errors	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK
High		1.200	600.0	.6000	1.200		
Low		.8000	400.0	.4000	.8000		

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9503	1.033	1.039	.9591	.0060	.0296	1.064
SDev	.0029	.003	.017	.0002	.0011	.0030	.007
%RSD	.3022	.2847	1.626	.0181	18.44	10.12	.6684
#1	.9483	1.031	1.027	.9593	.0052	.0318	1.069
#2	.9523	1.035	1.051	.9590	.0068	.0275	1.059
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	1.200	1.200					1.200
Low	.8000	.8000					.8000

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

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Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	89.93	1.057	1.043	1.081	.9858	1.048	1.076
SDev	.41	.022	.008	.000	.0055	.002	.000
%RSD	.4544	2.123	.7754	.0138	.5596	.1993	.0067
#1	90.22	1.041	1.049	1.081	.9819	1.046	1.076
#2	89.64	1.073	1.037	1.081	.9897	1.049	1.076
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High					1.200	1.200	1.200
Low					.8000	.8000	.8000

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.069	.0248	.9885	.9957	1.015	.4952	-.0026
SDev	.002	.0031	.0001	.0037	.007	.0005	.0050
%RSD	.2054	12.56	.0149	.3768	.6870	.1024	197.2
#1	1.071	.0270	.9886	.9930	1.020	.4948	-.0061
#2	1.067	.0226	.9884	.9983	1.010	.4956	.0010
Errors	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK	LC Pass	NOCHECK
High	1.200		1.200	1.200		.6000	
Low	.8000		.8000	.8000		.4000	

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0005	.9860	.9928
SDev	.0000	.0016	.0006
%RSD	8.681	.1641	.0605
#1	-.0005	.9871	.9923
#2	-.0004	.9848	.9932
Errors	NOCHECK	LC Pass	NOCHECK
High		1.200	
Low		.8000	

010176

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	648235	10000	--	--	--	--	--
SDev	2901.966	.0000000	--	--	--	--	--
%RSD	.4476719	.0000000	--	--	--	--	--
#1	650287	10000	--	--	--	--	--
#2	646183	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccv5 Operator:
Run Time: 02/15/05 20:09:54
Comment:
Mode: CONC Corr. Factor: 1

010177

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.001	9.724	5.114	4.855	10.12	.9852	5.079
SDev	.002	.052	.006	.013	.01	.0005	.001
%RSD	.1868	.5343	.1096	.2706	.1264	.0529	.0125
#1	1.002	9.760	5.118	4.846	10.12	.9848	5.079
#2	.9993	9.687	5.110	4.865	10.11	.9856	5.080
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	1.100	11.00	5.500	5.500	11.00	1.100	5.500
Low	.9000	9.000	4.500	4.500	9.000	.9000	4.500

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	20.12	.9910	5.021	2.009	2.056	10.04	18.12
SDev	.02	.0008	.001	.002	.012	.00	.01
%RSD	.0790	.0836	.0099	.1067	.5674	.0236	.0572
#1	20.11	.9904	5.021	2.008	2.064	10.04	18.12
#2	20.13	.9916	5.021	2.011	2.047	10.04	18.11
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	22.00	1.100	5.500	2.200	2.200	11.00	22.00
Low	18.00	.9000	4.500	1.800	1.800	9.000	18.00

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.962	4.696	19.94	1.013	5.063	27.92	H40.28
SDev	.001	.015	.03	.000	.003	.27	.28
%RSD	.0160	.3209	.1394	.0258	.0676	.9627	.7039
#1	4.962	4.707	19.96	1.013	5.060	28.11	H40.49
#2	4.963	4.686	19.92	1.014	5.065	27.73	H40.08
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC High
High	5.500	5.500	22.00	1.100	5.500	33.00	33.00
Low	4.500	4.500	18.00	.9000	4.500	27.00	27.00

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.035	4.985	4.997	4.996	1.002	1.006	1.006
SDev	.007	.012	.023	.017	.002	.009	.001
%RSD	.1362	.2500	.4532	.3346	.1696	.8852	.0586
#1	5.039	4.976	4.981	4.984	1.001	.9996	1.006
#2	5.030	4.993	5.013	5.008	1.003	1.012	1.006
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	5.500	5.500			1.100	1.100	1.100
Low	4.500	4.500			.9000	.9000	.9000

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010178

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.60	5.236	5.259	5.170	4.996	5.251	5.102
SDev	.94	.035	.045	.024	.019	.042	.002
%RSD	.9593	.6614	.8558	.4618	.3741	.7912	.0470
#1	98.26	5.212	5.227	5.186	4.983	5.222	5.104
#2	96.94	5.261	5.291	5.153	5.009	5.281	5.100
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				5.500	5.500	5.500	5.500
Low				4.500	4.500	4.500	4.500

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.069	.9749	4.966	5.212	1.008	4.977	1.071
SDev	.001	.0016	.001	.024	.000	.005	.010
%RSD	.0163	.1647	.0144	.4521	.0318	.1018	.9428
#1	5.068	.9737	4.966	5.229	1.008	4.981	1.064
#2	5.069	.9760	4.965	5.195	1.008	4.974	1.078
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500	5.500	1.100	5.500	1.100
Low	4.500	.9000	4.500	4.500	.9000	4.500	.9000

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	4.823	1.026	4.916
SDev	.007	.002	.000
%RSD	.1432	.2025	.0080
#1	4.828	1.024	4.916
#2	4.818	1.027	4.916
Errors	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500
Low	4.500	.9000	4.500

010179

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	703534	10000	--	--	--	--	--
SDev	6752.163	.0000000	--	--	--	--	--
%RSD	.9597500	.0000000	--	--	--	--	--
#1	708308	10000	--	--	--	--	--
#2	698759	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccb5 Operator:
Run Time: 02/15/05 20:18:20 010180
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	-.0068	-.0042	.0088	.0001	.0000	-.0017
SDev	.0007	.0037	.0027	.0014	.0000	.0000	.0065
%RSD	164.0	54.82	64.57	15.60	.7708	139.5	380.7
#1	-.0009	-.0095	-.0023	.0097	.0001	.0000	-.0063
#2	.0001	-.0042	L-.0061	.0078	.0001	.0000	.0029
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0500	.0050	.0500	.0050	.0050	.0100
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0100

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	-.0003	.0000	-.0002	.0000	-.0115	-.0156
SDev	.0008	.0001	.0004	.0006	.0002	.0130	.0134
%RSD	85.45	25.45	2907.	303.9	105700.	113.3	86.03
#1	.0003	-.0002	-.0003	.0002	-.0001	-.0207	-.0251
#2	.0014	-.0003	.0003	-.0007	.0001	-.0023	-.0061
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	.0001	-.0004	.0001	.0009	L-.1837	.0100
SDev	.0010	.0000	.0003	.0001	.0010	.0528	.0039
%RSD	272.9	10.25	72.45	124.5	116.4	28.75	39.38
#1	-.0011	.0001	-.0006	.0001	.0016	L-.2211	.0072
#2	.0004	.0001	-.0002	.0000	.0002	L-.1464	.0128
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Low	LC Pass
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0007	-.0039	.0023	.0004	-.0017	-.0075	.0005
SDev	.0017	.0007	.0013	.0004	.0041	.0066	.0014
%RSD	241.7	17.68	55.18	92.42	242.0	87.69	284.2
#1	.0005	-.0034	.0031	.0007	-.0045	L-.0122	.0015
#2	-.0019	-.0044	.0014	.0001	.0012	-.0029	-.0005
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	.0050	.0100			.0050	.0100	.0100
Low	-.0050	-.0100			-.0050	-.0100	-.0100

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010181

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	102.5	-.0003	.0002	.0011	.0011	.0000	H.0362
SDev	.3	.0008	.0017	.0019	.0007	.0009	.0038
%RSD	.2886	292.0	1118.	163.9	64.10	3482.	10.57
#1	102.7	.0003	-.0010	-.0002	.0015	-.0006	H.0389
#2	102.3	-.0008	.0013	.0025	.0006	.0006	H.0335
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC High
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0025	.0001	.0015	-.0186	-.0002	-.0016
SDev	.0000	.0040	.0000	.0005	.0371	.0004	.0009
%RSD	237.6	164.1	16.80	30.93	199.8	185.4	52.36
#1	-.0000	.0053	.0001	.0018	-.0448	-.0005	-.0022
#2	.0000	-.0004	.0001	.0012	.0077	.0001	-.0010
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	-.0001	.0000
SDev	.0000	.0003	.0003
%RSD	86.80	426.0	716.3
#1	-.0000	-.0003	-.0002
#2	-.0000	.0001	.0003
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010182

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	738882	10000	--	--	--	--	--
SDev	2192.031	.0000000	--	--	--	--	--
%RSD	.2966686	.0000000	--	--	--	--	--
#1	740432	10000	--	--	--	--	--
#2	737332	10000	--	--	--	--	--

Method: DAILY2 Sample Name: pbw-B10W6 Operator:
Run Time: 02/15/05 20:23:06
Comment:
Mode: CONC Corr. Factor: 1

010183

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	.0206	-.0024	.2405	.0009	.0000	.0005
SDev	.0010	.0064	.0019	.0008	.0000	.0000	.0029
%RSD	67.90	31.26	81.73	.3385	.5211	619.0	587.2
#1	.0022	.0252	-.0010	.2411	.0009	.0000	.0026
#2	.0008	.0160	-.0037	.2400	.0010	-.0000	-.0016

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0667	.0001	.0009	.0087	.0043	.0570	.0771
SDev	.0015	.0001	.0000	.0003	.0005	.0202	.0234
%RSD	2.313	167.5	.6736	3.896	11.04	35.44	30.37
#1	.0678	.0001	.0008	.0090	.0039	.0713	.0937
#2	.0656	-.0000	.0009	.0085	.0046	.0427	.0605

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0013	.0006	.0160	.0006	.0014	.4028	.0781
SDev	.0005	.0001	.0025	.0000	.0002	.2773	.0107
%RSD	37.04	17.82	15.53	5.485	14.87	68.84	13.67
#1	.0016	.0006	.0177	.0005	.0016	.5989	.0857
#2	.0009	.0005	.0142	.0006	.0013	.2067	.0706

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0035	.5312	-.0006	-.0019	.0047	.0555	.0050
SDev	.0011	.0004	.0023	.0039	.0058	.0067	.0009
%RSD	32.44	.0779	369.5	207.3	123.5	12.06	18.12
#1	.0027	.5315	.0010	-.0046	.0088	.0602	.0044
#2	.0043	.5309	-.0023	.0009	.0006	.0508	.0057

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.1	.0049	.0003	.0794	-.0014	.0019	.0968
SDev	.5	.0002	.0023	.0059	.0018	.0015	.0026
%RSD	.5172	4.777	760.2	7.410	125.1	78.94	2.654
#1	100.4	.0051	-.0013	.0752	-.0027	.0008	.0950
#2	99.71	.0048	.0019	.0836	-.0002	.0029	.0987

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	-.0016	.0012	.0043	.0245	-.0000	-.0033
SDev	.0000	.0013	.0002	.0023	.0213	.0007	.0011
%RSD	8.271	77.04	14.75	54.77	86.76	1350.	34.15
#1	.0004	-.0025	.0011	.0059	.0396	.0004	-.0025
#2	.0004	-.0007	.0014	.0026	.0095	-.0005	-.0041

010184

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0021	.0010
SDev	.0000	.0001	.0000
%RSD	21.78	4.141	.6682
#1	-.0001	.0022	.0010
#2	-.0001	.0021	.0010

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	721420	10000	--	--	--	--	--
SDev	3669.884	.0000000	--	--	--	--	--
%RSD	.5087029	.0000000	--	--	--	--	--
#1	724015	10000	--	--	--	--	--
#2	718825	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: lcsw-B10W4 Operator:
Run Time: 02/15/05 20:27:52
Comment:
Mode: CONC Corr. Factor: 1

010185

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.1038	4.016	4.193	.3515	4.173	.1077	-.0110
SDev	.0001	.008	.013	.0018	.012	.0001	.0059
%RSD	.1037	.2006	.3194	.5049	.2850	.0938	54.22
#1	.1039	4.010	4.202	.3502	4.165	.1077	-.0152
#2	.1037	4.022	4.183	.3527	4.182	.1078	-.0068

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	20.33	.1028	1.003	.3029	.5250	2.143	13.80
SDev	.02	.0000	.001	.0010	.0009	.006	.02
%RSD	.0825	.0379	.1010	.3433	.1795	.2745	.1105
#1	20.31	.1028	1.004	.3021	.5243	2.138	13.81
#2	20.34	.1027	1.002	.3036	.5256	2.147	13.79

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	.0007	20.01	1.027	.0005	17.75	25.87
SDev	.0001	.0000	.04	.002	.0002	.05	.05
%RSD	25.01	4.382	.1815	.1552	38.74	.2941	.1990
#1	.0002	.0007	19.98	1.025	.0004	17.71	25.83
#2	.0002	.0008	20.03	1.028	.0006	17.79	25.90

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.020	.5201	1.037	1.037	.0021	.0498	1.049
SDev	.004	.0071	.001	.001	.0009	.0086	.006
%RSD	.3494	1.371	.1403	.0716	40.63	17.20	.5808
#1	1.023	.5252	1.036	1.036	.0027	.0559	1.044
#2	1.018	.5151	1.038	1.038	.0015	.0438	1.053

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.17	4.441	4.441	.0425	1.037	4.441	.0878
SDev	1.12	.005	.022	.0002	.001	.013	.0012
%RSD	1.143	.1037	.5010	.4461	.0946	.2993	1.345
#1	97.37	4.437	4.456	.0424	1.036	4.450	.0870
#2	98.96	4.444	4.425	.0426	1.038	4.431	.0887

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	-.0155	.0042	4.198	-.0061	1.010	.0012
SDev	.0000	.0002	.0001	.006	.0283	.000	.0010
%RSD	2.177	1.157	1.914	.1436	466.5	.0272	81.82
#1	.0009	-.0154	.0041	4.194	-.0261	1.010	.0005
#2	.0010	-.0157	.0043	4.203	.0139	1.010	.0018

010186

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	1.030	.0946
SDev	.0001	.001	.0004
%RSD	108.3	.0895	.4154
#1	-.0002	1.030	.0943
#2	-.0000	1.031	.0949

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	707625	10000	--	--	--	--	--
SDev	8032.733	.0000000	--	--	--	--	--
%RSD	1.135168	.0000000	--	--	--	--	--
#1	701945	10000	--	--	--	--	--
#2	713305	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: srm-B10W7 t Operator:
Run Time: 02/15/05 20:32:38
Comment:
Mode: CONC Corr. Factor: 1

010187

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0038	482.9	.0014	.0053	6.258	.0173	.0017
SDev	.0003	.3	.0020	.0000	.007	.0001	.0017
%RSD	8.195	.0614	140.5	.2349	.1062	.6281	98.53
#1	.0041	483.1	.0000	.0053	6.253	.0172	.0029
#2	.0036	482.7	.0028	.0053	6.262	.0174	.0005

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	47.72	-.0005	.0097	.0448	.0441	95.44	221.7
SDev	.02	.0002	.0001	.0002	.0003	.01	.1
%RSD	.0464	31.67	1.382	.5243	.7827	.0087	.0449
#1	47.71	-.0006	.0098	.0446	.0439	95.43	221.8
#2	47.74	-.0004	.0096	.0450	.0443	95.45	221.6

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.2045	.4123	9.604	2.631	.0289	296.4	S151.8
SDev	.0010	.0006	.010	.001	.0006	.1	.9
%RSD	.4831	.1411	.1005	.0357	2.121	.0427	.5837
#1	.2052	.4119	9.597	2.631	.0285	296.5	S152.4
#2	.2038	.4128	9.611	2.630	.0293	296.3	S151.2

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0250	1.675	.1803	.0755	.0104	.2075	.0087
SDev	.0008	.011	.0050	.0032	.0042	.0008	.0144
%RSD	3.090	.6386	2.789	4.286	40.41	.3624	165.4
#1	.0255	1.683	.1768	.0732	.0134	.2070	-.0015
#2	.0244	1.668	.1839	.0778	.0075	.2080	.0189

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	96.27	.0059	-.0056	1.578	.1104	-.0017	.1149
SDev	.43	.0069	.0027	.021	.0038	.0005	.0097
%RSD	.4516	115.3	48.72	1.302	3.477	28.25	8.418
#1	95.96	.0108	-.0075	1.593	.1077	-.0014	.1081
#2	96.57	.0011	-.0036	1.564	.1132	-.0020	.1217

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4411	.0848	9.661	.0088	-.0105	.0440	.0110
SDev	.0001	.0031	.010	.0037	.0422	.0003	.0053
%RSD	.0180	3.598	.1034	41.95	401.1	.8045	48.38
#1	.4411	.0826	9.654	.0114	.0193	.0442	.0148
#2	.4412	.0869	9.668	.0062	-.0403	.0437	.0073

010188

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.2424	.3332	2.122
SDev	.0000	.0009	.004
%RSD	.0026	.2644	.1893
#1	.2424	.3326	2.125
#2	.2424	.3338	2.119

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	693953	10000	--	--	--	--	--
SDev	3131.069	.0000000	--	--	--	--	--
%RSD	.4511932	.0000000	--	--	--	--	--
#1	691739	10000	--	--	--	--	--
#2	696167	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: srm-B10W8 t Operator:
Run Time: 02/15/05 20:37:23
Comment:
Mode: CONC Corr. Factor: 1

010189

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	278.9	.0078	.0163	.5896	.0006	-.0066
SDev	.0009	.3	.0019	.0014	.0023	.0000	.0085
%RSD	1300.	.0963	25.01	8.553	.3915	5.959	129.7
#1	.0005	278.7	.0064	.0153	.5880	.0006	-.0005
#2	-.0007	279.0	.0091	.0173	.5912	.0005	-.0126

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	248.1	.0002	.1410	.9295	.3064	208.9	4.626
SDev	.8	.0003	.0017	.0017	.0007	.1	.004
%RSD	.3278	122.0	1.185	.1824	.2424	.0278	.0773
#1	247.6	.0004	.1399	.9283	.3058	208.9	4.628
#2	248.7	.0000	.1422	.9307	.3069	209.0	4.623

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0156	.0256	157.0	3.759	.0005	50.73	76.55
SDev	.0005	.0000	.3	.005	.0004	.27	.04
%RSD	3.260	.1425	.1668	.1436	96.44	.5376	.0502
#1	.0160	.0256	156.8	3.755	.0008	50.93	76.57
#2	.0153	.0255	157.1	3.763	.0001	50.54	76.52

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4618	2.423	.0294	-.0111	.0091	.3581	.0090
SDev	.0008	.011	.0027	.0004	.0020	.0071	.0055
%RSD	.1693	.4348	9.055	3.743	22.10	1.982	60.91
#1	.4612	2.430	.0313	-.0109	.0105	.3631	.0128
#2	.4623	2.416	.0275	-.0114	.0077	.3531	.0051

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.05	.0071	-.0050	.1614	.0024	-.0010	.0869
SDev	.60	.0069	.0014	.0003	.0012	.0013	.0034
%RSD	.6170	96.29	28.39	.2094	48.71	140.0	3.948
#1	98.48	.0023	-.0040	.1611	.0032	-.0019	.0845
#2	97.62	.0120	-.0060	.1616	.0016	-.0000	.0893

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.5379	-.0186	21.79	-.0007	.0165	.7570	-.0025
SDev	.0004	.0023	.01	.0030	.0030	.0008	.0002
%RSD	.0730	12.44	.0561	423.3	18.45	.1021	6.324
#1	.5376	-.0202	21.79	.0014	.0186	.7575	-.0026
#2	.5382	-.0170	21.78	-.0028	.0143	.7564	-.0024

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Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0547	.2240	.1626
SDev	.0003	.0010	.0008
%RSD	.6384	.4338	.4874
#1	.0545	.2233	.1620
#2	.0549	.2247	.1632

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	706799	10000	--	--	--	--	--
SDev	4338.807	.0000000	--	--	--	--	--
%RSD	.6138672	.0000000	--	--	--	--	--
#1	709867	10000	--	--	--	--	--
#2	703731	10000	--	--	--	--	--

Method: DAILY2 Sample Name: 257326 t Operator: 010191
Run Time: 02/15/05 20:43:59
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0014	99.00	.0209	.0304	1.155	.0030	-.0066
SDev	.0004	.10	.0015	.0004	.004	.0000	.0063
%RSD	28.22	.0994	7.338	1.186	.3134	1.306	96.45
#1	.0016	99.07	.0220	.0302	1.158	.0030	-.0021
#2	.0011	98.93	.0199	.0307	1.152	.0031	-.0110

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	30.59	.0016	.0164	.1264	.4442	41.24	28.44
SDev	.12	.0000	.0002	.0010	.0010	.06	.19
%RSD	.3855	1.501	1.200	.7810	.2349	.1350	.6516
#1	30.51	.0016	.0165	.1257	.4450	41.20	28.58
#2	30.67	.0016	.0162	.1271	.4435	41.28	28.31

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0601	.1026	20.71	1.018	.0045	21.65	32.00
SDev	.0004	.0003	.05	.002	.0006	.46	.05
%RSD	.7108	.3178	.2440	.1970	12.68	2.102	.1533
#1	.0604	.1029	20.68	1.016	.0049	21.97	32.03
#2	.0598	.1024	20.75	1.019	.0041	21.33	31.96

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0731	3.575	.0982	.0751	.0063	1.251	.0147
SDev	.0013	.001	.0002	.0025	.0029	.010	.0062
%RSD	1.718	.0308	.1929	3.305	45.71	.8266	42.38
#1	.0722	3.576	.0983	.0768	.0084	1.243	.0103
#2	.0739	3.574	.0980	.0733	.0043	1.258	.0191

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.4	.0074	-.0041	.0390	.0828	-.0002	.0832
SDev	.0	.0094	.0008	.0018	.0017	.0026	.0014
%RSD	.0386	126.9	19.02	4.680	2.073	1051.	1.623
#1	101.4	.0140	-.0046	.0403	.0840	.0016	.0823
#2	101.4	.0008	-.0035	.0377	.0816	-.0021	.0842

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4874	.0095	6.304	.0059	.0030	.0933	.0028
SDev	.0009	.0036	.004	.0024	.0096	.0011	.0014
%RSD	.1884	37.78	.0689	41.37	317.5	1.156	49.43
#1	.4880	.0070	6.301	.0076	.0098	.0926	.0037
#2	.4867	.0121	6.307	.0042	-.0038	.0941	.0018

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Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0282	1.951	.2366
SDev	.0001	.009	.0003
%RSD	.1767	.4392	.1222
#1	.0282	1.945	.2364
#2	.0282	1.957	.2368

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	730990	10000	--	--	--	--	--
SDev	270.8219	.0000000	--	--	--	--	--
%RSD	.0370487	.0000000	--	--	--	--	--
#1	731181	10000	--	--	--	--	--
#2	730798	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: zzzzzz Operator:
Run Time: 02/15/05 20:52:25 010193
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	-.0016	-.0019	.0011	.0000	-.0000	-.0060
SDev	.0004	.0028	.0025	.0007	.0001	.0000	.0040
%RSD	242.7	172.6	129.0	63.18	612.6	5.406	67.25
#1	-.0001	-.0035	-.0002	.0017	.0001	-.0000	-.0089
#2	.0004	.0004	-.0037	.0006	-.0001	-.0000	-.0031

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0020	.0000	.0004	.0004	-.0001	-.0031	-.0129
SDev	.0009	.0002	.0002	.0010	.0006	.0054	.0222
%RSD	45.45	542.5	62.15	251.4	441.1	174.6	171.7
#1	.0014	-.0001	.0002	.0011	.0003	-.0069	-.0287
#2	.0027	.0002	.0006	-.0003	-.0005	.0007	.0028

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.0002	.0005	.0000	.0011	-.1622	.0141
SDev	.0011	.0001	.0102	.0001	.0001	.1514	.0070
%RSD	958.8	46.37	2127.	676.4	13.29	93.33	49.31
#1	-.0009	.0001	-.0067	.0000	.0010	-.2693	.0092
#2	.0007	.0002	.0077	-.0000	.0012	-.0552	.0190

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0019	-.0015	-.0018	-.0021	-.0019	.0176	.0036
SDev	.0024	.0021	.0007	.0005	.0032	.0010	.0021
%RSD	130.0	135.1	36.53	25.27	166.2	5.606	59.54
#1	-.0002	-.0030	-.0023	-.0017	-.0042	.0169	.0021
#2	-.0036	-.0001	-.0013	-.0025	.0003	.0183	.0051

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	103.2	.0026	.0005	-.0021	-.0020	.0012	.0378
SDev	.2	.0012	.0069	.0030	.0001	.0042	.0023
%RSD	.1614	47.74	1423.	143.7	6.767	349.4	6.191
#1	103.3	.0017	.0054	-.0042	-.0019	.0042	.0394
#2	103.1	.0035	-.0044	.0000	-.0021	-.0018	.0361

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0002	.0001	.0017	.0005	-.0003	-.0015
SDev	.0000	.0031	.0001	.0017	.0116	.0007	.0019
%RSD	139.0	1979.	111.6	104.2	2364.	212.3	129.4
#1	-.0000	.0024	.0002	.0029	-.0077	.0002	-.0001
#2	-.0000	-.0021	.0000	.0004	.0087	-.0008	-.0029

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Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	-.0001	.0001
SDev	.0000	.0001	.0007
%RSD	14.00	84.92	998.5
#1	-.0001	-.0002	.0006
#2	-.0001	-.0000	-.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	743882	10000	--	--	--	--	--
SDev	1236.023	.0000000	--	--	--	--	--
%RSD	.1661584	.0000000	--	--	--	--	--
#1	744756	10000	--	--	--	--	--
#2	743008	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: cri Operator:
Run Time: 02/15/05 20:57:11
Comment:
Mode: CONC Corr. Factor: 1

010195

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0207	.0880	.0184	.1013	.0208	.0098	-.0055
SDev	.0014	.0002	.0022	.0018	.0000	.0000	.0020
%RSD	6.701	.2086	11.97	1.811	.0900	.2043	37.06
#1	.0197	.0879	.0168	.1026	.0208	.0097	-.0070
#2	.0217	.0881	.0199	.1000	.0208	.0098	-.0041
Errors	LC Pass	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High	.0300		.0300	.1500	.0300	.0150	
Low	.0100		.0100	.0500	.0100	.0050	

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0016	.0100	.0984	.0209	.0498	.0907	-.0124
SDev	.0014	.0004	.0000	.0008	.0004	.0237	.0148
%RSD	82.92	3.667	.0315	3.988	.7242	26.07	119.4
#1	.0007	.0098	.0984	.0215	.0501	.0740	-.0228
#2	.0026	.0103	.0984	.0204	.0496	.1074	-.0019
Errors	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High		.0150	.1500	.0300	.0750	.1500	
Low		.0050	.0500	.0100	.0250	.0500	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0702	.0016	.0304	.0211	-.0326	.0143
SDev	.0009	.0008	.0054	.0003	.0007	.1678	.0147
%RSD	2369.	1.086	341.1	.8220	3.519	514.8	102.6
#1	-.0007	.0696	-.0022	.0306	.0206	-.1512	.0039
#2	.0006	.0707	.0054	.0302	.0217	.0860	.0247
Errors	NOCHECK	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK	NOCHECK
High		.1500		.0450	.0300		
Low		.0500		.0150	.0100		

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0810	.1064	.0108	.0046	-.0005	.0012	.1231
SDev	.0005	.0061	.0010	.0005	.0022	.0013	.0027
%RSD	.5720	5.723	8.967	10.08	468.2	107.8	2.182
#1	.0813	.1107	.0101	.0043	-.0020	.0003	.1250
#2	.0807	.1021	.0115	.0049	.0011	.0021	.1212
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	.1200	.1500					.1800
Low	.0400	.0500					.0600

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010196

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	103.0	.0130	.0088	.1138	.0067	.0102	.1363
SDev	2.0	.0041	.0006	.0026	.0006	.0010	.0055
%RSD	1.969	31.96	6.342	2.262	9.445	9.932	4.021
#1	101.6	.0100	.0091	.1120	.0063	.0095	.1402
#2	104.5	.0159	.0084	.1157	.0071	.0109	.1324
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				.1500	.0090	.0150	.1500
Low				.0500	.0030	.0050	.0500

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0208	.0050	.0201	.0222	.1727	.1000	-.0017
SDev	.0001	.0012	.0003	.0024	.0277	.0005	.0026
%RSD	.7364	24.41	1.358	10.56	16.04	.5331	147.2
#1	.0207	.0058	.0203	.0206	.1531	.1004	-.0035
#2	.0209	.0041	.0199	.0239	.1923	.0997	.0001
Errors	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK	LC Pass	NOCHECK
High	.0300		.0300	.0300		.1500	
Low	.0100		.0100	.0100		.0500	

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0397	.0967
SDev	.0002	.0001	.0001
%RSD	1046.	.2626	.0615
#1	.0001	.0397	.0967
#2	-.0001	.0396	.0968
Errors	NOCHECK	LC Pass	NOCHECK
High		.0600	
Low		.0200	

010197

IntStd	1	2	3	4	5	6	
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	742850	10000	--	--	--	--	--
SDev	14622.97	.0000000	--	--	--	--	--
%RSD	1.968495	.0000000	--	--	--	--	--
#1	732510	10000	--	--	--	--	--
#2	753190	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: icsa Operator:
Run Time: 02/15/05 21:02:03
Comment:
Mode: CONC Corr. Factor: 1

010198

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	493.4	-.0008	-.0211	.0011	-.0000	-.0045
SDev	.0002	1.0	.0035	.0025	.0001	.0000	.0090
%RSD	296.0	.2053	418.8	11.75	7.526	4.609	197.1
#1	.0001	494.1	.0016	-.0229	.0010	-.0000	.0018
#2	-.0002	492.7	-.0033	-.0194	.0011	-.0000	-.0109
Errors	NOCHECK	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High		600.0					
Low		400.0					

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	450.5	-.0004	.0003	-.0003	.0013	187.4	-.0163
SDev	.1	.0001	.0007	.0001	.0004	.2	.0045
%RSD	.0196	18.13	219.8	24.85	30.39	.1319	27.68
#1	450.6	-.0003	.0008	-.0004	.0010	187.6	-.0131
#2	450.5	-.0004	-.0002	-.0003	.0016	187.2	-.0195
Errors	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass	NOCHECK
High	600.0					240.0	
Low	400.0					160.0	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0026	.0004	524.6	-.0011	-.0003	.3015	-.0253
SDev	.0005	.0000	.8	.0001	.0007	.0251	.0003
%RSD	17.29	6.741	.1500	12.87	247.2	8.326	1.170
#1	-.0029	.0004	525.1	-.0010	.0002	.3193	-.0255
#2	-.0023	.0004	524.0	-.0012	-.0008	.2838	-.0251
Errors	NOCHECK	NOCHECK	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High			600.0				
Low			400.0				

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	-.0214	.0423	-.0306	.0025	.0129	.0113
SDev	.0005	.0189	.0011	.0067	.0000	.0070	.0143
%RSD	45.52	88.30	2.670	21.93	.7692	54.15	126.8
#1	.0008	-.0347	.0431	-.0258	.0025	.0079	.0214
#2	.0015	-.0080	.0415	-.0353	.0025	.0178	.0012
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010199

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	92.54	.0050	-.0053	.0241	-.0063	-.0018	.0534
SDev	.15	.0003	.0053	.0003	.0048	.0035	.0007
%RSD	.1610	6.331	101.7	1.412	77.28	190.7	1.389
#1	92.65	.0048	-.0015	.0239	-.0028	.0006	.0529
#2	92.43	.0053	-.0090	.0244	-.0097	-.0043	.0540
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0130	.0244	-.0015	-.0047	-.0016	.0007	-.0063
SDev	.0000	.0032	.0002	.0074	.0028	.0006	.0001
%RSD	.1305	13.23	10.37	159.5	181.5	92.42	1.051
#1	.0130	.0221	-.0016	-.0099	-.0036	.0002	-.0064
#2	.0130	.0267	-.0014	.0006	.0004	.0011	-.0063
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0005	.0199	-.0003
SDev	.0001	.0004	.0006
%RSD	29.38	1.806	159.7
#1	-.0006	.0196	-.0007
#2	-.0004	.0202	.0000
Errors	NOCHECK	NOCHECK	NOCHECK
High			
Low			

010200

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	667088	10000	--	--	--	--	--
SDev	1102.380	.0000000	--	--	--	--	--
%RSD	.1652526	.0000000	--	--	--	--	--
#1	667867	10000	--	--	--	--	--
#2	666308	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: icsab Operator:
Run Time: 02/15/05 21:06:55 010201
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.086	498.8	1.043	1.029	.5359	.4806	-.0027
SDev	.002	.7	.005	.004	.0011	.0002	.0054
%RSD	.1993	.1371	.4878	.3957	.2058	.0324	202.9
#1	1.087	499.3	1.039	1.026	.5367	.4805	.0012
#2	1.084	498.3	1.047	1.032	.5351	.4807	-.0065
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High	1.200	600.0	1.200	1.200	.6000	.6000	
Low	.8000	400.0	.8000	.8000	.4000	.4000	

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	454.3	.9360	.4761	.4831	.5535	189.4	-.0145
SDev	.2	.0016	.0004	.0009	.0018	.1	.0202
%RSD	.0527	.1736	.0836	.1863	.3283	.0330	138.8
#1	454.5	.9349	.4758	.4825	.5522	189.5	-.0288
#2	454.2	.9372	.4763	.4837	.5548	189.4	-.0003
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High	600.0	1.200	.6000	.6000	.6000	240.0	
Low	400.0	.8000	.4000	.4000	.4000	160.0	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0021	1.177	531.1	.4869	1.032	.2691	-.0218
SDev	.0004	.002	.3	.0006	.003	.1180	.0044
%RSD	17.40	.1668	.0492	.1131	.3205	43.85	20.26
#1	-.0018	1.179	530.9	.4865	1.030	.1856	-.0249
#2	-.0023	1.176	531.2	.4873	1.034	.3525	-.0186
Errors	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK
High		1.200	600.0	.6000	1.200		
Low		.8000	400.0	.4000	.8000		

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9495	1.001	1.031	.9456	.0045	.0250	1.061
SDev	.0032	.001	.001	.0091	.0003	.0129	.001
%RSD	.3359	.1289	.1298	.9637	7.440	51.77	.1340
#1	.9473	1.002	1.031	.9392	.0043	.0342	1.060
#2	.9518	1.000	1.030	.9521	.0048	.0159	1.062
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	1.200	1.200					1.200
Low	.8000	.8000					.8000

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010202

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	92.28	1.050	1.030	1.076	.9739	1.036	1.064
SDev	.22	.010	.007	.007	.0056	.001	.000
%RSD	.2358	.9972	.7131	.6272	.5780	.1357	.0154
#1	92.12	1.057	1.024	1.081	.9700	1.035	1.064
#2	92.43	1.042	1.035	1.071	.9779	1.037	1.065
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High					1.200	1.200	1.200
Low					.8000	.8000	.8000

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.068	.0229	.9869	.9885	.9892	.4968	-.0025
SDev	.002	.0117	.0008	.0020	.0015	.0007	.0000
%RSD	.1804	51.11	.0840	.2015	.1512	.1497	1.173
#1	1.069	.0146	.9863	.9871	.9881	.4962	-.0025
#2	1.066	.0312	.9875	.9899	.9902	.4973	-.0024
Errors	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK	LC Pass	NOCHECK
High	1.200		1.200	1.200		.6000	
Low	.8000		.8000	.8000		.4000	

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0006	.9741	.9788
SDev	.0001	.0007	.0022
%RSD	19.34	.0750	.2233
#1	-.0006	.9736	.9803
#2	-.0005	.9746	.9772
Errors	NOCHECK	LC Pass	NOCHECK
High		1.200	
Low		.8000	

010203

IntStd	1	2	3	4	5	6	
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	665188	10000	--	--	--	--	--
SDev	1568.363	.0000000	--	--	--	--	--
%RSD	.2357774	.0000000	--	--	--	--	--
#1	664079	10000	--	--	--	--	--
#2	666297	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccv6 Operator:
Run Time: 02/15/05 21:15:24
Comment:
Mode: CONC Corr. Factor: 1

010204

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.002	9.729	5.126	4.858	10.24	.9834	5.062
SDev	.002	.024	.005	.013	.01	.0001	.009
%RSD	.1562	.2437	.1038	.2580	.1026	.0080	.1873
#1	1.001	9.746	5.129	4.849	10.24	.9834	5.068
#2	1.003	9.712	5.122	4.867	10.25	.9835	5.055
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	1.100	11.00	5.500	5.500	11.00	1.100	5.500
Low	.9000	9.000	4.500	4.500	9.000	.9000	4.500

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.98	.9911	5.006	2.002	2.063	10.04	18.15
SDev	.04	.0022	.000	.000	.004	.01	.00
%RSD	.1831	.2255	.0096	.0129	.1820	.1056	.0085
#1	19.95	.9927	5.006	2.002	2.066	10.03	18.15
#2	20.00	.9895	5.005	2.002	2.061	10.04	18.14
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	22.00	1.100	5.500	2.200	2.200	11.00	22.00
Low	18.00	.9000	4.500	1.800	1.800	9.000	18.00

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.982	4.717	19.86	1.011	5.048	28.07	H40.29
SDev	.008	.003	.01	.000	.008	.10	.04
%RSD	.1622	.0563	.0733	.0200	.1616	.3516	.0917
#1	4.977	4.719	19.85	1.011	5.042	28.00	H40.31
#2	4.988	4.715	19.87	1.011	5.054	28.14	H40.26
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC High
High	5.500	5.500	22.00	1.100	5.500	33.00	33.00
Low	4.500	4.500	18.00	.9000	4.500	27.00	27.00

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.040	5.009	4.960	4.958	.9999	1.003	.9987
SDev	.009	.023	.034	.018	.0039	.000	.0009
%RSD	.1865	.4628	.6786	.3623	.3941	.0416	.0943
#1	5.034	4.993	4.936	4.946	.9971	1.003	.9980
#2	5.047	5.026	4.984	4.971	1.003	1.002	.9993
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	5.500	5.500			1.100	1.100	1.100
Low	4.500	4.500			.9000	.9000	.9000

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010205

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.3	5.224	5.241	5.164	4.959	5.235	5.064
SDev	.8	.040	.032	.004	.023	.035	.002
%RSD	.7657	.7643	.6068	.0718	.4679	.6591	.0368
#1	100.9	5.196	5.218	5.167	4.942	5.211	5.065
#2	99.78	5.252	5.263	5.162	4.975	5.260	5.062
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				5.500	5.500	5.500	5.500
Low				4.500	4.500	4.500	4.500

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.086	.9747	4.964	5.203	.9987	4.989	1.072
SDev	.006	.0003	.005	.002	.0006	.004	.004
%RSD	.1122	.0334	.1075	.0326	.0561	.0849	.4010
#1	5.090	.9745	4.960	5.202	.9983	4.986	1.069
#2	5.082	.9749	4.968	5.205	.9991	4.992	1.075
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500	5.500	1.100	5.500	1.100
Low	4.500	.9000	4.500	4.500	.9000	4.500	.9000

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	4.839	1.017	4.881
SDev	.002	.001	.005
%RSD	.0325	.1340	.0962
#1	4.840	1.016	4.878
#2	4.838	1.018	4.884
Errors	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500
Low	4.500	.9000	4.500

010206

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	723114	10000	--	--	--	--	--
SDev	5520.383	.0000000	--	--	--	--	--
%RSD	.7634175	.0000000	--	--	--	--	--
#1	727018	10000	--	--	--	--	--
#2	719211	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccb6 Operator:
Run Time: 02/15/05 21:23:50
Comment:
Mode: CONC Corr. Factor: 1

010207

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	-.0003	-.0003	.0082	.0000	-.0000	-.0079
SDev	.0001	.0023	.0021	.0025	.0000	.0000	.0027
%RSD	28.68	650.3	681.3	30.86	103.2	6.364	34.41
#1	.0002	.0013	-.0018	.0100	.0000	-.0000	-.0060
#2	.0002	-.0020	.0012	.0064	.0000	-.0001	-.0099
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0500	.0050	.0500	.0050	.0050	.0100
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0100

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0027	-.0000	.0002	-.0006	-.0001	.0084	.0019
SDev	.0009	.0000	.0001	.0006	.0001	.0043	.0138
%RSD	34.79	32.33	78.86	100.0	209.3	51.02	722.5
#1	.0020	-.0000	.0001	-.0002	.0000	.0053	-.0078
#2	.0033	-.0000	.0003	-.0011	-.0001	.0114	.0116
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0002	.0045	-.0000	.0007	.0222	.0150
SDev	.0005	.0000	.0003	.0000	.0013	.0822	.0013
%RSD	1649.	17.62	6.103	71.88	178.4	370.7	8.545
#1	-.0003	.0002	.0043	-.0001	.0016	-.0359	.0141
#2	.0004	.0002	.0046	-.0000	-.0002	H.0803	.0159
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0025	.0029	.0018	-.0004	.0012	.0020	-.0007
SDev	.0009	.0006	.0012	.0006	.0013	.0058	.0042
%RSD	36.50	19.28	64.07	142.6	107.2	291.6	575.2
#1	-.0031	.0033	.0026	-.0008	.0003	-.0021	.0022
#2	-.0018	.0025	.0010	.0000	.0022	.0061	-.0037
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	.0050	.0100			.0050	.0100	.0100
Low	-.0050	-.0100			-.0050	-.0100	-.0100

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010208

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	102.6	-.0009	-.0028	.0007	.0004	-.0021	H.0341
SDev	1.0	.0043	.0034	.0003	.0000	.0008	.0003
%RSD	.9501	483.7	121.6	39.82	3.875	38.05	.9657
#1	103.3	-.0039	-.0004	.0009	.0004	-.0016	H.0343
#2	101.9	.0022	-.0051	.0005	.0004	-.0027	H.0338
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC High
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0020	.0000	.0015	-.0026	.0003	-.0029
SDev	.0000	.0005	.0001	.0004	.0041	.0003	.0002
%RSD	140.8	25.51	297.7	26.62	154.5	91.44	6.228
#1	.0000	.0024	.0001	.0012	.0002	.0005	-.0028
#2	.0000	.0017	-.0000	.0017	-.0055	.0001	-.0030
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0001	.0002
SDev	.0000	.0001	.0005
%RSD	.1702	70.17	258.5
#1	-.0001	.0001	.0006
#2	-.0001	.0000	-.0002
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010209

IntStd	1	2	3	4	5	6	
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	739702	10000	--	--	--	--	--
SDev	7026.520	.0000000	--	--	--	--	--
%RSD	.9499129	.0000000	--	--	--	--	--
#1	744670	10000	--	--	--	--	--
#2	734733	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: pbw-B10W459203df100 Operator:
Run Time: 02/15/05 21:28:36 010210
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	.0010	-.0007	37.20	.0002	-.0000	-.0096
SDev	.0004	.0021	.0015	.22	.0000	.0000	.0037
%RSD	43.63	212.7	215.7	.5868	14.80	83.16	38.82
#1	.0006	-.0005	-.0018	37.05	.0002	-.0001	-.0070
#2	.0011	.0024	.0004	37.36	.0003	-.0000	-.0122

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0012	.0001	-.0001	-.0001	-.0000	-.0012	-.0052
SDev	.0005	.0001	.0004	.0003	.0004	.0209	.0137
%RSD	44.14	96.26	554.9	230.5	3866.	1711.	266.3
#1	.0008	.0000	.0002	.0001	-.0003	-.0160	-.0149
#2	.0015	.0002	-.0004	-.0004	.0002	.0136	.0046

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	14.32	.0013	.0002	.0011	-.0306	.0103
SDev	.0009	.01	.0003	.0001	.0003	.1624	.0011
%RSD	586.1	.0429	26.65	26.92	26.64	530.8	10.80
#1	-.0005	14.32	.0015	.0001	.0009	-.1455	.0095
#2	.0008	14.33	.0010	.0002	.0013	.0842	.0111

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	-.0008	.0004	-.0026	-.0005	.0094	.0010
SDev	.0016	.0003	.0004	.0009	.0022	.0051	.0001
%RSD	189.9	34.62	105.0	35.96	464.3	54.14	7.243
#1	.0020	-.0006	.0007	-.0033	-.0020	.0130	.0010
#2	-.0003	-.0010	.0001	-.0020	.0011	.0058	.0009

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	103.1	-.0017	.0046	-.0017	-.0016	.0025	.0321
SDev	.8	.0021	.0045	.0000	.0005	.0037	.0017
%RSD	.7773	121.4	96.71	2.603	30.59	145.7	5.298
#1	103.6	-.0032	.0015	-.0018	-.0019	-.0001	.0333
#2	102.5	-.0002	.0078	-.0017	-.0013	.0051	.0309

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0015	.0002	.0001	.0073	.0008	-.0011
SDev	.0000	.0002	.0000	.0006	.0125	.0001	.0003
%RSD	112.9	13.08	4.068	1105.	172.2	13.42	27.44
#1	.0000	.0014	.0002	-.0004	-.0016	.0009	-.0013
#2	.0000	.0016	.0002	.0005	.0161	.0007	-.0009

010211

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	-.0003	.0004
SDev	.0001	.0002	.0002
%RSD	300.6	89.48	40.78
#1	-.0001	-.0004	.0003
#2	.0000	-.0001	.0006

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	743000	10000	--	--	--	--	--
SDev	5848.480	.0000000	--	--	--	--	--
%RSD	.7871445	.0000000	--	--	--	--	--
#1	747135	10000	--	--	--	--	--
#2	738864	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: srm-B10W5 df100 Operator:
Run Time: 02/15/05 21:33:22
Comment:
Mode: CONC Corr. Factor: 1

010212

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	.7198	.0013	37.09	.0097	-.0000	-.0110
SDev	.0001	.0026	.0001	.13	.0001	.0000	.0002
%RSD	24.71	.3571	3.668	.3591	.6157	40.95	2.049
#1	-.0003	.7179	.0014	36.99	.0096	-.0000	-.0108
#2	-.0004	.7216	.0013	37.18	.0097	-.0000	-.0112

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0683	-.0000	.0004	-.0008	-.0003	.1257	.2302
SDev	.0005	.0003	.0004	.0000	.0004	.0111	.0080
%RSD	.6671	27600.	112.0	2.621	135.3	8.815	3.470
#1	.0679	.0002	.0001	-.0008	-.0006	.1179	.2246
#2	.0686	-.0002	.0007	-.0008	-.0000	.1336	.2359

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	14.37	.0197	.0039	-.0003	.1167	.4696
SDev	.0002	.01	.0038	.0001	.0004	.0815	.0020
%RSD	805.3	.0615	19.11	1.294	141.6	69.84	.4251
#1	-.0002	14.37	.0170	.0039	-.0005	.0591	.4682
#2	.0001	14.38	.0223	.0039	.0000	.1743	.4710

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0005	.0059	.0022	-.0029	-.0033	.0020	.0011
SDev	.0001	.0043	.0022	.0014	.0015	.0036	.0020
%RSD	14.18	71.78	97.48	47.52	46.55	182.9	187.5
#1	-.0005	.0090	.0007	-.0039	-.0044	-.0006	.0025
#2	-.0004	.0029	.0037	-.0019	-.0022	.0046	-.0004

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	102.9	.0026	-.0031	3.495	-.0012	-.0012	.0299
SDev	1.3	.0055	.0031	.004	.0016	.0039	.0002
%RSD	1.227	211.5	101.8	.1071	136.2	334.2	.7385
#1	103.8	.0065	-.0009	3.493	-.0024	.0016	.0300
#2	102.0	-.0013	-.0053	3.498	-.0000	-.0039	.0297

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	.0011	.0139	-.0012	-.0151	-.0005	-.0000
SDev	.0000	.0034	.0001	.0032	.0068	.0004	.0010
%RSD	.4639	309.1	.4872	259.0	45.41	80.50	3025.
#1	.0007	-.0013	.0139	-.0035	-.0102	-.0002	-.0007
#2	.0007	.0035	.0139	.0010	-.0199	-.0008	.0007

010213

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0003	-.0001	.0024
SDev	.0001	.0003	.0002
%RSD	29.44	339.0	9.472
#1	.0002	-.0003	.0023
#2	.0003	.0001	.0026

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	741920	10000	--	--	--	--	--
SDev	9117.435	.0000000	--	--	--	--	--
%RSD	1.228897	.0000000	--	--	--	--	--
#1	748367	10000	--	--	--	--	--
#2	735473	10000	--	--	--	--	--

Method: DAILY2 Sample Name: srm-B10W6 df100 Operator:
Run Time: 02/15/05 21:38:08
Comment:
Mode: CONC Corr. Factor: 1

010214

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0013	.9447	-.0028	39.32	.0020	-.0001	-.0094
SDev	.0005	.0019	.0004	.14	.0001	.0000	.0030
%RSD	39.15	.2046	12.94	.3445	3.935	4.526	31.84
#1	-.0009	.9460	-.0030	39.22	.0021	-.0001	-.0073
#2	-.0016	.9433	-.0025	39.41	.0020	-.0001	-.0115

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9396	-.0003	.0002	.0035	.0007	.7592	-.0217
SDev	.0060	.0000	.0002	.0006	.0001	.0029	.0137
%RSD	.6403	6.060	75.89	16.32	6.810	.3829	62.98
#1	.9439	-.0003	.0004	.0039	.0007	.7572	-.0121
#2	.9354	-.0003	.0001	.0031	.0006	.7613	-.0314

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0022	15.62	.5262	.0136	.0003	-.1739	.2203
SDev	.0011	.02	.0073	.0001	.0010	.0719	.0067
%RSD	48.13	.1501	1.377	1.075	410.8	41.31	3.045
#1	-.0015	15.61	.5313	.0137	.0010	-.2248	.2156
#2	-.0030	15.64	.5211	.0135	-.0005	-.1231	.2251

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0021	.0059	.0024	-.0009	-.0039	.0048	-.0018
SDev	.0017	.0081	.0016	.0026	.0021	.0060	.0006
%RSD	82.48	136.9	65.80	290.8	52.90	123.7	32.84
#1	.0033	.0117	.0036	-.0027	-.0025	.0091	-.0022
#2	.0009	.0002	.0013	.0009	-.0054	.0006	-.0014

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	103.7	.0032	-.0015	2.473	.0002	.0001	.0288
SDev	1.9	.0017	.0005	.008	.0012	.0002	.0046
%RSD	1.812	53.98	34.34	.3240	517.8	371.2	15.89
#1	102.3	.0044	-.0019	2.479	-.0006	.0002	.0320
#2	105.0	.0020	-.0011	2.467	.0011	-.0001	.0255

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0018	.0025	.0731	-.0050	-.0546	.0025	-.0042
SDev	.0000	.0024	.0000	.0035	.0484	.0006	.0005
%RSD	2.366	96.68	.0073	69.75	88.70	22.12	13.14
#1	.0018	.0008	.0731	-.0074	-.0203	.0029	-.0038
#2	.0018	.0042	.0731	-.0025	-.0888	.0021	-.0045

010215

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	-.0000	.0004
SDev	.0001	.0001	.0007
%RSD	133.5	530.4	173.2
#1	.0001	-.0000	.0009
#2	.0000	.0000	-.0001

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	747234	10000	--	--	--	--	--
SDev	13483.11	.0000000	--	--	--	--	--
%RSD	1.804403	.0000000	--	--	--	--	--
#1	737700	10000	--	--	--	--	--
#2	756768	10000	--	--	--	--	--

Method: DAILY2 Sample Name: 257326 df100 f Operator:
Run Time: 02/15/05 21:44:45 010216
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.2933	-.0015	38.26	.0037	-.0001	-.0032
SDev	.0011	.0079	.0031	.05	.0001	.0000	.0040
%RSD	2860.	2.680	213.5	.1313	1.397	12.78	123.8
#1	-.0008	.2877	-.0037	38.22	.0037	-.0001	-.0060
#2	.0008	.2988	.0007	38.29	.0037	-.0001	-.0004

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0930	.0002	-.0002	.0011	.0012	.1079	.0614
SDev	.0026	.0001	.0009	.0006	.0000	.0059	.0275
%RSD	2.779	35.06	562.6	51.04	3.478	5.471	44.79
#1	.0912	.0002	-.0008	.0015	.0012	.1037	.0420
#2	.0949	.0003	.0005	.0007	.0011	.1121	.0808

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	15.12	.0613	.0032	.0010	-.0969	.1001
SDev	.0015	.06	.0076	.0001	.0005	.2472	.0044
%RSD	482.8	.3846	12.40	1.515	55.64	255.0	4.373
#1	-.0014	15.17	.0559	.0031	.0013	-.2717	.0970
#2	.0008	15.08	.0667	.0032	.0006	.0779	.1032

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0012	.0058	-.0007	-.0010	.0001	.0077	-.0061
SDev	.0013	.0015	.0012	.0017	.0044	.0124	.0132
%RSD	103.7	26.35	161.9	162.6	6693.	161.3	216.8
#1	.0003	.0047	-.0016	.0002	-.0031	-.0011	.0033
#2	.0021	.0069	.0001	-.0022	.0032	.0165	-.0155

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	102.8	.0005	.0001	1.192	-.0009	.0002	.0303
SDev	1.2	.0000	.0027	.002	.0007	.0018	.0016
%RSD	1.128	2.206	3179.	.1530	79.73	795.8	5.376
#1	103.6	.0005	-.0018	1.191	-.0004	-.0010	.0315
#2	101.9	.0005	.0020	1.194	-.0014	.0015	.0292

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	.0022	.0194	.0060	-.0097	.0001	-.0023
SDev	.0001	.0032	.0001	.0022	.0611	.0004	.0058
%RSD	3.078	143.0	.2872	37.17	628.7	310.3	248.8
#1	.0015	.0045	.0195	.0044	-.0529	-.0002	-.0065
#2	.0015	-.0000	.0194	.0076	.0335	.0004	.0018

010217

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0043	.0012
SDev	.0001	.0003	.0002
%RSD	81.86	6.555	20.49
#1	.0001	.0041	.0010
#2	.0000	.0045	.0013

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	740721	10000	--	--	--	--	--
SDev	8291.534	.0000000	--	--	--	--	--
%RSD	1.119387	.0000000	--	--	--	--	--
#1	746584	10000	--	--	--	--	--
#2	734858	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccv7 Operator:
Run Time: 02/15/05 21:53:11
Comment:
Mode: CONC Corr. Factor: 1

010218

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.001	9.723	5.112	4.996	10.30	.9813	5.050
SDev	.000	.008	.009	.030	.02	.0019	.012
%RSD	.0373	.0856	.1763	.5941	.1485	.1897	.2300
#1	1.001	9.717	5.106	4.975	10.29	.9826	5.042
#2	1.002	9.729	5.119	5.017	10.31	.9800	5.058
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	1.100	11.00	5.500	5.500	11.00	1.100	5.500
Low	.9000	9.000	4.500	4.500	9.000	.9000	4.500

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.88	.9885	4.990	1.998	2.066	10.04	18.15
SDev	.03	.0023	.007	.006	.001	.04	.01
%RSD	.1502	.2327	.1485	.2810	.0325	.3869	.0451
#1	19.90	.9901	4.995	2.002	2.065	10.07	18.15
#2	19.86	.9868	4.984	1.994	2.066	10.02	18.16
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	22.00	1.100	5.500	2.200	2.200	11.00	22.00
Low	18.00	.9000	4.500	1.800	1.800	9.000	18.00

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.975	4.724	19.76	1.008	5.037	27.73	H40.33
SDev	.002	.004	.00	.001	.008	.03	.09
%RSD	.0475	.0857	.0120	.1056	.1620	.1226	.2262
#1	4.974	4.727	19.77	1.009	5.031	27.70	H40.40
#2	4.977	4.721	19.76	1.007	5.043	27.75	H40.27
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC High
High	5.500	5.500	22.00	1.100	5.500	33.00	33.00
Low	4.500	4.500	18.00	.9000	4.500	27.00	27.00

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.065	4.919	4.969	4.985	.9987	1.011	.9991
SDev	.003	.045	.001	.016	.0015	.002	.0009
%RSD	.0661	.9087	.0263	.3251	.1526	.1750	.0877
#1	5.067	4.951	4.970	4.973	.9976	1.010	.9985
#2	5.062	4.888	4.968	4.996	.9998	1.012	.9998
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	5.500	5.500			1.100	1.100	1.100
Low	4.500	4.500			.9000	.9000	.9000

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010219

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	102.1	5.240	5.283	5.148	4.980	5.268	5.055
SDev	.3	.010	.015	.007	.010	.007	.010
%RSD	.2453	.1873	.2859	.1385	.2082	.1290	.1900
#1	102.3	5.247	5.272	5.143	4.972	5.264	5.062
#2	101.9	5.233	5.293	5.153	4.987	5.273	5.048
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				5.500	5.500	5.500	5.500
Low				4.500	4.500	4.500	4.500

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.070	.9712	4.960	5.195	1.016	4.993	1.072
SDev	.004	.0034	.000	.003	.014	.004	.005
%RSD	.0747	.3487	.0091	.0621	1.344	.0878	.5036
#1	5.067	.9688	4.961	5.193	1.026	4.997	1.076
#2	5.073	.9736	4.960	5.197	1.006	4.990	1.068
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500	5.500	1.100	5.500	1.100
Low	4.500	.9000	4.500	4.500	.9000	4.500	.9000

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	4.840	1.012	4.869
SDev	.000	.001	.002
%RSD	.0009	.1447	.0312
#1	4.840	1.013	4.871
#2	4.840	1.011	4.868
Errors	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500
Low	4.500	.9000	4.500

010220

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	736018	10000	--	--	--	--	--
SDev	1805.244	.0000000	--	--	--	--	--
%RSD	.2452715	.0000000	--	--	--	--	--
#1	737295	10000	--	--	--	--	--
#2	734742	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccb6 Operator:
Run Time: 02/15/05 22:01:37 010221
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0017	-.0016	H.0887	.0000	-.0001	-.0060
SDev	.0005	.0004	.0012	.0051	.0000	.0000	.0031
%RSD	185.5	24.25	75.81	5.722	350.2	7.459	50.81
#1	.0006	.0014	-.0007	H.0923	-.0000	-.0001	-.0039
#2	-.0001	.0020	-.0025	H.0851	.0000	-.0001	-.0082
Errors	LC Pass	LC Pass	LC Pass	LC High	LC Pass	LC Pass	LC Pass
High	.0050	.0500	.0050	.0500	.0050	.0050	.0100
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0100

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0014	-.0001	.0005	-.0000	-.0006	-.0074	-.0053
SDev	.0005	.0001	.0003	.0001	.0003	.0067	.0115
%RSD	34.82	102.2	53.81	393.3	49.43	91.24	216.5
#1	.0017	-.0001	.0003	-.0001	-.0004	-.0121	.0028
#2	.0010	-.0000	.0006	.0001	-.0009	-.0026	-.0135
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0008	.0023	.0000	.0021	L-.1078	.0130
SDev	.0011	.0000	.0044	.0001	.0004	.0912	.0004
%RSD	368.0	.6812	193.7	264.9	21.75	84.60	3.413
#1	.0011	.0008	.0054	-.0000	.0018	L-.1723	.0133
#2	-.0005	.0008	-.0008	.0001	.0024	-.0433	.0127
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Low	LC Pass
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0007	-.0037	-.0011	-.0032	.0020	.0086	.0016
SDev	.0001	.0080	.0001	.0020	.0015	.0040	.0085
%RSD	20.16	216.6	10.27	64.90	72.29	46.46	526.3
#1	-.0008	-.0093	-.0012	-.0046	.0010	H.0115	-.0044
#2	-.0006	.0020	-.0010	-.0017	.0031	.0058	.0077
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	.0050	.0100			.0050	.0100	.0100
Low	-.0050	-.0100			-.0050	-.0100	-.0100

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010222

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	103.0	.0008	-.0013	-.0002	-.0024	-.0005	H.0327
SDev	.7	.0005	.0027	.0011	.0014	.0016	.0045
%RSD	.6407	61.82	215.0	657.0	57.30	296.6	13.68
#1	103.4	.0005	.0007	.0006	L-.0034	.0006	H.0358
#2	102.5	.0012	-.0032	-.0010	-.0015	-.0017	H.0295
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC High
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0017	-.0000	.0004	.0028	-.0002	-.0019
SDev	.0000	.0013	.0000	.0012	.0225	.0002	.0001
%RSD	21380.	76.85	222.1	305.0	812.5	144.1	4.533
#1	.0000	.0008	-.0000	-.0005	.0186	-.0003	-.0020
#2	-.0000	.0026	.0000	.0013	-.0131	.0000	-.0019
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0001	.0002
SDev	.0000	.0000	.0003
%RSD	525.8	28.95	138.3
#1	-.0000	.0001	.0000
#2	.0000	.0001	.0004
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010223

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	742076	10000	--	--	--	--	--
SDev	4724.888	.0000000	--	--	--	--	--
%RSD	.6367121	.0000000	--	--	--	--	--
#1	745417	10000	--	--	--	--	--
#2	738735	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: pbw-B10W4 df10 Operator:
Run Time: 02/15/05 22:06:23
Comment:
Mode: CONC Corr. Factor: 1

010224

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0019	.0075	.0049	357.5	.0020	-.0001	.0065
SDev	.0004	.0025	.0012	.8	.0001	.0000	.0056
%RSD	20.28	33.75	24.51	.2258	4.253	1.893	86.62
#1	-.0022	.0093	.0040	357.0	.0019	-.0001	.0105
#2	-.0017	.0057	.0057	358.1	.0020	-.0001	.0025

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	.0002	-.0001	.0017	.0012	-.0028	.0043
SDev	.0009	.0001	.0001	.0001	.0005	.0090	.0010
%RSD	245.1	57.47	59.46	5.772	38.52	322.0	22.84
#1	-.0010	.0001	-.0001	.0017	.0009	-.0091	.0050
#2	.0003	.0003	-.0002	.0016	.0015	.0036	.0036

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0035	82.88	-.0042	.0003	-.0011	.0898	-.0111
SDev	.0003	.39	.0062	.0000	.0005	.0180	.0033
%RSD	9.639	.4763	146.8	6.794	47.77	19.99	29.40
#1	-.0037	83.16	-.0086	.0003	-.0008	.1025	-.0134
#2	-.0032	82.60	.0002	.0003	-.0015	.0771	-.0088

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0045	.0078	.0095	-.0029	-.0031	.0138	.0018
SDev	.0005	.0037	.0008	.0009	.0005	.0120	.0034
%RSD	10.42	46.94	7.831	30.22	16.95	86.66	188.0
#1	.0048	.0104	.0090	-.0035	-.0035	.0054	-.0006
#2	.0042	.0052	.0101	-.0023	-.0028	.0223	.0043

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.0	-.0003	.0012	.0105	.0013	.0007	.0315
SDev	.6	.0021	.0014	.0031	.0008	.0017	.0007
%RSD	.5998	772.6	117.3	29.25	65.18	223.9	2.087
#1	99.62	-.0018	.0002	.0127	.0007	-.0004	.0320
#2	100.5	.0012	.0022	.0084	.0019	.0019	.0311

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0010	.0001	.0005	-.0293	-.0009	-.0004
SDev	.0000	.0022	.0002	.0006	.0101	.0001	.0038
%RSD	15.49	223.6	207.6	106.8	34.54	9.938	1069.
#1	.0001	.0025	-.0000	.0001	-.0365	-.0008	.0024
#2	.0002	-.0006	.0002	.0010	-.0221	-.0009	-.0031

010225

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	-.0033	-.0005
SDev	.0001	.0002	.0001
%RSD	77.51	6.006	18.71
#1	-.0000	-.0034	-.0006
#2	-.0001	-.0032	-.0005

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	721100	10000	--	--	--	--	--
SDev	4314.059	.0000000	--	--	--	--	--
%RSD	.5982603	.0000000	--	--	--	--	--
#1	718050	10000	--	--	--	--	--
#2	724151	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: srm-B10W5 df10 Operator:
Run Time: 02/15/05 22:11:09
Comment:
Mode: CONC Corr. Factor: 1

010226

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0009	7.505	.0077	353.0	.0960	.0002	.0075
SDev	.0007	.006	.0017	.3	.0003	.0000	.0048
%RSD	77.20	.0863	22.14	.0892	.2959	1.048	64.59
#1	-.0014	7.509	.0065	352.8	.0962	.0002	.0041
#2	-.0004	7.500	.0089	353.2	.0958	.0002	.0109

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.6777	.0004	.0011	.0024	.0027	1.435	3.782
SDev	.0034	.0001	.0004	.0001	.0004	.031	.002
%RSD	.4994	20.76	38.53	5.696	16.68	2.135	.0616
#1	.6753	.0004	.0008	.0023	.0024	1.413	3.781
#2	.6801	.0003	.0014	.0025	.0030	1.457	3.784

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	82.31	.1312	.0395	-.0036	3.569	6.587
SDev	.0011	.72	.0078	.0001	.0009	.209	.016
%RSD	382.9	.8800	5.920	.3726	24.49	5.856	.2385
#1	-.0005	81.80	.1257	.0394	-.0030	3.421	6.598
#2	.0010	82.83	.1367	.0396	-.0042	3.716	6.576

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0072	.0191	.0073	-.0024	-.0023	-.0027	.0019
SDev	.0010	.0022	.0021	.0017	.0021	.0016	.0002
%RSD	14.62	11.34	28.49	73.65	90.10	57.61	10.55
#1	.0079	.0207	.0058	-.0011	-.0038	-.0016	.0018
#2	.0064	.0176	.0087	-.0036	-.0008	-.0038	.0021

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.6	.0019	.0010	35.60	.0009	.0013	.0320
SDev	1.0	.0019	.0008	.06	.0005	.0001	.0019
%RSD	1.005	97.22	73.91	.1761	53.04	8.960	6.088
#1	101.3	.0006	.0016	35.64	.0012	.0013	.0334
#2	99.84	.0032	.0005	35.55	.0005	.0014	.0306

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0068	.0028	.1403	-.0018	.0026	.0001	.0023
SDev	.0000	.0008	.0001	.0038	.0165	.0007	.0042
%RSD	.0676	28.86	.0881	208.9	629.9	525.3	183.5
#1	.0068	.0022	.1404	.0009	-.0090	-.0003	.0052
#2	.0068	.0034	.1402	-.0045	.0143	.0006	-.0007

010227

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0036	.0013	.0282
SDev	.0002	.0002	.0002
%RSD	4.475	15.85	.6454
#1	.0037	.0012	.0281
#2	.0034	.0015	.0283

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	724842	10000	--	--	--	--	--
SDev	7264.108	.0000000	--	--	--	--	--
%RSD	1.002164	.0000000	--	--	--	--	--
#1	729979	10000	--	--	--	--	--
#2	719706	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: srm-B10W6 df10 Operator:
Run Time: 02/15/05 22:15:56
Comment:
Mode: CONC Corr. Factor: 1

010228

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	k-.0014	k9.962	k.0044	374.1	k.0207	k-.0000	k.0023
SDev	.0003	.014	.0016	.2	.0001	.0000	.0036
%RSD	19.79	.1422	37.78	.0495	.6549	29.55	155.6
#1	-.0016	9.952	.0032	373.9	.0206	-.0000	-.0002
#2	k-.0012	k9.972	k.0055	374.2	k.0208	k-.0000	k.0048

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	k9.178	k.0002	k.0062	k.0381	k.0098	k7.720	.1750
SDev	.030	.0001	.0004	.0004	.0004	.003	.0132
%RSD	.3263	61.87	5.906	1.193	4.374	.0439	7.563
#1	9.156	.0001	.0059	.0378	.0095	7.718	.1656
#2	k9.199	k.0002	k.0064	k.0384	k.0101	k7.722	.1843

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	k-.0031	S52.85	k5.300	k.1378	k-.0025	k1.642	k3.040
SDev	.0010	43.42	.001	.0002	.0011	.090	.006
%RSD	32.31	82.15	.0142	.1611	45.70	5.484	.2063
#1	-.0038	83.55	5.300	.1376	-.0033	1.578	3.035
#2	k-.0024	S22.15	k5.299	k.1380	k-.0017	k1.705	k3.044

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	k.0243	k.0697	k.0056	k-.0034	k-.0020	k.0024	k.0064
SDev	.0005	.0072	.0001	.0008	.0041	.0095	.0016
%RSD	1.944	10.30	2.048	24.68	202.2	398.8	25.03
#1	.0239	.0748	.0057	-.0040	-.0049	.0091	.0076
#2	k.0246	k.0647	k.0056	k-.0028	k.0009	k-.0043	k.0053

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.21	k-.0010	k.0009	k25.36	k-.0004	k.0003	k.0342
SDev	.39	.0014	.0014	.01	.0005	.0005	.0050
%RSD	.3931	140.2	160.7	.0271	135.5	179.2	14.60
#1	99.48	-.0020	.0019	25.36	-.0008	.0006	.0378
#2	98.93	k-.0000	k-.0001	k25.35	k-.0000	k-.0001	k.0307

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	k.0188	k.0021	k.7384	k.0034	k.0009	k.0280	k.0019
SDev	.0000	.0003	.0004	.0070	.0248	.0004	.0019
%RSD	.0397	16.27	.0520	203.1	2709.	1.499	103.5
#1	.0188	.0019	.7382	.0084	-.0166	.0283	.0005
#2	k.0188	k.0024	k.7387	k-.0015	k.0184	k.0277	k.0032

010229

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	k.0019	k.0040	k.0058
SDev	.0002	.0010	.0008
%RSD	8.850	24.34	13.46
#1	.0018	.0033	.0053
#2	k.0020	k.0047	k.0064

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	715090	10000	--	--	--	--	--
SDev	2831.963	.0000000	--	--	--	--	--
%RSD	.3960291	.0000000	--	--	--	--	--
#1	717092	10000	--	--	--	--	--
#2	713087	10000	--	--	--	--	--

Method: DAILY2 Sample Name: 257326 df10 f Operator:
Run Time: 02/15/05 22:22:32
Comment:
Mode: CONC Corr. Factor: 1

010230

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0018	3.139	.0098	364.7	.0374	-.0000	.0029
SDev	.0009	.001	.0004	.5	.0001	.0000	.0049
%RSD	52.36	.0235	4.156	.1331	.1861	45.84	172.0
#1	-.0024	3.140	.0101	364.3	.0375	-.0000	-.0006
#2	-.0011	3.139	.0095	365.0	.0374	-.0000	.0064

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9142	.0002	.0007	.0054	.0114	1.250	1.165
SDev	.0022	.0001	.0009	.0007	.0004	.029	.033
%RSD	.2349	67.43	123.5	13.32	3.116	2.341	2.805
#1	.9127	.0003	.0001	.0060	.0112	1.229	1.142
#2	.9157	.0001	.0014	.0049	.0117	1.271	1.188

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0016	82.59	.5985	.0317	-.0015	.6646	1.288
SDev	.0012	.69	.0039	.0001	.0004	.4878	.003
%RSD	72.61	.8368	.6456	.2740	27.77	73.41	.2438
#1	-.0025	82.10	.5958	.0318	-.0018	.3196	1.286
#2	-.0008	83.08	.6012	.0316	-.0012	1.010	1.291

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0086	.0926	.0083	-.0031	-.0054	.0085	.0025
SDev	.0002	.0021	.0004	.0005	.0076	.0060	.0026
%RSD	2.705	2.314	5.297	16.07	140.4	69.82	103.2
#1	.0088	.0911	.0086	-.0028	-.0108	.0127	.0007
#2	.0085	.0941	.0080	-.0035	-.0000	.0043	.0044

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.7	.0022	.0005	12.18	.0007	.0011	.0332
SDev	1.1	.0009	.0018	.03	.0005	.0015	.0038
%RSD	1.071	42.03	342.4	.2210	69.43	138.6	11.56
#1	101.4	.0016	-.0008	12.20	.0010	.0000	.0359
#2	99.89	.0029	.0018	12.16	.0003	.0022	.0305

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0150	.0044	.1967	-.0022	-.0209	.0023	.0044
SDev	.0000	.0022	.0005	.0062	.0257	.0000	.0007
%RSD	.2111	50.75	.2663	285.0	122.9	1.548	15.09
#1	.0150	.0059	.1971	.0022	-.0391	.0023	.0049
#2	.0151	.0028	.1964	-.0066	-.0027	.0023	.0039

010231

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0009	.0468	.0095
SDev	.0001	.0004	.0002
%RSD	10.86	.7750	2.407
#1	.0010	.0465	.0097
#2	.0008	.0471	.0094

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	725552	10000	--	--	--	--	--
SDev	7756.254	.0000000	--	--	--	--	--
%RSD	1.069014	.0000000	--	--	--	--	--
#1	731037	10000	--	--	--	--	--
#2	720068	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: zzzzzzz Operator:
Run Time: 02/15/05 22:30:58
Comment:
Mode: CONC Corr. Factor: 1

010232

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	.0041	-.0031	1.296	-.0000	-.0001	-.0027
SDev	.0010	.0016	.0017	.085	.0001	.0000	.0101
%RSD	210.5	40.26	55.84	6.559	120.6	19.15	380.1
#1	-.0002	.0029	-.0019	1.356	-.0001	-.0001	-.0098
#2	.0012	.0053	-.0043	1.236	-.0000	-.0001	.0045

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0026	-.0000	.0003	-.0001	-.0005	.0037	.0048
SDev	.0007	.0000	.0006	.0001	.0006	.0135	.0092
%RSD	28.54	268.2	196.9	46.99	121.1	361.5	190.7
#1	.0021	.0000	-.0001	-.0001	-.0009	-.0058	-.0017
#2	.0031	-.0000	.0007	-.0002	-.0001	.0133	.0114

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0154	-.0009	.0001	.0013	.1084	.0145
SDev	.0004	.0005	.0053	.0001	.0006	.0756	.0016
%RSD	1210.	3.026	570.0	86.01	45.56	69.67	10.92
#1	-.0003	.0157	-.0047	.0001	.0018	.0550	.0156
#2	.0003	.0150	.0028	.0000	.0009	.1619	.0134

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	-.0065	.0040	-.0005	.0023	.0014	.0042
SDev	.0006	.0073	.0011	.0016	.0021	.0080	.0058
%RSD	88.97	112.5	26.86	334.9	92.68	569.1	138.9
#1	.0010	-.0117	.0047	.0006	.0008	.0070	.0001
#2	.0002	-.0013	.0032	-.0016	.0038	-.0042	.0083

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.6	.0018	-.0013	-.0003	.0010	-.0002	.0332
SDev	1.2	.0016	.0011	.0040	.0014	.0013	.0014
%RSD	1.214	89.25	86.80	1274.	136.3	548.2	4.158
#1	102.5	.0007	-.0021	-.0031	.0020	-.0011	.0342
#2	100.8	.0030	-.0005	.0025	.0000	.0007	.0323

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0019	.0000	.0048	.0151	-.0004	-.0001
SDev	.0000	.0008	.0000	.0016	.0126	.0001	.0072
%RSD	214.4	44.48	111.9	32.75	83.69	34.86	6735.
#1	-.0000	.0025	.0000	.0037	.0062	-.0004	-.0052
#2	.0000	.0013	.0000	.0059	.0240	-.0003	.0050

010233

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	-.0001	.0002
SDev	.0000	.0002	.0004
%RSD	3671.	290.3	252.9
#1	-.0000	-.0002	-.0001
#2	.0000	.0001	.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	732720	10000	--	--	--	--	--
SDev	8870.654	.0000000	--	--	--	--	--
%RSD	1.210646	.0000000	--	--	--	--	--
#1	738993	10000	--	--	--	--	--
#2	726448	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: cri Operator:
Run Time: 02/15/05 22:35:45
Comment:
Mode: CONC Corr. Factor: 1

010234

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0210	.0999	.0192	H1.047	.0207	.0097	-.0041
SDev	.0003	.0051	.0015	.043	.0000	.0001	.0003
%RSD	1.282	5.084	7.594	4.136	.0886	.5851	7.760
#1	.0208	.1035	.0203	H1.078	.0207	.0097	-.0038
#2	.0212	.0963	.0182	H1.017	.0207	.0098	-.0043
Errors	LC Pass	NOCHECK	LC Pass	LC High	LC Pass	LC Pass	NOCHECK
High	.0300		.0300	.1500	.0300	.0150	
Low	.0100		.0100	.0500	.0100	.0050	

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0017	.0103	.0998	.0197	.0493	.1110	.0089
SDev	.0010	.0001	.0003	.0001	.0000	.0184	.0147
%RSD	55.57	.6441	.2698	.4567	.0305	16.59	166.0
#1	.0010	.0103	.0996	.0197	.0493	.0980	-.0015
#2	.0024	.0102	.1000	.0196	.0493	.1240	.0193
Errors	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High		.0150	.1500	.0300	.0750	.1500	
Low		.0050	.0500	.0100	.0250	.0500	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0804	.0006	.0304	.0209	.2538	.0194
SDev	.0001	.0005	.0004	.0000	.0002	.2219	.0026
%RSD	147.5	.6074	68.06	.1476	1.172	87.44	13.66
#1	-.0000	.0807	.0008	.0304	.0211	.0969	.0212
#2	.0002	.0800	.0003	.0305	.0207	.4107	.0175
Errors	NOCHECK	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK	NOCHECK
High		.1500		.0450	.0300		
Low		.0500		.0150	.0100		

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0808	.0983	.0069	.0050	.0015	.0119	.1244
SDev	.0011	.0056	.0018	.0003	.0005	.0018	.0077
%RSD	1.326	5.726	25.55	6.312	32.50	14.99	6.186
#1	.0800	.0943	.0057	.0048	.0019	.0132	.1189
#2	.0816	.1023	.0082	.0052	.0012	.0106	.1298
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	.1200	.1500					.1800
Low	.0400	.0500					.0600

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010235

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	102.2	.0166	.0086	.1118	.0056	.0113	.1354
SDev	1.4	.0038	.0012	.0020	.0008	.0020	.0008
%RSD	1.365	22.75	13.45	1.810	14.16	18.00	.5853
#1	103.2	.0193	.0095	.1103	.0051	.0127	.1348
#2	101.2	.0140	.0078	.1132	.0062	.0099	.1359
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				.1500	.0090	.0150	.1500
Low				.0500	.0030	.0050	.0500

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0207	.0005	.0200	.0230	.1953	.0999	-.0022
SDev	.0001	.0009	.0001	.0000	.0079	.0001	.0001
%RSD	.3359	191.9	.3175	.1799	4.053	.1016	3.969
#1	.0208	.0011	.0200	.0230	.1897	.0999	-.0022
#2	.0207	-.0002	.0201	.0230	.2009	.0998	-.0023
Errors	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK	LC Pass	NOCHECK
High	.0300		.0300	.0300		.1500	
Low	.0100		.0100	.0100		.0500	

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0403	.0955
SDev	.0000	.0001	.0000
%RSD	11.37	.1742	.0089
#1	-.0001	.0403	.0955
#2	-.0001	.0402	.0955
Errors	NOCHECK	LC Pass	NOCHECK
High		.0600	
Low		.0200	

010236

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	736476	10000	--	--	--	--	--
SDev	10029.60	.0000000	--	--	--	--	--
%RSD	1.361837	.0000000	--	--	--	--	--
#1	743568	10000	--	--	--	--	--
#2	729384	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: icsa Operator: 010237
Run Time: 02/15/05 22:40:31
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0006	493.4	-.0016	.8095	.0009	-.0001	-.0042
SDev	.0002	.0	.0043	.0357	.0001	.0000	.0025
%RSD	31.90	.0072	264.1	4.406	5.612	23.32	59.07
#1	-.0007	493.4	.0014	.8348	.0010	-.0001	-.0024
#2	-.0005	493.4	-.0047	.7843	.0009	-.0001	-.0059
Errors	NOCHECK	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High		600.0					
Low		400.0					

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	449.1	-.0005	.0001	-.0005	.0013	187.7	-.0115
SDev	1.6	.0007	.0009	.0005	.0002	.3	.0160
%RSD	.3650	145.5	584.3	97.25	12.13	.1541	139.9
#1	447.9	.0000	-.0005	-.0002	.0012	187.5	-.0228
#2	450.2	-.0010	.0008	-.0009	.0015	187.9	-.0001
Errors	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass	NOCHECK
High	600.0					240.0	
Low	400.0					160.0	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0023	.0183	524.9	-.0011	-.0006	.1485	-.0142
SDev	.0002	.0007	.4	.0000	.0006	.0780	.0020
%RSD	7.890	3.951	.0685	2.572	94.38	52.49	14.03
#1	-.0022	.0188	524.6	-.0010	-.0011	.0934	-.0128
#2	-.0025	.0178	525.1	-.0011	-.0002	.2036	-.0156
Errors	NOCHECK	NOCHECK	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High			600.0				
Low			400.0				

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	-.0176	.0428	-.0311	.0042	.0191	.0108
SDev	.0009	.0043	.0037	.0044	.0027	.0018	.0010
%RSD	1056.	24.51	8.626	14.18	63.82	9.335	9.242
#1	-.0006	-.0146	.0454	-.0279	.0023	.0178	.0115
#2	.0008	-.0207	.0402	-.0342	.0061	.0204	.0101
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010238

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	93.76	.0065	-.0029	.0223	-.0064	.0002	.0406
SDev	1.46	.0005	.0010	.0030	.0042	.0008	.0063
%RSD	1.555	8.147	34.18	13.63	64.90	361.0	15.60
#1	94.79	.0068	-.0022	.0245	-.0035	.0008	.0451
#2	92.73	.0061	-.0036	.0202	-.0094	-.0004	.0361
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0130	.0286	-.0017	-.0100	.0028	-.0009	-.0020
SDev	.0000	.0020	.0003	.0044	.0039	.0004	.0002
%RSD	.0417	6.998	19.23	43.99	139.5	44.31	11.47
#1	.0130	.0300	-.0015	-.0131	.0000	-.0012	-.0018
#2	.0130	.0272	-.0019	-.0069	.0055	-.0006	-.0022
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0005	.0195	-.0002
SDev	.0000	.0001	.0002
%RSD	3.742	.3724	72.38
#1	-.0005	.0196	-.0001
#2	-.0006	.0195	-.0003
Errors	NOCHECK	NOCHECK	NOCHECK
High			
Low			

010239

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	675880	10000	--	--	--	--	--
SDev	10550.74	.0000000	--	--	--	--	--
%RSD	1.561036	.0000000	--	--	--	--	--
#1	683341	10000	--	--	--	--	--
#2	668420	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: icsab Operator:
Run Time: 02/15/05 22:45:18
Comment:
Mode: CONC Corr. Factor: 1

010240

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.088	499.0	1.039	H1.710	.5386	.4811	-.0022
SDev	.000	.4	.001	.030	.0004	.0007	.0002
%RSD	.0434	.0786	.1434	1.765	.0726	.1514	8.398
#1	1.088	499.2	1.038	H1.731	.5383	.4816	-.0023
#2	1.089	498.7	1.040	H1.688	.5389	.4806	-.0020
Errors	LC Pass	LC Pass	LC Pass	LC High	LC Pass	LC Pass	NOCHECK
High	1.200	600.0	1.200	1.200	.6000	.6000	
Low	.8000	400.0	.8000	.8000	.4000	.4000	

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	453.4	.9364	.4753	.4856	.5553	189.5	-.0331
SDev	1.6	.0005	.0014	.0026	.0014	.4	.0019
%RSD	.3490	.0517	.3006	.5389	.2508	.1947	5.859
#1	454.6	.9367	.4763	.4875	.5543	189.7	-.0345
#2	452.3	.9361	.4743	.4838	.5563	189.2	-.0317
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High	600.0	1.200	.6000	.6000	.6000	240.0	
Low	400.0	.8000	.4000	.4000	.4000	160.0	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0016	1.187	530.8	.4877	1.031	.2111	-.0191
SDev	.0009	.004	1.1	.0003	.000	.1693	.0058
%RSD	55.06	.3014	.2091	.0698	.0214	80.23	30.27
#1	-.0022	1.184	531.6	.4879	1.032	.0913	-.0232
#2	-.0010	1.189	530.0	.4874	1.031	.3308	-.0150
Errors	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK
High		1.200	600.0	.6000	1.200		
Low		.8000	400.0	.4000	.8000		

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9513	1.006	1.019	.9587	.0012	.0297	1.063
SDev	.0059	.001	.011	.0078	.0032	.0007	.019
%RSD	.6200	.0613	1.117	.8149	279.1	2.284	1.781
#1	.9555	1.006	1.011	.9532	-.0011	.0292	1.077
#2	.9472	1.005	1.027	.9642	.0035	.0302	1.050
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	1.200	1.200					1.200
Low	.8000	.8000					.8000

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010241

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	92.99	1.035	1.029	1.077	.9789	1.031	1.052
SDev	.69	.017	.013	.001	.0090	.014	.001
%RSD	.7424	1.645	1.252	.0547	.9201	1.383	.0567
#1	92.50	1.023	1.020	1.076	.9725	1.021	1.052
#2	93.48	1.047	1.038	1.077	.9852	1.041	1.053
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High					1.200	1.200	1.200
Low					.8000	.8000	.8000

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.071	.0267	.9894	.9987	.9962	.4987	.0016
SDev	.001	.0049	.0003	.0026	.0247	.0009	.0052
%RSD	.1046	18.36	.0269	.2606	2.480	.1858	324.7
#1	1.070	.0301	.9892	.9968	.9788	.4994	-.0021
#2	1.071	.0232	.9896	1.001	1.014	.4980	.0053
Errors	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK	LC Pass	NOCHECK
High	1.200		1.200	1.200		.6000	
Low	.8000		.8000	.8000		.4000	

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0005	.9735	.9773
SDev	.0001	.0039	.0010
%RSD	17.54	.4037	.1076
#1	-.0005	.9763	.9781
#2	-.0006	.9708	.9766
Errors	NOCHECK	LC Pass	NOCHECK
High		1.200	
Low		.8000	

010242

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	670300	10000	--	--	--	--	--
SDev	4967.425	.0000000	--	--	--	--	--
%RSD	.7410755	.0000000	--	--	--	--	--
#1	666787	10000	--	--	--	--	--
#2	673812	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccv8 Operator:
Run Time: 02/15/05 22:53:44
Comment:
Mode: CONC Corr. Factor: 1

010243

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.002	9.721	5.119	5.279	10.29	.9829	5.039
SDev	.002	.022	.002	.012	.04	.0001	.018
%RSD	.1938	.2298	.0377	.2322	.4289	.0153	.3478
#1	1.003	9.737	5.117	5.271	10.26	.9830	5.051
#2	1.000	9.706	5.120	5.288	10.32	.9828	5.027
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	1.100	11.00	5.500	5.500	11.00	1.100	5.500
Low	.9000	9.000	4.500	4.500	9.000	.9000	4.500

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.91	.9864	5.003	1.998	2.066	10.03	18.11
SDev	.01	.0013	.001	.002	.001	.05	.05
%RSD	.0637	.1356	.0137	.1222	.0721	.4660	.2836
#1	19.90	.9855	5.003	1.996	2.067	9.997	18.15
#2	19.91	.9873	5.002	2.000	2.065	10.06	18.07
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	22.00	1.100	5.500	2.200	2.200	11.00	22.00
Low	18.00	.9000	4.500	1.800	1.800	9.000	18.00

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.972	4.699	19.80	1.009	5.037	27.71	H40.23
SDev	.008	.011	.01	.001	.002	.13	.20
%RSD	.1686	.2350	.0403	.0669	.0344	.4782	.4927
#1	4.978	4.707	19.80	1.009	5.039	27.80	H40.37
#2	4.966	4.691	19.81	1.008	5.036	27.61	H40.09
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC High
High	5.500	5.500	22.00	1.100	5.500	33.00	33.00
Low	4.500	4.500	18.00	.9000	4.500	27.00	27.00

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.062	4.955	4.940	4.950	.9974	1.002	1.004
SDev	.006	.007	.012	.003	.0034	.002	.001
%RSD	.1114	.1380	.2434	.0545	.3394	.1812	.1221
#1	5.058	4.960	4.931	4.948	.9950	1.004	1.005
#2	5.065	4.951	4.948	4.952	.9998	1.001	1.003
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	5.500	5.500			1.100	1.100	1.100
Low	4.500	4.500			.9000	.9000	.9000

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010244

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.6	5.193	5.238	5.159	4.947	5.223	5.060
SDev	.6	.016	.022	.002	.006	.020	.010
%RSD	.6184	.3025	.4127	.0457	.1173	.3762	.2019
#1	102.1	5.182	5.222	5.161	4.943	5.209	5.052
#2	101.2	5.204	5.253	5.157	4.951	5.237	5.067
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				5.500	5.500	5.500	5.500
Low				4.500	4.500	4.500	4.500

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.074	.9734	4.967	5.212	.9945	5.005	1.081
SDev	.006	.0006	.003	.002	.0021	.002	.006
%RSD	.1253	.0602	.0590	.0458	.2075	.0482	.5345
#1	5.078	.9738	4.969	5.214	.9960	5.003	1.077
#2	5.069	.9730	4.965	5.210	.9931	5.007	1.085
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500	5.500	1.100	5.500	1.100
Low	4.500	.9000	4.500	4.500	.9000	4.500	.9000

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	4.841	1.012	4.864
SDev	.002	.001	.004
%RSD	.0395	.1337	.0757
#1	4.842	1.011	4.867
#2	4.840	1.013	4.861
Errors	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500
Low	4.500	.9000	4.500

010245

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	732394	10000	--	--	--	--	--
SDev	4532.555	.0000000	--	--	--	--	--
%RSD	.6188683	.0000000	--	--	--	--	--
#1	735599	10000	--	--	--	--	--
#2	729189	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccb8 Operator:
Run Time: 02/15/05 23:02:11 010246
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	.0044	-.0023	H.3594	-.0000	-.0001	-.0045
SDev	.0003	.0034	.0007	.0090	.0000	.0000	.0020
%RSD	54.60	78.23	29.11	2.499	6906.	2.777	44.31
#1	.0007	.0068	-.0028	H.3657	-.0000	-.0001	-.0031
#2	.0003	.0020	-.0019	H.3530	.0000	-.0001	-.0060
Errors	LC Pass	LC Pass	LC Pass	LC High	LC Pass	LC Pass	LC Pass
High	.0050	.0500	.0050	.0500	.0050	.0050	.0100
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0100

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0034	.0002	.0007	.0000	-.0005	.0038	.0019
SDev	.0009	.0003	.0001	.0012	.0010	.0152	.0264
%RSD	27.43	137.1	7.266	52820.	206.5	399.7	1425.
#1	.0027	.0000	.0007	-.0009	-.0012	-.0069	-.0168
#2	.0041	.0005	.0008	.0009	.0002	.0145	.0205
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	.0050	.0042	.0001	.0015	H.0681	.0171
SDev	.0003	.0001	.0004	.0001	.0008	.1989	.0010
%RSD	30.56	1.107	8.667	271.6	50.09	291.9	5.808
#1	.0007	H.0050	.0045	-.0000	.0021	L-.0725	.0178
#2	.0011	.0049	.0040	.0002	.0010	H.2088	.0164
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC High	LC Pass
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0014	.0048	-.0043	.0028	.0058	.0023
SDev	.0004	.0074	.0025	.0023	.0031	.0004	.0036
%RSD	294.7	546.8	53.08	53.47	107.0	6.787	157.2
#1	-.0002	.0066	.0030	-.0059	.0007	.0055	-.0003
#2	.0005	-.0039	.0066	-.0027	.0050	.0061	.0048
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	.0050	.0100			.0050	.0100	.0100
Low	-.0050	-.0100			-.0050	-.0100	-.0100

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010247

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	102.8	.0056	-.0011	-.0001	-.0012	.0012	H.0313
SDev	1.2	.0016	.0010	.0046	.0024	.0012	.0027
%RSD	1.164	29.33	89.87	8324.	192.6	103.6	8.628
#1	103.6	.0068	-.0004	-.0033	-.0029	.0020	H.0332
#2	101.9	.0045	-.0018	.0032	.0004	.0003	H.0294
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC High
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0016	.0000	.0016	.0373	.0001	.0008
SDev	.0000	.0003	.0000	.0016	.0055	.0004	.0040
%RSD	30.85	17.98	28.14	102.5	14.64	382.3	527.2
#1	.0000	.0018	.0000	.0004	.0412	-.0002	-.0021
#2	.0000	.0014	.0000	.0027	.0334	.0004	.0036
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0000	.0003
SDev	.0001	.0002	.0004
%RSD	121.0	449.0	136.4
#1	-.0001	-.0001	.0000
#2	-.0000	.0002	.0005
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010248

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	740938	10000	--	--	--	--	--
SDev	8588.519	.0000000	--	--	--	--	--
%RSD	1.159141	.0000000	--	--	--	--	--
#1	747011	10000	--	--	--	--	--
#2	734865	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: pbw-B10W1p59201df100 Operator:
Run Time: 02/15/05 23:06:57
Comment:
Mode: CONC Corr. Factor: 1

010249

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	.0093	-.0012	.3289	.0000	-.0001	-.0060
SDev	.0004	.0006	.0001	.0182	.0001	.0000	.0014
%RSD	88.08	6.908	7.759	5.528	1054.	22.41	22.98
#1	.0008	.0097	-.0013	.3418	.0001	-.0001	-.0070
#2	.0002	.0088	-.0011	.3160	-.0001	-.0001	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0052	.0000	.0002	.0000	.0001	-.0023	.0011
SDev	.0005	.0002	.0008	.0021	.0011	.0141	.0104
%RSD	9.724	1909.	308.8	42290.	734.2	608.0	934.7
#1	.0049	-.0002	-.0003	.0015	.0009	-.0123	-.0063
#2	.0056	.0002	.0008	-.0015	-.0006	.0077	.0085

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0043	.0021	.0001	.0010	-.0881	.0054
SDev	.0004	.0001	.0014	.0001	.0011	.0601	.0153
%RSD	171.2	1.216	68.02	85.55	111.1	68.22	282.1
#1	-.0001	.0044	.0031	.0001	.0017	-.1306	-.0054
#2	.0006	.0043	.0011	.0000	.0002	-.0456	.0163

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0009	-.0004	.0042	-.0004	.0013	.0137	.0014
SDev	.0013	.0020	.0042	.0022	.0037	.0074	.0004
%RSD	142.3	452.1	98.59	534.4	278.5	53.77	26.86
#1	.0000	.0010	.0013	.0012	-.0013	.0085	.0017
#2	-.0018	-.0018	.0072	-.0020	.0040	.0189	.0012

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.53	.0030	.0015	.1175	.0012	.0020	.0266
SDev	2.12	.0084	.0012	.0259	.0001	.0020	.0082
%RSD	2.133	283.4	80.67	21.99	8.497	99.58	30.86
#1	98.03	-.0030	.0024	.0992	.0012	.0006	.0325
#2	101.0	.0089	.0006	.1358	.0011	.0034	.0208

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0039	.0002	-.0005	.0034	.0004	-.0000
SDev	.0000	.0065	.0003	.0012	.0010	.0006	.0033
%RSD	142.3	167.4	182.1	232.9	28.86	131.1	9236.
#1	.0000	.0084	.0004	-.0014	.0027	.0008	-.0024
#2	-.0000	-.0007	-.0000	.0003	.0041	.0000	.0023

010250

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0010	.0143
SDev	.0002	.0001	.0030
%RSD	1853.	15.04	20.96
#1	.0002	.0009	.0165
#2	-.0001	.0011	.0122

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	717420	10000	--	--	--	--	--
SDev	15266.44	.0000000	--	--	--	--	--
%RSD	2.127963	.0000000	--	--	--	--	--
#1	706625	10000	--	--	--	--	--
#2	728215	10000	--	--	--	--	--

Method: DAILY2 Sample Name: pbw-B10W2 df100 Operator:
Run Time: 02/15/05 23:11:44
Comment:
Mode: CONC Corr. Factor: 1

010251

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	.0117	-.0022	.2961	.0000	-.0001	-.0035
SDev	.0011	.0011	.0002	.0126	.0000	.0000	.0010
%RSD	149.5	9.850	7.559	4.251	180.2	6.959	29.71
#1	-.0000	.0109	-.0021	.3050	.0000	-.0001	-.0028
#2	.0015	.0125	-.0024	.2872	-.0000	-.0001	-.0043

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0066	.0001	.0004	-.0002	.0001	-.0033	-.0090
SDev	.0007	.0003	.0006	.0001	.0005	.0105	.0101
%RSD	11.02	469.7	168.6	47.31	371.0	319.4	113.1
#1	.0061	-.0001	-.0001	-.0003	-.0002	-.0107	-.0161
#2	.0072	.0003	.0008	-.0002	.0005	.0041	-.0018

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	.0039	.0023	.0015	.0007	-.0478	-.0007
SDev	.0011	.0001	.0012	.0000	.0004	.0388	.0062
%RSD	332.1	2.113	51.38	2.984	52.79	81.20	843.4
#1	-.0011	.0040	.0015	.0014	.0004	-.0752	-.0051
#2	.0004	.0039	.0032	.0015	.0010	-.0204	.0037

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	-.0087	-.0005	-.0014	-.0004	.0127	.0040
SDev	.0007	.0065	.0007	.0011	.0021	.0070	.0036
%RSD	101.5	74.35	123.2	82.47	491.7	55.57	90.10
#1	.0012	-.0133	-.0001	-.0022	-.0019	.0077	.0014
#2	.0002	-.0041	-.0010	-.0006	.0010	.0177	.0065

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.98	.0020	.0008	.1241	-.0011	.0012	.0309
SDev	.07	.0009	.0049	.0218	.0005	.0036	.0041
%RSD	.0746	46.79	598.0	17.54	50.12	292.9	13.33
#1	97.93	.0026	.0043	.1087	-.0014	.0038	.0339
#2	98.04	.0013	-.0027	.1395	-.0007	-.0013	.0280

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0022	.0002	-.0027	-.0125	.0004	-.0002
SDev	.0000	.0003	.0001	.0000	.0187	.0011	.0023
%RSD	1412.	13.37	33.63	1.266	149.4	282.2	1036.
#1	-.0000	.0024	.0002	-.0027	-.0257	-.0004	-.0019
#2	.0000	.0020	.0001	-.0027	.0007	.0011	.0014

010252

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0011	.0084
SDev	.0000	.0003	.0012
%RSD	.0108	27.01	13.92
#1	-.0000	.0009	.0076
#2	-.0000	.0013	.0092

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	706304	10000	--	--	--	--	--
SDev	491.4392	.0000000	--	--	--	--	--
%RSD	.0695790	.0000000	--	--	--	--	--
#1	705956	10000	--	--	--	--	--
#2	706651	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: srm-B10W1 df100 Operator:
Run Time: 02/15/05 23:16:31
Comment:
Mode: CONC Corr. Factor: 1

010253

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	.8599	.0004	.2668	.0119	-.0001	-.0049
SDev	.0019	.0110	.0019	.0091	.0001	.0000	.0067
%RSD	1133.	1.282	470.7	3.424	.5098	13.46	136.9
#1	-.0012	.8521	-.0009	.2732	.0119	-.0001	-.0096
#2	.0015	.8677	.0017	.2603	.0118	-.0001	-.0002

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0879	-.0003	.0002	.0012	.0001	.1674	.2164
SDev	.0024	.0001	.0015	.0008	.0003	.0344	.0254
%RSD	2.757	22.44	740.6	67.34	305.0	20.56	11.72
#1	.0862	-.0004	-.0008	.0017	.0003	.1431	.1985
#2	.0896	-.0003	.0012	.0006	-.0001	.1918	.2344

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	.0040	.0189	.0051	.0005	.2626	.4235
SDev	.0015	.0001	.0074	.0000	.0006	.1968	.0130
%RSD	788.9	2.112	39.05	.8382	114.5	74.95	3.067
#1	-.0012	.0040	.0137	.0051	.0001	.1235	.4143
#2	.0009	.0041	.0241	.0051	.0009	.4018	.4327

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.0007	.0003	.0003	-.0023	.0106	.0053
SDev	.0008	.0057	.0004	.0037	.0059	.0076	.0015
%RSD	1319.	773.5	157.8	1475.	255.3	72.12	28.83
#1	.0005	.0048	-.0000	.0029	-.0065	.0159	.0042
#2	-.0006	-.0033	.0006	-.0024	.0019	.0052	.0063

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.43	.0017	.0019	4.095	.0003	.0018	.0300
SDev	.01	.0063	.0027	.023	.0023	.0003	.0032
%RSD	.0070	382.2	140.6	.5551	814.9	19.31	10.59
#1	99.44	-.0028	.0038	4.079	.0019	.0016	.0322
#2	99.43	.0062	.0000	4.111	-.0014	.0021	.0277

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0008	.0045	.0176	.0020	-.0159	-.0000	-.0017
SDev	.0001	.0029	.0002	.0040	.0412	.0014	.0004
%RSD	9.049	64.17	1.382	196.2	259.9	3787.	21.01
#1	.0008	.0065	.0178	-.0008	-.0450	.0009	-.0020
#2	.0009	.0025	.0175	.0049	.0133	-.0010	-.0015

010254

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0004	.0008	.0094
SDev	.0001	.0001	.0005
%RSD	32.84	16.23	5.663
#1	.0005	.0009	.0090
#2	.0003	.0007	.0098

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	716768	10000	--	--	--	--	--
SDev	59.39697	.0000000	--	--	--	--	--
%RSD	.0082868	.0000000	--	--	--	--	--
#1	716810	10000	--	--	--	--	--
#2	716726	10000	--	--	--	--	--

Analysis Report 02/15/05 11:25:51 PM

Method: DAILY2 Sample Name: srm-B10W2 df100 Operator:
Run Time: 02/15/05 23:21:17
Comment:
Mode: CONC Corr. Factor: 1

010255

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	.6559	-.0028	.2363	.0090	-.0001	-.0017
SDev	.0005	.0021	.0023	.0069	.0000	.0000	.0033
%RSD	86.32	.3122	82.32	2.927	.4650	11.49	195.9
#1	.0009	.6544	-.0012	.2411	.0091	-.0001	-.0041
#2	.0002	.6573	-.0045	.2314	.0090	-.0001	.0007

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0687	.0001	-.0000	.0006	.0004	.1252	.1763
SDev	.0006	.0000	.0006	.0008	.0004	.0080	.0003
%RSD	.8517	44.48	7056.	140.0	100.5	6.422	.1546
#1	.0683	.0001	.0004	.0011	.0006	.1195	.1765
#2	.0692	.0001	-.0004	.0000	.0001	.1309	.1761

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0038	.0161	.0038	.0007	.2755	.3186
SDev	.0001	.0001	.0022	.0000	.0001	.0275	.0096
%RSD	942.8	1.389	14.01	.9288	14.20	9.984	3.015
#1	.0000	.0038	.0176	.0039	.0006	.2561	.3118
#2	-.0000	.0037	.0145	.0038	.0007	.2950	.3254

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	-.0021	.0008	-.0012	.0006	.0052	.0073
SDev	.0007	.0066	.0018	.0008	.0004	.0017	.0015
%RSD	368.2	307.8	234.2	67.85	71.54	33.55	20.63
#1	.0003	.0025	.0020	-.0018	.0009	.0064	.0063
#2	-.0007	-.0068	-.0005	-.0006	.0003	.0040	.0084

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.09	.0016	-.0005	3.130	-.0006	.0002	.0337
SDev	.84	.0107	.0003	.026	.0000	.0038	.0016
%RSD	.8585	653.4	64.96	.8168	6.120	1634.	4.712
#1	97.50	-.0060	-.0007	3.112	-.0005	-.0025	.0348
#2	98.69	.0092	-.0003	3.148	-.0006	.0029	.0325

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	.0041	.0135	.0014	.0038	.0002	-.0017
SDev	.0000	.0020	.0002	.0012	.0126	.0006	.0011
%RSD	2.810	47.93	1.253	86.14	335.3	265.1	61.77
#1	.0006	.0055	.0136	.0005	-.0052	.0006	-.0025
#2	.0006	.0027	.0134	.0022	.0127	-.0002	-.0010

010256

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0003	.0009	.0079
SDev	.0001	.0001	.0005
%RSD	43.64	10.75	6.250
#1	.0004	.0008	.0075
#2	.0002	.0009	.0082

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	707082	10000	--	--	--	--	--
SDev	6059.198	.0000000	--	--	--	--	--
%RSD	.8569306	.0000000	--	--	--	--	--
#1	702797	10000	--	--	--	--	--
#2	711366	10000	--	--	--	--	--

Analysis Report 02/15/05 11:30:38 PM page 1

Method: DAILY2 Sample Name: srm-B10W3 df100 Operator:
Run Time: 02/15/05 23:26:03
Comment:
Mode: CONC Corr. Factor: 1

010257

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	.3997	-.0024	.2092	.0001	-.0001	-.0112
SDev	.0001	.0008	.0008	.0049	.0000	.0000	.0009
%RSD	15.17	.2094	33.30	2.329	13.43	10.65	7.700
#1	.0004	.4002	-.0029	.2127	.0001	-.0001	-.0118
#2	.0004	.3991	-.0018	.2058	.0001	-.0001	-.0106

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.2249	.0000	.0008	.0024	.0102	.6929	.0054
SDev	.0013	.0002	.0003	.0003	.0004	.0289	.0168
%RSD	.5614	328.3	39.06	11.05	3.526	4.177	312.3
#1	.2240	.0002	.0006	.0026	.0099	.6725	-.0065
#2	.2258	-.0001	.0010	.0022	.0104	.7134	.0172

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	.0032	.1842	.0131	.0002	-.1405	.0478
SDev	.0008	.0000	.0043	.0001	.0001	.1360	.0029
%RSD	187.1	.8895	2.319	.4418	56.84	96.78	6.138
#1	-.0010	.0032	.1812	.0131	.0003	-.2366	.0457
#2	.0001	.0032	.1872	.0131	.0001	-.0443	.0498

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.0107	.0017	-.0003	.0002	.0153	.0046
SDev	.0010	.0042	.0010	.0004	.0043	.0034	.0040
%RSD	773.3	39.17	57.44	123.7	2788.	21.91	87.20
#1	.0006	.0136	.0010	-.0006	-.0029	.0130	.0018
#2	-.0008	.0077	.0024	-.0000	.0032	.0177	.0075

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.76	.0026	-.0030	2.335	.0004	-.0011	.0313
SDev	.81	.0044	.0025	.011	.0006	.0032	.0001
%RSD	.8331	168.1	82.56	.4842	157.9	276.8	.2832
#1	98.34	-.0005	-.0048	2.327	-.0000	-.0034	.0314
#2	97.19	.0058	-.0013	2.343	.0008	.0011	.0312

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	.0008	.0713	.0031	-.0062	.0022	.0013
SDev	.0000	.0005	.0001	.0032	.0234	.0003	.0021
%RSD	6.014	68.05	.1416	104.4	380.6	12.87	158.7
#1	.0004	.0011	.0712	.0008	-.0227	.0020	.0028
#2	.0005	.0004	.0714	.0053	.0104	.0024	-.0002

010258

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0075	.0045
SDev	.0000	.0001	.0005
%RSD	32.15	.9710	10.28
#1	-.0001	.0075	.0041
#2	-.0001	.0074	.0048

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	704686	10000	--	--	--	--	--
SDev	5912.827	.0000000	--	--	--	--	--
%RSD	.8390726	.0000000	--	--	--	--	--
#1	708867	10000	--	--	--	--	--
#2	700505	10000	--	--	--	--	--

Analysis Report 02/15/05 11:35:24 PM

Method: DAILY2 Sample Name: srm-B10W4 df100 Operator:
Run Time: 02/15/05 23:30:50
Comment:
Mode: CONC Corr. Factor: 1

010259

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	.3706	-.0009	.1904	.0001	-.0001	-.0067
SDev	.0000	.0004	.0047	.0056	.0000	.0000	.0009
%RSD	.3723	.0995	513.0	2.953	34.18	19.44	13.53
#1	-.0003	.3704	-.0042	.1944	.0001	-.0001	-.0074
#2	-.0004	.3709	.0024	.1864	.0001	-.0001	-.0061

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.2041	-.0001	.0001	.0031	.0009	.6329	-.0046
SDev	.0016	.0002	.0006	.0004	.0002	.0151	.0148
%RSD	.8093	402.4	422.0	13.12	23.27	2.388	321.8
#1	.2029	-.0002	-.0003	.0034	.0011	.6222	-.0151
#2	.2052	.0001	.0006	.0028	.0008	.6436	.0059

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0006	.0028	.1611	.0125	.0012	-.0635	.0557
SDev	.0004	.0001	.0022	.0001	.0011	.2762	.0056
%RSD	62.17	3.024	1.363	.5492	96.09	435.2	9.977
#1	-.0009	.0028	.1596	.0125	.0020	-.2588	.0518
#2	-.0003	.0029	.1627	.0126	.0004	.1318	.0597

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0021	.0026	-.0003	-.0027	-.0015	.0103	.0031
SDev	.0004	.0140	.0006	.0028	.0023	.0102	.0055
%RSD	17.63	528.3	190.3	102.2	146.1	99.30	178.9
#1	.0019	-.0072	.0001	-.0008	-.0032	.0031	.0070
#2	.0024	.0125	-.0007	-.0047	.0001	.0175	-.0008

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.79	-.0020	-.0010	2.250	-.0019	-.0013	.0296
SDev	.19	.0028	.0012	.015	.0020	.0017	.0008
%RSD	.1907	142.4	116.7	.6458	108.2	130.7	2.803
#1	98.92	-.0040	-.0018	2.240	-.0004	-.0025	.0302
#2	98.66	.0000	-.0002	2.260	-.0033	-.0001	.0291

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	.0026	.0692	.0024	-.0183	.0029	-.0035
SDev	.0000	.0018	.0001	.0011	.0270	.0005	.0013
%RSD	8.454	68.41	.1108	44.14	147.3	17.14	37.87
#1	.0004	.0013	.0692	.0032	-.0374	.0032	-.0025
#2	.0004	.0038	.0691	.0017	.0008	.0025	-.0044

010260

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0012	.0037
SDev	.0000	.0002	.0007
%RSD	40.90	20.69	19.47
#1	-.0000	.0010	.0032
#2	-.0001	.0013	.0042

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	712122	10000	--	--	--	--	--
SDev	1415.628	.0000000	--	--	--	--	--
%RSD	.1987901	.0000000	--	--	--	--	--
#1	713123	10000	--	--	--	--	--
#2	711121	10000	--	--	--	--	--

Method: DAILY2 Sample Name: 257326 df100 r Operator:
Run Time: 02/15/05 23:37:26
Comment:
Mode: CONC Corr. Factor: 1

010261

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	.2660	-.0043	.1739	.0030	-.0001	-.0073
SDev	.0000	.0004	.0003	.0095	.0000	.0000	.0030
%RSD	6.200	.1352	6.756	5.454	1.430	12.48	40.65
#1	.0006	.2658	-.0045	.1806	.0031	-.0001	-.0052
#2	.0007	.2663	-.0041	.1672	.0030	-.0001	-.0094

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0849	-.0000	.0006	-.0001	.0015	.1171	.0472
SDev	.0002	.0001	.0003	.0004	.0004	.0026	.0001
%RSD	.2088	417.7	57.98	422.2	25.22	2.199	.1296
#1	.0851	-.0001	.0004	.0002	.0012	.1190	.0472
#2	.0848	.0000	.0009	-.0004	.0017	.1153	.0472

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.0028	.0589	.0030	.0008	.0014	.0511
SDev	.0001	.0001	.0005	.0001	.0014	.0443	.0152
%RSD	223.7	2.642	.8034	3.616	179.5	3071.	29.79
#1	-.0002	.0028	.0592	.0031	.0018	.0328	.0403
#2	.0000	.0027	.0586	.0029	-.0002	-.0299	.0618

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	.0002	.0028	-.0023	-.0018	.0100	.0043
SDev	.0003	.0050	.0012	.0022	.0002	.0025	.0026
%RSD	154.8	2133.	43.90	97.64	10.00	24.91	60.12
#1	-.0004	.0038	.0037	-.0007	-.0019	.0083	.0062
#2	.0000	-.0033	.0019	-.0038	-.0016	.0118	.0025

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.19	.0037	-.0005	1.075	-.0006	.0009	.0341
SDev	2.81	.0037	.0018	.011	.0019	.0000	.0053
%RSD	2.867	102.2	361.7	1.061	336.0	3.042	15.44
#1	96.20	.0010	.0008	1.067	.0008	.0009	.0378
#2	100.2	.0063	-.0018	1.083	-.0019	.0009	.0304

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0013	.0021	.0148	.0016	.0016	.0004	-.0014
SDev	.0000	.0003	.0002	.0013	.0111	.0009	.0040
%RSD	2.372	11.53	1.075	77.29	674.4	229.9	275.8
#1	.0013	.0020	.0149	.0007	.0095	.0010	-.0042
#2	.0013	.0023	.0146	.0025	-.0062	-.0002	.0014

010262

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0058	.0043
SDev	.0000	.0000	.0001
%RSD	247.1	.5678	2.420
#1	.0000	.0059	.0044
#2	-.0000	.0058	.0042

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	707756	10000	--	--	--	--	--
SDev	20274.87	.0000000	--	--	--	--	--
%RSD	2.864672	.0000000	--	--	--	--	--
#1	693419	10000	--	--	--	--	--
#2	722092	10000	--	--	--	--	--

Analysis Report 02/15/05 11:50:27 PM

Method: DAILY2 Sample Name: ccv9 Operator:
Run Time: 02/15/05 23:45:53
Comment:
Mode: CONC Corr. Factor: 1

010263

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.003	9.703	5.109	4.958	10.28	.9846	5.027
SDev	.000	.002	.006	.021	.04	.0004	.015
%RSD	.0195	.0166	.1088	.4197	.3945	.0388	.3058
#1	1.003	9.702	5.105	4.943	10.25	.9849	5.016
#2	1.003	9.704	5.113	4.972	10.31	.9843	5.038
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	1.100	11.00	5.500	5.500	11.00	1.100	5.500
Low	.9000	9.000	4.500	4.500	9.000	.9000	4.500

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.94	.9928	5.003	2.003	2.060	10.05	18.02
SDev	.00	.0028	.001	.001	.003	.01	.06
%RSD	.0039	.2814	.0110	.0444	.1554	.0522	.3306
#1	19.94	.9908	5.003	2.002	2.058	10.06	L17.98
#2	19.94	.9948	5.003	2.003	2.062	10.05	18.06
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	22.00	1.100	5.500	2.200	2.200	11.00	22.00
Low	18.00	.9000	4.500	1.800	1.800	9.000	18.00

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.977	4.694	19.86	1.010	5.036	27.75	H40.15
SDev	.004	.019	.01	.000	.004	.20	.07
%RSD	.0750	.4009	.0637	.0313	.0739	.7382	.1649
#1	4.974	4.681	19.87	1.010	5.033	27.61	H40.10
#2	4.979	4.708	19.85	1.010	5.038	27.90	H40.20
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC High
High	5.500	5.500	22.00	1.100	5.500	33.00	33.00
Low	4.500	4.500	18.00	.9000	4.500	27.00	27.00

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.074	4.881	4.963	4.982	.9969	1.006	.9958
SDev	.013	.038	.008	.004	.0006	.005	.0019
%RSD	.2527	.7748	.1624	.0837	.0549	.4507	.1932
#1	5.065	4.908	4.968	4.979	.9965	1.009	.9944
#2	5.083	4.854	4.957	4.985	.9973	1.003	.9972
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	5.500	5.500			1.100	1.100	1.100
Low	4.500	4.500			.9000	.9000	.9000

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010364

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.81	5.179	5.252	5.121	4.976	5.227	5.060
SDev	.38	.011	.020	.006	.000	.009	.003
%RSD	.3832	.2180	.3715	.1125	.0019	.1768	.0531
#1	99.54	5.187	5.238	5.125	4.976	5.221	5.062
#2	100.1	5.171	5.265	5.117	4.976	5.234	5.058
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				5.500	5.500	5.500	5.500
Low				4.500	4.500	4.500	4.500

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.070	.9759	4.968	5.209	1.012	5.007	1.068
SDev	.007	.0001	.002	.002	.003	.001	.004
%RSD	.1322	.0083	.0441	.0330	.3286	.0171	.3785
#1	5.065	.9760	4.967	5.208	1.010	5.008	1.071
#2	5.075	.9759	4.970	5.211	1.014	5.007	1.065
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500	5.500	1.100	5.500	1.100
Low	4.500	.9000	4.500	4.500	.9000	4.500	.9000

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	4.846	1.017	4.844
SDev	.001	.002	.009
%RSD	.0115	.1946	.1856
#1	4.846	1.019	4.837
#2	4.845	1.016	4.850
Errors	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500
Low	4.500	.9000	4.500

010265

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	719447	10000	--	--	--	--	--
SDev	2694.077	.0000000	--	--	--	--	--
%RSD	.3744650	.0000000	--	--	--	--	--
#1	717542	10000	--	--	--	--	--
#2	721352	10000	--	--	--	--	--

Analysis Report 02/15/05 11:58:53 PM

Method: DAILY2 Sample Name: ccb9 Operator: 010266
Run Time: 02/15/05 23:54:19
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0041	-.0032	H.1262	.0001	-.0001	-.0094
SDev	.0006	.0045	.0023	.0047	.0000	.0000	.0046
%RSD	91130.	111.5	70.47	3.759	19.34	2.288	48.42
#1	-.0004	.0009	-.0048	H.1296	.0001	-.0001	L-.0127
#2	.0004	.0073	-.0016	H.1229	.0001	-.0001	-.0062
Errors	LC Pass	LC Pass	LC Pass	LC High	LC Pass	LC Pass	LC Pass
High	.0050	.0500	.0050	.0500	.0050	.0050	.0100
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0100

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	.0002	.0005	-.0002	-.0007	-.0067	-.0166
SDev	.0021	.0002	.0007	.0005	.0001	.0348	.0313
%RSD	235.1	99.82	136.5	266.8	19.34	517.1	188.2
#1	-.0006	.0001	.0000	-.0005	-.0008	L-.0313	-.0387
#2	.0024	.0003	.0010	.0002	-.0006	.0179	.0055
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0024	.0005	-.0000	.0006	L-.0689	.0099
SDev	.0008	.0002	.0097	.0000	.0004	.3255	.0138
%RSD	3138.	9.020	1829.	128.9	70.54	472.1	139.2
#1	-.0006	.0022	-.0063	-.0000	.0009	L-.2991	.0002
#2	.0005	.0025	.0074	-.0001	.0003	H.1612	.0196
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Low	LC Pass
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0013	.0006	-.0001	-.0020	-.0008	.0025	.0088
SDev	.0003	.0011	.0026	.0002	.0061	.0124	.0010
%RSD	22.26	174.6	2512.	12.66	790.4	492.3	11.93
#1	-.0011	.0014	-.0020	-.0018	L-.0051	-.0062	.0081
#2	-.0015	-.0001	.0017	-.0021	.0036	H.0113	.0096
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	.0050	.0100			.0050	.0100	.0100
Low	-.0050	-.0100			-.0050	-.0100	-.0100

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010267

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	103.5	.0018	.0013	.0003	-.0013	.0014	H.0282
SDev	.3	.0062	.0013	.0036	.0007	.0029	.0009
%RSD	.2992	351.6	104.7	1219.	53.35	204.6	3.083
#1	103.3	-.0026	.0003	-.0022	-.0018	-.0006	H.0288
#2	103.7	.0062	.0022	.0028	-.0008	.0035	H.0276
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC High
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0008	.0001	.0025	.0005	.0002	-.0002
SDev	.0000	.0037	.0000	.0016	.0434	.0005	.0032
%RSD	660.2	447.8	47.97	63.83	8492.	207.8	1752.
#1	-.0000	.0035	.0001	.0014	-.0302	.0006	-.0025
#2	.0000	-.0018	.0001	.0037	.0312	-.0001	.0021
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	-.0001	.0001
SDev	.0000	.0003	.0003
%RSD	63.03	249.6	589.9
#1	-.0000	-.0003	.0003
#2	-.0000	.0001	-.0002
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010268

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	745998	10000	--	--	--	--	--
SDev	2226.679	.0000000	--	--	--	--	--
%RSD	.2984831	.0000000	--	--	--	--	--
#1	744424	10000	--	--	--	--	--
#2	747573	10000	--	--	--	--	--

Analysis Report 02/16/05 00:03:39 AM

Method: DAILY2 Sample Name: zzzzzz Operator: 010269
Run Time: 02/15/05 23:59:05
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	.0030	-.0050	.1173	-.0000	-.0001	-.0021
SDev	.0003	.0004	.0005	.0018	.0000	.0000	.0007
%RSD	65.08	12.31	9.091	1.541	70.52	2.402	34.49
#1	.0003	.0033	-.0053	.1186	-.0000	-.0001	-.0027
#2	.0007	.0028	-.0047	.1160	-.0000	-.0001	-.0016

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0016	.0001	.0004	.0003	-.0007	.0014	-.0045
SDev	.0021	.0002	.0003	.0002	.0003	.0053	.0116
%RSD	129.8	216.5	70.11	56.54	36.33	373.8	259.0
#1	.0001	-.0001	.0006	.0002	-.0005	-.0023	-.0127
#2	.0031	.0002	.0002	.0004	-.0009	.0051	.0037

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0022	.0013	.0000	.0012	-.0149	.0072
SDev	.0005	.0001	.0016	.0000	.0008	.1985	.0003
%RSD	3573.	5.626	124.3	116.1	64.97	1330.	3.890
#1	-.0003	.0021	.0002	.0000	.0006	-.1553	.0070
#2	.0004	.0023	.0025	.0001	.0017	.1255	.0074

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0005	.0023	.0012	-.0005	.0007	.0176	.0072
SDev	.0002	.0033	.0042	.0011	.0023	.0006	.0060
%RSD	46.41	144.5	352.1	211.2	317.5	3.633	83.26
#1	-.0003	-.0000	-.0018	-.0013	-.0009	.0181	.0030
#2	-.0007	.0046	.0041	.0003	.0024	.0172	.0114

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	102.0	.0006	.0001	.0009	.0001	.0003	.0297
SDev	1.2	.0025	.0004	.0020	.0021	.0006	.0030
%RSD	1.208	434.7	297.1	227.6	3170.	197.1	10.10
#1	102.9	-.0012	.0004	-.0005	-.0014	-.0001	.0318
#2	101.1	.0023	-.0001	.0023	.0016	.0007	.0276

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0002	.0000	.0007	.0187	.0009	-.0023
SDev	.0000	.0005	.0000	.0026	.0092	.0004	.0003
%RSD	62.26	222.7	79.97	385.8	49.26	46.29	14.02
#1	.0000	-.0001	.0000	-.0012	.0122	.0006	-.0021
#2	.0000	.0006	.0001	.0025	.0253	.0012	-.0025

010270

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0002	.0004
SDev	.0001	.0001	.0001
%RSD	4514.	61.79	24.00
#1	.0001	.0001	.0003
#2	-.0001	.0002	.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	735163	10000	--	--	--	--	--
SDev	8813.379	.0000000	--	--	--	--	--
%RSD	1.198833	.0000000	--	--	--	--	--
#1	741395	10000	--	--	--	--	--
#2	728931	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: zzzzzz Operator:
Run Time: 02/16/05 00:03:51 010271
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0053	-.0059	.1129	.0001	-.0001	-.0005
SDev	.0001	.0044	.0019	.0032	.0001	.0000	.0026
%RSD	53.99	83.92	31.88	2.824	200.4	20.26	551.5
#1	.0002	.0084	-.0072	.1151	-.0000	-.0002	-.0023
#2	.0001	.0022	-.0046	.1106	.0002	-.0001	.0014

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0008	-.0000	.0001	.0013	-.0004	-.0048	-.0032
SDev	.0004	.0001	.0001	.0005	.0008	.0107	.0006
%RSD	54.97	1179.	70.26	40.09	195.7	224.3	19.96
#1	.0005	-.0001	.0001	.0009	-.0009	.0028	-.0036
#2	.0011	.0001	.0002	.0016	.0001	-.0123	-.0027

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0021	-.0004	.0001	.0015	-.0753	-.0059
SDev	.0002	.0001	.0001	.0001	.0001	.1104	.0033
%RSD	174.6	2.721	23.31	199.4	6.316	146.5	56.70
#1	.0003	.0022	-.0005	-.0000	.0014	-.1534	-.0083
#2	-.0000	.0021	-.0004	.0001	.0015	.0027	-.0035

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	-.0012	-.0036	.0020	-.0005	.0186	.0031
SDev	.0007	.0056	.0013	.0001	.0006	.0027	.0055
%RSD	361.4	456.1	37.59	3.264	119.5	14.70	178.3
#1	.0003	-.0052	-.0026	.0020	-.0009	.0167	-.0008
#2	-.0007	.0027	-.0045	.0021	-.0001	.0205	.0070

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.73	-.0011	.0022	-.0016	.0002	.0011	.0313
SDev	.41	.0015	.0067	.0003	.0004	.0040	.0035
%RSD	.4067	132.1	309.3	15.93	198.9	365.2	11.14
#1	99.44	-.0021	.0069	-.0018	.0005	.0039	.0337
#2	100.0	-.0001	-.0026	-.0014	-.0001	-.0017	.0288

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0059	.0003	.0035	-.0113	.0010	-.0004
SDev	.0000	.0032	.0002	.0008	.0003	.0000	.0003
%RSD	49.35	52.99	66.62	23.40	3.042	.1854	67.70
#1	-.0000	.0037	.0002	.0029	-.0111	.0010	-.0006
#2	-.0000	.0082	.0005	.0040	-.0116	.0010	-.0002

010272

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	-.0001	.0006
SDev	.0003	.0001	.0009
%RSD	225.1	83.92	140.5
#1	-.0001	-.0000	.0000
#2	.0003	-.0002	.0013

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	718874	10000	--	--	--	--	--
SDev	2957.828	.0000000	--	--	--	--	--
%RSD	.4114526	.0000000	--	--	--	--	--
#1	716783	10000	--	--	--	--	--
#2	720966	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: pbw-B10W1 df10 Operator:
Run Time: 02/16/05 00:08:36
Comment:
Mode: CONC Corr. Factor: 1

010273

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	.0154	-.0014	.1059	-.0000	-.0001	-.0070
SDev	.0006	.0060	.0011	.0017	.0000	.0000	.0046
%RSD	117.1	38.75	80.62	1.603	82.88	8.902	65.60
#1	.0001	.0112	-.0006	.1071	-.0001	-.0001	-.0103
#2	.0009	.0196	-.0022	.1047	-.0000	-.0001	-.0038

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0025	-.0001	-.0000	-.0005	-.0005	.0036	-.0059
SDev	.0011	.0000	.0003	.0000	.0003	.0097	.0082
%RSD	42.63	32.42	2570.	5.979	65.04	266.5	139.4
#1	.0017	-.0001	-.0003	-.0005	-.0003	.0105	-.0117
#2	.0032	-.0001	.0002	-.0005	-.0007	-.0032	-.0001

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0017	.0082	.0001	.0010	-.0923	-.0058
SDev	.0002	.0001	.0015	.0000	.0004	.1199	.0002
%RSD	510.8	5.222	17.96	17.11	45.80	129.9	3.541
#1	-.0002	.0018	.0092	.0001	.0007	-.1770	-.0056
#2	.0001	.0017	.0071	.0001	.0013	-.0075	-.0059

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0007	.0034	.0035	-.0020	-.0015	.0204	.0045
SDev	.0013	.0063	.0038	.0009	.0030	.0024	.0006
%RSD	190.1	184.5	109.0	46.91	201.1	11.51	13.43
#1	-.0016	.0079	.0008	-.0027	-.0037	.0221	.0049
#2	.0002	-.0010	.0062	-.0013	.0006	.0188	.0040

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.30	.0030	.0016	.9679	-.0002	.0021	.0445
SDev	.95	.0041	.0018	.0938	.0019	.0026	.0097
%RSD	.9638	136.8	117.0	9.688	1183.	126.0	21.83
#1	98.97	.0059	.0028	1.034	-.0015	.0039	.0376
#2	97.63	.0001	.0003	.9016	.0012	.0002	.0513

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0014	.0010	-.0014	-.0020	-.0002	-.0000
SDev	.0000	.0006	.0001	.0019	.0154	.0003	.0003
%RSD	135.9	40.06	14.39	128.6	784.2	113.3	622.2
#1	.0000	.0010	.0009	-.0001	-.0128	-.0004	-.0003
#2	.0000	.0018	.0011	-.0028	.0089	-.0000	.0002

010274

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0003	.1262
SDev	.0001	.0002	.0233
%RSD	301.3	55.38	18.44
#1	-.0001	.0004	.1427
#2	.0000	.0002	.1098

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	708581	10000	--	--	--	--	--
SDev	6884.392	.0000000	--	--	--	--	--
%RSD	.9715744	.0000000	--	--	--	--	--
#1	713449	10000	--	--	--	--	--
#2	703713	10000	--	--	--	--	--

Analysis Report 02/16/05 00:17:56 AM page 1

Method: DAILY2 Sample Name: pbw-B10W2 df10 Operator:
Run Time: 02/16/05 00:13:22
Comment:
Mode: CONC Corr. Factor: 1

010275

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	.0176	-.0004	.0902	.0000	-.0001	-.0072
SDev	.0004	.0065	.0003	.0039	.0000	.0000	.0028
%RSD	83.88	37.16	75.43	4.270	332.3	5.892	38.70
#1	.0002	.0129	-.0006	.0929	.0000	-.0001	-.0092
#2	.0008	.0222	-.0002	.0874	-.0000	-.0001	-.0053

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0037	-.0001	.0010	.0006	.0000	.0099	-.0001
SDev	.0000	.0001	.0005	.0002	.0002	.0032	.0084
%RSD	.7156	61.38	47.29	38.98	1317.	32.15	8597.
#1	.0037	-.0002	.0007	.0007	.0001	.0077	-.0060
#2	.0036	-.0001	.0013	.0004	-.0001	.0122	.0058

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	.0016	.0158	.0000	.0009	.0118	-.0015
SDev	.0003	.0001	.0023	.0000	.0004	.1246	.0031
%RSD	76.88	3.485	14.69	76.83	49.28	1056.	204.7
#1	.0002	.0017	.0142	.0000	.0006	.0999	-.0037
#2	.0007	.0016	.0175	.0000	.0012	-.0763	.0007

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	.0009	.0009	-.0005	.0013	.0227	.0034
SDev	.0001	.0079	.0034	.0018	.0008	.0091	.0010
%RSD	18.53	873.4	388.6	363.2	61.45	39.85	29.29
#1	.0008	-.0047	-.0015	.0008	.0007	.0163	.0041
#2	.0006	.0065	.0032	-.0018	.0018	.0291	.0027

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.48	.0058	.0035	.6083	-.0000	.0043	.0681
SDev	.20	.0064	.0009	.0248	.0001	.0015	.0124
%RSD	.2052	111.2	26.98	4.084	360.0	35.47	18.27
#1	98.62	.0012	.0042	.5907	.0000	.0032	.0593
#2	98.33	.0103	.0028	.6259	-.0001	.0053	.0769

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0019	.0010	.0007	.0237	-.0002	-.0006
SDev	.0000	.0007	.0001	.0006	.0142	.0010	.0033
%RSD	150.0	35.42	9.970	87.17	60.21	482.4	592.0
#1	.0000	.0014	.0010	.0011	.0337	.0005	.0018
#2	-.0000	.0023	.0009	.0003	.0136	-.0010	-.0029

010276

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0001	.0556
SDev	.0001	.0001	.0006
%RSD	441.9	99.91	1.106
#1	.0001	.0000	.0560
#2	-.0001	.0002	.0551

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	709822	10000	--	--	--	--	--
SDev	1438.962	.0000000	--	--	--	--	--
%RSD	.2027214	.0000000	--	--	--	--	--
#1	710840	10000	--	--	--	--	--
#2	708805	10000	--	--	--	--	--

Method: DAILY2 Sample Name: srm-B10W1 df10 Operator:
Run Time: 02/16/05 00:18:08
Comment:
Mode: CONC Corr. Factor: 1

010277

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	8.727	-.0019	.0774	.1177	.0002	-.0050
SDev	.0007	.033	.0008	.0039	.0002	.0000	.0059
%RSD	202.8	.3751	44.69	5.041	.1486	8.441	119.3
#1	-.0001	8.704	-.0025	.0802	.1176	.0002	-.0008
#2	.0008	8.751	-.0013	.0747	.1178	.0002	-.0091

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.8735	.0001	.0001	.0014	.0009	1.808	2.768
SDev	.0001	.0005	.0004	.0000	.0001	.038	.032
%RSD	.0063	556.7	424.9	2.221	11.13	2.129	1.166
#1	.8735	-.0003	-.0002	.0013	.0009	1.780	2.746
#2	.8735	.0004	.0004	.0014	.0008	1.835	2.791

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0022	.0062	.1769	.0503	-.0028	3.377	4.798
SDev	.0001	.0000	.0021	.0000	.0006	.120	.018
%RSD	2.654	.0496	1.177	.0415	21.00	3.555	.3656
#1	.0022	.0062	.1755	.0503	-.0024	3.292	4.786
#2	.0022	.0062	.1784	.0503	-.0033	3.462	4.811

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	.0201	.0040	-.0006	-.0008	.0236	.0135
SDev	.0010	.0040	.0003	.0014	.0021	.0153	.0008
%RSD	110.9	19.97	7.683	213.0	255.6	64.64	5.764
#1	.0002	.0229	.0042	-.0016	-.0023	.0128	.0140
#2	.0016	.0173	.0038	.0003	.0007	.0344	.0129

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.43	.0028	.0011	40.80	.0009	.0017	.0692
SDev	.83	.0037	.0090	.12	.0008	.0048	.0148
%RSD	.8375	132.6	831.0	.2977	87.25	286.6	21.44
#1	100.0	.0054	-.0053	40.71	.0004	-.0017	.0587
#2	98.84	.0002	.0075	40.89	.0015	.0050	.0797

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0083	.0047	.1762	.0040	.0041	.0015	-.0012
SDev	.0001	.0016	.0004	.0083	.0060	.0004	.0002
%RSD	.6361	33.27	.2193	207.4	143.5	25.77	19.80
#1	.0082	.0036	.1759	-.0019	-.0001	.0018	-.0014
#2	.0083	.0058	.1765	.0099	.0084	.0013	-.0010

010278

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0032	.0063	.0633
SDev	.0000	.0001	.0009
%RSD	.4687	1.902	1.503
#1	.0031	.0062	.0639
#2	.0032	.0064	.0626

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	716721	10000	--	--	--	--	--
SDev	5951.011	.0000000	--	--	--	--	--
%RSD	.8303106	.0000000	--	--	--	--	--
#1	720929	10000	--	--	--	--	--
#2	712513	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: srm-B10W2 df10 Operator:
Run Time: 02/16/05 00:22:55
Comment:
Mode: CONC Corr. Factor: 1

010279

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	6.633	-.0007	.0618	.0891	.0001	-.0071
SDev	.0005	.003	.0021	.0023	.0001	.0000	.0029
%RSD	180.0	.0481	296.0	3.686	.1253	24.99	41.26
#1	-.0001	6.631	-.0022	.0634	.0890	.0001	-.0091
#2	.0007	6.635	.0008	.0602	.0892	.0001	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.6668	-.0000	-.0004	.0005	.0010	1.343	2.046
SDev	.0031	.0001	.0001	.0005	.0004	.020	.020
%RSD	.4569	413.1	39.08	94.22	37.40	1.519	.9945
#1	.6647	-.0001	-.0005	.0009	.0008	1.328	2.032
#2	.6690	.0000	-.0003	.0002	.0013	1.357	2.061

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	.0050	.1353	.0381	-.0019	2.613	3.602
SDev	.0006	.0000	.0014	.0000	.0000	.026	.002
%RSD	116.9	.4149	1.023	.0456	.0821	.9842	.0510
#1	.0001	.0050	.1344	.0381	-.0019	2.631	3.601
#2	.0009	.0050	.1363	.0381	-.0019	2.595	3.604

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	.0156	.0001	.0006	-.0005	.0184	.0043
SDev	.0001	.0022	.0012	.0029	.0024	.0032	.0042
%RSD	34.51	14.46	1117.	466.9	493.8	17.66	98.17
#1	-.0005	.0171	-.0007	.0027	-.0022	.0161	.0072
#2	-.0003	.0140	.0009	-.0014	.0012	.0207	.0013

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.3	.0073	.0028	31.13	.0005	.0043	.0535
SDev	.8	.0032	.0088	.03	.0016	.0048	.0035
%RSD	.7424	44.65	316.3	.1078	330.0	111.3	6.543
#1	101.8	.0050	.0090	31.10	.0016	.0077	.0510
#2	100.8	.0096	-.0034	31.15	-.0006	.0009	.0560

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0063	.0024	.1341	.0024	-.0251	.0001	-.0001
SDev	.0001	.0020	.0001	.0054	.0046	.0009	.0011
%RSD	.8067	85.14	.0578	225.5	18.21	778.1	1546.
#1	.0063	.0009	.1341	.0062	-.0283	-.0005	-.0008
#2	.0063	.0038	.1342	-.0014	-.0218	.0008	.0007

010280

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0021	.0050	.0496
SDev	.0000	.0000	.0001
%RSD	.9474	.7558	.2604
#1	.0021	.0050	.0495
#2	.0021	.0051	.0497

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	730285	10000	--	--	--	--	--
SDev	5454.622	.0000000	--	--	--	--	--
%RSD	.7469168	.0000000	--	--	--	--	--
#1	734142	10000	--	--	--	--	--
#2	726428	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: srm-B10W3 df10 Operator:
Run Time: 02/16/05 00:27:51
Comment:
Mode: CONC Corr. Factor: 1

010281

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	4.019	-.0038	.0478	.0014	-.0001	-.0064
SDev	.0001	.001	.0032	.0020	.0000	.0000	.0005
%RSD	11.63	.0367	82.94	4.275	.0851	10.52	7.643
#1	.0005	4.020	-.0061	.0492	.0014	-.0001	-.0068
#2	.0005	4.018	-.0016	.0463	.0014	-.0001	-.0061

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.235	-.0002	.0056	.0321	.0096	6.836	.0495
SDev	.001	.0003	.0003	.0002	.0003	.038	.0095
%RSD	.0229	165.4	5.334	.7152	2.776	.5549	19.21
#1	2.235	-.0003	.0054	.0322	.0098	6.810	.0427
#2	2.236	.0000	.0058	.0319	.0094	6.863	.0562

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	.0016	1.815	.1325	-.0014	.4189	.6024
SDev	.0004	.0001	.003	.0001	.0002	.0932	.0059
%RSD	251.0	2.840	.1716	.0812	14.92	22.26	.9818
#1	.0004	.0017	1.817	.1325	-.0013	.3529	.5982
#2	-.0001	.0016	1.813	.1324	-.0016	.4848	.6066

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0155	.0612	.0003	-.0024	-.0020	.0174	.0064
SDev	.0016	.0000	.0051	.0033	.0030	.0063	.0014
%RSD	10.30	.0601	1477.	139.9	152.5	36.12	22.62
#1	.0166	.0613	.0040	-.0000	-.0041	.0219	.0074
#2	.0144	.0612	-.0033	-.0047	.0002	.0130	.0054

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.6	.0048	.0013	23.02	-.0014	.0024	.0524
SDev	.1	.0031	.0017	.04	.0039	.0001	.0011
%RSD	.0657	64.20	132.8	.1756	272.6	4.534	2.206
#1	101.6	.0026	.0025	22.99	.0013	.0025	.0515
#2	101.7	.0069	.0001	23.05	-.0042	.0024	.0532

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0047	-.0008	.7201	-.0011	.0022	.0262	-.0017
SDev	.0000	.0013	.0007	.0030	.0155	.0000	.0008
%RSD	.4349	159.5	.0962	263.0	696.6	.1144	50.18
#1	.0047	.0001	.7206	.0010	.0132	.0262	-.0023
#2	.0048	-.0017	.7196	-.0033	-.0088	.0262	-.0011

010282

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0081	.0248
SDev	.0000	.0002	.0000
%RSD	18.51	1.939	.1548
#1	.0001	.0080	.0248
#2	.0001	.0082	.0248

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	732400	10000	--	--	--	--	--
SDev	478.7113	.0000000	--	--	--	--	--
%RSD	.0653620	.0000000	--	--	--	--	--
#1	732062	10000	--	--	--	--	--
#2	732739	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: srm-B10W4 df10 Operator:
Run Time: 02/16/05 00:32:46
Comment:
Mode: CONC Corr. Factor: 1

010283

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	3.845	-.0035	.0426	.0010	-.0001	-.0075
SDev	.0003	.019	.0010	.0039	.0001	.0000	.0001
%RSD	446.8	.4965	27.78	9.117	7.915	.7303	1.841
#1	.0002	3.859	-.0028	.0454	.0010	-.0001	-.0076
#2	-.0003	3.832	-.0042	.0399	.0011	-.0001	-.0074

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.077	-.0002	.0047	.0302	.0085	6.497	.0359
SDev	.004	.0001	.0003	.0001	.0001	.030	.0118
%RSD	.1832	46.49	6.288	.2016	.5918	.4598	32.92
#1	2.080	-.0001	.0049	.0302	.0085	6.518	.0442
#2	2.075	-.0002	.0045	.0302	.0085	6.476	.0275

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0011	.0016	1.674	.1274	-.0012	.2307	.5413
SDev	.0004	.0001	.001	.0001	.0001	.1776	.0073
%RSD	35.64	7.105	.0658	.0820	7.533	77.01	1.357
#1	-.0008	.0017	1.673	.1274	-.0011	.3563	.5465
#2	-.0013	.0015	1.675	.1273	-.0012	.1051	.5361

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0154	.0598	.0010	-.0002	-.0016	.0261	.0051
SDev	.0007	.0008	.0023	.0002	.0025	.0042	.0053
%RSD	4.550	1.346	230.0	91.83	153.8	15.95	103.9
#1	.0149	.0592	.0026	-.0001	.0001	.0291	.0014
#2	.0159	.0604	-.0006	-.0003	-.0034	.0232	.0089

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.48	-.0014	-.0033	22.47	.0002	-.0026	.0511
SDev	.11	.0018	.0041	.04	.0009	.0033	.0056
%RSD	.1089	126.2	126.5	.1588	378.1	127.1	10.93
#1	99.56	-.0026	-.0062	22.49	.0008	-.0050	.0551
#2	99.41	-.0001	-.0003	22.44	-.0004	-.0003	.0472

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0042	-.0031	.7048	-.0059	-.0302	.0246	-.0031
SDev	.0000	.0017	.0006	.0036	.0272	.0001	.0009
%RSD	.1265	55.18	.0848	61.86	90.12	.5909	28.19
#1	.0042	-.0019	.7052	-.0033	-.0110	.0247	-.0037
#2	.0042	-.0044	.7044	-.0084	-.0495	.0245	-.0024

010284

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0078	.0200
SDev	.0000	.0002	.0003
%RSD	17.42	2.260	1.762
#1	-.0001	.0077	.0198
#2	-.0001	.0079	.0203

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	717068	10000	--	--	--	--	--
SDev	789.8383	.0000000	--	--	--	--	--
%RSD	.1101482	.0000000	--	--	--	--	--
#1	717627	10000	--	--	--	--	--
#2	716510	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 257326 df10 r Operator:
Run Time: 02/16/05 00:39:42
Comment:
Mode: CONC Corr. Factor: 1

010285

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0006	2.678	-.0014	.0443	.0307	-.0000	-.0100
SDev	.0013	.007	.0018	.0059	.0002	.0000	.0034
%RSD	201.4	.2533	127.4	13.43	.7409	80.30	34.48
#1	.0003	2.683	-.0001	.0485	.0305	-.0000	-.0075
#2	-.0015	2.673	-.0026	.0401	.0309	-.0000	-.0124

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.8422	-.0001	-.0003	.0039	.0126	1.162	.5818
SDev	.0056	.0000	.0007	.0005	.0001	.008	.0013
%RSD	.6665	22.49	207.9	12.11	.5234	.6944	.2209
#1	.8462	-.0001	.0002	.0036	.0126	1.168	.5827
#2	.8382	-.0002	-.0008	.0042	.0127	1.156	.5809

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.0032	.5685	.0295	.0012	.2674	.6243
SDev	.0012	.0001	.0090	.0001	.0002	.0168	.0090
%RSD	1094.	4.062	1.585	.4426	13.38	6.293	1.439
#1	.0008	.0033	.5749	.0296	.0011	.2555	.6179
#2	-.0010	.0031	.5621	.0294	.0014	.2792	.6307

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0018	.0811	.0025	.0023	-.0030	.0549	.0079
SDev	.0005	.0073	.0041	.0002	.0010	.0017	.0040
%RSD	26.23	8.933	165.9	8.269	32.19	3.117	50.55
#1	.0021	.0760	.0054	.0024	-.0036	.0561	.0051
#2	.0014	.0862	-.0004	.0021	-.0023	.0537	.0107

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.0	.0011	-.0010	10.48	.0024	-.0003	.0349
SDev	1.3	.0047	.0064	.03	.0015	.0027	.0036
%RSD	1.298	410.7	621.7	.2783	63.54	925.5	10.36
#1	100.1	-.0022	.0035	10.46	.0034	.0016	.0375
#2	101.9	.0045	-.0056	10.50	.0013	-.0022	.0324

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0136	.0015	.1501	-.0015	-.0452	.0025	-.0030
SDev	.0000	.0007	.0000	.0055	.0442	.0000	.0035
%RSD	.2468	47.88	.0074	373.3	97.77	.6167	114.0
#1	.0136	.0020	.1501	-.0054	-.0139	.0025	-.0006
#2	.0135	.0010	.1501	.0024	-.0764	.0025	-.0055

010286

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0004	.0575	.0190
SDev	.0000	.0003	.0015
%RSD	1.213	.4316	7.718
#1	.0004	.0576	.0201
#2	.0004	.0573	.0180

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	727888	10000	--	--	--	--	--
SDev	9413.713	.0000000	--	--	--	--	--
%RSD	1.293292	.0000000	--	--	--	--	--
#1	721231	10000	--	--	--	--	--
#2	734544	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: zzzzzz Operator:
Run Time: 02/16/05 00:48:36
Comment:
Mode: CONC Corr. Factor: 1

010287

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	.0055	-.0015	.0657	.0000	-.0001	-.0062
SDev	.0010	.0064	.0018	.0015	.0000	.0000	.0013
%RSD	106.9	116.6	121.2	2.367	309.9	15.57	21.45
#1	.0002	.0010	-.0002	.0646	.0000	-.0001	-.0053
#2	.0017	.0100	-.0028	.0668	-.0000	-.0001	-.0072

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0014	.0001	-.0001	.0005	-.0006	-.0090	-.0149
SDev	.0001	.0003	.0001	.0002	.0003	.0150	.0174
%RSD	5.299	194.2	145.7	45.35	43.56	167.5	117.0
#1	.0014	-.0000	-.0002	.0006	-.0004	-.0196	-.0272
#2	.0015	.0003	.0000	.0003	-.0008	.0017	-.0026

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	.0015	.0062	.0001	.0014	-.0239	.0034
SDev	.0012	.0000	.0035	.0001	.0002	.1106	.0033
%RSD	284.2	1.936	55.80	168.3	15.27	462.1	95.87
#1	-.0004	.0015	.0038	-.0000	.0012	.0543	.0011
#2	.0013	.0015	.0087	.0001	.0015	-.1021	.0058

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0009	-.0029	.0020	-.0017	-.0018	.0279	-.0010
SDev	.0012	.0056	.0055	.0006	.0028	.0013	.0061
%RSD	124.7	192.8	276.1	33.80	153.4	4.488	585.3
#1	-.0001	-.0068	-.0019	-.0021	-.0037	.0288	-.0054
#2	-.0017	.0011	.0059	-.0013	.0002	.0270	.0033

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	102.0	.0047	-.0003	.1217	-.0004	.0014	.0809
SDev	.7	.0053	.0015	.0168	.0022	.0028	.0032
%RSD	.6710	113.1	489.8	13.83	515.3	203.0	3.965
#1	102.5	.0009	-.0014	.1336	-.0020	-.0006	.0832
#2	101.5	.0084	.0008	.1098	.0011	.0033	.0786

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0014	.0001	-.0025	.0248	.0001	-.0008
SDev	.0001	.0001	.0002	.0024	.0215	.0002	.0027
%RSD	376.2	8.642	144.0	97.72	86.45	150.1	322.5
#1	-.0000	.0013	-.0000	-.0042	.0097	.0002	-.0027
#2	.0000	.0015	.0003	-.0008	.0400	-.0000	.0011

010288

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	-.0000	.0005
SDev	.0000	.0001	.0002
%RSD	14.06	3610.	43.22
#1	-.0001	-.0000	.0004
#2	-.0001	.0000	.0007

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	735425	10000	--	--	--	--	--
SDev	4910.149	.0000000	--	--	--	--	--
%RSD	.6676615	.0000000	--	--	--	--	--
#1	738897	10000	--	--	--	--	--
#2	731953	10000	--	--	--	--	--

Analysis Report 02/16/05 00:58:16 AM page 1

Method: DAILY2 Sample Name: zzzzzz Operator:
Run Time: 02/16/05 00:53:32
Comment:
Mode: CONC Corr. Factor: 1

010289

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	.0076	-.0012	.0765	.0001	-.0001	-.0040
SDev	.0004	.0019	.0002	.0018	.0001	.0000	.0021
%RSD	99.67	25.18	18.80	2.300	128.8	15.64	51.25
#1	.0001	.0062	-.0011	.0777	.0001	-.0001	-.0055
#2	.0008	.0089	-.0014	.0752	.0000	-.0001	-.0026

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0019	-.0001	.0005	.0003	-.0005	.0024	-.0010
SDev	.0002	.0000	.0003	.0010	.0004	.0049	.0136
%RSD	12.06	.5227	59.97	323.0	75.86	204.1	1375.
#1	.0018	-.0001	.0003	.0010	-.0008	-.0011	-.0106
#2	.0021	-.0001	.0007	-.0004	-.0002	.0058	.0086

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0014	.0032	.0001	.0007	-.1401	-.0030
SDev	.0003	.0000	.0047	.0000	.0001	.0159	.0025
%RSD	86.07	2.262	147.5	29.22	8.666	11.32	84.01
#1	.0001	.0015	-.0001	.0001	.0007	-.1289	-.0048
#2	.0005	.0014	.0066	.0001	.0006	-.1513	-.0012

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	.0007	-.0019	-.0000	.0010	.0158	.0062
SDev	.0018	.0007	.0002	.0019	.0014	.0131	.0048
%RSD	243.1	103.2	8.065	4694.	142.1	82.83	76.96
#1	.0020	.0012	-.0018	.0013	-.0000	.0250	.0096
#2	-.0005	.0002	-.0020	-.0014	.0020	.0065	.0028

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.4	-.0003	.0015	.0760	-.0007	.0009	.0728
SDev	.2	.0030	.0020	.0072	.0013	.0003	.0017
%RSD	.1790	1090.	135.0	9.446	206.2	38.26	2.374
#1	100.2	.0018	.0001	.0810	.0003	.0007	.0740
#2	100.5	-.0024	.0029	.0709	-.0016	.0012	.0715

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0021	.0002	-.0006	.0076	.0009	-.0017
SDev	.0000	.0034	.0001	.0015	.0094	.0007	.0015
%RSD	4462.	161.9	33.97	244.2	124.7	77.07	85.57
#1	-.0000	.0046	.0002	-.0017	.0009	.0014	-.0007
#2	.0000	-.0003	.0001	.0005	.0142	.0004	-.0028

010290

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	-.0000	.0007
SDev	.0000	.0001	.0004
%RSD	73.83	274.8	63.68
#1	-.0000	.0000	.0009
#2	-.0000	-.0001	.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	723486	10000	--	--	--	--	--
SDev	1250.165	.0000000	--	--	--	--	--
%RSD	.1727974	.0000000	--	--	--	--	--
#1	722602	10000	--	--	--	--	--
#2	724370	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: cri Operator:
Run Time: 02/16/05 00:58:29
Comment:
Mode: CONC Corr. Factor: 1

010291

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0211	.0996	.0206	H.1764	.0208	.0097	-.0045
SDev	.0005	.0030	.0013	.0022	.0000	.0000	.0034
%RSD	2.238	2.999	6.409	1.271	.1174	.4219	75.92
#1	.0208	.0975	.0216	H.1780	.0207	.0097	-.0070
#2	.0214	.1017	.0197	H.1748	.0208	.0097	-.0021
Errors	LC Pass	NOCHECK	LC Pass	LC High	LC Pass	LC Pass	NOCHECK
High	.0300		.0300	.1500	.0300	.0150	
Low	.0100		.0100	.0500	.0100	.0050	

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0029	.0101	.0987	.0216	.0500	.0982	.0005
SDev	.0016	.0001	.0008	.0009	.0009	.0210	.0166
%RSD	56.24	.4620	.7552	4.056	1.775	21.35	3103.
#1	.0017	.0100	.0993	.0223	.0507	.0834	-.0112
#2	.0040	.0101	.0982	.0210	.0494	.1130	.0123
Errors	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
High		.0150	.1500	.0300	.0750	.1500	
Low		.0050	.0500	.0100	.0250	.0500	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	.0710	.0032	.0304	.0217	.0543	.0052
SDev	.0013	.0005	.0102	.0001	.0000	.1404	.0123
%RSD	214.8	.6658	315.4	.3223	.0809	258.4	238.7
#1	-.0003	.0706	-.0040	.0305	.0217	-.0449	-.0035
#2	.0015	.0713	.0105	.0304	.0217	.1536	.0139
Errors	NOCHECK	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK	NOCHECK
High		.1500		.0450	.0300		
Low		.0500		.0150	.0100		

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0830	.0965	.0073	.0054	.0019	.0088	.1270
SDev	.0040	.0035	.0034	.0031	.0023	.0091	.0006
%RSD	4.878	3.586	45.84	57.80	123.3	103.4	.5063
#1	.0859	.0990	.0049	.0076	.0002	.0024	.1265
#2	.0802	.0941	.0097	.0032	.0035	.0152	.1274
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	.1200	.1500					.1800
Low	.0400	.0500					.0600

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010292

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.0	.0134	.0093	H.1587	.0060	.0107	H.1615
SDev	1.3	.0023	.0033	.0084	.0009	.0030	.0044
%RSD	1.257	17.50	35.79	5.317	15.66	28.09	2.699
#1	100.1	.0117	.0069	H.1647	.0067	.0085	H.1646
#2	101.9	.0151	.0116	H.1528	.0054	.0128	H.1584
Errors	NOCHECK	NOCHECK	NOCHECK	LC High	LC Pass	LC Pass	LC High
High				.1500	.0090	.0150	.1500
Low				.0500	.0030	.0050	.0500

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0207	.0021	.0202	.0160	.2019	.1012	.0001
SDev	.0001	.0024	.0003	.0009	.0252	.0004	.0001
%RSD	.6227	112.5	1.578	5.693	12.46	.4207	77.85
#1	.0206	.0038	.0204	.0153	.1841	.1015	.0001
#2	.0208	.0004	.0200	.0166	.2197	.1009	.0002
Errors	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK	LC Pass	NOCHECK
High	.0300		.0300	.0300		.1500	
Low	.0100		.0100	.0100		.0500	

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0402	.0957
SDev	.0002	.0001	.0004
%RSD	207.1	.1324	.4237
#1	.0002	.0401	.0960
#2	-.0000	.0402	.0955
Errors	NOCHECK	LC Pass	NOCHECK
High		.0600	
Low		.0200	

010293

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	728274	10000	--	--	--	--	--
SDev	9180.367	.0000000	--	--	--	--	--
%RSD	1.260566	.0000000	--	--	--	--	--
#1	721782	10000	--	--	--	--	--
#2	734765	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: icsa Operator: 010294
Run Time: 02/16/05 01:03:26
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	493.8	-.0024	.0669	.0010	-.0001	-.0024
SDev	.0005	.5	.0013	.0003	.0000	.0000	.0023
%RSD	1462.	.0912	54.31	.3832	.4382	12.53	94.33
#1	-.0004	494.1	-.0015	.0667	.0010	-.0001	-.0041
#2	.0003	493.5	-.0034	.0671	.0010	-.0001	-.0008
Errors	NOCHECK	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High		600.0					
Low		400.0					

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	449.2	-.0004	.0001	-.0000	.0016	187.4	-.0035
SDev	.4	.0001	.0012	.0001	.0002	.0	.0197
%RSD	.0834	35.55	2384.	134.8	13.09	.0190	556.9
#1	448.9	-.0003	.0009	-.0001	.0015	187.4	-.0175
#2	449.5	-.0005	-.0008	-.0000	.0018	187.4	.0104
Errors	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass	NOCHECK
High	600.0					240.0	
Low	400.0					160.0	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0014	.0026	524.9	-.0011	.0004	.4016	-.0244
SDev	.0001	.0000	.7	.0001	.0005	.1692	.0077
%RSD	5.865	1.012	.1380	10.97	130.7	42.13	31.36
#1	-.0014	.0025	524.4	-.0010	.0008	.2820	-.0299
#2	-.0015	.0026	525.4	-.0011	.0000	.5213	-.0190
Errors	NOCHECK	NOCHECK	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High			600.0				
Low			400.0				

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0021	-.0111	.0446	-.0297	.0060	.0335	.0092
SDev	.0025	.0078	.0055	.0007	.0043	.0081	.0063
%RSD	121.9	70.22	12.38	2.335	72.37	24.09	67.83
#1	.0039	-.0166	.0407	-.0292	.0029	.0278	.0136
#2	.0003	-.0056	.0485	-.0302	.0090	.0393	.0048
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010295

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	92.94	.0075	-.0069	.0472	-.0049	-.0021	.0404
SDev	.29	.0003	.0022	.0006	.0014	.0016	.0082
%RSD	.3120	3.597	32.33	1.335	27.97	76.25	20.36
#1	93.14	.0073	-.0084	.0476	-.0059	-.0032	.0462
#2	92.73	.0077	-.0053	.0468	-.0040	-.0009	.0346
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0130	.0269	-.0014	-.0057	.0181	-.0012	-.0033
SDev	.0000	.0018	.0002	.0027	.0222	.0008	.0058
%RSD	.0229	6.789	12.86	48.15	122.5	70.79	177.1
#1	.0130	.0257	-.0013	-.0038	.0024	-.0017	.0008
#2	.0130	.0282	-.0015	-.0076	.0339	-.0006	-.0073
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0006	.0197	.0001
SDev	.0000	.0001	.0000
%RSD	6.723	.5272	11.37
#1	-.0006	.0196	.0001
#2	-.0005	.0198	.0001
Errors	NOCHECK	NOCHECK	NOCHECK
High			
Low			

010296

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	669928	10000	--	--	--	--	--
SDev	2127.684	.0000000	--	--	--	--	--
%RSD	.3175992	.0000000	--	--	--	--	--
#1	671432	10000	--	--	--	--	--
#2	668423	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: icsab Operator:
Run Time: 02/16/05 01:08:23
Comment:
Mode: CONC Corr. Factor: 1

went to wrong location (CRi)

010297

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	L.0214	L.1210	L.0180	L.1715	L.0206	L.0097	-.0096
SDev	.0004	.0140	.0086	.0018	.0001	.0000	.0017
%RSD	1.706	11.54	47.65	1.028	.3698	.0544	17.36
#1	L.0216	L.1309	L.0240	L.1703	L.0207	L.0097	-.0084
#2	L.0211	L.1112	L.0119	L.1728	L.0206	L.0097	-.0108
Errors	LC Low	LC Low	LC Low	LC Low	LC Low	LC Low	NOCHECK
High	1.200	600.0	1.200	1.200	.6000	.6000	
Low	.8000	400.0	.8000	.8000	.4000	.4000	

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	L.0267	L.0103	L.0989	L.0201	L.0487	L.1242	.0021
SDev	.0117	.0002	.0004	.0000	.0004	.0038	.0177
%RSD	43.69	2.192	.3679	.1470	.8975	3.065	853.1
#1	L.0350	L.0105	L.0991	L.0201	L.0491	L.1215	-.0104
#2	L.0185	L.0102	L.0986	L.0201	L.0484	L.1269	.0146
Errors	LC Low	LC Low	LC Low	LC Low	LC Low	LC Low	NOCHECK
High	600.0	1.200	.6000	.6000	.6000	240.0	
Low	400.0	.8000	.4000	.4000	.4000	160.0	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	L.0707	L.0280	L.0305	L.0211	.1786	-.0010
SDev	.0000	.0003	.0154	.0002	.0008	.2042	.0001
%RSD	53.40	.4872	54.96	.5217	3.696	114.4	12.81
#1	.0000	L.0710	L.0389	L.0306	L.0217	.0342	-.0009
#2	.0000	L.0705	L.0171	L.0303	L.0206	.3230	-.0011
Errors	NOCHECK	LC Low	LC Low	LC Low	LC Low	NOCHECK	NOCHECK
High		1.200	600.0	.6000	1.200		
Low		.8000	400.0	.4000	.8000		

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	L.0809	L.1033	.0049	.0064	.0006	.0171	L.1262
SDev	.0006	.0087	.0016	.0013	.0033	.0079	.0079
%RSD	.6899	8.424	32.03	19.73	588.0	46.10	6.271
#1	L.0805	L.0971	.0038	.0073	-.0018	.0115	L.1318
#2	L.0813	L.1094	.0060	.0055	.0029	.0227	L.1206
Errors	LC Low	LC Low	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Low
High	1.200	1.200					1.200
Low	.8000	.8000					.8000

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010298

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.28	.0111	.0128	.1268	L.0059	L.0123	L.1353
SDev	1.68	.0046	.0004	.0006	.0003	.0018	.0009
%RSD	1.692	40.92	3.225	.4657	5.299	14.60	.6409
#1	100.5	.0143	.0131	.1264	L.0061	L.0135	L.1346
#2	98.09	.0079	.0125	.1272	L.0057	L.0110	L.1359
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Low	LC Low	LC Low
High					1.200	1.200	1.200
Low					.8000	.8000	.8000

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	L.0207	.0010	L.0198	L.0227	.1955	L.0996	-.0015
SDev	.0001	.0007	.0001	.0026	.0174	.0004	.0004
%RSD	.2918	69.98	.4901	11.60	8.890	.3941	27.87
#1	L.0208	.0015	L.0199	L.0246	.2078	L.0999	-.0012
#2	L.0207	.0005	L.0197	L.0208	.1833	L.0993	-.0018
Errors	LC Low	NOCHECK	LC Low	LC Low	NOCHECK	LC Low	NOCHECK
High	1.200		1.200	1.200		.6000	
Low	.8000		.8000	.8000		.4000	

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	L.0402	.0953
SDev	.0001	.0001	.0010
%RSD	82.86	.1486	1.009
#1	-.0000	L.0402	.0960
#2	-.0002	L.0402	.0946
Errors	NOCHECK	LC Low	NOCHECK
High		1.200	
Low		.8000	

010299

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	715639	10000	--	--	--	--	--
SDev	12059.00	.0000000	--	--	--	--	--
%RSD	1.685067	.0000000	--	--	--	--	--
#1	724166	10000	--	--	--	--	--
#2	707112	10000	--	--	--	--	--

SR 3/14/05

Analysis Report 02/16/05 01:22:03 AM page 1

Method: DAILY2 Sample Name: ccv10 Operator:
Run Time: 02/16/05 01:17:19 010300
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.001	9.672	5.114	4.898	10.25	.9841	5.018
SDev	.000	.017	.019	.027	.02	.0021	.015
%RSD	.0122	.1772	.3716	.5498	.1494	.2128	.2938
#1	1.001	9.660	5.101	4.879	10.23	.9856	5.008
#2	1.001	9.684	5.128	4.917	10.26	.9826	5.028
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	1.100	11.00	5.500	5.500	11.00	1.100	5.500
Low	.9000	9.000	4.500	4.500	9.000	.9000	4.500

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.92	.9898	5.008	2.001	2.056	10.06	L17.92
SDev	.06	.0025	.006	.006	.012	.07	.09
%RSD	.3048	.2505	.1294	.3145	.5844	.6673	.5162
#1	19.96	.9916	5.013	2.005	2.048	10.11	L17.85
#2	19.88	.9881	5.003	1.996	2.065	10.01	L17.98
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Low
High	22.00	1.100	5.500	2.200	2.200	11.00	22.00
Low	18.00	.9000	4.500	1.800	1.800	9.000	18.00

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.955	4.682	19.84	1.009	5.033	27.59	H40.00
SDev	.006	.030	.04	.001	.007	.28	.18
%RSD	.1262	.6392	.2175	.1388	.1329	1.004	.4575
#1	4.951	4.661	19.87	1.010	5.028	27.78	H39.87
#2	4.960	4.703	19.81	1.008	5.038	27.39	H40.13
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC High
High	5.500	5.500	22.00	1.100	5.500	33.00	33.00
Low	4.500	4.500	18.00	.9000	4.500	27.00	27.00

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.053	4.887	4.982	4.931	.9926	1.014	.9943
SDev	.014	.019	.011	.091	.0003	.017	.0019
%RSD	.2801	.3955	.2175	1.850	.0273	1.721	.1946
#1	5.063	4.873	4.975	4.995	.9924	1.001	.9956
#2	5.043	4.901	4.990	4.866	.9928	1.026	.9929
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	5.500	5.500			1.100	1.100	1.100
Low	4.500	4.500			.9000	.9000	.9000

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010301

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.36	5.213	5.163	5.095	4.948	5.180	5.061
SDev	1.67	.058	.081	.012	.057	.034	.013
%RSD	1.678	1.107	1.560	.2438	1.156	.6654	.2568
#1	98.18	5.172	5.220	5.086	4.988	5.204	5.070
#2	100.5	5.254	5.106	5.104	4.907	5.155	5.052
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				5.500	5.500	5.500	5.500
Low				4.500	4.500	4.500	4.500

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.054	.9778	4.958	5.202	.9660	4.996	1.065
SDev	.014	.0019	.003	.025	.0185	.001	.001
%RSD	.2856	.1989	.0689	.4792	1.914	.0194	.1260
#1	5.044	.9765	4.956	5.185	.9791	4.997	1.064
#2	5.065	.9792	4.961	5.220	.9529	4.995	1.066
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500	5.500	1.100	5.500	1.100
Low	4.500	.9000	4.500	4.500	.9000	4.500	.9000

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	4.842	1.018	4.784
SDev	.005	.005	.011
%RSD	.0977	.4800	.2361
#1	4.846	1.021	4.776
#2	4.839	1.014	4.792
Errors	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500
Low	4.500	.9000	4.500

010302

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	716236	10000	--	--	--	--	--
SDev	12002.43	.0000000	--	--	--	--	--
%RSD	1.675765	.0000000	--	--	--	--	--
#1	707749	10000	--	--	--	--	--
#2	724723	10000	--	--	--	--	--

Analysis Report 02/16/05 01:30:56 AM page 1

Method: DAILY2 Sample Name: ccb10 Operator: 010303
Run Time: 02/16/05 01:26:13
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	.0020	-.0004	H.0679	.0001	-.0001	-.0034
SDev	.0005	.0026	.0030	.0046	.0002	.0000	.0026
%RSD	91.69	130.1	684.1	6.825	148.5	26.04	76.43
#1	.0008	.0002	-.0026	H.0712	.0003	-.0001	-.0016
#2	.0002	.0039	.0017	H.0646	-.0000	-.0001	-.0053
Errors	LC Pass	LC Pass	LC Pass	LC High	LC Pass	LC Pass	LC Pass
High	.0050	.0500	.0050	.0500	.0050	.0050	.0100
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0100

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0023	-.0000	.0005	.0008	-.0002	-.0017	.0050
SDev	.0011	.0001	.0001	.0018	.0005	.0004	.0123
%RSD	48.90	580.4	27.71	226.4	253.5	22.43	247.7
#1	.0015	.0001	.0004	.0021	.0002	-.0020	-.0037
#2	.0031	-.0001	.0006	-.0005	-.0005	-.0014	.0136
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	.0013	.0009	.0001	.0008	-.0440	.0002
SDev	.0001	.0001	.0004	.0002	.0007	.1767	.0093
%RSD	39.48	4.973	43.03	175.5	80.64	401.8	6049.
#1	.0005	.0013	.0012	.0002	.0013	L-.1689	-.0064
#2	.0003	.0012	.0006	-.0000	.0004	H.0810	.0067
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	-.0021	.0010	-.0008	.0038	H.0122	.0038
SDev	.0012	.0024	.0032	.0019	.0016	.0022	.0059
%RSD	116.8	115.8	311.6	252.3	40.99	17.63	155.8
#1	.0019	-.0038	-.0013	.0006	.0027	H.0107	.0080
#2	.0002	-.0004	.0033	-.0021	.0049	H.0137	-.0004
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC High	LC Pass
High	.0050	.0100			.0050	.0100	.0100
Low	-.0050	-.0100			-.0050	-.0100	-.0100

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899

010304

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.6	.0014	-.0014	.0097	-.0001	-.0004	H.0296
SDev	.8	.0031	.0051	.0005	.0002	.0024	.0006
%RSD	.8332	225.4	374.0	4.921	146.2	534.8	1.942
#1	100.0	-.0008	.0023	H.0100	.0000	.0012	H.0300
#2	101.2	.0035	-.0050	.0093	-.0003	-.0021	H.0292
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC High
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0048	.0003	.0027	.0032	.0010	-.0006
SDev	.0000	.0060	.0003	.0039	.0101	.0011	.0014
%RSD	41.90	122.7	104.5	145.4	311.5	105.8	222.8
#1	.0001	.0091	.0006	.0055	-.0039	.0018	-.0017
#2	.0000	.0006	.0001	-.0001	.0104	.0003	.0004
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	-.0004	.0004
SDev	.0003	.0001	.0010
%RSD	368.0	15.17	235.3
#1	.0003	-.0004	.0012
#2	-.0001	-.0005	-.0003
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010305

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	725254	10000	--	--	--	--	--
SDev	5996.973	.0000000	--	--	--	--	--
%RSD	.8268784	.0000000	--	--	--	--	--
#1	721014	10000	--	--	--	--	--
#2	729495	10000	--	--	--	--	--

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

BOOK / PAGE: 59 202

CLIENT(S): DIU 20 ~~010306~~
TASK ORDER(S): 050119-1 SDG(S): 257326
PROJECT NO(S): 06002.01.211
METHOD: 3005A___ 3050B___ 3050B-7.5___ 3010A___ 3020A___ 7760A___ 7740A___ $HClO_4$___ $HClO_4/H_2SO_4$___
Microwave___ Fusion___ Teflon___ Rock___ OTHER di water dilution
MATRIX: Water___ Soil___ Biota___ Solid___ Liquid___ TCLP Ext___ OTHER Dust
INSTRUMENT: GFAA___ ICP___ ICP-MS___ IC ✓ FLAA___ HYDRIDE___ OTHER___
ACID INORG #: HNO_3#___ HCl#___ H_2SO_4#___ $HClO_4$#___ HF#___
INTERNAL STD: Sc @ 10 PPM___ Be @ 10 PPM___ SOURCE:___ INORG#___ EXP:___ AMT:___
Oven/Hotplate/ Block ID: / Temperature (°C): Ambient

SAMPLE IDENTIFICATION	pH	WT (g)	I.V. (mL)	F.V. (mL)	
PBW-B10W3				5	
LCSW-B10W1 *				~~5~~ 5.5	3-14-05
257326		0.0523		↓ 5	
wt. ~ 50 mg sample into a tared 60 mL Nalgene bottle,					
add 5 mls di water and shake to mix.					
* Spike 250 uL IC Inst. Check		Std	Spex # 4870	Exp. 11/05	
↓ 250 uL nitrite-N		# 42-01	165	Exp 02/15/05	
Two 257326 received, container 2 was mixed thoroughly into container 1					
Note: a small amount of sample was received, total wt 540 mg, wts lowered for prep.					
		2-10-05			
					LOCATION:

PREPARED BY: John Wills DATE: 2-10-05
REVIEWED BY: Orduña DATE: 2/11/05
DISPOSAL INT/DATE/LOC: ___

FRM-191 (Rev 3/Aug 04)

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

BOOK / PAGE: 59 204

CLIENT(S): DIV 20
TASK ORDER(S): 050119-1 SDG(S): 257326
PROJECT NO(S): 06002.01.211 010307
METHOD: 3005A___3050B___3050B-7.5___3010A___3020A___7760A___7740A___$HClO_4$___$HClO_4/H_2SO_4$___
Microwave___Fusion___Teflon___Rock___OTHER di water leach
MATRIX: Water___Soil___Biota___Solid___Liquid___TCLP Ext___OTHER JW 2-10-05 ~~Dust~~ filter
INSTRUMENT: GFAA___ICP ✓ ICP-MS___IC ✓ FLAA___HYDRIDE___OTHER___
ACID INORG #: HNO_3#___HCl#___H_2SO_4#___$HClO_4$#___HF#___
INTERNAL STD: Sc @ 10 PPM___Be @ 10 PPM___SOURCE:___INORG#___EXP:___AMT:___
Oven/Hotplate/ Block ID: Shaker Temperature (°C): Ambient

SAMPLE IDENTIFICATION	pH	WT (g)	I.V. (mL)	F.V. (mL)	
PBW-B10W5				25	
LCSW-B10W2 *				↓	
LCSW-B10W3 **				27	JW 3-14-05
257326 ~~7~~ JW 3-10-05		.1736		25	
↓ 7328		.1491		↓	
* Spike 500 µL Spike 1		Spex#4836	Exp 10/05		
↓ 100 µL I-CAL 1		Spex#4837	↓ ↓		
** Spike 1mL IC Inst.	Check Std.	Spex#4870	Exp. 11/05		
↓ 1mL Nitrite-N		#42-01-165	Exp. 03/15/05		
Samples were cut into small pieces, ~ ½ cm x ½ cm and					
placed into 60 mL Nalgene bottles, 25 mLs di water					
was added and samples were placed on a shaker for					
3 hours.					
Note: Sample blank was first cut down to length of actual sample then					
to ~ ½ cm x ½ cm etc.					
		2-10-05			
					LOCATION:
					17 B1

PREPARED BY: John Willis DATE: 2-10-05
REVIEWED BY: Ordiña DATE: 2/11/05
DISPOSAL INT/DATE/LOC: ___

FRM-191 (Rev 3/Aug 04)

Work continued from Page

010308

59-01-IC5 20ppm Anions

Anion	Std Vol, mL	Conc Std. mg/L	Source	Inorg #	Exp. Date
Fluoride	0.2mL	1000mg/L	SPEX	4951	1/15/2006
Chloride				4950	1/15/2006
Nitrite N				4480	3/15/2005
Bromide				4603	6/15/2005
Nitrate-N				4952	1/15/2006
Phosphate-P				4953	1/15/2006
Sulfate				4610	6/30/2005

— Diluted to 10mL DI H_2O.

59-02-IC5 15ppm Anions
3mL 59-01-IC5 + 7mL DI H_2O

59-03-IC5 10ppm Anions
2mL 59-01-IC5 + 2mL DI H_2O

59-04-IC5 5ppm Anions
2mL 59-03-IC5 + 2mL DI H_2O

59-05-IC5 1ppm Anions
1mL 59-04-IC5 + 4mL DI H_2O.

59-06-IC5 0.5ppm Anions
2.0mL 59-05-IC5 + 2mL DI H_2O

59-07-IC5 0.1ppm Anions
1.4mL 59-06-IC5 + 4mL DI H_2O.
RLS 3.1.05

59-08-IC5 0ppm Anions
DI H_2O

Eppendorfs:
5000L
200H
1000G

www.scientificbindery88yrs.com

Work continued to Page

SIGNATURE R Spres DATE 3/2/05

DISCLOSED TO AND UNDERSTOOD BY Michael Hardy DATE 3/28/05 WITNESS DATE

62 PROJECT NO. —
BOOK NO. 1C5

TITLE Nitrite-N QC Std

Work continued from Page

010309

62-01-1C5 100 ppm Nitrite-N

1 mL Nitrite-N 1000 ppm (Inorg #4954) diluted to 10 mL DI H_2O.

Exp. 5/2/05 Eppendorf: 1000G

RSS

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Work continued to Page

SIGNATURE DATE 3/1/05

DISCLOSED TO AND UNDERSTOOD BY DATE 3/28/05 WITNESS DATE

42 PROJECT NO. –
BOOK NO. 1C5

TITLE Nitrite-N QC Std.

Work continued from Page

010310

4201-1C5 Nitrite N 100ppm QC Exp. 3/12/05

5ml Nitrite N 1000ppm Std (Inorg # 4954)
Diluted to 50mL F.V. w/ DI H_2O Balance #12

RSS

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Work continued to Page

SIGNATURE

DATE 1/12/05

DISCLOSED TO AND UNDERSTOOD BY

DATE 3/28/05

WITNESS

DATE

Book/Page: 13 053

Southwest Research Institute

Dionex DX500 Ion Chromatography Daily Log

010311

Analyst: RSpris

Date: 3/3/05

Conductivity: 17.7

Client	Project #	TO #	Analytical Method
DI 120.	06002.01.211	05011191	300
	RSS 3/2/05		

Loop: 40ul

Method: anions 050302

Column: AS14: # 018 097

Calibration: 3/2/05

Comments: Lot 004 04 137

ICV/CCV/MS:

Source: SPEX

Source: Nitrate-N

Lot/Inorg#: 1N # 4870

Lot/Inorg#: 62-01-1C5

CCV: ~~0.20~~ 0.250 ml → 5 ml DI

CCV: 0.250 ml → 5 ml DI

MS: 50 ul → 5 ml sample

MS: 50 ul → 5 ml sample

✓ ELUENT SOLUTION PREP:

FV = 2.0L DI H20

1.0 mM Sodium Bicarbonate & 3.5 mM Sodium Carbonate

Weight: 0.168 g $NaHCO_3$

Weight: 0.7419 Na_2HCO_3

Inorg#: #2626

Inorg#: #3757

Other: Balance # 12

RSS 3/2/05

50 mA-Autoregen (ASRS)

Other:

3/28/05

Book/Page: 13 063

Southwest Research Institute

Dionex DX500 Ion Chromatography Daily Log

010312

Analyst: R Spurs

Date: 3/11/05

Conductivity: 17.7 RSS 3/11/05

Client	Project #	TO #	Analytical Method
DIV20	06002.01.211	050119-1	300
	R Spurs 3/16/05		

Loop: 40ul

Method: anions 050302

Column: AS14: 018097

Calibration: 3/2/05

Comments:

ICV/CCV/MS:

Source: SPEX

Lot/Inorg#: 4870

CCV: 1:20

MS:

Source: Nitrite N

Lot/Inorg#: 62-01-1C5

CCV: 1:20.

MS:

✓ ELUENT SOLUTION PREP:

FV = 2.0L DI H20

1.0 mM Sodium Bicarbonate & 3.5 mM Sodium Carbonate

Weight: 0.168g $NaHCO_3$

Inorg#: #2626

Weight: 0.7419 Na_2HCO_3

Inorg#: #3757

✓ Other: Balance #12

RSS 3/11/05

50 mA-Autoregen (ASRS)

✓ Other:

✓ 3/28/05

DIV 20
06002.01.211
TO# 050119-1

3/14/05

Analyst: RSS RSS
Method: EPA 300
Sig Fig: 3

010313

Date Analyzed	System ID	Analyte	Conc. mg/L	FV ml	RESULT ug	Qual	DL	TV	%REC %RPD
03/03/05	PB B10W5	Fluoride	0.000	25.0	2.5	U	3		
03/03/05	PB B10W5	Chloride	0.053	25.0	2.5	U	2.5		
03/03/05	PB B10W5	Nitrite-N	0.000	25.0	2.5	U	2.5		
03/03/05	PB B10W5	Bromide	0.000	25.0	2.5	U	2.5		
03/03/05	PB B10W5	Nitrate-N	0.000	25.0	2.5	U	2.5		
03/03/05	PB B10W5	Phosphate-P	0.000	25.0	2.5	U	2.5		
03/03/05	PB B10W5	Sulfate	0.000	25.0	2.5	U	2.5		
03/03/05	LCSW B10W3	Fluoride	3.546	27.0	95.7		2.7	100	95.7%
03/03/05	LCSW B10W3	Chloride	7.240	27.0	195		2.7	200	97.5%
03/03/05	LCSW B10W3	Nitrite-N	3.633	27.0	98.1		2.7	100	98.1%
03/03/05	LCSW B10W3	Bromide	14.864	27.0	401		2.7	400	100%
03/03/05	LCSW B10W3	Nitrate-N	3.195	27.0	86.3		2.7	90.4	95.5%
03/03/05	LCSW B10W3	Phosphate-P	6.886	27.0	186		2.7	191	97.4%
03/03/05	LCSW B10W3	Sulfate	14.677	27.0	396		2.7	400	99.0%
03/03/05	257327	Fluoride	0.510	25.0	12.8		2.5		
03/03/05	257327	Chloride	12.524	25.0	313		2.5		
03/03/05	257327	Nitrite-N	0.111	25.0	2.78		2.5		
03/03/05	257327	Bromide	0.133	25.0	3.33		2.5		
03/11/05	257327	Nitrate-N	18.570	25.0	464		25		
03/03/05	257327	Phosphate-P	1.475	25.0	36.9		2.5		
03/11/05	257327	Sulfate	151.328	25.0	3780		25		
03/03/05	257327D	Fluoride	0.499	25.0	12.5		2.5		
03/03/05	257327D	Chloride	12.560	25.0	314		2.5		
03/03/05	257327D	Nitrite-N	0.116	25.0	2.90		2.5		
03/03/05	257327D	Bromide	0.129	25.0	3.23		2.5		
03/11/05	257327D	Nitrate-N	19.511	25.0	488		25		
03/03/05	257327D	Phosphate-P	1.480	25.0	37.0		2.5		
03/11/05	257327D	Sulfate	156.881	25.0	3920		25		
03/03/05	257327S	Fluoride	1.340	25.0	33.5		2.5	25	82.80%
03/03/05	257327S	Chloride	14.311	25.0	358		2.5	50	90.00%
03/03/05	257327S	Nitrite-N	1.096	25.0	27.4		2.5	25	98.48%
03/03/05	257327S	Bromide	4.120	25.0	103		2.5	100	99.67%
03/11/05	257327S	Nitrate-N	27.113	25.0	678		25	226	94.69%
03/03/05	257327S	Phosphate-P	3.291	25.0	82.3		2.5	47.8	94.98%
03/11/05	257327S	Sulfate	188.755	25.0	4720		25	1000	94.00%
03/03/05	257328	Fluoride	0.000	25.0	2.5	U	2.5		
03/03/05	257328	Chloride	1.228	25.0	30.7		2.5		
03/03/05	257328	Nitrite-N	0.000	25.0	2.5	U	2.5		
03/03/05	257328	Bromide	0.000	25.0	2.5	U	2.5		
03/03/05	257328	Nitrate-N	0.108	25.0	2.70		2.5		
03/03/05	257328	Phosphate-P	0.070	25.0	2.5	U	2.5		
03/03/05	257328	Sulfate	0.917	25.0	22.9		2.5		

Sample calc 257327 F.

$$0.510 \frac{mg}{L} \times \frac{25 ml}{} \times \frac{1 L}{1000 ml} \times \frac{1000 ug}{1 mg} = 12.8 ug.$$

U = Undetected

DIV 20
06002.01.211
TO# 050119-1

3/14/05

Analyst: RSS
Method: EPA 300
Sig Fig: 3

010314

Date Analyzed	System ID	Analyte	Conc. mg/L	Weight g	FV ml	RESULT mg/Kg	Qual	DL	TV	%REC %RPD
03/03/05	PB B10W3	Fluoride	0.000	0.0523	5.0	9.56	U	10		
03/03/05	PB B10W3	Chloride	0.228	0.0523	5.0	47.8	U	48		
03/03/05	PB B10W3	Nitrite-N	0.000	0.0523	5.0	9.56	U	9.6		
03/03/05	PB B10W3	Bromide	0.084	0.0523	5.0	9.56	U	9.6		
03/03/05	PB B10W3	Nitrate-N	0.045	0.0523	5.0	9.56	U	9.6		
03/03/05	PB B10W3	Phosphate-P	0.000	0.0523	5.0	9.56	U	9.6		
03/03/05	PB B10W3	Sulfate	0.076	0.0523	5.0	9.56	U	9.6		
03/03/05	LCSW B10W1	Fluoride	4.447	0.2500	5.5	97.8		2.2	100	97.8%
03/03/05	LCSW B10W1	Chloride	9.273	0.2500	5.5	204		11	200	102%
03/03/05	LCSW B10W1	Nitrite-N	4.492	0.2500	5.5	98.8		2.2	100	98.8%
03/03/05	LCSW B10W1	Bromide	18.635	0.2500	5.5	410		2.2	400	103%
03/03/05	LCSW B10W1	Nitrate-N	4.033	0.2500	5.5	88.7		2.2	90.4	98.1%
03/03/05	LCSW B10W1	Phosphate-P	8.605	0.2500	5.5	189		2.2	191	99.0%
03/03/05	LCSW B10W1	Sulfate	18.398	0.2500	5.5	405		2.2	400	101%
03/03/05	257326	Fluoride	0.187	0.0523	5.0	17.9		9.6		
03/03/05	257326	Chloride	0.319	0.0523	5.0	47.8	U	48		
03/03/05	257326	Nitrite-N	0.059	0.0523	5.0	9.56	U	9.6		
03/03/05	257326	Bromide	0.000	0.0523	5.0	9.56	U	9.6		
03/03/05	257326	Nitrate-N	0.215	0.0523	5.0	20.6		9.6		
03/03/05	257326	Phosphate-P	4.316	0.0523	5.0	413		9.6		
03/03/05	257326	Sulfate	0.992	0.0523	5.0	94.8		9.6		

Sample calc 257326 F

$$0.187 \times \frac{5}{0.0523} = 17.9 \frac{mg}{Kg}$$

U = Undetected

Schedule File: C:\PeakNet\schedule\050302.sch

Line	Sample	Sample Type	Level	Method	Data File	Dilution
1	BLK	Sample		anions050302.met	050302_001.dxd	1
2	STD 8 59-08-IC5	Calibration St	1	anions050302.met	050302_002.dxd	1
3	STD 7 59-07-IC5	Calibration St	2	anions050302.met	050302_003.dxd	1
4	STD 6 59-06-IC5	Calibration St	3	anions050302.met	050302_004.dxd	1
5	STD 5 59-05-IC5	Calibration St	4	anions050302.met	050302_005.dxd	1
6	STD 4 59-04-IC5	Calibration St	5	anions050302.met	050302_006.dxd	1
7	STD 3 59-03-IC5	Calibration St	6	anions050302.met	050302_007.dxd	1
8	STD 2 59-02-IC5	Calibration St	7	anions050302.met	050302_008.dxd	1
9	STD 1 59-01-IC5	Calibration St	8	anions050302.met	050302_009.dxd	1
10	ICV	Sample		anions050302.met	050302_010.dxd	20
11	ICB	Sample		anions050302.met	050302_011.dxd	1
12	259407	Sample		anions050302.met	050302_012.dxd	1
13	259407D	Sample		anions050302.met	050302_013.dxd	1
14	259407S	Sample		anions050302.met	050302_014.dxd	1
15	259408	Sample		anions050302.met	050302_015.dxd	1
16	259409	Sample		anions050302.met	050302_016.dxd	1
17	259577	Sample		anions050302.met	050302_017.dxd	1
18	259577D	Sample		anions050302.met	050302_018.dxd	1
19	259577S	Sample		anions050302.met	050302_019.dxd	1
20	259578	Sample		anions050302.met	050302_020.dxd	1
21	259579	Sample		anions050302.met	050302_021.dxd	1
22	CCV	Sample		anions050302.met	050302_022.dxd	20
23	CCB	Sample		anions050302.met	050302_023.dxd	1
24	259407 df10	Sample		anions050302.met	050302_024.dxd	10
25	259407D df10	Sample		anions050302.met	050302_025.dxd	10
26	259407S df10	Sample		anions050302.met	050302_026.dxd	10
27	259408 df10	Sample		anions050302.met	050302_027.dxd	10
28	259409 df10	Sample		anions050302.met	050302_028.dxd	10
29	259577 df10	Sample		anions050302.met	050302_029.dxd	10
30	259577D df10	Sample		anions050302.met	050302_030.dxd	10
31	259577S df10	Sample		anions050302.met	050302_031.dxd	10
32	259578 df10	Sample		anions050302.met	050302_032.dxd	10
33	259579 df10	Sample		anions050302.met	050302_033.dxd	10
34	CCV	Sample		anions050302.met	050302_034.dxd	20
35	CCB	Sample		anions050302.met	050302_035.dxd	1
36	259543	Sample		anions050302.met	050302_036.dxd	1
37	259543D	Sample		anions050302.met	050302_037.dxd	1
38	259543S	Sample		anions050302.met	050302_038.dxd	1
39	259545	Sample		anions050302.met	050302_039.dxd	1
40	259547	Sample		anions050302.met	050302_040.dxd	1
41	259549	Sample		anions050302.met	050302_041.dxd	1
42	259551	Sample		anions050302.met	050302_042.dxd	1
43	CCV	Sample		anions050302.met	050302_043.dxd	20
44	CCB	Sample		anions050302.met	050302_044.dxd	1
45	259543 df10	Sample		anions050302.met	050302_045.dxd	10
46	259543D df10	Sample		anions050302.met	050302_046.dxd	10
47	259543S df10	Sample		anions050302.met	050302_047.dxd	10
48	259545 df10	Sample		anions050302.met	050302_048.dxd	10
49	259547 df10	Sample		anions050302.met	050302_049.dxd	10
50	259549 df10	Sample		anions050302.met	050302_050.dxd	10
51	259551 df10	Sample		anions050302.met	050302_051.dxd	10
52	CCV	Sample		anions050302.met	050302_052.dxd	20
53	CCB	Sample		anions050302.met	050302_053.dxd	1
54	CCB	Sample		astop.met	050302	1

010315

Default Method Path: C:\PEAKNET\METHOD
Default Data Path: C:\PEAKNET\DATA\050302
Comment:
DIV 20 06002.01.232 TO#050222-4, 050302-3
EPA 06685.28.006 TO#050228-4

D Spies 3/4/05

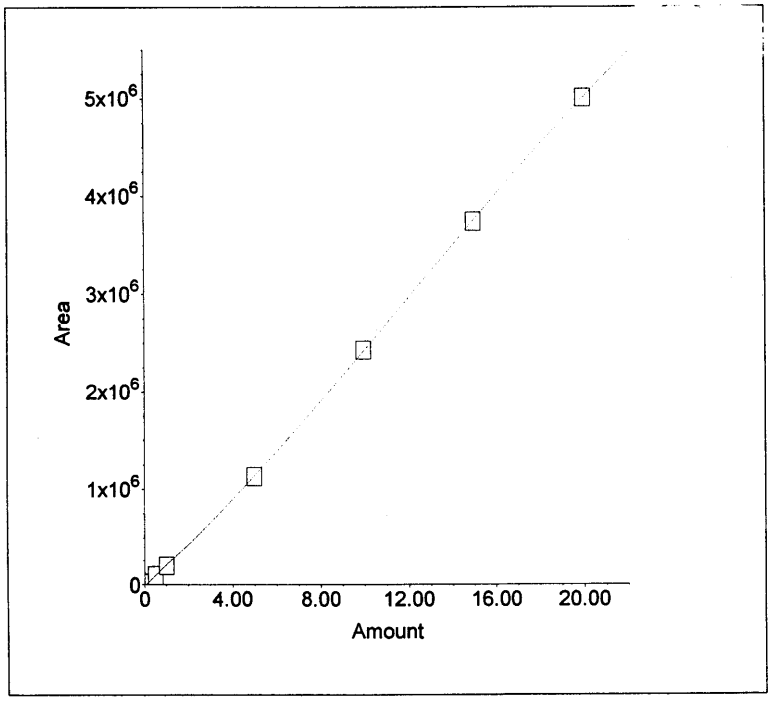
ICV Sources:
1) SPEX LOT#28-138AS (INORG# 4870)

F = 100 mg/L
Cl = 200 mg/L
Br = 400 mg/L
NO3N = 90.4 mg/L
PO4P = 191 mg/L
SO4 = 400 mg/L
2) 62-01-IC5
NO2N 100mg/L

010316

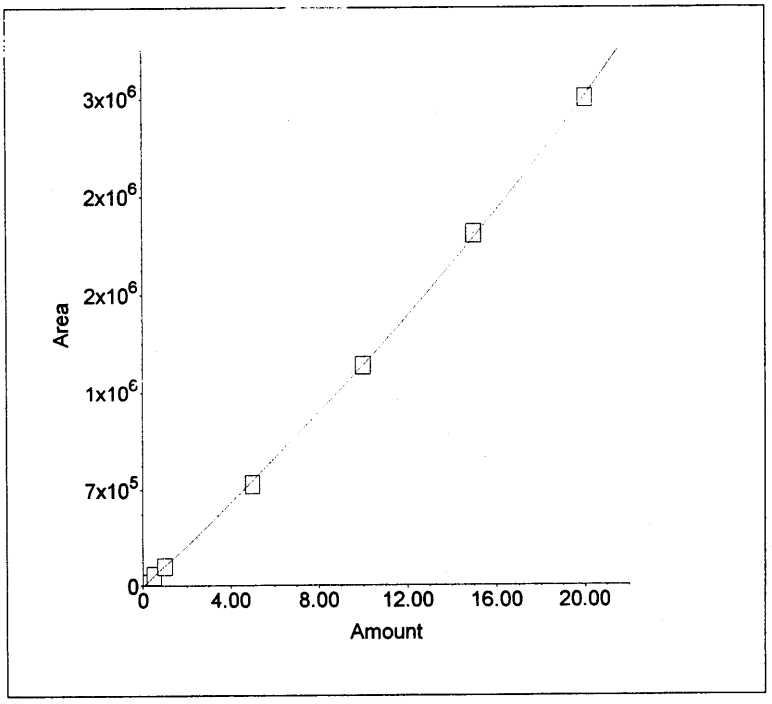
Method:C:\PEAKNET\METHOD\ANIONS050302.MET Updated:3/3/05 9:09:29 AM Total:7

1. Component:FLUORIDE
Standard:External Fit Type:Cubic
Origin:Ignore Calibration:Area
r^2=0.999983
Amt=2.498599e-020*Resp³+
-2.454890e-013*Resp²+
4.161358e-006*Resp+0.06743

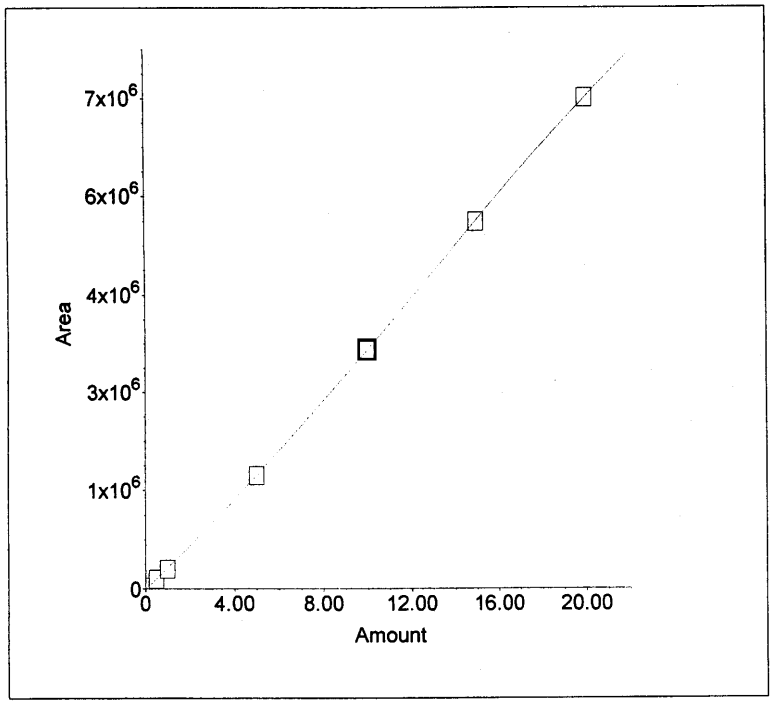


2. Component:CHLORIDE
Standard:External Fit Type:Quadratic
Origin:Include Calibration:Area
r^2=0.999861
Amt=-2.600127e-013*Resp²+
6.343445e-006*Resp+0.048[illegible]

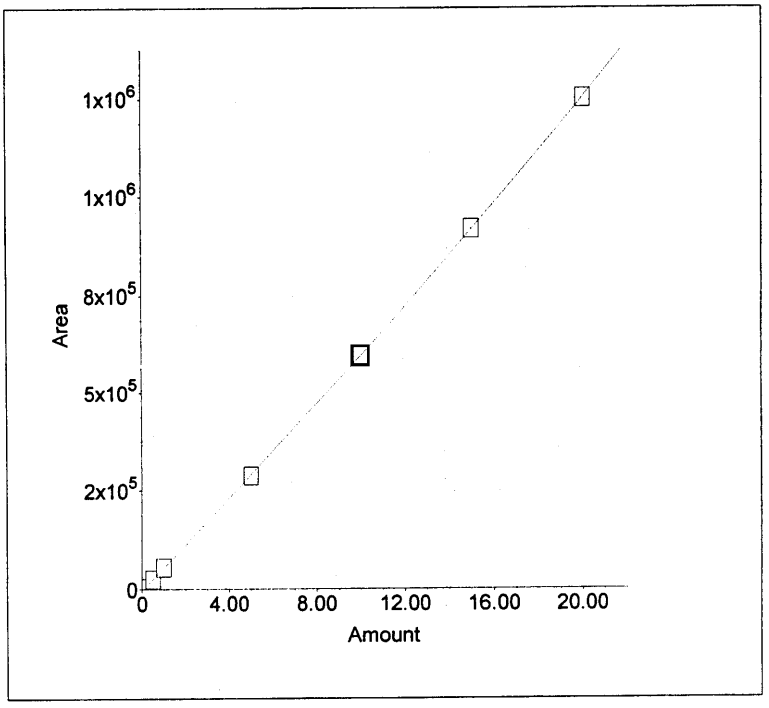
010317



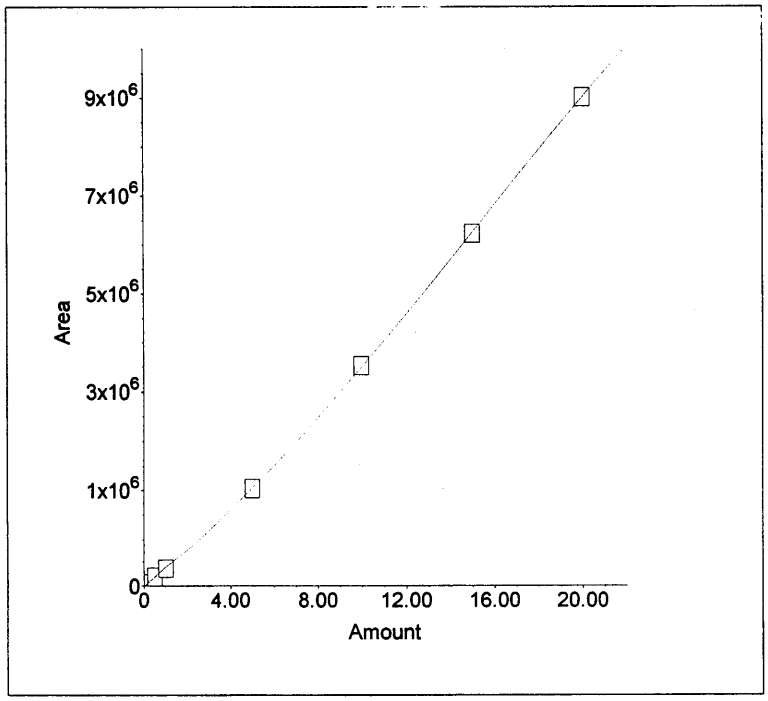
3. Component:NITRITE-N
Standard:External Fit Type:Cubic
Origin:Ignore Calibration:Area
r^2=0.999991
Amt=8.777003e-021*Resp³+
-1.184819e-013*Resp²+
2.991603e-006*Resp+0.04405



4. Component:BROMIDE
Standard:External Fit Type:Quadratic
Origin:Ignore Calibration:Area
r^2=0.999989
Amt=-8.677811e-013*Resp²+
1.514133e-005*Resp+0.06389

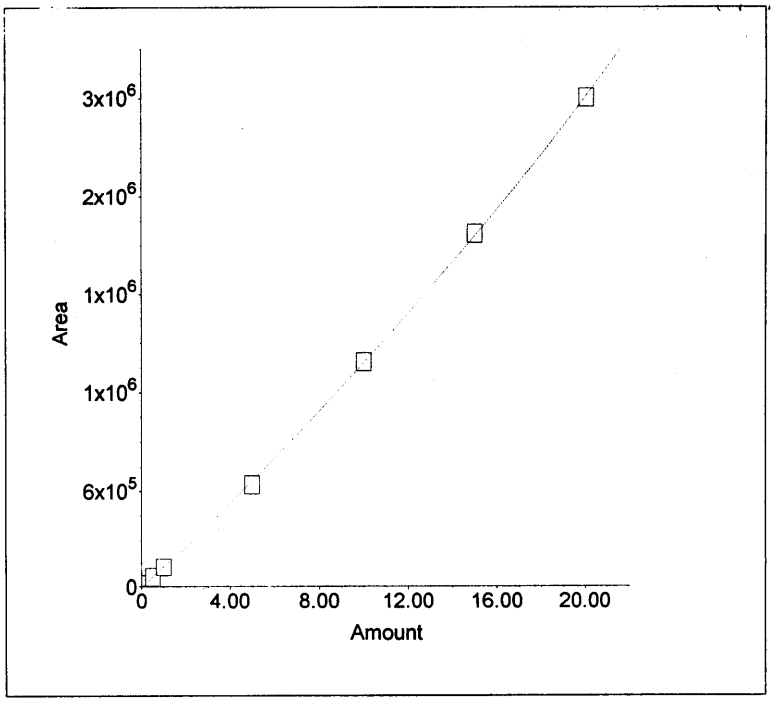


5. Component:NITRATE-N
Standard:External Fit Type:Cubic
Origin:Include Calibration:Area
r^2=0.999981
Amt=5.696868e-021*Resp^3+
-1.234729e-013*Resp^2+
2.689641e-006*Resp+0.02076

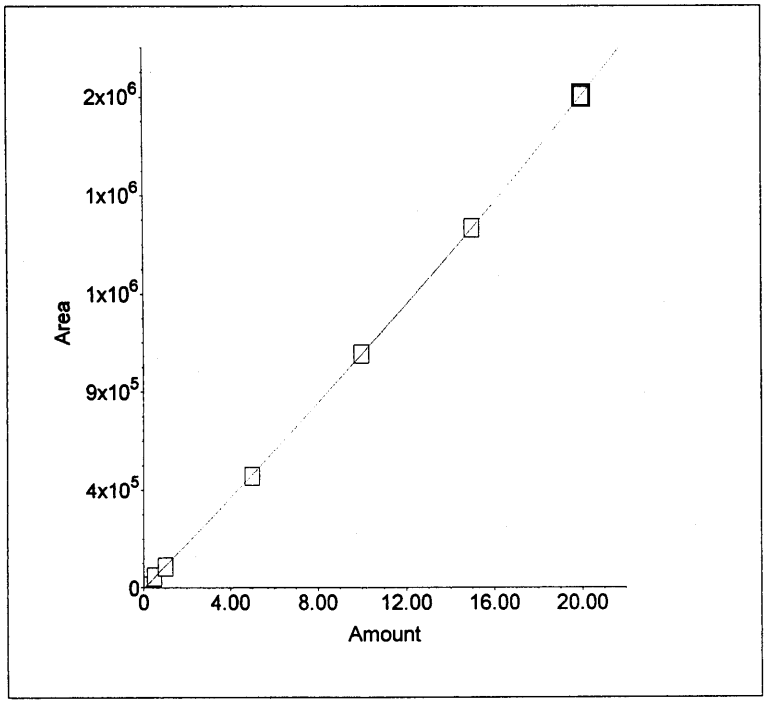


6. Component:PHOSPHATE-P
Standard:External Fit Type:Quadratic
Origin:Include Calibration:Area
r^2=0.999891
Amt=-3.357642e-013*Resp^2+
7.438606e-006*Resp+0.05495

010318



7. Component:SULFATE
Standard:External Fit Type:Quadratic
Origin:Ignore Calibration:Area
r^2=0.999976
Amt=-3.576137e-013*Resp^2+
9.368711e-006*Resp+0.04121



Sample Name : BLK
Dilution Factor : 1.00
Injection Number : 1
Data File Name : ...\050302_001.DXD
Method File Name : ...\ANIONS050302.met
Schedule File Name : c:\peaknet\schedule\050302.sch

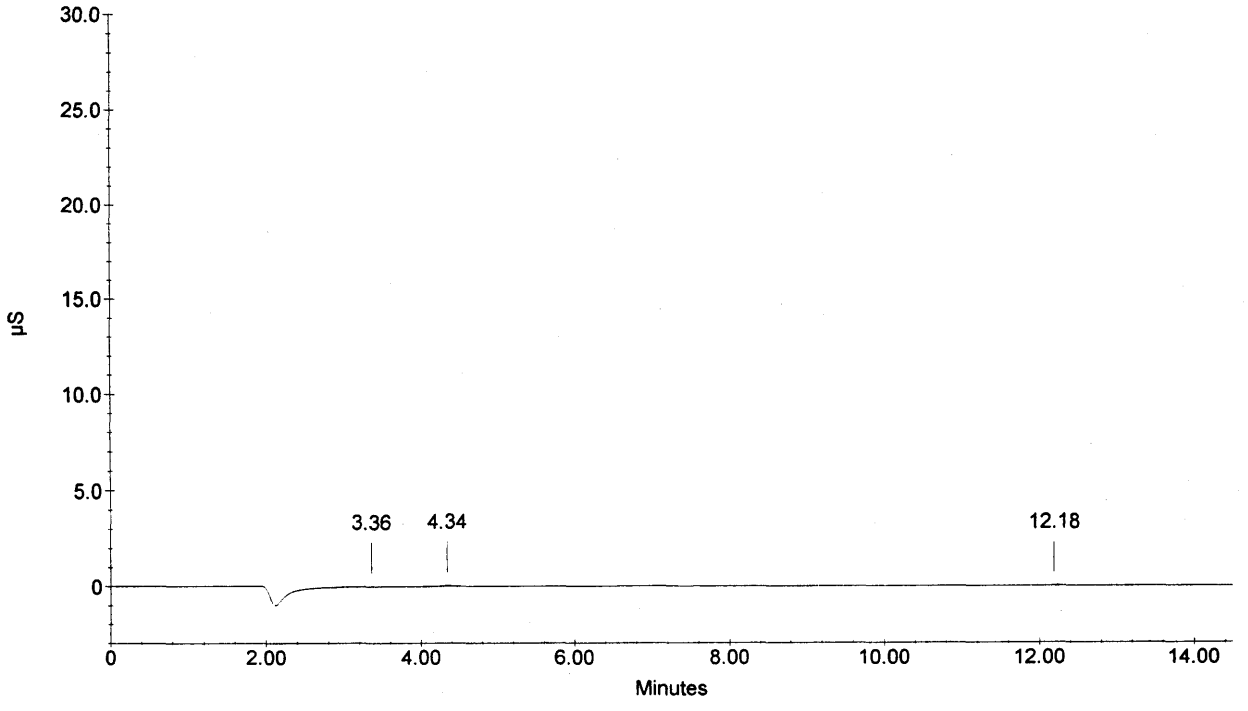
Date Time Collected : 3/2/05 10:40:11 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010319

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.36		0.000	43	295	1	
2	4.34	CHLORIDE	0.090	531	6542	1	-0.91
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
3	12.18	SULFATE	0.056	83	1605	1	-0.33
			---total(s)---				
	0.00		0.146		8443		

BLK



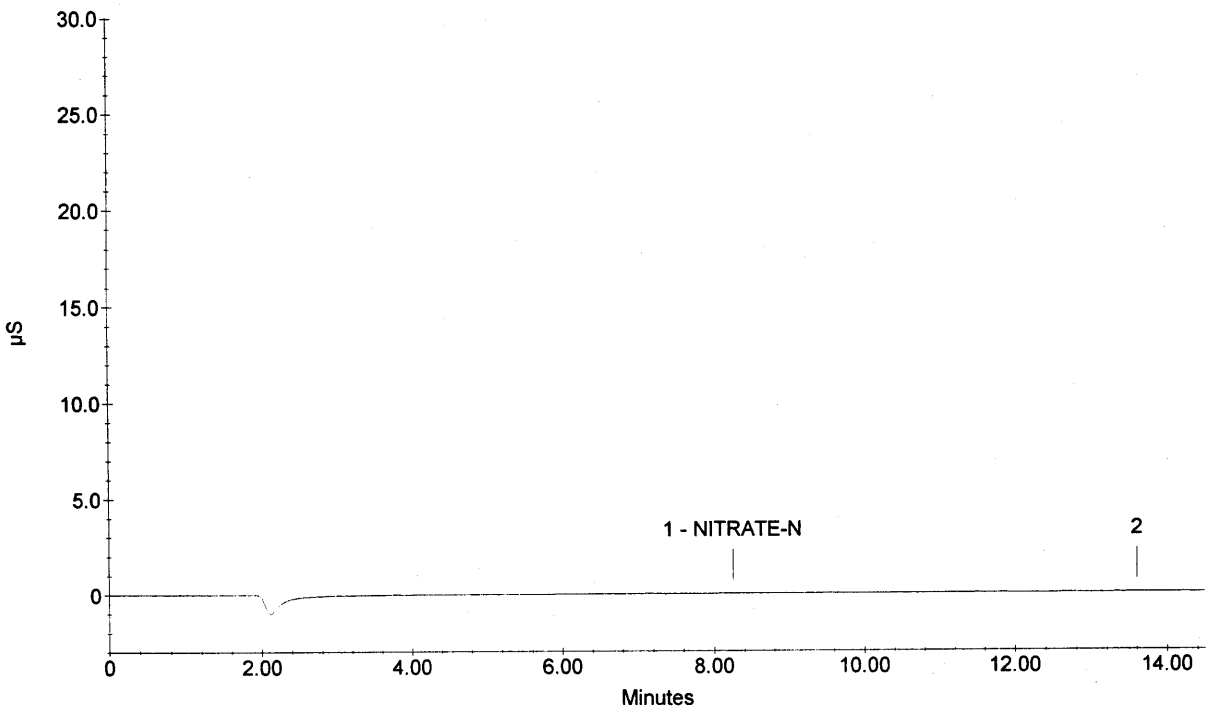
Sample Name : STD 8 59-08-IC5
Dilution Factor : 1.00
Injection Number : 2
Data File Name : ...\050302_002.DXD
Method File Name : ...\ANIONS050302.met
Schedule File Name : c:\peaknet\schedule\050302.sch

Date Time Collected : 3/2/05 10:57:33 AM
Date Time Updated : 3/3/05 8:43:43 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940 010320
System Operator : rSPIES

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	8.25	NITRATE-N CHLORIDE NITRITE-N BROMIDE	0.00	261	32
1	8.25	NITRATE-N PHOSPHATE-P SULFATE	0.00	261	32

STD 8 59-08-IC5



Sample Name : STD 7 59-07-IC5
Dilution Factor : 1.00
Injection Number : 3
Data File Name : ...\050302_003.DXD
Method File Name : ...\ANIONS050302.met
Schedule File Name : c:\peaknet\schedule\050302.sch

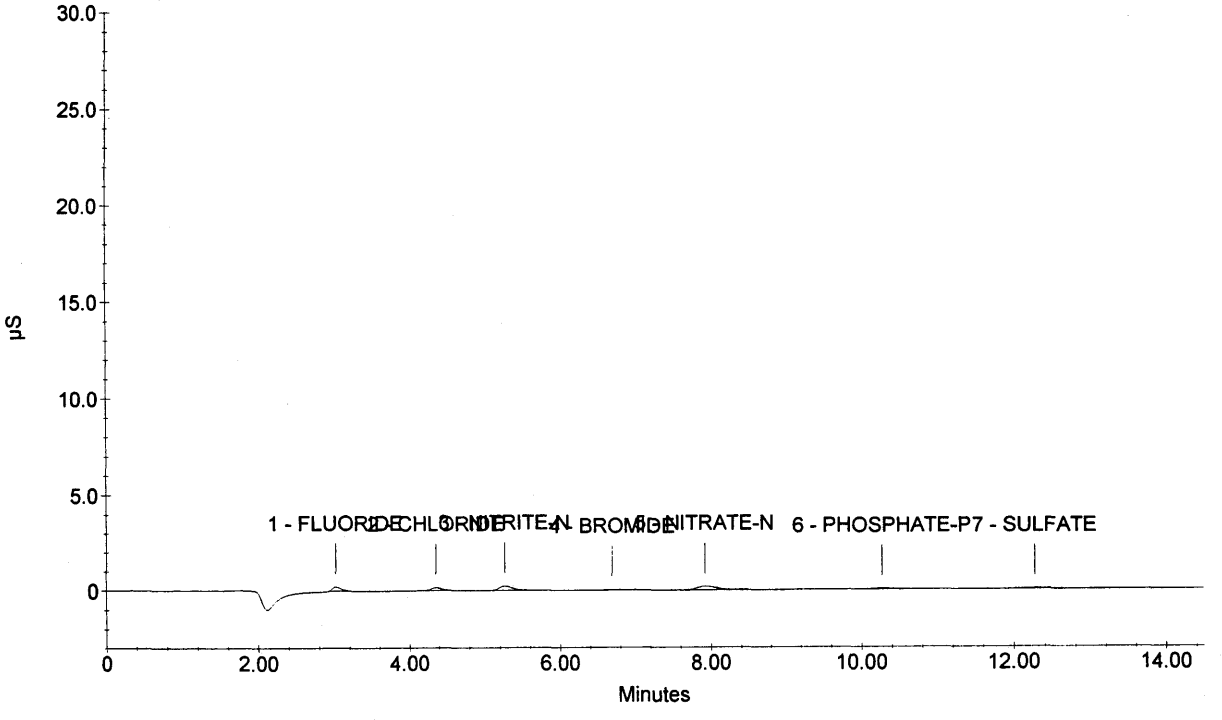
Date Time Collected : 3/2/05 11:14:46 AM
Date Time Updated : 3/3/05 9:06:52 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010321

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	3.02	FLUORIDE	0.10	16124	2082
2	4.36	CHLORIDE	0.10	16346	1595
3	5.26	NITRITE-N	0.10	29539	2308
4	6.69	BROMIDE	0.10	4111	344
5	7.92	NITRATE-N	0.10	32827	1857
6	10.26	PHOSPHATE-P	0.10	12479	517
7	12.26	SULFATE	0.10	9822	401

STD 7 59-07-IC5



Sample Name : STD 6 59-06-IC5
Dilution Factor : 1.00
Injection Number : 4
Data File Name : ...\050302_004.DXD
Method File Name : ...\ANIONS050302.met
Schedule File Name : c:\peaknet\schedule\050302.sch

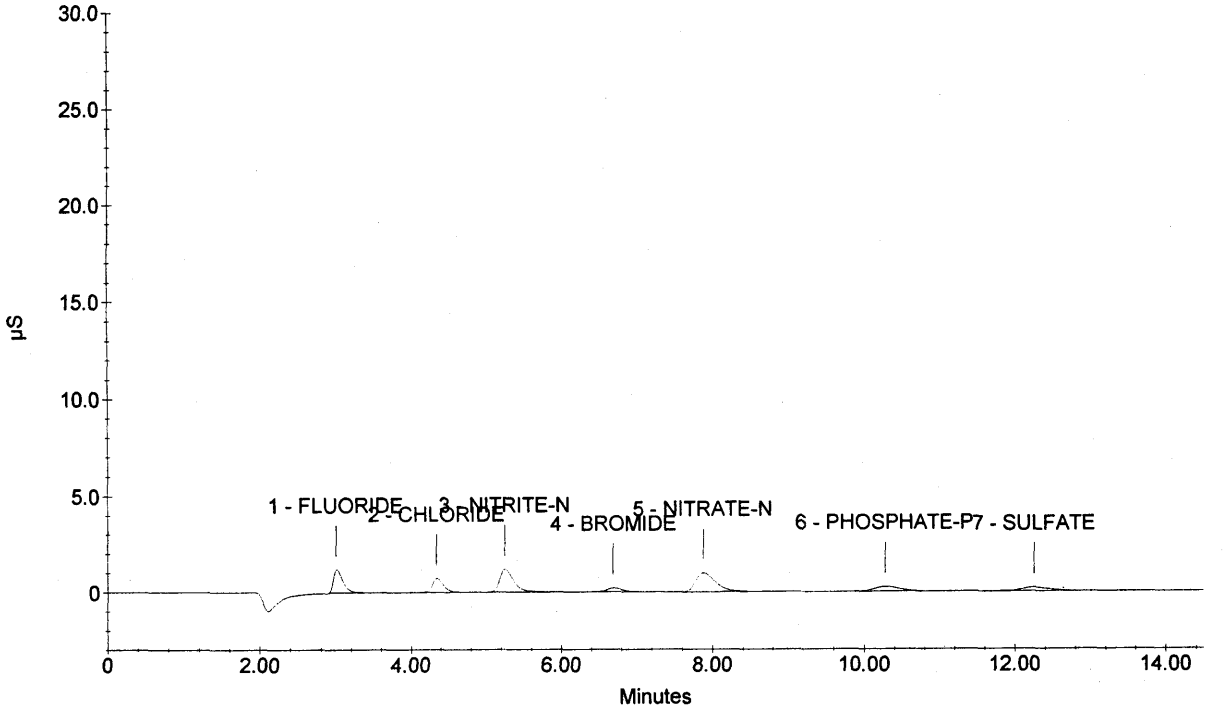
Date Time Collected : 3/2/05 11:32:00 AM
Date Time Updated : 3/3/05 9:10:35 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010322

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	3.01	FLUORIDE	0.50	104232	11966
2	4.34	CHLORIDE	0.50	73477	7073
3	5.25	NITRITE-N	0.50	152298	11809
4	6.69	BROMIDE	0.50	28376	1969
5	7.88	NITRATE-N	0.50	176533	9718
6	10.28	PHOSPHATE-P	0.50	59766	2485
7	12.25	SULFATE	0.50	51745	1931

STD 6 59-06-IC5



Sample Name : STD 5 59-05-IC5
Dilution Factor : 1.00
Injection Number : 5
Data File Name : ...\050302_005.DXD
Method File Name : ...\ANIONS050302.met
Schedule File Name : c:\peaknet\schedule\050302.sch

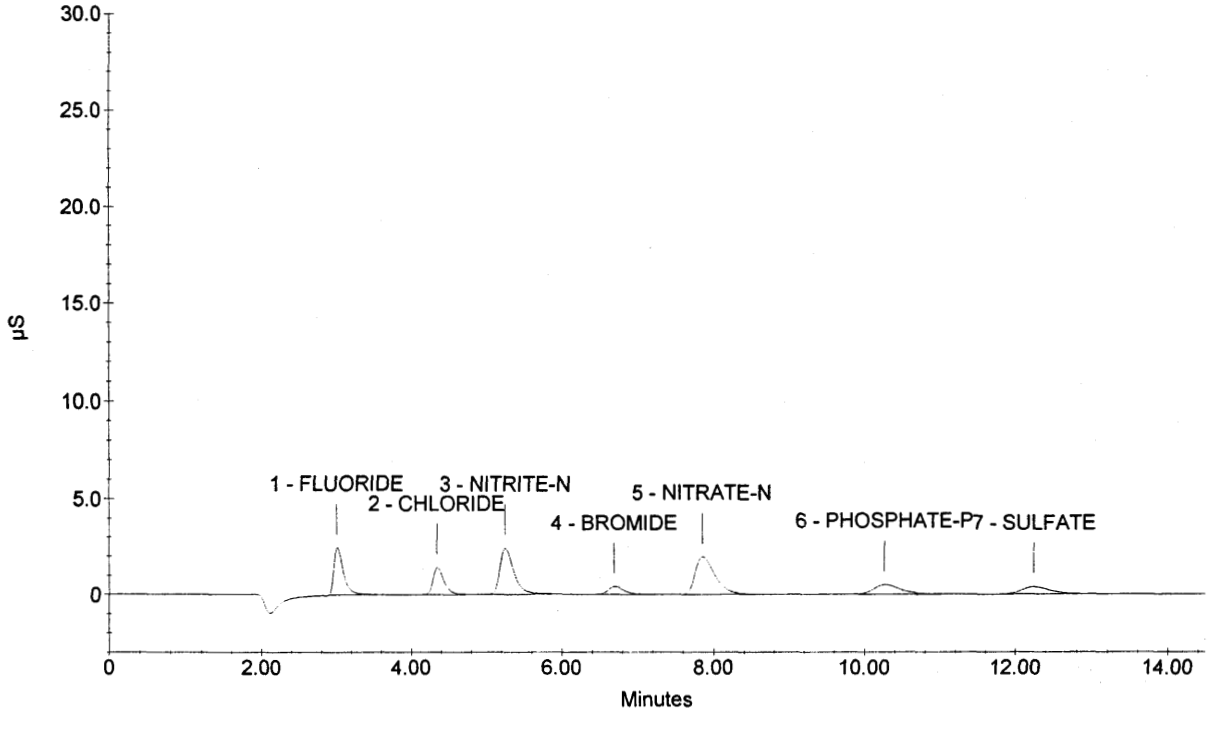
Date Time Collected : 3/2/05 11:49:15 AM
Date Time Updated : 3/3/05 9:10:35 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010323

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	3.01	FLUORIDE	1.00	219738	24616
2	4.34	CHLORIDE	1.00	147609	14106
3	5.25	NITRITE-N	1.00	312790	24038
4	6.69	BROMIDE	1.00	62304	4049
5	7.85	NITRATE-N	1.00	355388	19700
6	10.26	PHOSPHATE-P	1.00	125368	5078
7	12.24	SULFATE	1.00	99632	3820

STD 5 59-05-IC5



Sample Name : STD 4 59-04-IC5
Dilution Factor : 1.00
Injection Number : 6
Data File Name : ...\050302_006.DXD
Method File Name : ...\ANIONS050302.met
Schedule File Name : c:\peaknet\schedule\050302.sch

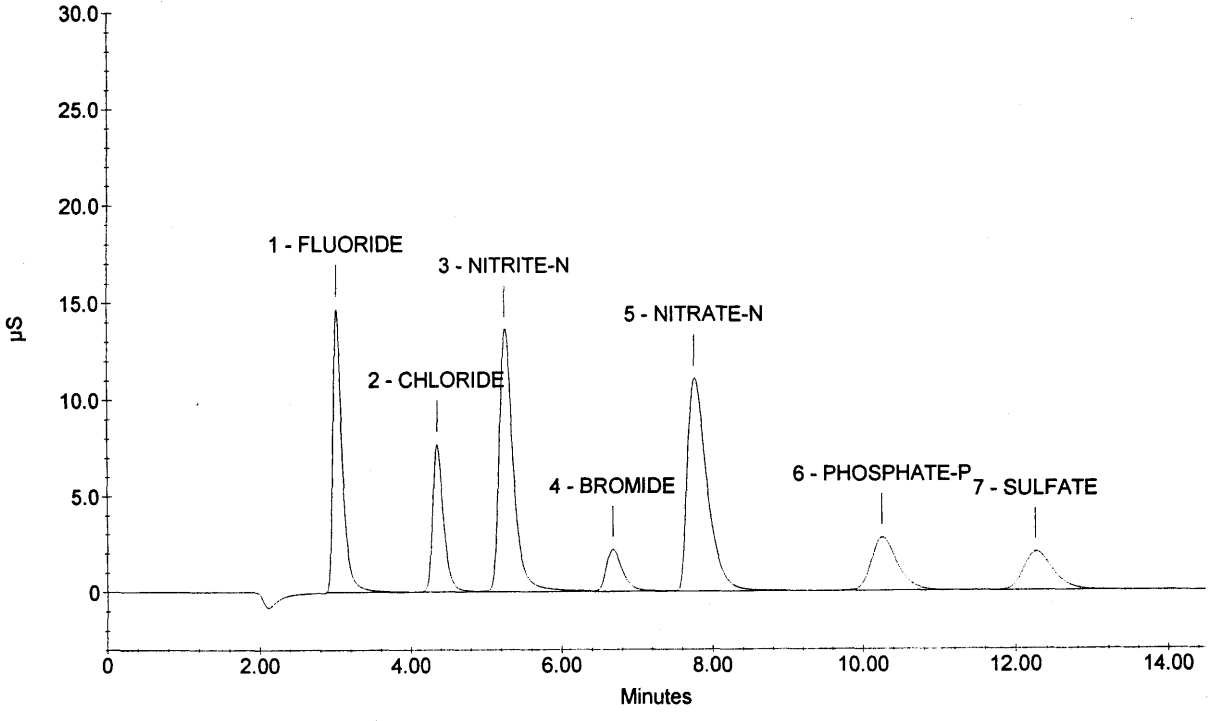
Date Time Collected : 3/2/05 12:06:30 PM
Date Time Updated : 3/3/05 9:10:36 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010324

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	3.02	FLUORIDE	5.00	1260546	146678
2	4.36	CHLORIDE	5.00	779240	76821
3	5.25	NITRITE-N	5.00	1760043	135592
4	6.68	BROMIDE	5.00	329149	21689
5	7.76	NITRATE-N	5.00	2006195	110394
6	10.25	PHOSPHATE-P	5.00	662272	27726
7	12.25	SULFATE	5.00	532918	20035

STD 4 59-04-IC5



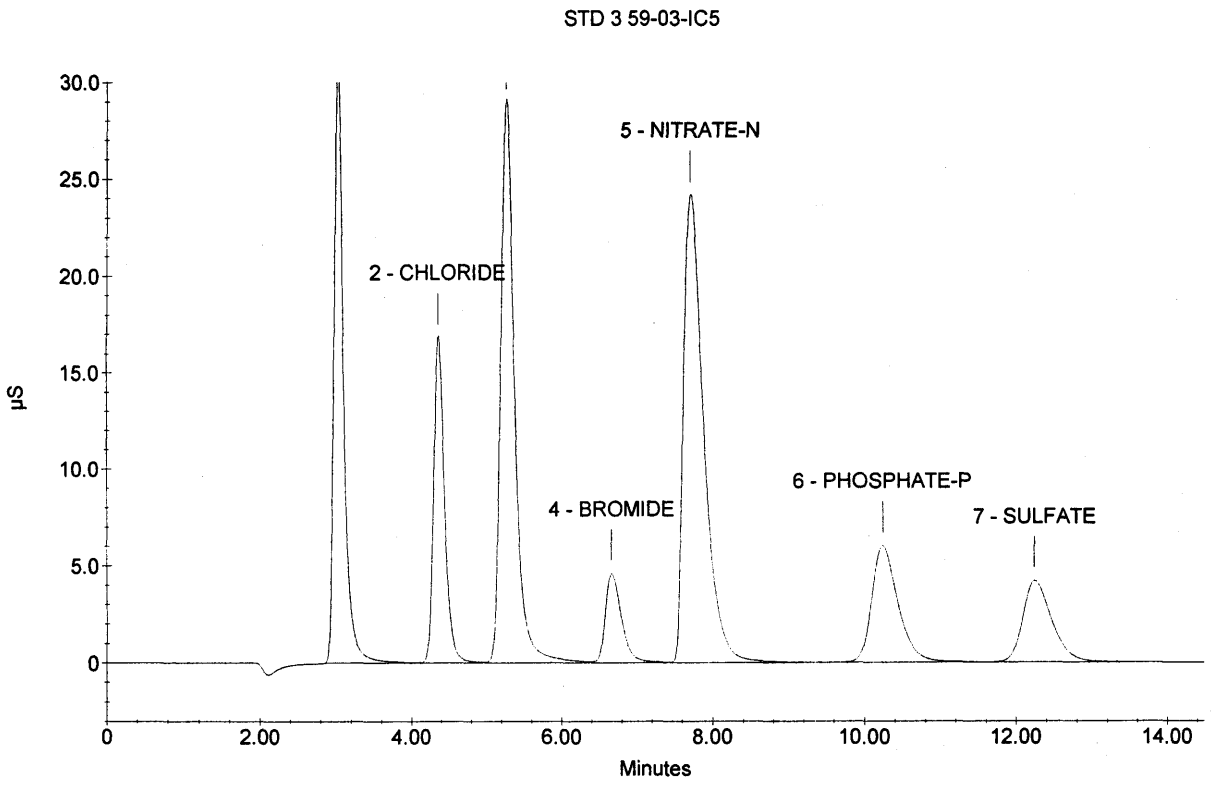
Sample Name : STD 3 59-03-IC5
Dilution Factor : 1.00
Injection Number : 7
Data File Name : ...\050302_007.DXD
Method File Name : ...\ANIONS050302.met
Schedule File Name : c:\peaknet\schedule\050302.sch

Date Time Collected : 3/2/05 12:23:44 PM
Date Time Updated : 3/3/05 9:10:36 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010325

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	3.02	FLUORIDE	10.00	2712952	307837
2	4.36	CHLORIDE	10.00	1684813	168184
3	5.26	NITRITE-N	10.00	3736686	289623
4	6.66	BROMIDE	10.00	683712	45738
5	7.70	NITRATE-N	10.00	4455922	241307
6	10.24	PHOSPHATE-P	10.00	1435181	60094
7	12.24	SULFATE	10.00	1113465	41932



Sample Name : STD 2 59-02-IC5
Dilution Factor : 1.00
Injection Number : 8
Data File Name : ...\050302_008.DXD
Method File Name : ...\ANIONS050302.met
Schedule File Name : c:\peaknet\schedule\050302.sch

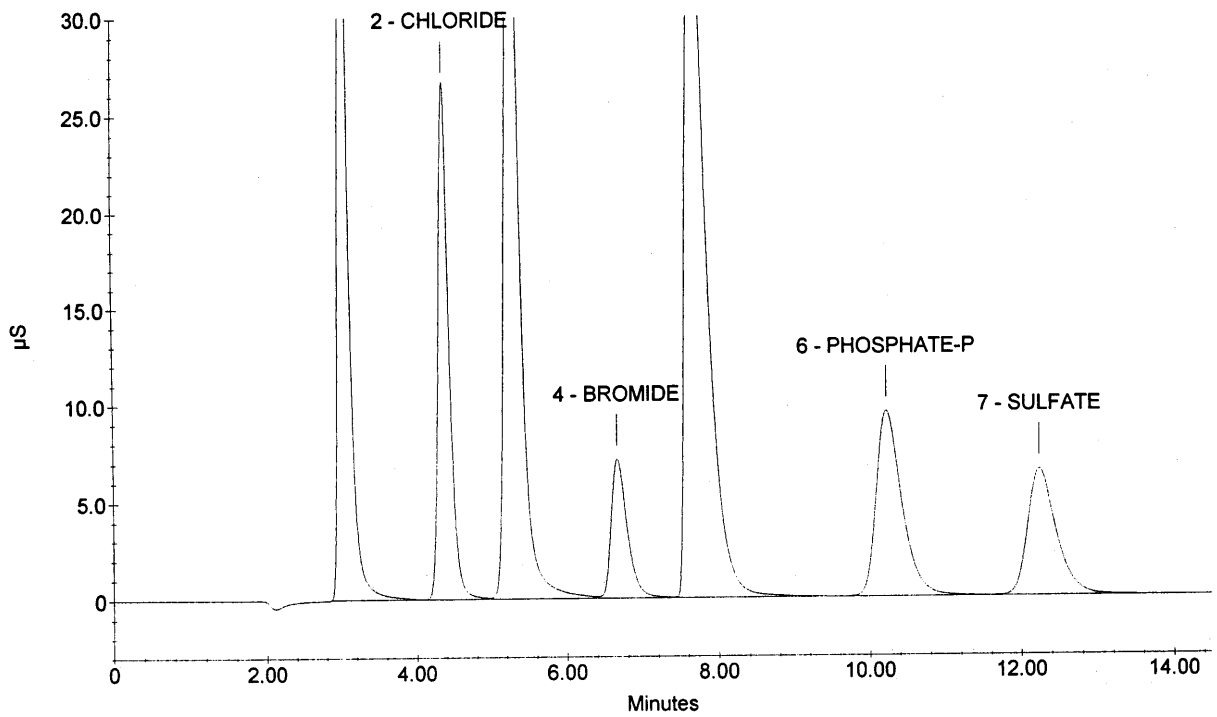
Date Time Collected : 3/2/05 12:41:02 PM
Date Time Updated : 3/3/05 9:10:36 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010326

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	3.04	FLUORIDE	15.00	4170705	461253
2	4.37	CHLORIDE	15.00	2672189	264917
3	5.29	NITRITE-N	15.00	5743371	439788
4	6.66	BROMIDE	15.00	1051687	71502
5	7.68	NITRATE-N	15.00	7117497	379091
6	10.22	PHOSPHATE-P	15.00	2250157	95397
7	12.24	SULFATE	15.00	1711181	65218

STD 2 59-02-IC5



Sample Name : STD 1 59-01-IC5
Dilution Factor : 1.00
Injection Number : 9
Data File Name : ...\050302_009.DXD
Method File Name : ...\ANIONS050302.met
Schedule File Name : c:\peaknet\schedule\050302.sch

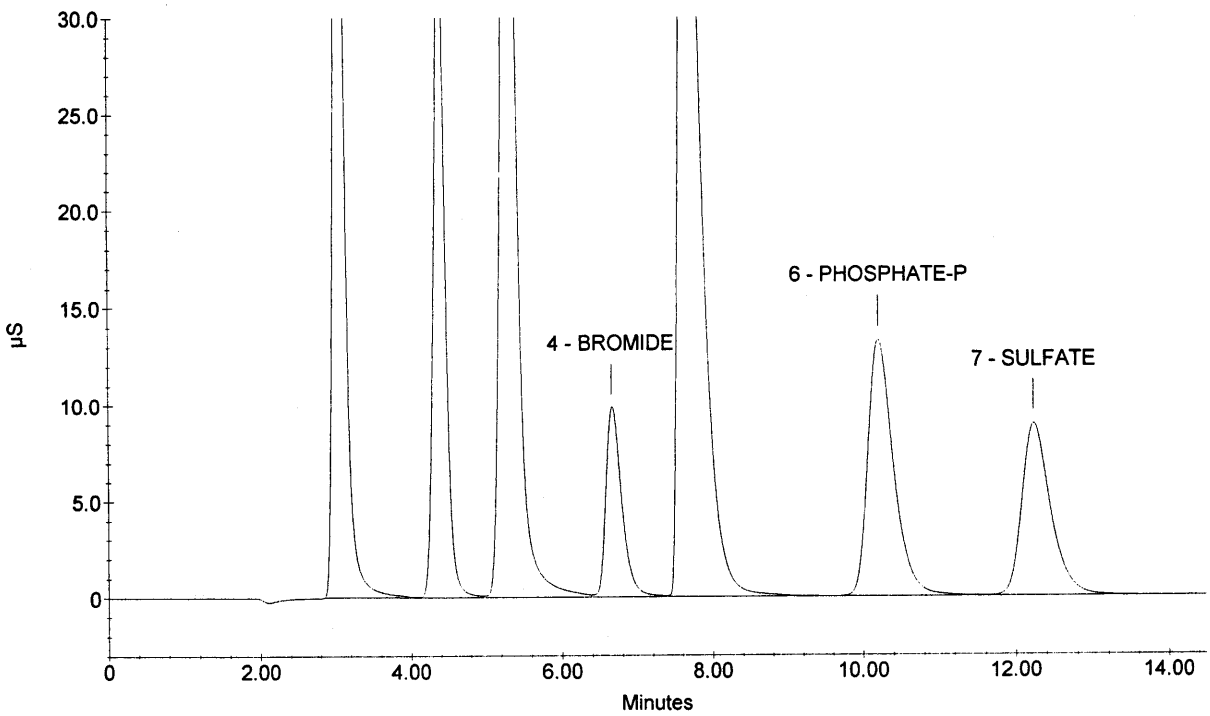
Date Time Collected : 3/2/05 12:58:21 PM
Date Time Updated : 3/3/05 9:10:37 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010327

Peak Information : Ali Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	3.05	FLUORIDE	20.00	5586310	610021
2	4.38	CHLORIDE	20.00	3694038	363649
3	5.30	NITRITE-N	20.00	7679338	575695
4	6.65	BROMIDE	20.00	1433436	98026
5	7.64	NITRATE-N	20.00	9865809	514213
6	10.20	PHOSPHATE-P	20.00	3111711	132679
7	12.22	SULFATE	20.00	2337046	89349

STD 1 59-01-IC5



Sample Name : ICV
Dilution Factor : 20.00
Injection Number : 10
Data File Name : ...\050302_010.DXD
Method File Name : ...\ANIONS050302.met
Schedule File Name : c:\peaknet\schedule\050302.sch

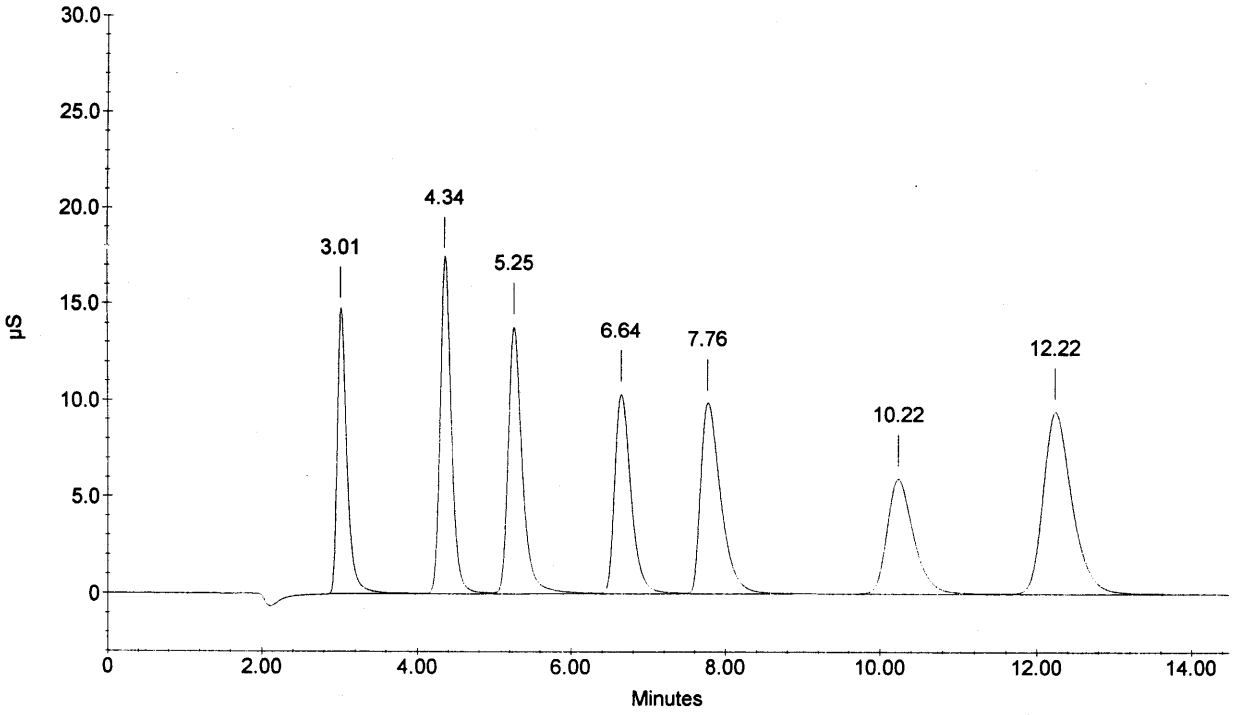
Date Time Collected : 3/2/05 1:15:40 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010328

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.01	FLUORIDE	101.457	146043	1287850	1	-1.31
2	4.34	CHLORIDE	207.129	172234	1750609	2	-0.91
3	5.25	NITRITE-N	101.642	138121	1794667	2	-1.01
4	6.64	BROMIDE	420.565	103084	1516359	2	-0.20
5	7.76	NITRATE-N	90.335	98546	1809342	2	1.57
6	10.22	PHOSPHATE-P	198.235	59430	1415534	2	0.26
7	12.22	SULFATE	419.438	94199	2466285	2	0.00
			---total(s)---				
	0.00		1538.802		12040645		

ICV



Sample Name : ICB
Dilution Factor : 1.00
Injection Number : 11
Data File Name : ...\050302_011.DXD
Method File Name : ...\ANIONS050302.met
Schedule File Name : c:\peaknet\schedule\050302.sch

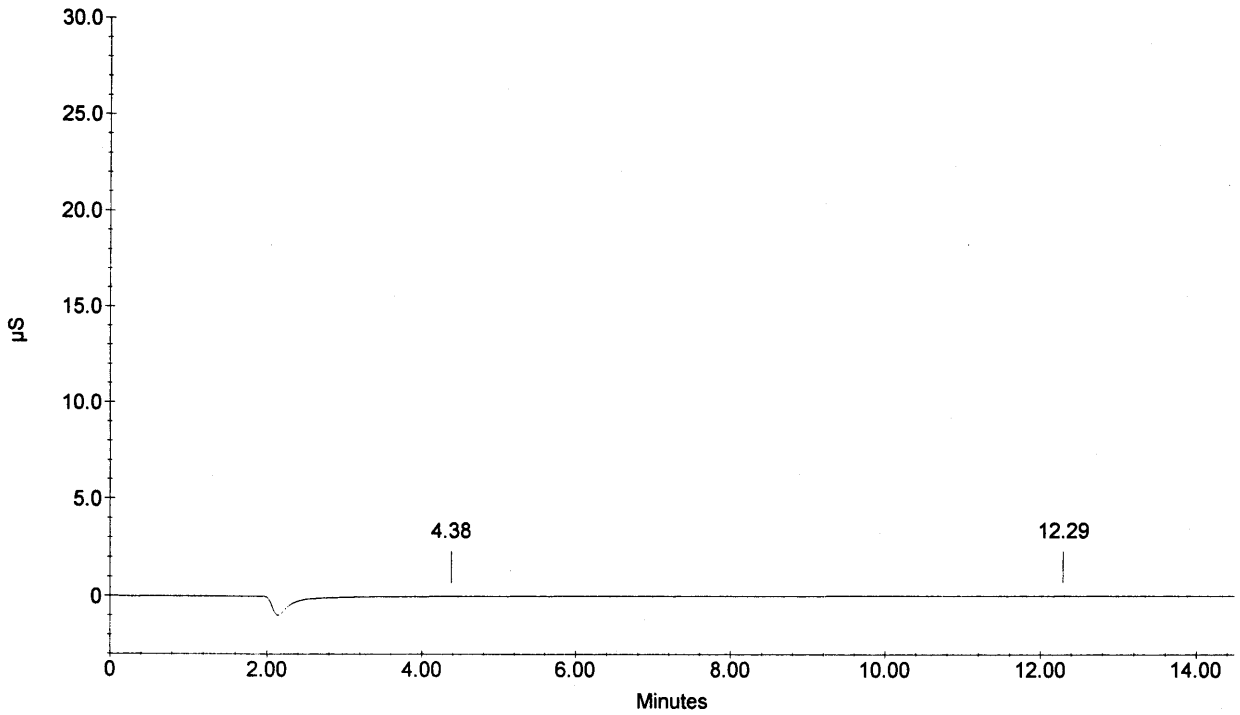
Date Time Collected : 3/2/05 1:33:00 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010329

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.38	CHLORIDE	0.058	198	1589	1	0.00
1	4.38	CHLORIDE	0.058	198	1589	1	0.00
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
2	12.29	SULFATE	0.053	71	1241	1	0.55
			---total(s)---				
	0.00		0.170		4420		

ICB



Schedule File: C:\PeakNet\schedule\11mar05.SCH

Line	Sample	Sample Type	Level	Method	Data File	Volume	Dilution
1	ICV	Sample		anions050302.met	data_001.dxd	1	20
2	ICB	Sample		anions050302.met	data_002.dxd	1	1
3	257327 DF10	Sample		anions050302.met	data_003.dxd	1	10
4	257327D DF10	Sample		anions050302.met	data_004.dxd	1	10
5	257327AS DF10	Sample		anions050302.met	data_005.dxd	1	10
6	CCV	Sample		anions050302.met	data_006.dxd	1	20
7	CCB	Sample		anions050302.met	data_007.dxd	1	1

Default Method Path: C:\PEAKNET\METHOD
Default Data Path: C:\PEAKNET\DATA\050311
Comment:
DIV 20 06002.01.211 TO#050119-1

010330

ICV Sources:
1) SPEX LOT#28-138AS (INORG# 4870)
F = 100 mg/L
Cl = 200 mg/L
Br = 400 mg/L
NO3N = 90.4 mg/L
PO4P = 191 mg/L
SO4 = 400 mg/L
2) 63-01-IC5
NO2N 100mg/L

RSpies 3/11/05

AS- Spiked 50uL SPEX + NO_2N Std into 5mL Sample dilution (10x).

Sample Name : ICV
Dilution Factor : 20.00
Injection Number : 1
Data File Name : c:\peaknet\data\050311\Data_001.dxd
Method File Name : C:\PEAKNET\METHOD\anions050302.met
Schedule File Name : c:\peaknet\schedule\11mar05.sch

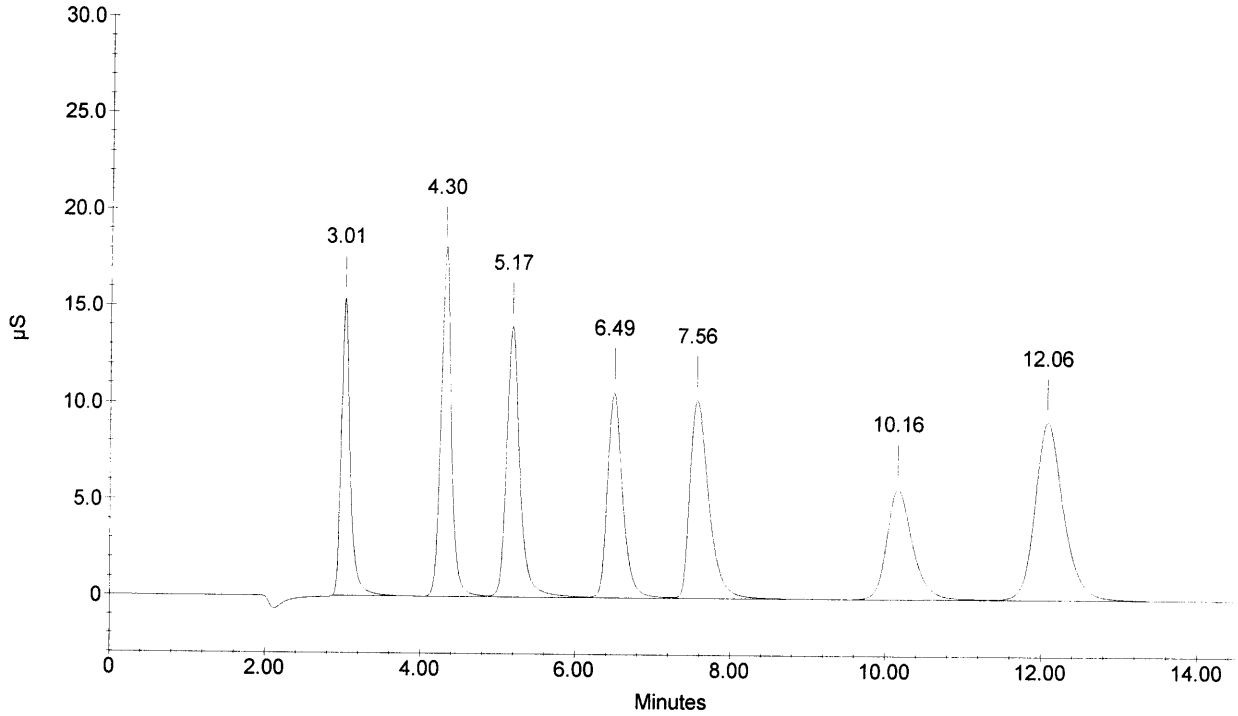
Date Time Collected : 3/11/05 9:10:52 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : MHardy

010331

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.01	FLUORIDE	96.785	152803	1224077	1	-1.31
2	4.30	CHLORIDE	200.175	178675	1686801	2	-1.83
3	5.17	NITRITE-N	96.455	139861	1697095	2	-2.51
4	6.49	BROMIDE	405.528	106275	1456504	2	-2.41
5	7.56	NITRATE-N	87.576	102452	1749470	2	-1.05
6	10.16	PHOSPHATE-P	188.163	57456	1338221	2	-0.39
7	12.06	SULFATE	400.087	91891	2339808	2	-1.31
	0.00		---total(s)--- 1474.768		11491977		

ICV



Sample Name : ICB
Dilution Factor : 1.00
Injection Number : 2
Data File Name : c:\peaknet\data\050311\Data_002.dxd
Method File Name : C:\PEAKNET\METHOD\anions050302.met
Schedule File Name : c:\peaknet\schedule\11mar05.sch

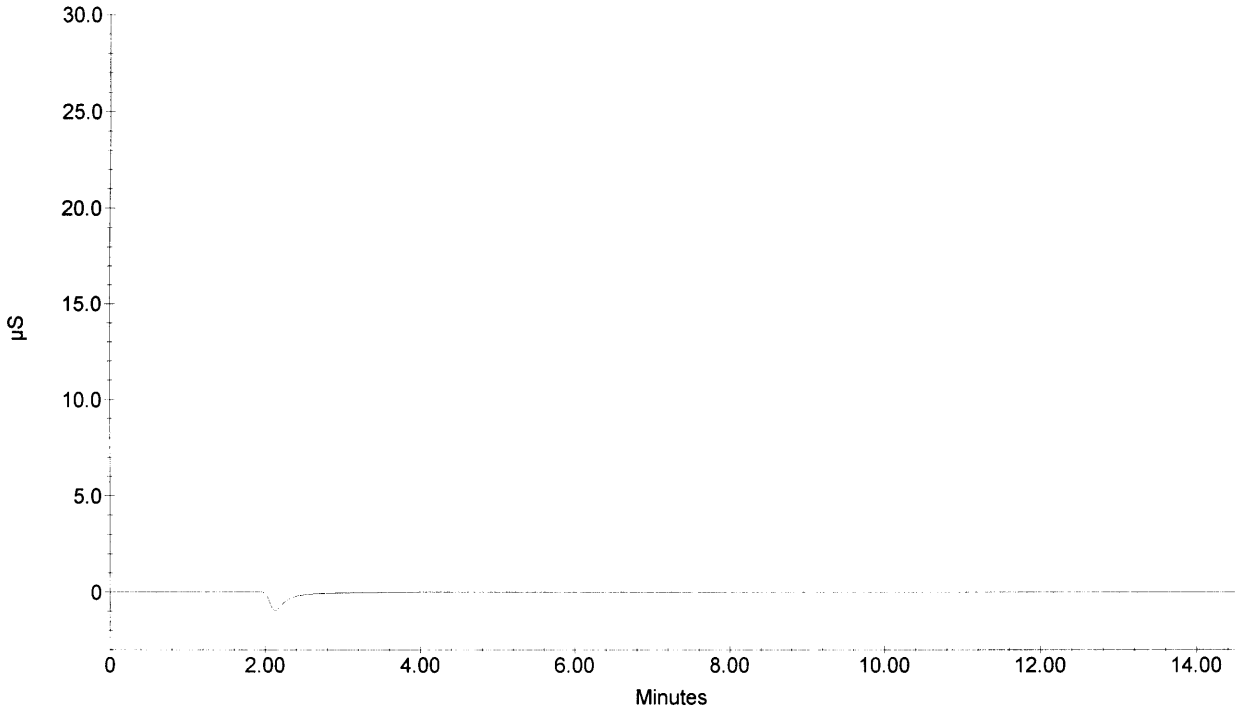
Date Time Collected : 3/11/05 9:28:06 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : MHardy

010332

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
0	0.00	(null)	0.000	0	0	0	0.00
		CHLORIDE					
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
			---total(s)---				
	0.00		0.000		0		

ICB



Sample Name : 257327 DF10
Dilution Factor : 10.00
Injection Number : 3
Data File Name : C:\PEAKNET\DATA\050311\Data_003.dxd
Method File Name : C:\PEAKNET\METHOD\anions050302.met
Schedule File Name : c:\peaknet\schedule\11mar05.sch

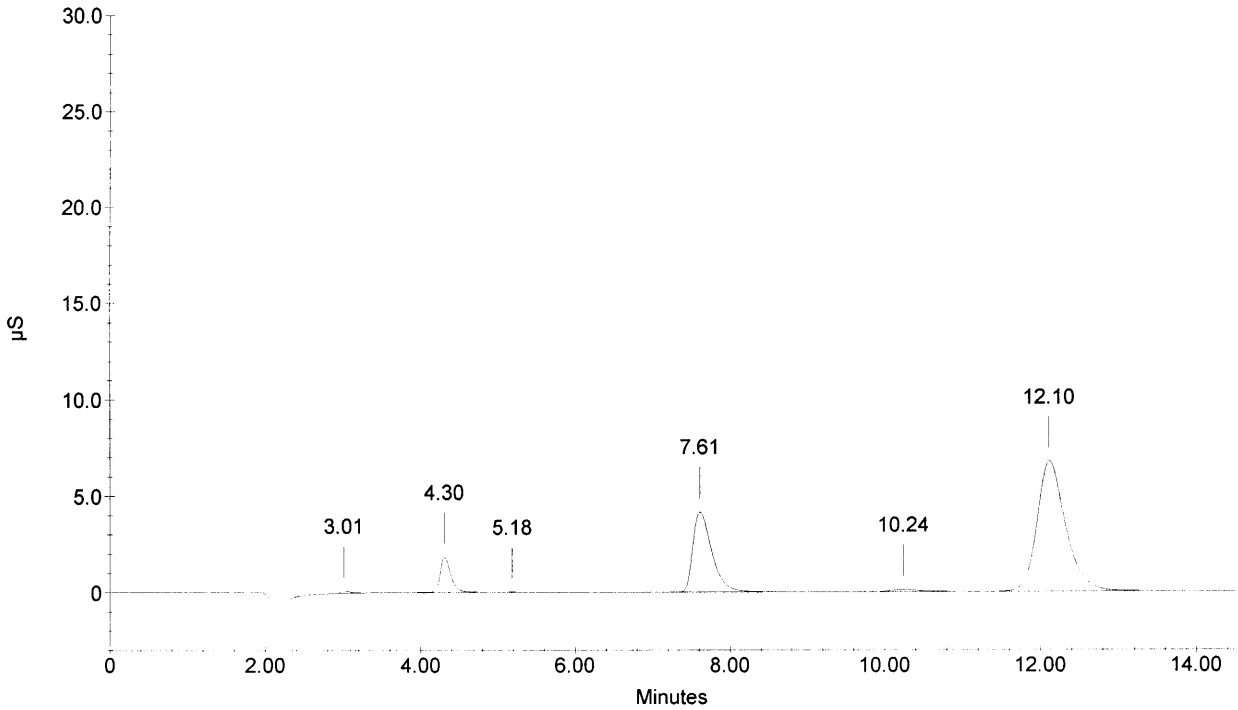
Date Time Collected : 3/11/05 9:45:18 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : MHardy

010333

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.01	FLUORIDE	0.987	1049	7509	1	-1.31
2	4.30	CHLORIDE	11.750	18297	178917	1	-1.83
3	5.18	NITRITE-N BROMIDE	0.476	137	1178	1	-2.26
4	7.61	NITRATE-N	18.570	41591	704787	1	-0.35
5	10.24	PHOSPHATE-P	2.608	1172	27708	1	0.39
6	12.10	SULFATE	151.328	67398	1724347	1	-0.98
	0.00		---total(s)--- 185.719		2644447		

257327 DF10



Sample Name : 257327D DF10
Dilution Factor : 10.00
Injection Number : 4
Data File Name : C:\PEAKNET\DATA\050311\Data_004.dxd
Method File Name : C:\PEAKNET\METHOD\anions050302.met
Schedule File Name : c:\peaknet\schedule\11mar05.sch

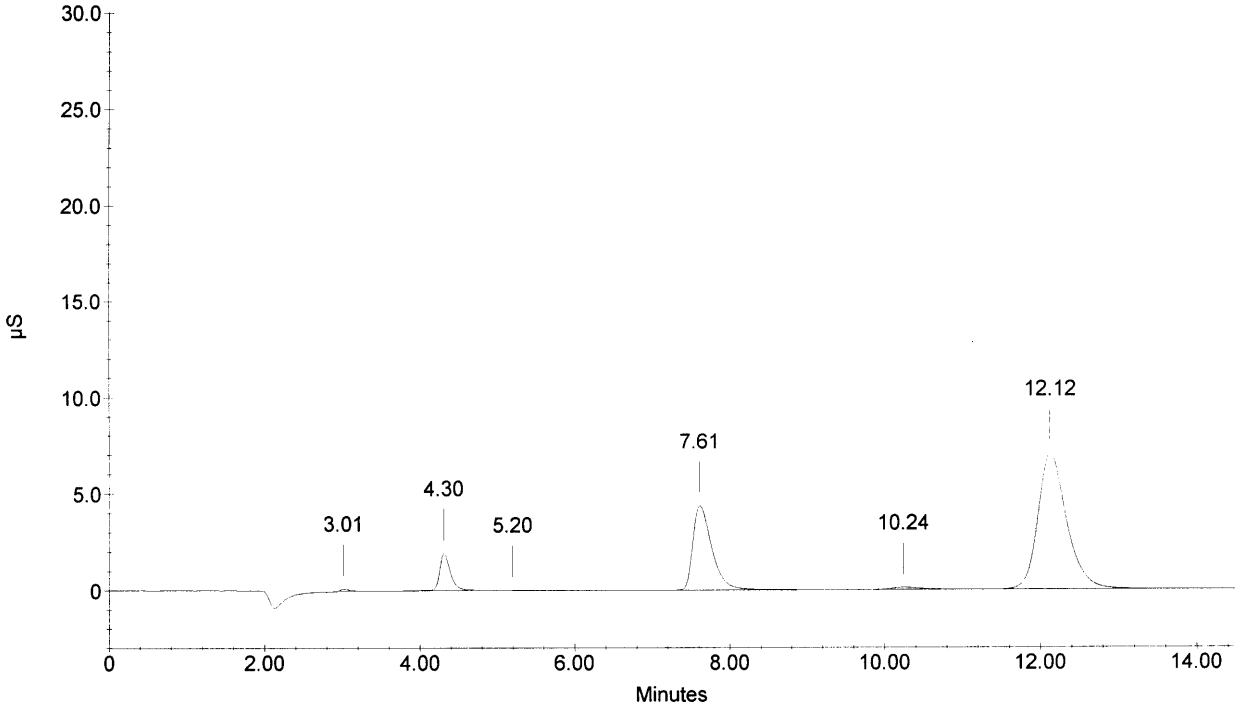
Date Time Collected : 3/11/05 10:02:32 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : MHardy

010334

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.01	FLUORIDE	0.971	1040	7132	1	-1.31
2	4.30	CHLORIDE	12.312	19044	187912	1	-1.83
3	5.20	NITRITE-N	0.492	167	1733	1	-2.01
		BROMIDE					
4	7.61	NITRATE-N	19.511	43322	742130	1	-0.35
5	10.24	PHOSPHATE-P	2.856	1225	31046	1	0.39
6	12.12	SULFATE	156.881	70343	1792808	1	-0.87
			---total(s)---				
	0.00		193.024		2762761		

257327D DF10



Sample Name : 257327AS DF10
Dilution Factor : 10.00
Injection Number : 5
Data File Name : C:\PEAKNET\DATA\050311\Data_005.dxd
Method File Name : C:\PEAKNET\METHOD\anions050302.met
Schedule File Name : c:\peaknet\schedule\11mar05.sch

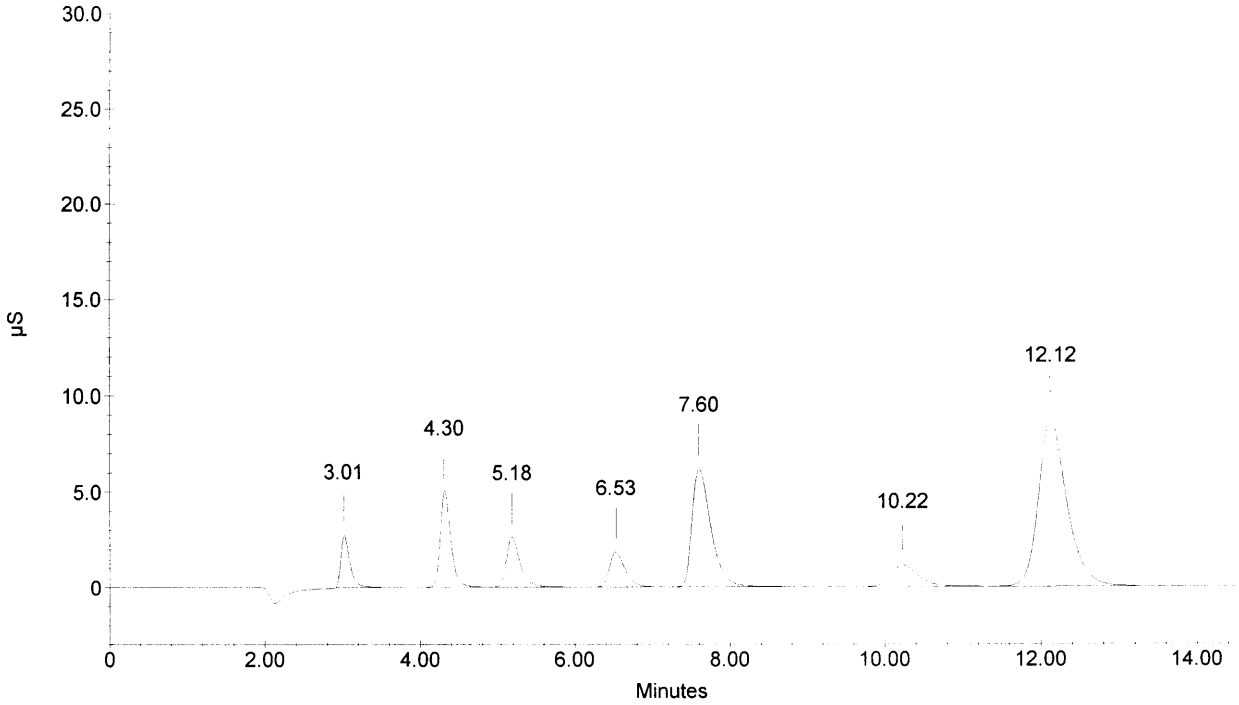
Date Time Collected : 3/11/05 10:19:48 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : MHardy

010335

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.01	FLUORIDE	9.795	26889	222022	1	-1.31
2	4.30	CHLORIDE	30.137	49432	476770	2	-1.83
3	5.18	NITRITE-N	9.817	26129	317310	2	-2.26
4	6.53	BROMIDE	38.344	18196	252684	1	-1.80
5	7.60	NITRATE-N	27.113	61526	1048346	1	-0.52
6	10.22	PHOSPHATE-P	20.905	11202	277116	2	0.26
7	12.12	SULFATE	188.755	86538	2194104	2	-0.87
			---total(s)---				
	0.00		324.867		4788352		

257327AS DF10



Sample Name : CCV
Dilution Factor : 20.00
Injection Number : 6
Data File Name : c:\peaknet\data\050311\DATA_006.DXD
Method File Name : C:\PEAKNET\METHOD\anions050302.met
Schedule File Name : c:\peaknet\schedule\11mar05.sch

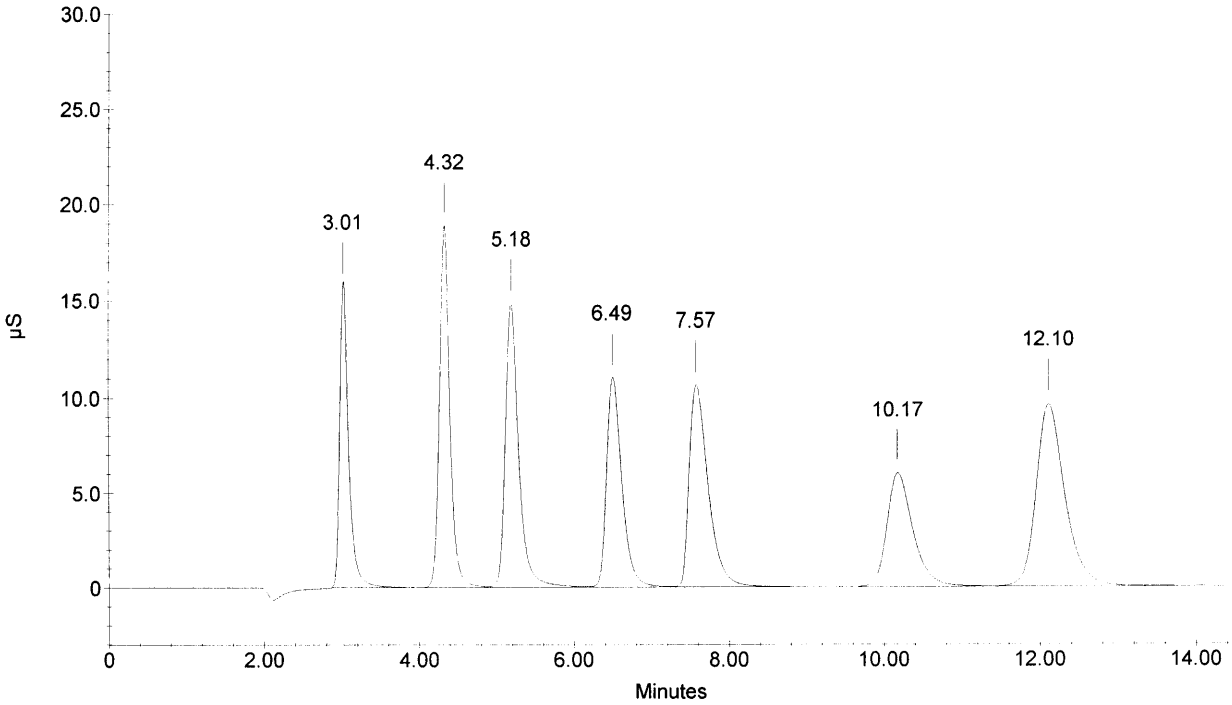
Date Time Collected : 3/11/05 10:37:03 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : MHardy

010336

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.01	FLUORIDE	100.445	156803	1274001	1	-1.31
2	4.32	CHLORIDE	207.908	188447	1757775	2	-1.52
3	5.18	NITRITE-N	101.538	148118	1792714	2	-2.26
4	6.49	BROMIDE	419.891	109704	1513665	2	-2.41
5	7.57	NITRATE-N	90.783	106126	1819075	2	-0.87
6	10.17	PHOSPHATE-P	196.083	60015	1398963	2	-0.26
7	12.10	SULFATE	418.152	96301	2457831	2	-0.98
			---total(s)---				
	0.00		1534.799		12014025		

CCV



Sample Name : CCB
Dilution Factor : 1.00
Injection Number : 7
Data File Name : c:\peaknet\data\050311\Data_007.DXD
Method File Name : C:\PEAKNET\METHOD\anions050302.met
Schedule File Name : c:\peaknet\schedule\11mar05.sch

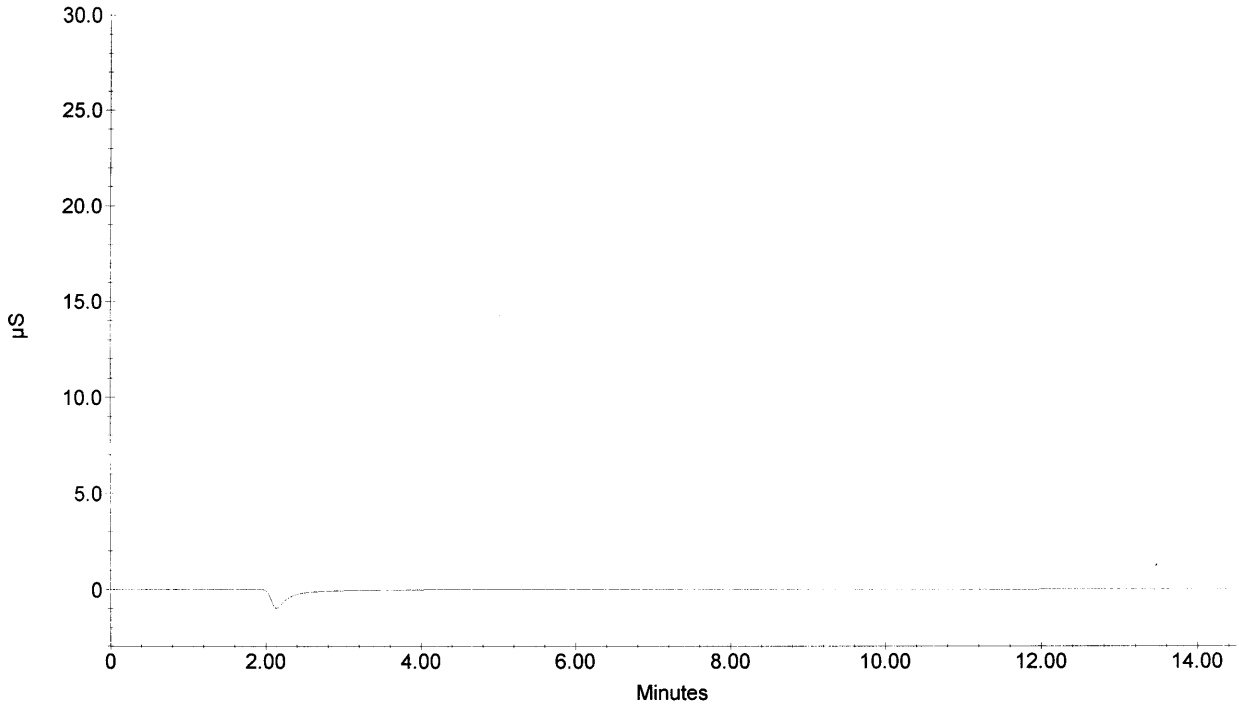
Date Time Collected : 3/11/05 10:54:21 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : MHardy

010337

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
0	0.00	(null)	0.000	0	0	0	0.00
		CHLORIDE					
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
			---total(s)---				
	0.00		0.000		0		

CCB



Schedule File: C:\PeakNet\schedule\03mar05.SCH

Line	Sample	Sample Type	Level	Method	Data File	Volume
1	ICV	Sample		anions050302.met	050302_001.dxd	1
2	ICB	Sample		anions050302.met	050302_002.dxd	1
3	PBS-B10W3	Sample		anions050302.met	050302_003.dxd	1
4	LCSW-B10W1	Sample		anions050302.met	050302_004.dxd	1
5	257326	Sample		anions050302.met	050302_005.dxd	1
6	CCV	Sample		anions050302.met	050302_006.dxd	1
7	CCB	Sample		anions050302.met	050302_007.dxd	1
8	ZZZZZZZ	Sample		anions050302.met	050302	1
9	ZZZZZZZ	Sample		anions050302.met	050302	1
10	PBW-B10W5	Sample		anions050302.met	050302_010.dxd	1
11	LCSW-B10W2	Sample		anions050302.met	050302_011.dxd	1
12	257327	Sample		anions050302.met	050302_012.dxd	1
13	257327D	Sample		anions050302.met	050302_013.dxd	1
14	257327AS	Sample		anions050302.met	050302_014.dxd	1
15	257328	Sample		anions050302.met	050302_015.dxd	1
16	LCSW-B10W3	Sample		anions050302.met	050302_016.dxd	1
17	CCV	Sample		anions050302.met	050302_017.dxd	1
18	CCB	Sample		anions050302.met	050302_018.dxd	1

010338

Default Method Path: C:\PEAKNET\METHOD
Default Data Path: C:\PEAKNET\DATA\050303
Comment:
DIV 20 06002.01.211 TO#050119-1

ICV Sources:
1) SPEX LOT#28-138AS (INORG# 4870)
   F = 100 mg/L
   Cl = 200 mg/L
   Br = 400 mg/L
   NO3N = 90.4 mg/L
   PO4P = 191 mg/L
   SO4 = 400 mg/L
2) 63-01-IC5
   NO2N 100mg/L

DSpies 3/14/05

AS= Spiked 5Ul ea SPEX + NO_2N into 5ml Sample.

Sample Name : ICV
Dilution Factor : 20.00
Injection Number : 1
Data File Name : c:\peaknet\data\050303\050302_001.DXD
Method File Name : c:\peaknet\method\anions050302.met
Schedule File Name : c:\peaknet\schedule\03mar05.sch

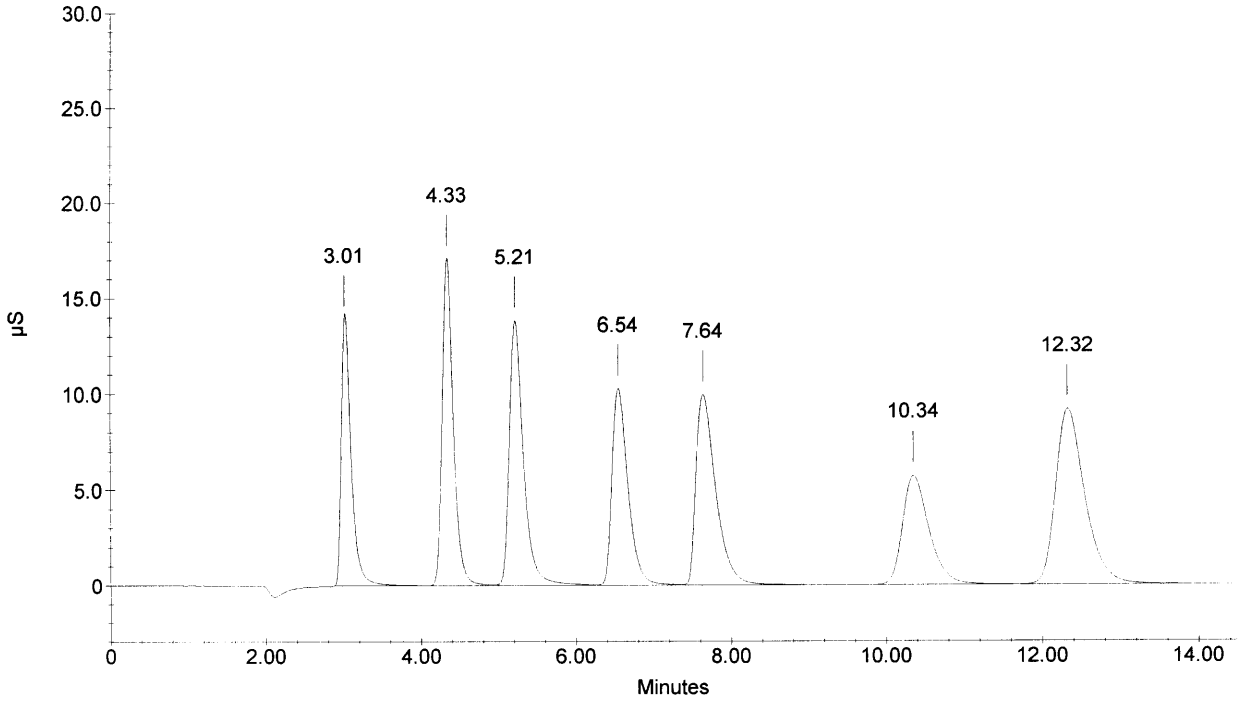
Date Time Collected : 3/3/05 10:37:44 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010339

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.01	FLUORIDE	98.728	138862	1250564	1	-1.31
2	4.33	CHLORIDE	202.461	170441	1707734	2	-1.22
3	5.21	NITRITE-N	100.548	138069	1774052	2	-1.76
4	6.54	BROMIDE	411.155	102483	1478845	2	-1.60
5	7.64	NITRATE-N	88.834	99267	1776730	2	0.00
6	10.34	PHOSPHATE-P	191.348	57030	1362603	2	1.44
7	12.32	SULFATE	407.530	91261	2388274	2	0.76
			---total(s)---				
	0.00		1500.604		11738803		

ICV



Sample Name : ICB
Dilution Factor : 1.00
Injection Number : 2
Data File Name : c:\peaknet\data\050303\050302_002.DXD
Method File Name : c:\peaknet\method\anions050302.met
Schedule File Name : c:\peaknet\schedule\03mar05.sch

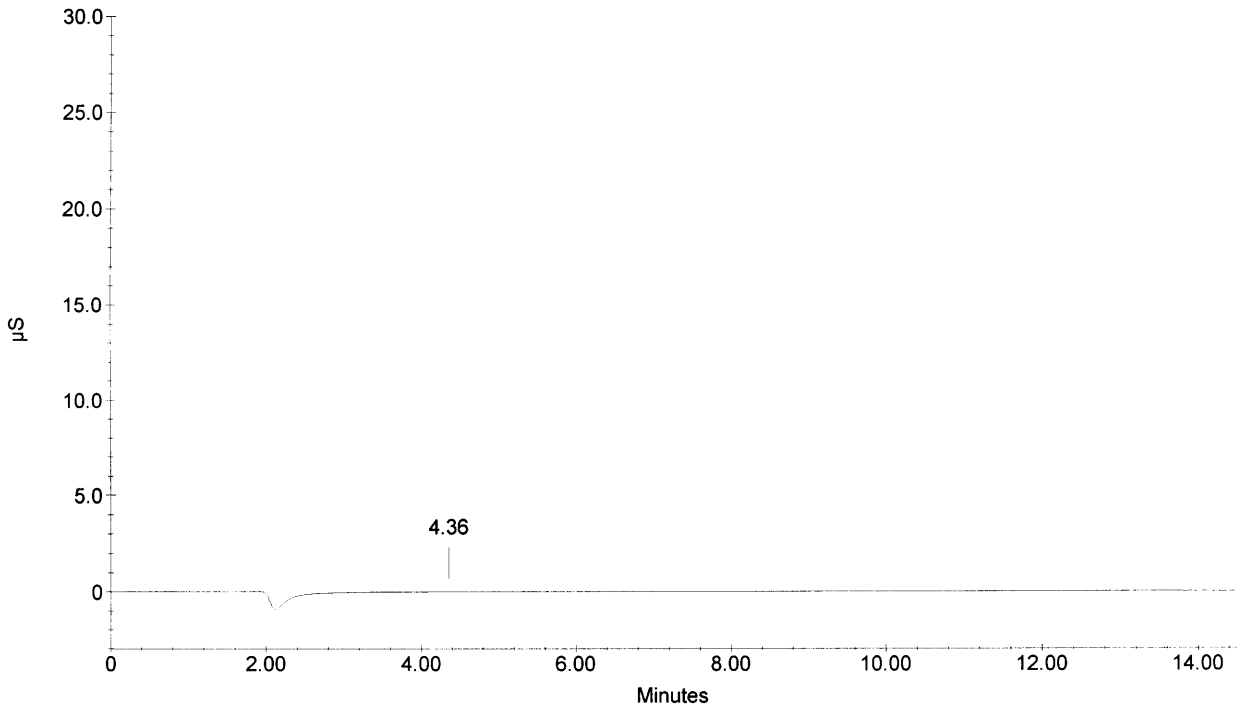
Date Time Collected : 3/3/05 10:55:01 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010340

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.36	CHLORIDE	0.052	67	628	1	-0.61
1	4.36	CHLORIDE	0.052	67	628	1	-0.61
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
			---total(s)---				
	0.00		0.105		1256		

ICB



Sample Name : PBS-B10W3
Dilution Factor : 1.00
Injection Number : 3
Data File Name : c:\peaknet\data\050303\050302_003.DXD
Method File Name : c:\peaknet\method\anions050302.met
Schedule File Name : c:\peaknet\schedule\03mar05.sch

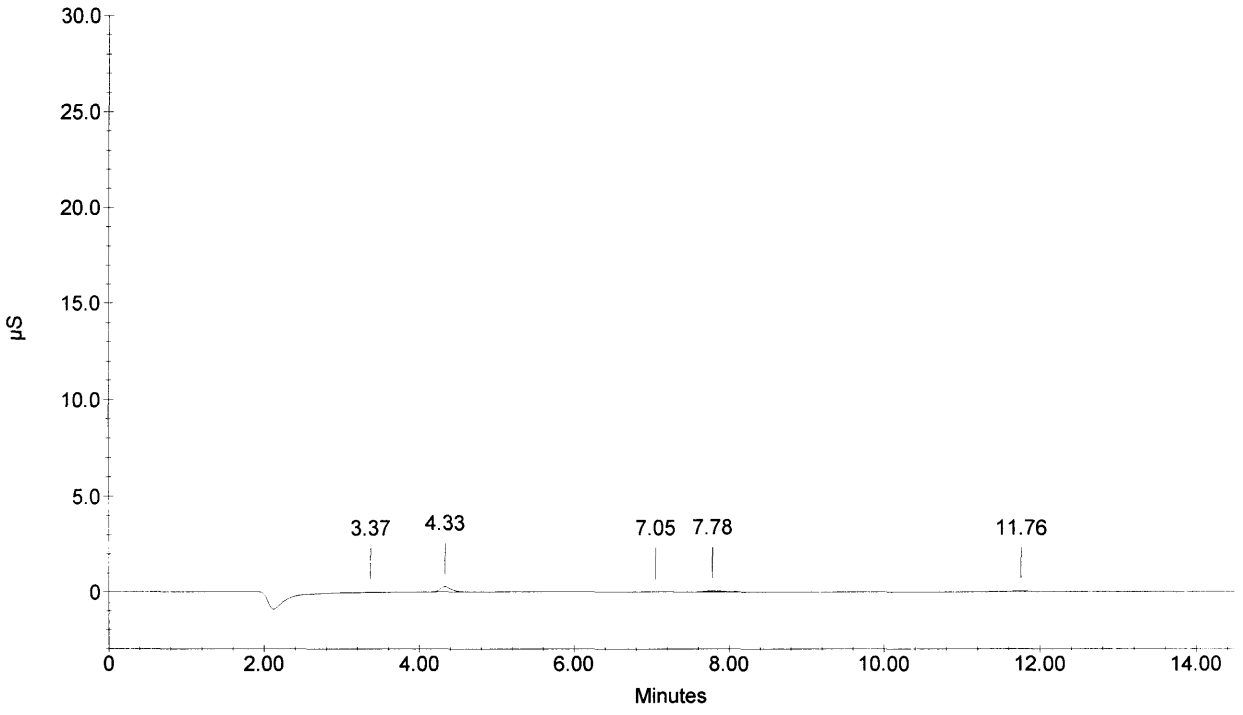
Date Time Collected : 3/3/05 11:19:53 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010341

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.37		0.000	179	1298	1	
2	4.33	CHLORIDE	0.228	2743	28314	1	-1.22
		NITRITE-N					
3	7.05	BROMIDE	0.084	109	1335	1	6.02
4	7.78	NITRATE-N	0.045	549	9115	1	1.92
		PHOSPHATE-P					
5	11.76	SULFATE	0.076	164	3730	1	-3.82
			---total(s)---				
	0.00		0.433		43792		

PBS-B10W3



Sample Name : LCSW-B10W1
Dilution Factor : 1.00
Injection Number : 4
Data File Name : c:\peaknet\data\050303\050302_004.DXD
Method File Name : c:\peaknet\method\anions050302.met
Schedule File Name : c:\peaknet\schedule\03mar05.sch

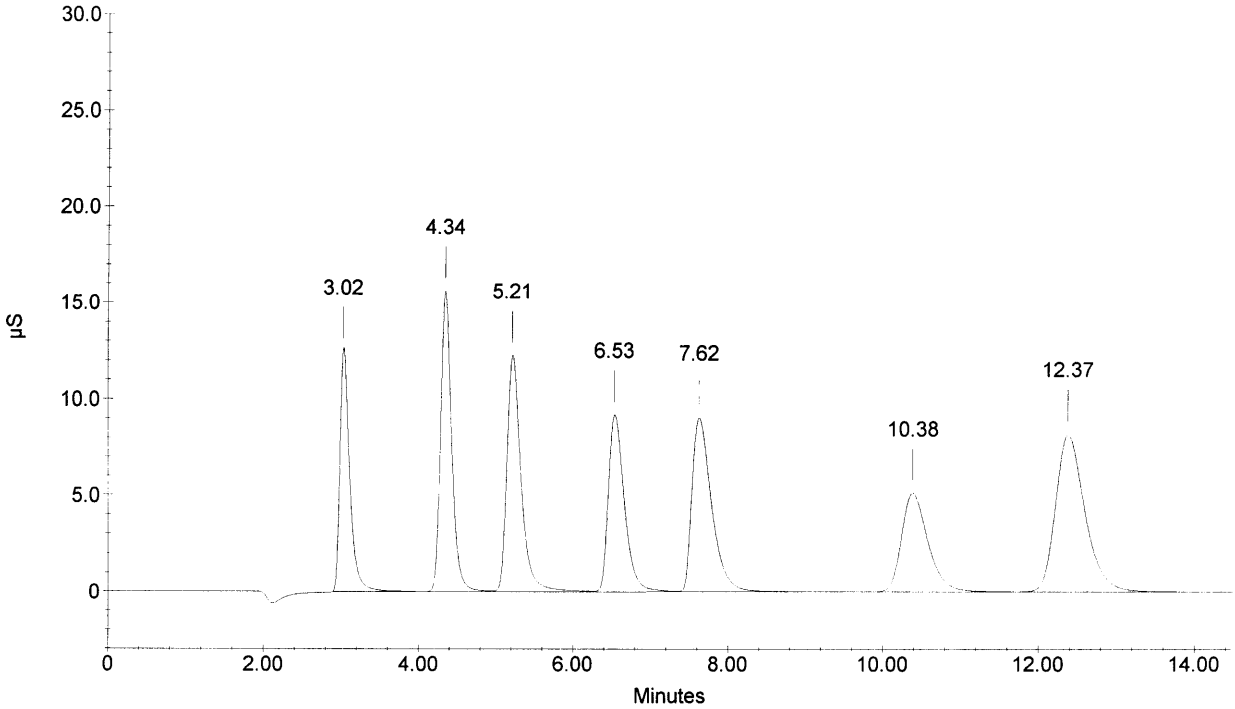
Date Time Collected : 3/3/05 11:37:07 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010342

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.02	FLUORIDE	4.447	124371	1117702	2	-0.87
2	4.34	CHLORIDE	9.273	156019	1553098	2	-0.91
3	5.21	NITRITE-N	4.492	122430	1573405	2	-1.76
4	6.53	BROMIDE	18.635	91728	1327533	2	-1.80
5	7.62	NITRATE-N	4.033	90215	1600519	2	-0.17
6	10.38	PHOSPHATE-P	8.605	51059	1216156	2	1.83
7	12.37	SULFATE	18.398	81657	2133052	2	1.20
			---total(s)---				
	0.00		67.883		10521465		

LCSW-B10W1



Sample Name : 257326
Dilution Factor : 1.00
Injection Number : 5
Data File Name : ...\050302_005.DXD
Method File Name : C:\PEAKNET\METHOD\anions050302.met
Schedule File Name : c:\peaknet\schedule\03mar05.sch

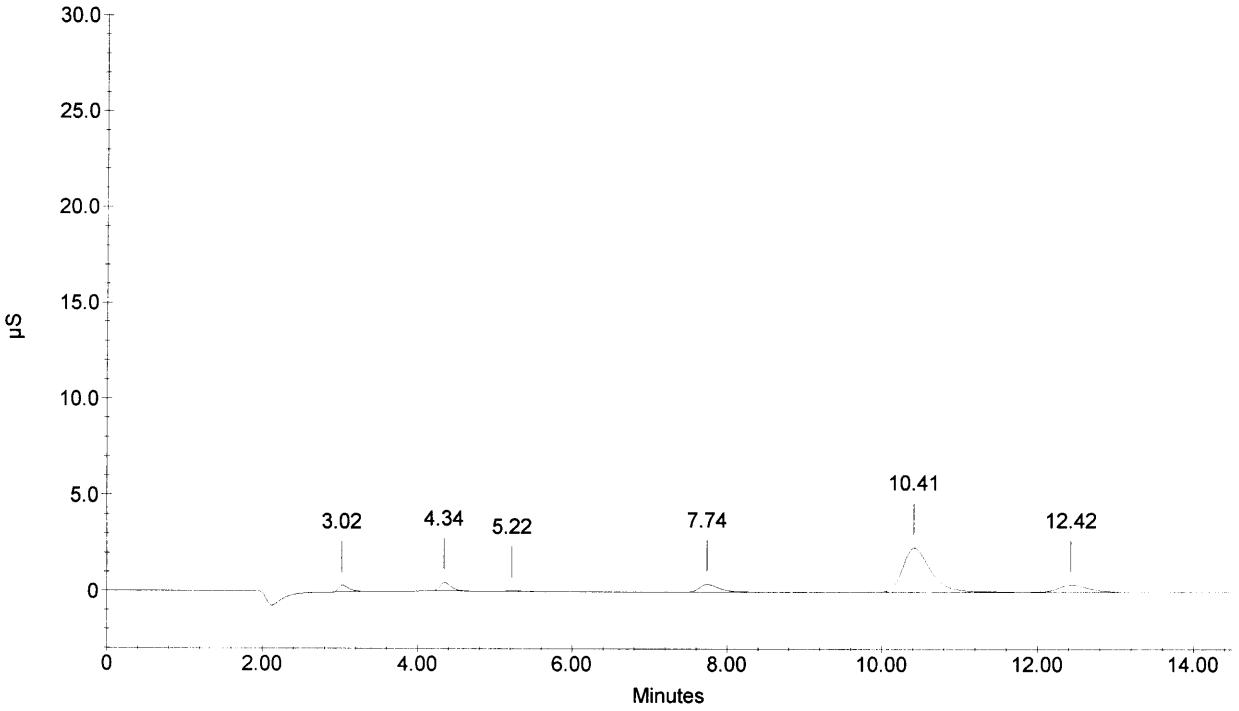
Date Time Collected : 3/3/05 11:54:21 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010343

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.02	FLUORIDE	0.187	3290	28684	1	-0.87
2	4.34	CHLORIDE	0.319	4351	42671	1	-0.91
3	5.22	NITRITE-N BROMIDE	0.059	420	4857	1	-1.51
4	7.74	NITRATE-N	0.215	4076	72291	1	1.40
5	10.41	PHOSPHATE-P	4.316	23249	588520	2	2.09
6	12.42	SULFATE	0.992	3804	101896	2	1.64
			---total(s)---				
	0.00		6.087		838919		

257326



Sample Name : CCV
Dilution Factor : 20.00
Injection Number : 6
Data File Name : c:\peaknet\data\050303\050302_006.DXD
Method File Name : c:\peaknet\method\anions050302.met
Schedule File Name : c:\peaknet\schedule\03mar05.sch

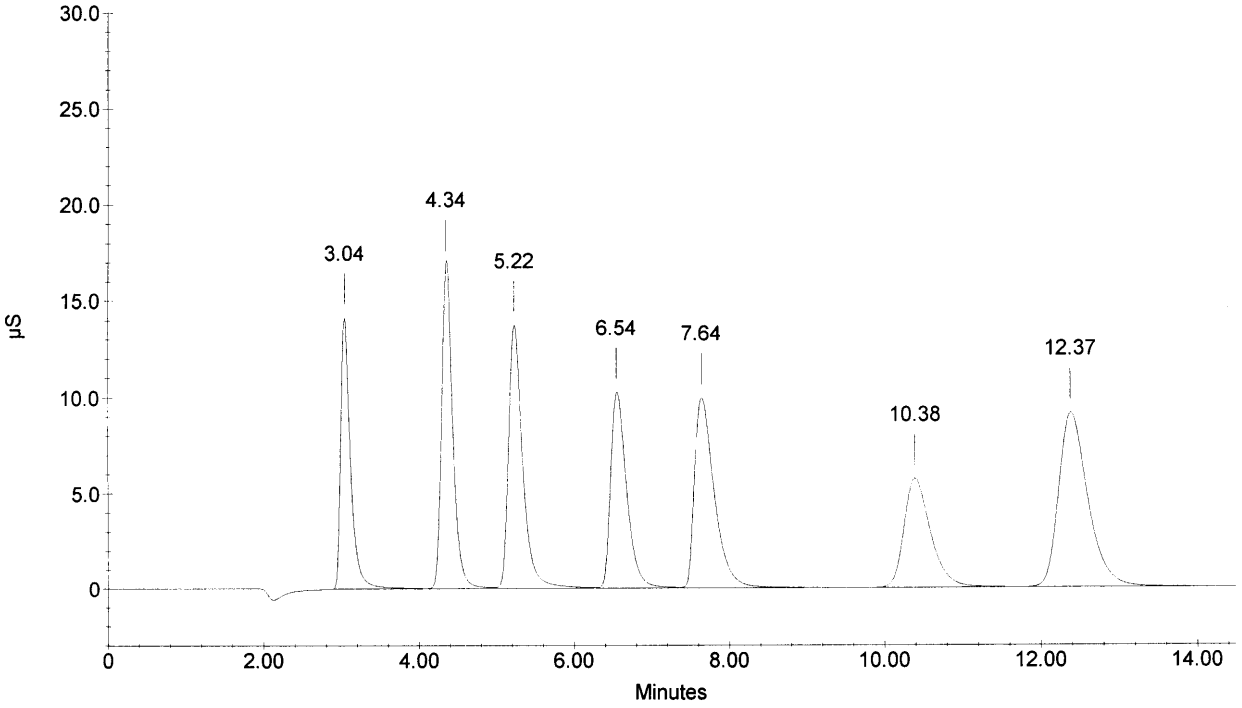
Date Time Collected : 3/3/05 12:36:42 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010344

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.04	FLUORIDE	98.609	141103	1248938	1	-0.44
2	4.34	CHLORIDE	202.558	168819	1708627	2	-0.91
3	5.22	NITRITE-N	99.944	137071	1762676	2	-1.51
4	6.54	BROMIDE	411.095	102352	1478606	2	-1.60
5	7.64	NITRATE-N	88.767	99476	1775276	2	0.00
6	10.38	PHOSPHATE-P	192.017	57289	1367730	2	1.83
7	12.37	SULFATE	408.209	91336	2392707	2	1.20
			---total(s)---				
	0.00		1501.199		11734562		

CCV



Sample Name : CCB
Dilution Factor : 1.00
Injection Number : 7
Data File Name : c:\peaknet\data\050303\050302_007.DXD
Method File Name : c:\peaknet\method\anions050302.met
Schedule File Name : c:\peaknet\schedule\03mar05.sch

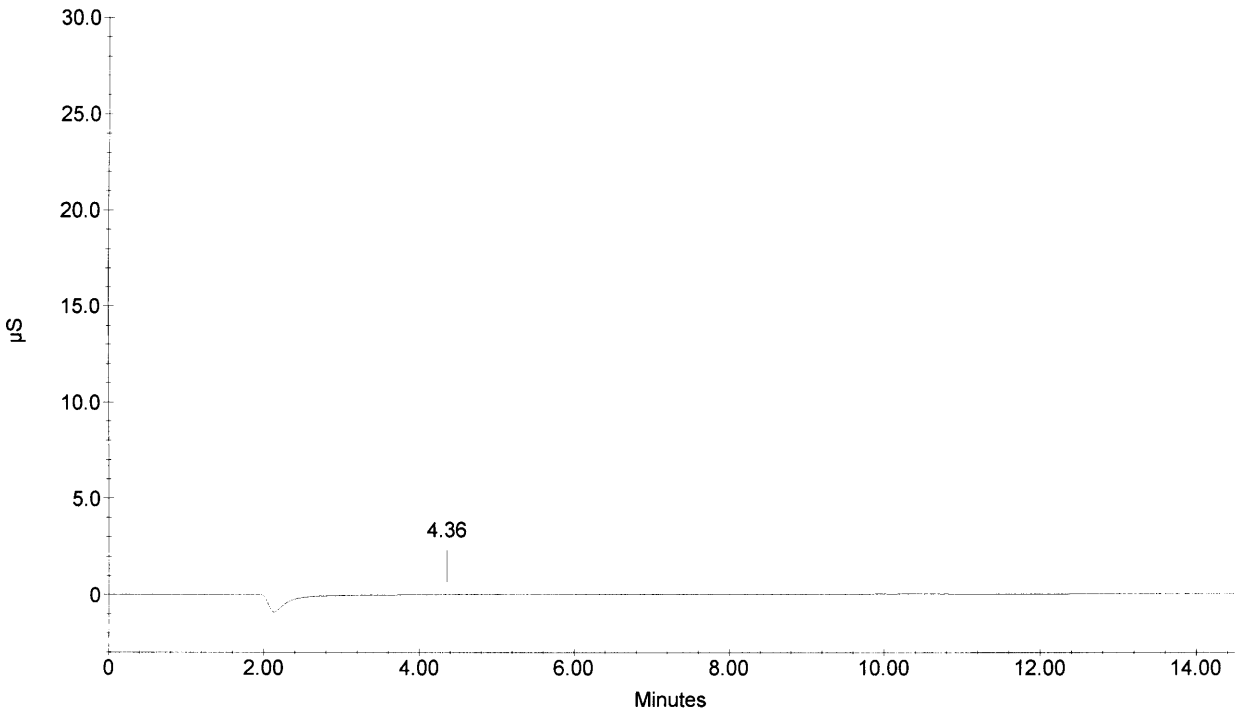
Date Time Collected : 3/3/05 12:53:54 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010345

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.36	CHLORIDE	0.053	96	750	1	-0.61
1	4.36	CHLORIDE	0.053	96	750	1	-0.61
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
			---total(s)---				
	0.00		0.106		1499		

CCB



Sample Name : PBW-B10W5
Dilution Factor : 1.00
Injection Number : 10
Data File Name : ...\050302_010.DXD
Method File Name : C:\PEAKNET\METHOD\anions050302.met
Schedule File Name : c:\peaknet\schedule\03mar05.sch

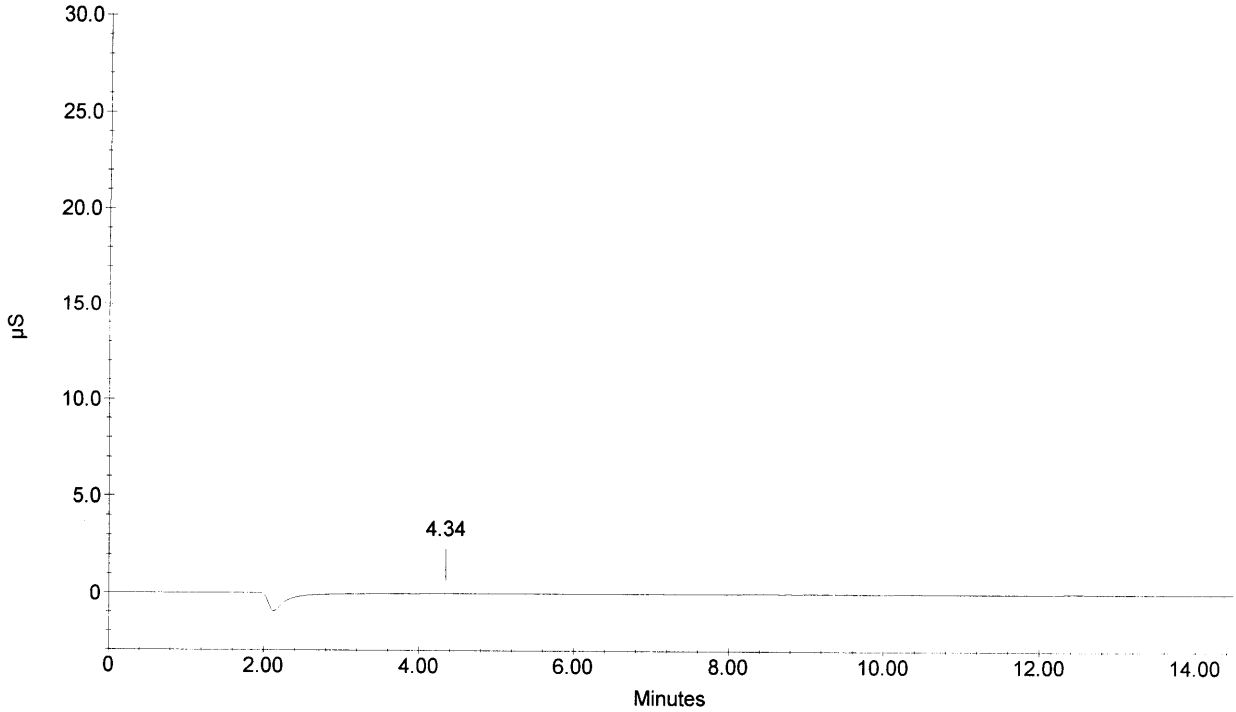
Date Time Collected : 3/3/05 1:15:08 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010346

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.34	CHLORIDE	0.053	77	785	1	-0.91
1	4.34	CHLORIDE	0.053	77	785	1	-0.91
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
			---total(s)---				
	0.00		0.107		1570		

PBW-B10W5



Sample Name : LCSW-B10W2
Dilution Factor : 1.00
Injection Number : 11
Data File Name : ...\050302_011.DXD
Method File Name : C:\PEAKNET\METHOD\anions050302.met
Schedule File Name : c:\peaknet\schedule\03mar05.sch

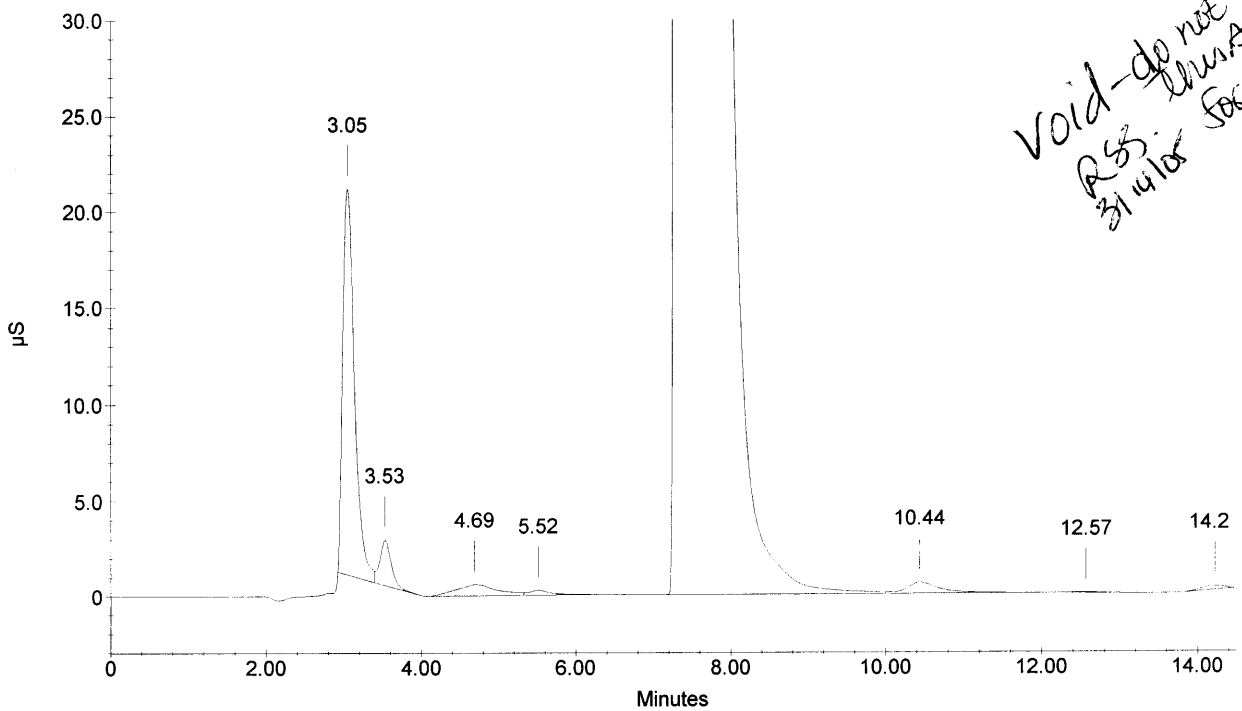
Date Time Collected : 3/3/05 1:32:21 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010347

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.05	FLUORIDE	7.992	200134	2110582	2	0.00
3	4.69	CHLORIDE	1.472	6068	226501	2	7.00
4	5.52	NITRITE-N	0.198	2659	51544	2	4.02
		BROMIDE					
5	7.60	NITRATE-N	34681.880	8160219	189216865	2	-0.52
6	10.44	PHOSPHATE-P	1.310	5984	170020	2	2.35
7	12.57	SULFATE	0.104	287	6740	1	2.84
			---total(s)---				
	0.00		34692.955		191782252		

LCSW-B10W2



Void - do not need this sample RSS 3/14/05 for IC.

Sample Name : 257327
Dilution Factor : 1.00
Injection Number : 12
Data File Name : ...\050302_012.DXD
Method File Name : C:\PEAKNET\METHOD\anions050302.met
Schedule File Name : c:\peaknet\schedule\03mar05.sch

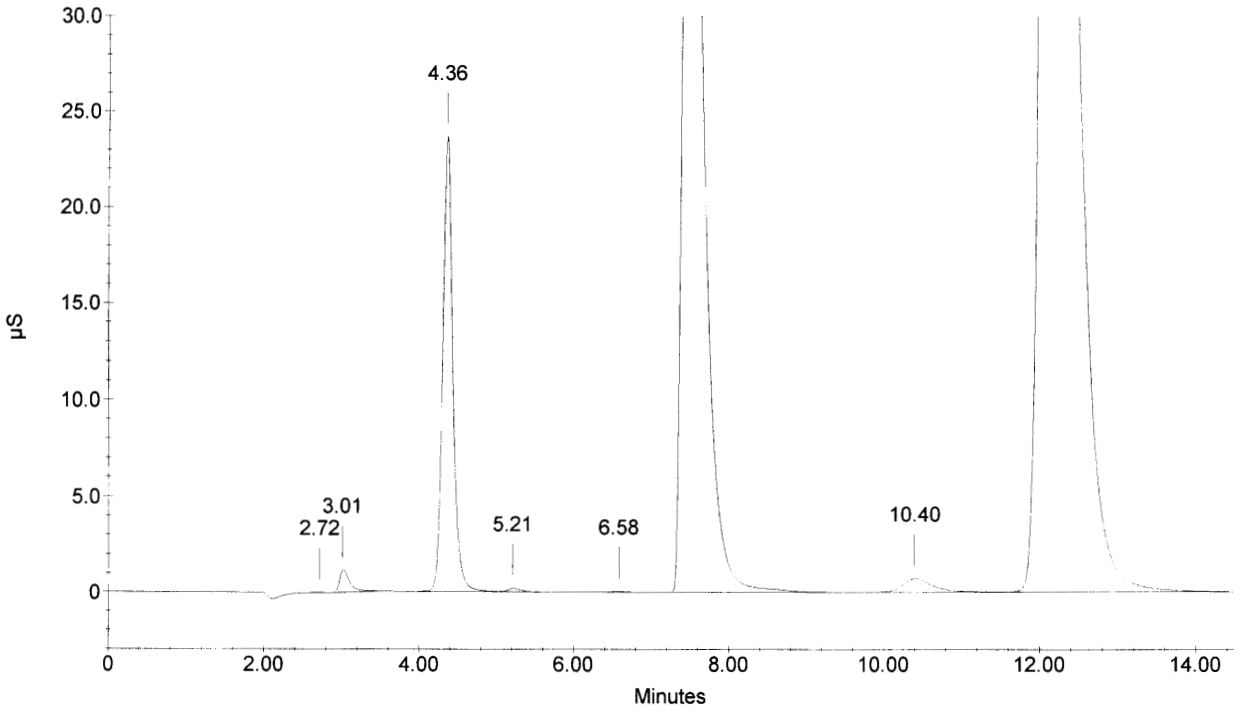
Date Time Collected : 3/3/05 1:49:36 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010348

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
2	3.01	FLUORIDE	0.510	11601	107010	1	-1.31
3	4.36	CHLORIDE	12.524	236385	2157500	2	-0.61
4	5.21	NITRITE-N	0.111	1815	22291	2	-1.76
5	6.58	BROMIDE	0.133	371	4570	1	-1.00
6	7.48	NITRATE-N	19.501	544043	9599248	1	-2.10
7	10.40	PHOSPHATE-P	1.475	7081	192598	2	1.96
8	12.14	SULFATE	22.785	843580	23490437	2	-0.65
			---total(s)---				
	0.00		57.039		35573654		

257327



Sample Name : 257327D
Dilution Factor : 1.00
Injection Number : 13
Data File Name : ...\050302_013.DXD
Method File Name : C:\PEAKNET\METHOD\anions050302.met
Schedule File Name : c:\peaknet\schedule\03mar05.sch

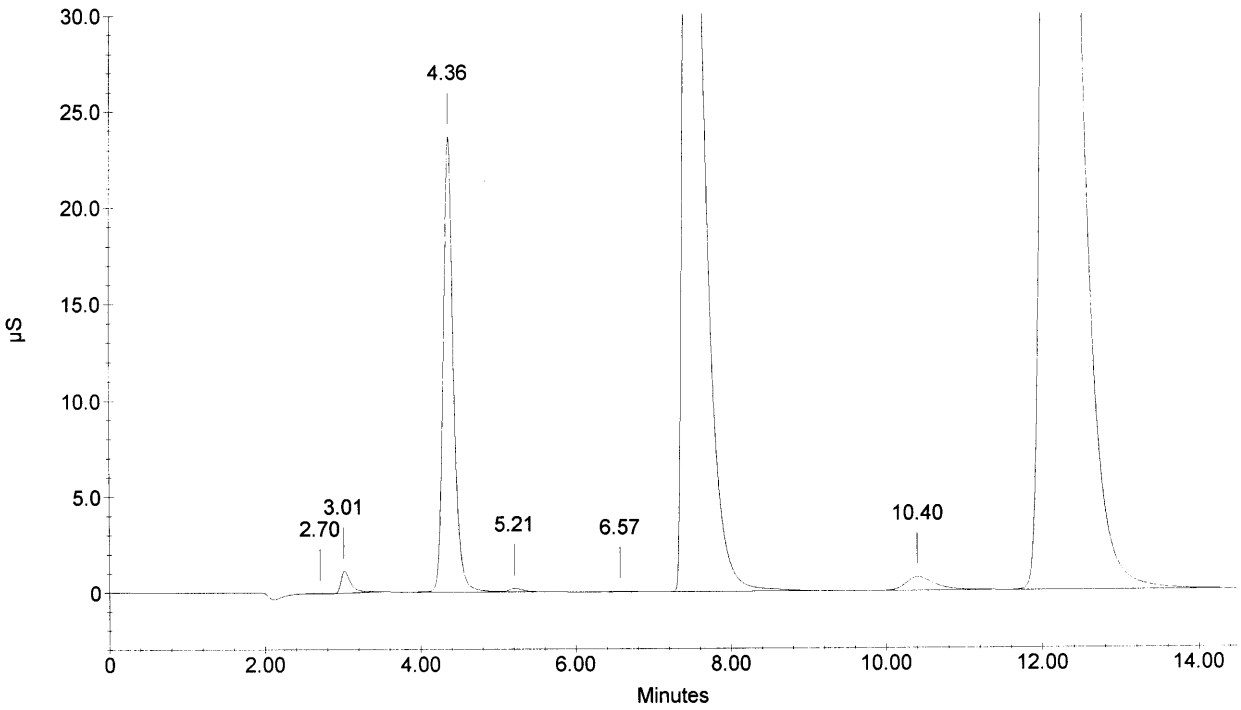
Date Time Collected : 3/3/05 2:06:51 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010349

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
2	3.01	FLUORIDE	0.499 ✓	11364	104306	1	-1.31
3	4.36	CHLORIDE	12.560✓	236218	2164472	2	-0.61
4	5.21	NITRITE-N	0.116✓	1896	24240	2	-1.76
5	6.57	BROMIDE	0.129✓	340	4283	1	-1.20
6	7.48	NITRATE-N	19.376	541932	9533356	1	-2.10
7	10.40	PHOSPHATE-P	1.480✓	7191	193279	2	1.96
8	12.16	SULFATE	22.573	842492	23518910	2	-0.55
			---total(s)---				
	0.00		56.734		35542847		

257327D



Sample Name : 257327AS
Dilution Factor : 1.00
Injection Number : 14
Data File Name : ...\050302_014.DXD
Method File Name : C:\PEAKNET\METHOD\anions050302.met
Schedule File Name : c:\peaknet\schedule\03mar05.sch

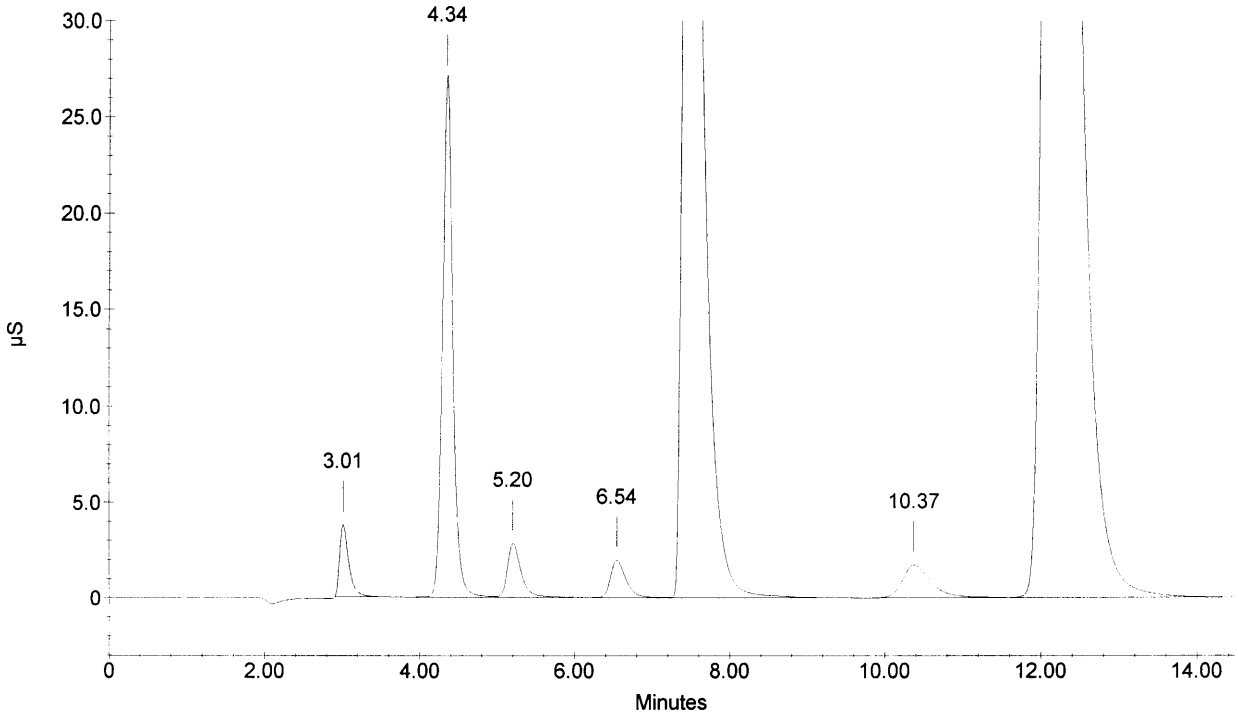
Date Time Collected : 3/3/05 2:24:07 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010350

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.01	FLUORIDE	1.340	37606	311398	1	-1.31
2	4.34	CHLORIDE	14.311	269459	2505744	2	-0.91
3	5.20	NITRITE-N	1.096	28224	356616	2	-2.01
4	6.54	BROMIDE	4.120	19567	272147	2	-1.60
5	7.48	NITRATE-N	19.900	556734	9809151	2	-2.10
6	10.37	PHOSPHATE-P	3.291	17287	443994	2	1.70
7	12.17	SULFATE	21.362	849042	23680082	2	-0.44
			---total(s)---				
	0.00		65.422		37379132		

257327AS



Sample Name : 257328
Dilution Factor : 1.00
Injection Number : 15
Data File Name : ...\050302_015.DXD
Method File Name : C:\PEAKNET\METHOD\anions050302.met
Schedule File Name : c:\peaknet\schedule\03mar05.sch

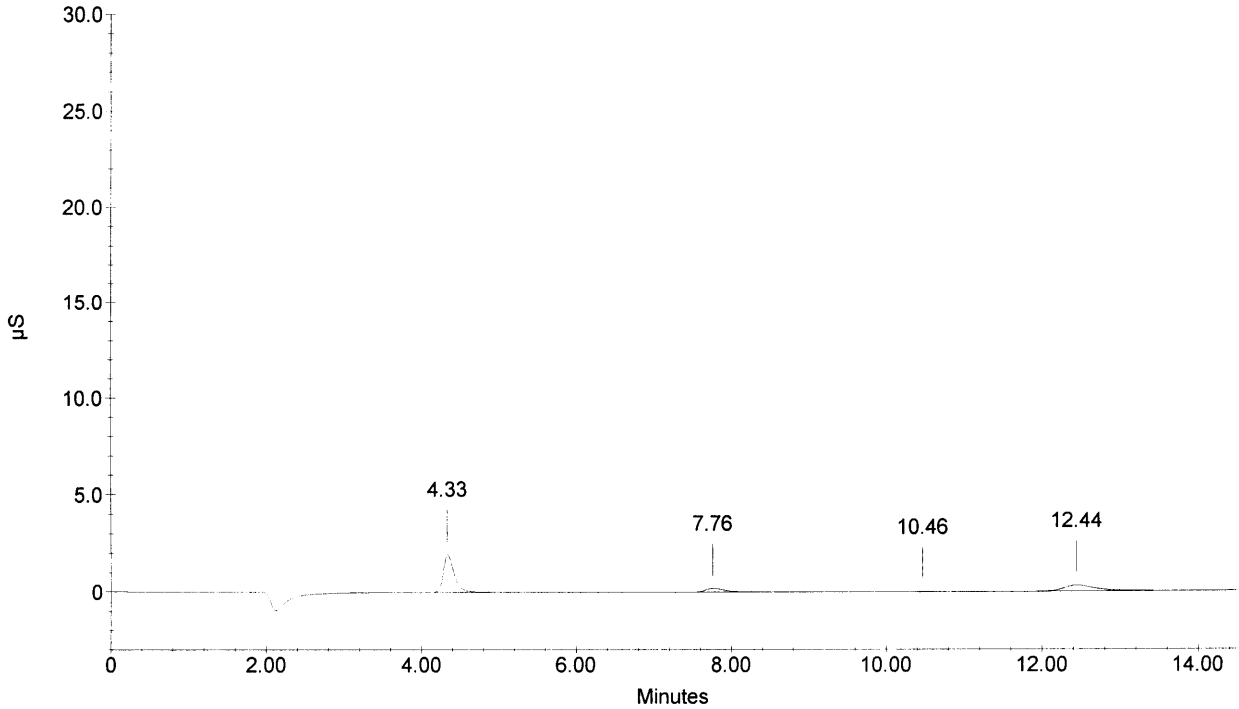
Date Time Collected : 3/3/05 2:41:21 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010351

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.33	CHLORIDE	1.228	19280	187325	1	-1.22
1	4.33	CHLORIDE	1.228	19280	187325	1	-1.22
		NITRITE-N					
		BROMIDE					
2	7.76	NITRATE-N	0.108	1883	32323	1	1.57
3	10.46	PHOSPHATE-P	0.070	106	2025	1	2.62
4	12.44	SULFATE	0.917	3134	93848	1	1.75
		---total(s)---					
	0.00		3.550		502845		

257328



Sample Name : LCSW-B10W3
Dilution Factor : 1.00
Injection Number : 16
Data File Name : ...\050302_016.DXD
Method File Name : C:\PEAKNET\METHOD\anions050302.met
Schedule File Name : c:\peaknet\schedule\03mar05.sch

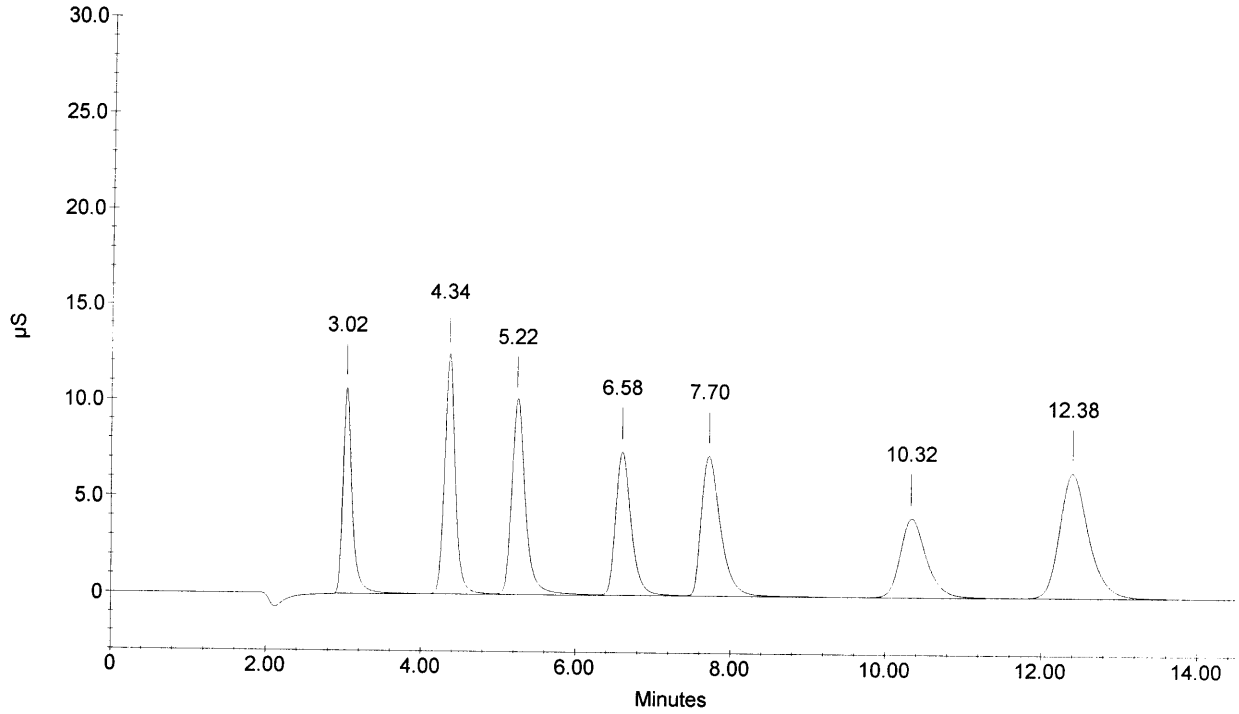
Date Time Collected : 3/3/05 4:40:35 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010352

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.02	FLUORIDE	3.546✓	106128	877250	2	-0.87
2	4.34	CHLORIDE	7.240✓	123836	1191977	2	-0.91
3	5.22	NITRITE-N	3.633✓	100545	1256201	2	-1.51
4	6.58	BROMIDE	14.864✓	74097	1039374	2	-1.00
5	7.70	NITRATE-N	3.195✓	72169	1247578	2	0.87
6	10.32	PHOSPHATE-P	6.886✓	40769	959885	2	1.18
7	12.38	SULFATE	14.677✓	64414	1668402	2	1.31
	0.00		---total(s)--- 54.040		8240667		

LCSW-B10W3



Sample Name : CCV
Dilution Factor : 20.00
Injection Number : 17
Data File Name : ...\050302_017.DXD
Method File Name : C:\PEAKNET\METHOD\anions050302.met
Schedule File Name : c:\peaknet\schedule\03mar05.sch

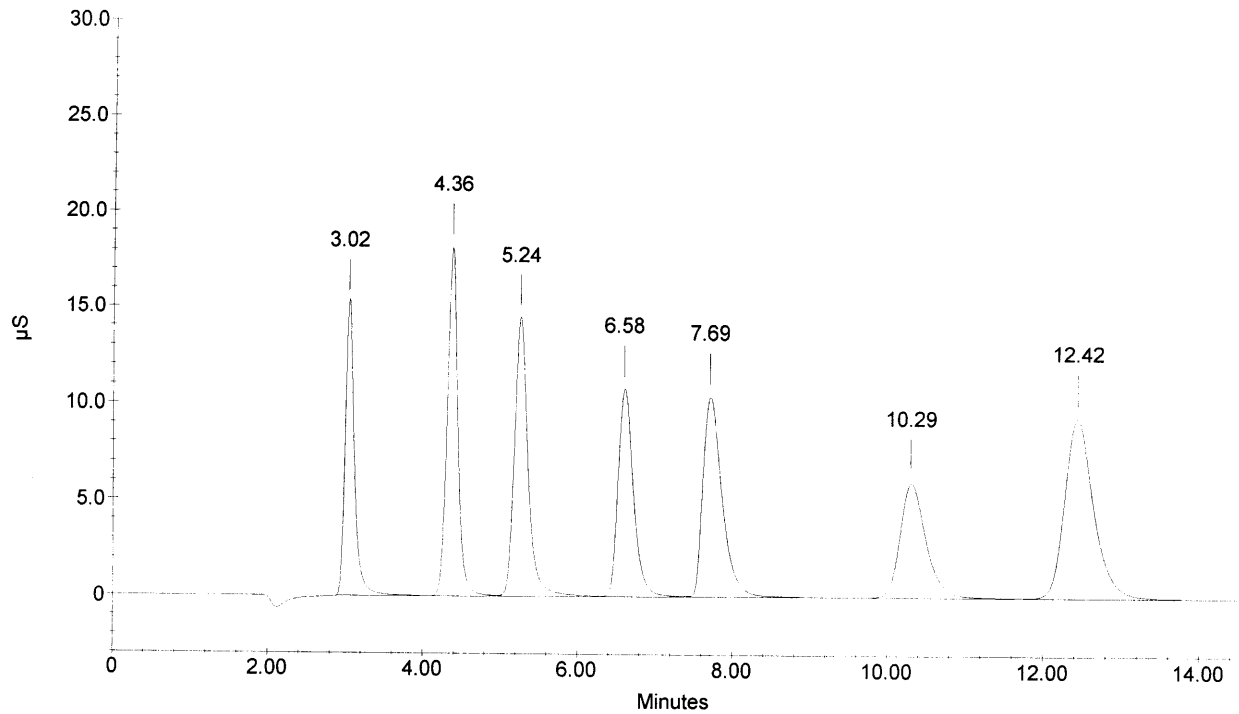
Date Time Collected : 3/3/05 4:57:53 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010353

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.02	FLUORIDE	100.357	151790	1272805	1	-0.87
2	4.36	CHLORIDE	205.880	181313	1739114	2	-0.61
3	5.24	NITRITE-N	101.360	144236	1789355	2	-1.26
4	6.58	BROMIDE	416.556	107235	1500355	2	-1.00
5	7.69	NITRATE-N	89.931	103411	1800557	2	0.70
6	10.29	PHOSPHATE-P	196.057	59560	1398759	2	0.92
7	12.42	SULFATE	413.675	93390	2428458	2	1.64
	0.00		---total(s)--- 1523.816		11929403		

CCV



Sample Name : CCB
Dilution Factor : 1.00
Injection Number : 18
Data File Name : ...\050302_018.DXD
Method File Name : C:\PEAKNET\METHOD\anions050302.met
Schedule File Name : c:\peaknet\schedule\03mar05.sch

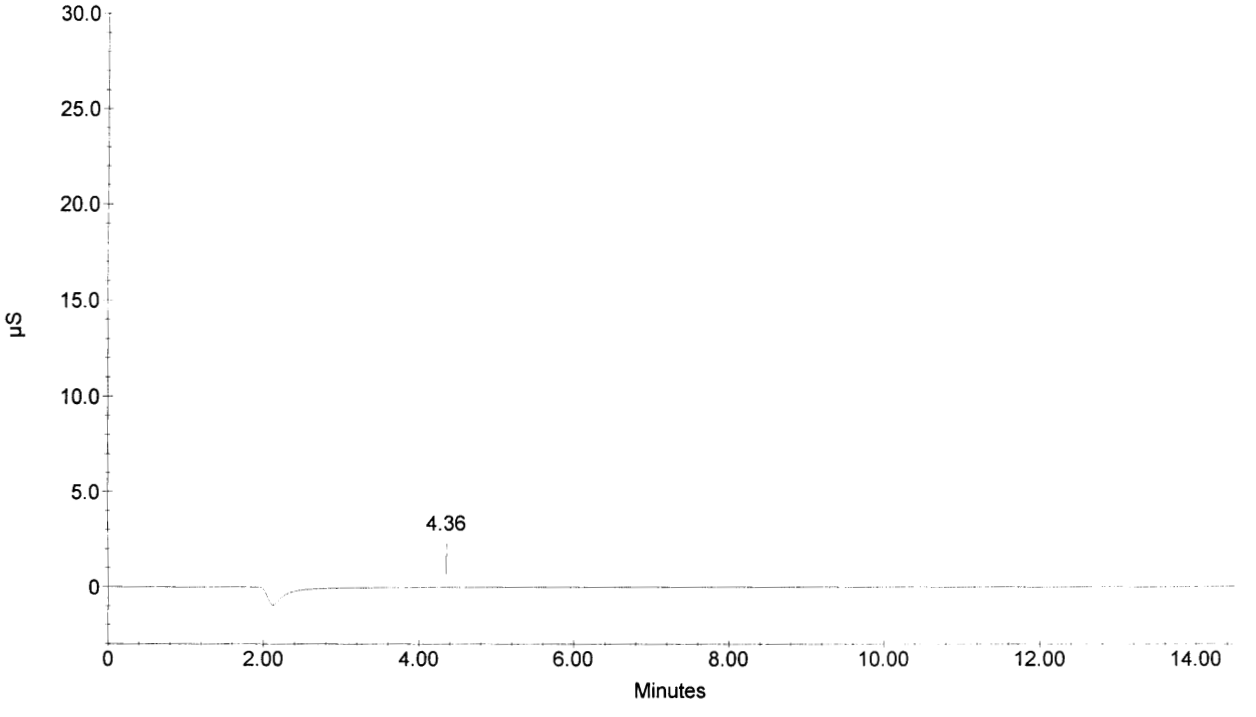
Date Time Collected : 3/3/05 5:15:12 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-SN#018097 AG14-#019940
System Operator : rSPIES

010354

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.36	CHLORIDE	0.053	63	709	1	-0.61
1	4.36	CHLORIDE	0.053	63	709	1	-0.61
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
			---total(s)---				
	0.00		0.106		1418		

CCB



SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050119-1
SRR: 27044
SDG: 257326
CASE: CNWRA
VTSR: January 06, 2005
PROJECT#: 06002.01.211

010355

Certificates of Analysis

010356

Fisher Scientific

TRACEMETAL GRADE NITRIC ACID
CERTIFICATE OF ANALYSIS

B McKelvey

Dr. B. McKelvey
QA/QC Manager

CATALOG NUMBER: A509
LOT NUMBER: 1104080
RELEASE DATE: September, 2004
EXPIRY DATE: September, 2007

Tests	Maximum Specification	Actual Value	Units
ASSAY (HNO_3, w/w):	67 - 70%	70%	% by w/w
Color:	10	<10	APHA

Analyte	Maximum Specification	Actual Value (in ppb)	Analyte	Maximum Specification	Actual Value (in ppb)
Aluminum (Al)	1 ppb	<0.5	Neodymium (Nd)	0.5 ppb	<0.1
Antimony (Sb)	1 ppb	<0.1	Nickel (Ni)	1 ppb	<0.1
Arsenic (As)	1 ppb	<0.1	Niobium (Nb)	0.5 ppb	<0.1
Barium (Ba)	1 ppb	<0.1	Palladium (Pd)	0.5 ppb	<0.1
Beryllium (Be)	1 ppb	<0.1	Platinum (Pt)	0.5 ppb	<0.1
Bismuth (Bi)	1 ppb	<0.1	Potassium (K)	1 ppb	<0.2
Boron (B)	1 ppb	<0.5	Praseodymium (Pr)	0.5 ppb	<0.1
Cadmium (Cd)	1 ppb	<0.1	Rhenium (Re)	0.5 ppb	<0.1
Calcium (Ca)	1 ppb	<0.5	Rhodium (Rh)	0.5 ppb	<0.1
Cerium (Ce)	0.5 ppb	<0.1	Rubidium (Rb)	0.5 ppb	<0.1
Cesium (Cs)	0.5 ppb	<0.1	Ruthenium (Ru)	0.5 ppb	<0.1
Chromium (Cr)	1 ppb	<0.2	Samarium (Sm)	0.5 ppb	<0.1
Cobalt (Co)	1 ppb	<0.1	Scandium (Sc)	0.5 ppb	<0.1
Copper (Cu)	1 ppb	<0.1	Selenium (Se)	1 ppb	<0.1
Dysprosium (Dy)	0.5 ppb	<0.1	Silver (Ag)	1 ppb	<0.1
Erbium (Er)	0.5 ppb	<0.1	Sodium (Na)	1 ppb	<0.2
Europium (Eu)	0.5 ppb	<0.1	Strontium (Sr)	1 ppb	<0.1
Gadolinium (Gd)	0.5 ppb	<0.1	Tantalum (Ta)	Information Only	<0.1
Gallium (Ga)	0.5 ppb	<0.1	Tellurium (Te)	0.5 ppb	<0.1
Germanium (Ge)	0.5 ppb	<0.1	Terbium (Tb)	0.5 ppb	<0.1
Gold (Au)	0.5 ppb	<0.1	Thallium (Tl)	0.5 ppb	<0.1
Hafnium (Hf)	0.5 ppb	<0.1	Thorium (Th)	1 ppb	<0.1
Holmium (Ho)	0.5 ppb	<0.1	Thulium (Tm)	0.5 ppb	<0.1
Indium (In)	0.5 ppb	<0.1	Tin (Sn)	1 ppb	<0.1
Iron (Fe)	1 ppb	<0.5	Titanium (Ti)	1 ppb	<0.1
Lanthanum (La)	0.5 ppb	<0.1	Tungsten (W)	0.5 ppb	<0.1
Lead (Pb)	1 ppb	<0.1	Uranium (U)	1 ppb	<0.1
Lithium (Li)	1 ppb	<0.1	Vanadium (V)	1 ppb	<0.1
Lutetium (Lu)	0.5 ppb	<0.1	Ytterbium (Yb)	0.5 ppb	<0.1
Magnesium (Mg)	1 ppb	<0.2	Yttrium (Y)	0.5 ppb	<0.1
Manganese (Mn)	1 ppb	<0.1	Zinc (Zn)	1 ppb	<0.2
Mercury (Hg)	1 ppb	<0.2	Zirconium (Zr)	1 ppb	<0.1
Molybdenum (Mo)	1 ppb	<0.1			

Element concentrations are at the point of bottling. Concentrations of some elements in particular, Ca, Si, K, Na, B, Al, Mg & Mn will increase due to storage in glass bottles.

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DATE EXPIRED: 12/02/04
DATE OPENED: 12/06/04
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010357

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TRACEMETAL GRADE NITRIC ACID
CERTIFICATE OF ANALYSIS

B McKelvey
Dr. B. McKelvey
QA/QC Manager

CATALOG NUMBER: A509
LOT NUMBER: 1104060
RELEASE DATE: September, 2004
EXPIRY DATE: September, 2007

Tests	Maximum Specification	Actual Value	Units
ASSAY (HNO_3, w/w):	67 - 70%	70%	% by w/w
Color:	10	<10	APHA

Analyte	Maximum Specification	Actual Value (in ppb)	Analyte	Maximum Specification	Actual Value (in ppb)
Aluminum (Al)	1 ppb	<0.5	Neodymium (Nd)	0.5 ppb	<0.1
Antimony (Sb)	1 ppb	<0.1	Nickel (Ni)	1 ppb	<0.1
Arsenic (As)	1 ppb	<0.1	Niobium (Nb)	0.5 ppb	<0.1
Barium (Ba)	1 ppb	<0.1	Palladium (Pd)	0.5 ppb	<0.1
Beryllium (Be)	1 ppb	<0.1	Platinum (Pt)	0.5 ppb	<0.1
Bismuth (Bi)	1 ppb	<0.1	Potassium (K)	1 ppb	<0.2
Boron (B)	1 ppb	<0.5	Praseodymium (Pr)	0.5 ppb	<0.1
Cadmium (Cd)	1 ppb	<0.1	Rhenium (Re)	0.5 ppb	<0.1
Calcium (Ca)	1 ppb	<0.5	Rhodium (Rh)	0.5 ppb	<0.1
Cerium (Ce)	0.5 ppb	<0.1	Rubidium (Rb)	0.5 ppb	<0.1
Cesium (Cs)	0.5 ppb	<0.1	Ruthenium (Ru)	0.5 ppb	<0.1
Chromium (Cr)	1 ppb	<0.2	Samarium (Sm)	0.5 ppb	<0.1
Cobalt (Co)	1 ppb	<0.1	Scandium (Sc)	0.5 ppb	<0.1
Copper (Cu)	1 ppb	<0.1	Selenium (Se)	1 ppb	<0.1
Dysprosium (Dy)	0.5 ppb	<0.1	Silver (Ag)	1 ppb	<0.1
Erbium (Er)	0.5 ppb	<0.1	Sodium (Na)	1 ppb	<0.2
Europium (Eu)	0.5 ppb	<0.1	Strontium (Sr)	1 ppb	<0.1
Gadolinium (Gd)	0.5 ppb	<0.1	Tantalum (Ta)	Information Only	<0.1
Gallium (Ga)	0.5 ppb	<0.1	Tellurium (Te)	0.5 ppb	<0.1
Germanium (Ge)	0.5 ppb	<0.1	Terbium (Tb)	0.5 ppb	<0.1
Gold (Au)	0.5 ppb	<0.1	Thallium (Tl)	0.5 ppb	<0.1
Hafnium (Hf)	0.5 ppb	<0.1	Thorium (Th)	1 ppb	<0.1
Holmium (Ho)	0.5 ppb	<0.1	Thulium (Tm)	0.5 ppb	<0.1
Indium (In)	0.5 ppb	<0.1	Tin (Sn)	1 ppb	<0.1
Iron (Fe)	1 ppb	<0.5	Titanium (Ti)	1 ppb	<0.1
Lanthanum (La)	0.5 ppb	<0.1	Tungsten (W)	0.5 ppb	<0.1
Lead (Pb)	1 ppb	<0.1	Uranium (U)	1 ppb	<0.1
Lithium (Li)	1 ppb	<0.1	Vanadium (V)	1 ppb	<0.1
Lutetium (Lu)	0.5 ppb	<0.1	Ytterbium (Yb)	0.5 ppb	<0.1
Magnesium (Mg)	1 ppb	<0.2	Yttrium (Y)	0.5 ppb	<0.1
Manganese (Mn)	1 ppb	<0.1	Zinc (Zn)	1 ppb	<0.2
Mercury (Hg)	1 ppb	<0.2	Zirconium (Zr)	1 ppb	<0.1
Molybdenum (Mo)	1 ppb	<0.1			

Element concentrations are at the point of bottling. Concentrations of some elements in particular, Ca, Si, K, Na, B, Al, Mg & Mn will increase due to storage in glass bottles.

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010358

Fisher Scientific

TRACEMETAL GRADE HYDROCHLORIC ACID
CERTIFICATE OF ANALYSIS

B McKelvey
Dr. B. McKelvey
QA/QC Manager

CATALOG NUMBER: A508
LOT NUMBER: 4104090
RELEASE DATE: November, 2004
EXPIRY DATE: November, 2007

Tests	Maximum Specification	Actual Value	Units
ASSAY (HCl, w/w):	34 - 37%	36%	% by w/w
Color:	10	<10	APHA

Analyte	Maximum Specification	Actual Value (in ppb)	Analyte	Maximum Specification	Actual Value (in ppb)
Aluminum (Al)	1 ppb	<0.5	Neodymium (Nd)	0.5 ppb	<0.1
Antimony (Sb)	1 ppb	<0.1	Nickel (Ni)	1 ppb	<0.1
Arsenic (As)	1 ppb	<0.1	Niobium (Nb)	0.5 ppb	<0.1
Barium (Ba)	1 ppb	<0.1	Palladium (Pd)	Information Only	<0.5
Beryllium (Be)	1 ppb	<0.1	Platinum (Pt)	Information Only	<0.5
Bismuth (Bi)	1 ppb	<0.1	Potassium (K)	1 ppb	<0.1
Boron (B)	1 ppb	<0.5	Praseodymium (Pr)	0.5 ppb	<0.1
Cadmium (Cd)	1 ppb	<0.1	Rhenium (Re)	0.5 ppb	<0.1
Calcium (Ca)	1 ppb	<0.5	Rhodium (Rh)	0.5 ppb	<0.1
Cerium (Ce)	0.5 ppb	<0.1	Rubidium (Rb)	0.5 ppb	<0.1
Cesium (Cs)	0.5 ppb	<0.1	Ruthenium (Ru)	0.5 ppb	<0.1
Chromium (Cr)	1 ppb	<0.1	Samarium (Sm)	0.5 ppb	<0.1
Cobalt (Co)	1 ppb	<0.1	Scandium (Sc)	0.5 ppb	<0.1
Copper (Cu)	1 ppb	<0.1	Selenium (Se)	1 ppb	<0.1
Dysprosium (Dy)	0.5 ppb	<0.1	Silver (Ag)	1 ppb	<0.1
Erbium (Er)	0.5 ppb	<0.1	Sodium (Na)	1 ppb	<0.5
Europium (Eu)	0.5 ppb	<0.1	Strontium (Sr)	1 ppb	<0.1
Gadolinium (Gd)	0.5 ppb	<0.1	Tantalum (Ta)	Information Only	<1
Gallium (Ga)	0.5 ppb	<0.1	Tellurium (Te)	0.5 ppb	<0.1
Gold (Au)	0.5 ppb	<0.1	Terbium (Tb)	0.5 ppb	<0.1
Hafnium (Hf)	0.5 ppb	<0.1	Thallium (Tl)	0.5 ppb	<0.1
Holmium (Ho)	0.5 ppb	<0.1	Thorium (Th)	1 ppb	<0.1
Indium (In)	0.5 ppb	<0.1	Thulium (Tm)	0.5 ppb	<0.1
Iron (Fe)	1 ppb	<0.5	Tin (Sn)	1 ppb	<0.1
Lanthanum (La)	0.5 ppb	<0.1	Titanium (Ti)	1 ppb	<0.1
Lead (Pb)	1 ppb	<0.1	Tungsten (W)	0.5 ppb	<0.1
Lithium (Li)	1 ppb	<0.1	Uranium (U)	1 ppb	<0.1
Lutetium (Lu)	0.5 ppb	<0.1	Vanadium (V)	1 ppb	<0.1
Magnesium (Mg)	1 ppb	<0.5	Ytterbium (Yb)	0.5 ppb	<0.1
Manganese (Mn)	1 ppb	<0.1	Yttrium (Y)	0.5 ppb	<0.1
Mercury (Hg)	1 ppb	<0.2	Zinc (Zn)	1 ppb	<0.5
Molybdenum (Mo)	1 ppb	<0.1	Zirconium (Zr)	1 ppb	<0.1

Element concentrations are at the point of bottling. Concentrations of some elements in particular, Ca, Si, K, Na, B, Al, Mg & Mn will increase due to storage in glass bottles.

Fisher Sci

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010359

FISHER SCIENTIFIC
TRACEMETAL GRADE HYDROFLUORIC ACID

CERTIFICATE OF ANALYSIS

Catalog No. A513

Lot No: 5104011
Release Date: March, 2004
Expiry Date: March, 2007

Tests	Units	Value
Assay	%	49%
Color	APHA	<10
Aluminum	ppb	<0.5
Antimony	ppb	<0.1
Arsenic	ppb	<0.1
Barium	ppb	<0.1
Beryllium	ppb	<0.1
Bismuth	ppb	<0.1
Boron	ppb	<0.5
Cadmium	ppb	<0.1
Calcium	ppb	<0.5
Chromium	ppb	<0.1
Cobalt	ppb	<0.1
Copper	ppb	<0.1
Iron	ppb	<0.5
Lead	ppb	<0.1
Lithium	ppb	<0.1
Magnesium	ppb	<0.2
Manganese	ppb	<0.2
Mercury	ppb	<1
Molybdenum	ppb	<0.2
Nickel	ppb	<0.1
Potassium	ppb	<0.2
Selenium	ppb	<0.1
Silver	ppb	<0.1
Sodium	ppb	<0.5
Strontium	ppb	<0.1
Thorium	ppb	<0.1
Tin	ppb	<0.1
Titanium	ppb	<0.5
Uranium	ppb	<0.1
Vanadium	ppb	<0.1
Zinc	ppb	<0.1
Zirconium	ppb	<0.1

Element concentrations are at the point of bottling. Concentrations of some elements in particular, Ca, Fe, Na, Zn & Al will increase due to storage in polyethylene bottles.

B McKelvey

Dr. B. McKelvey
QA/QC Manager

INORGANIC LABS/RADCHEM LABS
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010360

G F S CHEMICALS, INC.
Columbus, Ohio 43223

LOT ANALYSIS

ITEM: 66 PERCHLORIC ACID, 70%, REAGENT (ACS) **LOT#: P454881**

TEST	PASS/ FAIL	NUMERICAL RESULT
1. Assay 69.0-72.0%	PASS	70.0%
2. Residue after ignition 0.003%	PASS	<0.003%
3. Silicate + phosphate 0.0005%	PASS	<0.0005%
4. Chloride 0.001%	PASS	<0.001%
5. Sulfate 0.001%	PASS	<0.001%
6. Nitrogen compounds (as N) 0.001%	PASS	<0.001%
7. Heavy metals (as Pb) 0.0001%	PASS	<0.0001%
8. Iron 0.0001%	PASS	<0.0001%
9. Color (APHA) 10 max	PASS	<10

TRACEABLE TO N.I.S.T. (Y/N)? Y

Comment:

INORGANIC LABS/RADCHEM LABS
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DATE EXPIRED: 7/20/2014
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Reported by:

Date: 4/06/04

QC Supervisor: Roger Duff

Retest Date: 4/06/09

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National Institute of Standards & Technology

Certificate

010361

Standard Reference Material 278

Obsidian Rock

INORGANIC LABS/RADIUM LABS
DATE RECEIVED: 5/20/04
DATE EXPIRED: 5/20/10
DATE OPENED: 6/7/04
INORG: 4595 PO: 4554331K

This Standard Reference Material (SRM) is intended for use in evaluating the accuracy of analytical methods and instruments used in the analysis of geological type materials. SRM 278 is a finely powdered obsidian rock, which was obtained from Clear Lake, Newberry Crater, Oregon.

Certified Values of Constituents

The concentrations of the constituents were determined by methods that are widely used in the field of geological analysis and have a demonstrated accuracy. The values given are "certified" values, i.e., those values that were determined by either a definitive method, reference method, or by two or more independent methods, and "information" values that were determined by single or non-reference methods. The certified values are given in Table 1.

Table 1. Certified Values of Constituents

Constituent[1]	Content[2], wt %	Constituent[1]	Content[2], mg/Kg
Al_2O_3[d]	14.15 ± 0.15	Cu[e]	5.9 ± 0.2
CaO[e]	0.983 ± 0.002	Ni[e]	3.6 ± 0.3
FeO[i]	1.36 ± 0.02	Rb[a,e]	127.5 ± 0.3
Fe_2O_3[i,f] (Total Fe as Fe_2O_3)	2.04 ± 0.02	Sr[e]	63.5 ± 0.1
K_2O[a,d,e]	4.16 ± 0.02	Th[e,f]	12.4 ± 0.3
MnO[b,f]	0.052 ± 0.002	Tl[e]	0.54 ± 0.04
Na_2O[a,d,f]	4.84 ± 0.05	U[e]	4.58 ± 0.04
P_2O_5[b,d]	0.036 ± 0.003	Pb[e]	16.4 ± 0.2
SiO_2	73.05 ± 0.13		
TiO_2[b,g]	0.245 ± 0.007		

[1]Methods of Analysis: codes are identified in table 2.

[2]The estimated uncertainties of the certified values are based on judgment and represent an evaluation of the combined effects of method imprecision, possible systematic errors among methods and material variability of 250 mg or more. (No attempt was made to derive exact statistical measures of imprecision because several methods were involved in the determination of most constituents.)

This Certificate of Analysis has undergone editorial revision to reflect program and organizational changes at NIST and at the Department of Commerce. No attempt was made to reevaluate the certificate value or any technical data presented in this certificate.

Gaithersburg, MD 20899
March 27, 1992
(Revision of certificate dated 8-19-81)

William P. Reed, Chief
Standard Reference Materials Program

(over)

The overall direction and coordination of the technical measurements leading to certification were performed in the Inorganic Analytical Research Division by E.L. Garner.

The technical and support aspects involved in the preparation, certification, and issuance of this Standard Reference Material were coordinated through the Standard Reference Materials Program by T.E. Gills. Revision of this certificate was coordinated through the Standard Reference Materials Program by J.S. Kane.

The constituents given in Table 2 are *not certified* but are included for information only.

010362

Table 2. Information Values

Constituent[1]	Content, wt %	Constituent[1]	Content, mg/Kg
C (Total Carbon)[j]	(0.05)	Ba[f]	(1140)
CO_2[d]	(0.01)	B[g]	(25)
F[h]	(0.05)	Ce[f]	(62.2)
MgO[d]	(0.23)	Co[f]	(1.5)
		Cr[f]	(6.1)
		Cs[f]	(5.5)
		Eu[f]	(0.84)
		Gd[g]	(5.3)
		Hf[f]	(8.4)
		Lu[f]	(0.73)
		Sb[f]	(1.5)
		Sc[f]	(5.1)
		Sm[f,g]	(5.7)
		Ta[f]	(1.2)
		Tb[f]	(1.0)
		Yb[f]	(4.5)
		Zn[f]	(55)

[1]Methods of Analysis:

[a]Atomic Absorption
[b]Colorimetry
[c]Emission Spectrometry
[d]Gravimetry
[e]Isotope Dilution Mass Spectrometry
[f]Neutron Activation Analysis
[g]Prompt-gamma Activation Analysis
[h]Specific Ion Electrode Potentiometry
[i]Titrimetry
[j]Volumetry

Supplemental Information

Preparation

The material was processed by the Colorado School of Mines, Colorado. Approximately 350 lbs of obsidian rock were crushed, ground, and sieved to <200 mesh. The material was mixed in a cone blender to ensure homogeneity. For homogeneity, testing and certification, samples were randomly chosen and analyzed for both major and minor constituents. The inhomogeneity of this material is considered to be $\leq$2% relative.

Analysis

SRM 278, a natural glass, is hygroscopic and contains water that cannot be driven off by drying at low temperatures. This material will pick up additional water on exposure to the atmosphere. Thus, exposure time should be kept to a minimum. Furthermore, the sample should be ignited to a constant weight in a muffle furnace or over a small flame at a temperature between 350-600 °C prior to analysis. This procedure will ensure the accurate and precise determination of SiO_2, K_2O, Na_2O, Al_2O_3 and possibly other major constituents.

The analysts and laboratories cooperating in the analytical program for certification were:

- M.J. Blackman, E.L. Garner, J.W. Gramlich, L.A. Machlan, L.J. Moore, and R. Zeisler of the Inorganic Analytical Research Division, National Institute of Standards & Technology.

- J.B. Bodkin, J.C. DeVine, and N.H. Suhr of the Mineral Constitution Laboratories, The Pennsylvania State University, University Park, Pennsylvania.

- S.S. Goldrich of the Department of Geology, Northern Illinois University, DeKalb, Illinois.

- M.D. Glascock, C.C. Graham, J.R. Vogt, University of Missouri, Columbia, Missouri.

U. S. Department of Commerce
Malcolm Baldrige
Secretary
National Bureau of Standards
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National Bureau of Standards

010364

Certificate

Standard Reference Material 688

Basalt Rock

This Standard Reference Material (SRM) is intended for use in evaluating the accuracy of analytical methods and instruments used in the analysis of geological type materials. SRM 688 is a finely powdered basalt rock that was obtained from a Cenozoic basalt flow near Jackpot, Nevada.

Certified Values of Constituents

The concentrations of the constituents were determined by methods that are widely used in the field of geological analysis and have a demonstrated accuracy. The values given are "certified" values, i.e., those values that were determined by either a definitive method, reference method, or by two or more independent methods, and "information" values that were determined by single or non-reference methods. The certified values are given in Table 1.

Table 1 Certified Values of Constituents

Constituent [1]	Content [2] wt (%)	Constituent [1]	Content [2] wt (μg/g)
Al_2O_3 [c,g]	17.36 ± 0.09	Cr [b,e]	332 ± 9
FeO [g]	7.64 ± 0.03	Rb [d]	1.91 ± 0.01
Fe_2O_3 [c,g] (Total Fe as Fe_2O_3)	10.35 ± 0.04	Sr [d]	169.2 ± 0.7
		Th [d]	0.33 ± 0.02
K_2O [b,d]	0.187 ± 0.008	Pb [d]	3.3 ± 0.2
MnO [a,b,e]	0.167 ± 0.002		
Na_2O [b,c,e]	2.15 ± 0.03		
P_2O_5 [a,c]	0.134 ± 0.003		
SiO_2 [c]	48.4 ± 0.1		
TiO_2 [a,b]	1.17 ± 0.01		

1. Methods of Analysis
   [a] Colorimetry
   [b] Emission spectrometry
   [c] Gravimetry
   [d] Isotope dilution mass spectrometry
   [e] Neutron activation analysis
   [f] Specific ion electrode potentiometry
   [g] Titrimetry
2. The estimated uncertainties of the certified values are based on judgment and represent an evaluation of the combined effects of method imprecision, possible systematic errors among methods and material variability of 250 mg or more. (No attempt was made to derive exact statistical measures of imprecision because several methods were involved in the determination of most constituents.)

The overall direction and coordination of the technical measurements leading to certification were performed in the Inorganic Analytical Research Division, E. L. Garner, Chief.

The technical and support aspects involved in the preparation, certification, and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by T. E. Gills.

Washington, D.C. 20234
August 18, 1981

George A. Uriano, Chief
Office of Standard Reference Materials

(over)

SUPPLEMENTAL INFORMATION

Preparation

The material was processed by the Colorado School of Mines, Golden, Colorado. Approximately 600 pounds of basalt rock were crushed, ground, and sieved to <200 mesh. The material was mixed in a cone blender to ensure homogeneity. The inhomogeneity was tested by taking random samples and analyzing for both major and minor constituents and was found to be $\leq 2\%$ relative.

Analysis

SRM 688 may pick up additional water on exposure to the atmosphere. Thus, exposure time should be kept to a minimum. Before analysis, it is recommended that the material be dried at 105 °C for 24 hours. Typical weight loss upon drying is approximately 0.2 percent.

The analysts and laboratories cooperating in the analytical program for certification were:

I. L. Barnes, M. J. Blackman, E. L. Garner, J. W. Gramlich, L. A. Machlan, L. J. Moore, and R. Zeisler of the Inorganic Analytical Research Division, National Bureau of Standards.

J. B. Bodkin, J. C DeVine, and N. H. Suhr of the Mineral Constitution Laboratories, The Pennsylvania State University, University Park, Pa.

S. S. Goldich of the Department of Geology, Northern Illinois University, Dekalb, Ill.

The constituents given in Table 2 are *not certified*, but are included for information only.

Table 2 Information Values

Constituent[1]	Content wt %	Constituent[1]	Content wt (μg/g)
CaO [c]	(12.17)	Ce [e]	(13.3)
CO_2 [f]	(0.05)	Co [e]	(49.7)
F [f]	(0.02)	Eu [e]	(1.07)
MgO [c]	(8.4)	Hf [e]	(1.6)
		Lu [e]	(0.34)
		Sc [e]	(38.1)
		Ba [b]	(200)
		V [b]	(250)
		Cu [b]	(96)
		Ni [b]	(150)
		Sm [e]	(2.79)
		Tb [e]	(0.448)
		U [d]	(0.37)
		Yb [e]	(2.09)
		Zn [e]	(58.0)

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 5/14/03
DATE EXPIRED: 5/14/2013
DATE OPENED: 5/14/03
INORG: 4072 PO: F52353

CERTIFICATE OF ANALYSIS

010366

PRODUCT:	LITHIUM TETRABORATE, ANHYDROUS ; $Li_2B_4O_7$, FUSED
ORIGIN:	CORPORATION SCIENTIFIQUE CLAISSE INC., QUÉBEC, CANADA
LOT NO.:	C-2068
QUALITY:	PURE, 99.9+%
DESCRIPTION:	GLASS (TRANSPARENT) AND CRYSTALS (WHITE)
APPARENT DENSITY:	1.4
LOSS ON IGNITION:	< 0,05% two hours at 300°C
GRANULOMETRY:	100% <500µm

ANALYTE	CONCENTRATION (GUARANTEED)	ANALYTICAL TECHNIQUE
Al	< 10 ppm	ICP-OES
Ca	< 10 ppm	ICP-OES
Cd	< 10 ppm	ICP-OES
Cr	< 10 ppm	ICP-OES
Cu	< 10 ppm	ICP-OES
Fe	< 10 ppm	ICP-OES
K	< 10 ppm	ICP-OES
Mg	< 10 ppm	ICP-OES
Mn	< 10 ppm	ICP-OES
Mo	< 10 ppm	ICP-OES
Na	< 10 ppm	ICP-OES
Ni	< 10 ppm	ICP-OES
P	< 10 ppm	ICP-OES
Pb	< 10 ppm	ICP-OES
S	< 10 ppm	ICP-OES
Si	< 10 ppm	ICP-OES
Ti	< 10 ppm	ICP-OES
Zn	< 10 ppm	ICP-OES
$Li_2B_4O_7$	100%	Acidimetry

CORPORATION SCIENTIFIQUE CLAISSE INC. BY:

FRÉDÉRIC GIRARD, B. Sc.
Chemist, supervisor of chemicals division

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 6/3/03
DATE EXPIRED: 6/3/2013 OR
DATE OPENED: 6/3/03
INORG: 4/22 PO: F52367

CERTIFICATE OF ANALYSIS

010367

FF-0610

PRODUCT:	LITHIUM METABORATE, ANHYDROUS ; $LiBO_2$, FUSED
ORIGIN:	CORPORATION SCIENTIFIQUE CLAISSE INC., QUÉBEC, CANADA
LOT NO.:	C-1153
QUALITY:	PURE, 99.9+%
DESCRIPTION:	GLASS (TRANSPARENT) AND CRYSTALS (WHITE)
APPARENT DENSITY:	1,4
LOSS ON IGNITION:	0,07% two hours at 300°C
GRANULOMETRY:	100% <500µm

ANALYTE	CONCENTRATION (GUARANTEED)	ANALYTICAL TECHNIQUE
Al	< 10 ppm	ICP-OES
Ca	< 10 ppm	ICP-OES
Cd	< 10 ppm	ICP-OES
Cr	< 10 ppm	ICP-OES
Cu	< 10 ppm	ICP-OES
Fe	< 10 ppm	ICP-OES
K	< 10 ppm	ICP-OES
Mg	< 10 ppm	ICP-OES
Mn	< 10 ppm	ICP-OES
Mo	< 10 ppm	ICP-OES
Na	< 10 ppm	ICP-OES
Ni	< 10 ppm	ICP-OES
P	< 10 ppm	ICP-OES
Pb	< 10 ppm	ICP-OES
S	< 10 ppm	ICP-OES
Si	< 10 ppm	ICP-OES
Ti	< 10 ppm	ICP-OES
Zn	< 10 ppm	ICP-OES
$LiBO_2$ ($Li_2B_2O_4$)	100%	Acidimetry

CORPORATION SCIENTIFIQUE CLAISSE INC. BY:

FRÉDÉRIC GIRARD, B. Sc.
Chemist, supervisor of chemicals division

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 6/03/03
DATE EXPIRED: 6/03/2013
DATE OPENED: 6/03/03
INORG: 4123 PO: F52341

CERTIFICATE OF ANALYSIS

010368

PRODUCT:	LITHIUM BROMIDE, ANHYDROUS ; LiBr, POWDER
ORIGIN:	CORPORATION SCIENTIFIQUE CLAISSE INC., QUÉBEC, CANADA
LOT NO.:	NW-1006
QUALITY:	PURE, 99+%
DESCRIPTION:	CRYSTALS (WHITE OR LIGHT YELLOW)
APPARENT DENSITY:	1.6
LOSS ON IGNITION:	0,36% two hours at 300°C
GRANULOMETRY:	100% <1mm

ANALYTE	CONCENTRATION (GUARANTEED)	ANALYTICAL TECHNIQUE
Al	< 10 ppm	ICP-OES
Ca	< 10 ppm	ICP-OES
Cd	< 10 ppm	ICP-OES
Cr	< 10 ppm	ICP-OES
Cu	< 10 ppm	ICP-OES
Fe	< 10 ppm	ICP-OES
K	< 10 ppm	ICP-OES
Mg	< 10 ppm	ICP-OES
Mn	< 10 ppm	ICP-OES
Mo	< 20 ppm	ICP-OES
Na	< 300 ppm	ICP-OES
Ni	< 10 ppm	ICP-OES
P	< 10 ppm	ICP-OES
Pb	< 10 ppm	ICP-OES
Si	< 10 ppm	ICP-OES
Ti	< 10 ppm	ICP-OES
Zn	< 10 ppm	ICP-OES
LiBr	100%	Argentimetry

CORPORATION SCIENTIFIQUE CLAISSE INC. BY:

FRÉDÉRIC GIRARD, B. Sc.
Chemist, supervisor of chemicals division

SPECertificate™

Certificate of Reference Material

010369

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 10/22/04
DATE EXPIRED: 10/15/2005
DATE OPENED: 10/25/04
INORG: 4836 PO: F54741

Catalog Number: SPIKE-1 **Lot No.:** 26-28AS
Description: **Spike Sample Standard 1**
Matrix: 5% Nitric Acid/tr Tartaric Acid - HF

This **ASSURANCE** ®certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

The CRM is prepared from high purity single element concentrates of individual elements using Class A laboratory ware to give precise concentration.

Refer to side 2 for details of measurement uncertainties.

Instrumental Analysis by ICP Spectrometer:

Element	Labeled (mg/L)	Measured (mg/L)	NIST SRM	Element	Labeled (mg/L)	Measured (mg/L)	NIST SRM
Al	200	198.56	3101a	Pb	50	50.06	3128
As	200	197.01	3103a	Sb	50	48.62	3102a
Ba	200	199.49	3104a	V	50	49.87	3165
Se	200	198.51	3149	Zn	50	49.70	3168a
TL	200	199.25	3158	Cu	25	25.15	3114
Fe	100	98.90	3126a	Cr	20	19.81	3112a
Co	50	50.04	3113	Ag	5	4.96	3151
Mn	50	49.90	3132	Be	5	4.92	3105a
Ni	50	50.16	3136	Cd	5	4.96	3108

Spex Reference Multi: Lot #4-24BD, 2-61BD, 17-55AS, 16-68AS

Balances are calibrated regularly with weight sets traceable to NIST#s 32856, 32867 and others. This CRM is guaranteed stable and accurate to +/- 0.5% on the average of all the certified concentrations with no single component exceeding +/- 2%. This guarantee is valid for a period of one year from the date of certification only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: OCT - - 2004 Certifying Officer: N. Kocherlakota

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Report of Certification 010370

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s = s^2 m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U = ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i, and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

SPEX CertiPrep reference materials are not for any cosmetic, drug or household application and are to be used only by qualified individuals who are trained in appropriate procedures. No claims against SPEX CertiPrep, Inc. of any kind whatsoever, whether based on breach of warranty, alleged negligence, or otherwise, with respect to this RM shall be greater than the purchase price. In no event shall SPEX CertiPrep, Inc. be liable for any loss of profits or any incidental, special, or consequential damages.

ISO 9001
CERTIFIED

4836

SPEXertificate™

010371

Certificate of Reference Material

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/15/04
DATE EXPIRED: 11/15/05 OK
DATE OPENED: 11/15/04
INORG: 4837 PO: F54761

Catalog Number: ICAL-1 **Lot No.:** 28-64AS
Description: **Instrument Calibration Standard 1**
Matrix: 5% Nitric Acid

This **ASSURANCE** ®certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

The CRM is prepared from high purity single element concentrates of individual elements using Class A laboratory ware to give precise concentration.

Refer to side 2 for details of measurement uncertainties.

Instrumental Analysis by ICP Spectrometer:

Element	Labeled (mg/L)	Measured (mg/L)	NIST SRM
Ca	5,000	5011.87	3109a
K	5,000	5011.80	3141a
Mg	5,000	5020.86	3131a
Na	5,000	4995.13	3152a

Spex Reference Multi: Lot #6-28VY, 6-104VY, 25-178AS-REF

Balances are calibrated regularly with weight sets traceable to NIST#s 32856, 32867 and others. This CRM is guaranteed stable and accurate to +/- 0.5% on the average of all the certified concentrations with no single element exceeding +/-2%. This includes uncertainty of measurements and other effects, such as transpiration losses. This guarantee is valid for a period of one year from the date of certification only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: OCT - - 2004 Certifying Officer: N. Kocherlakota

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4837

010372

Report of Certification

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s=s^2m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
$X = x+/-U$ where X =True value (Labeled Value), U= Expanded uncertainty
$U=ku_c$ where $k=2$ is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c=\sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

SPEX CertiPrep reference materials are not for any cosmetic, drug or household application and are to be used only by qualified individuals who are trained in appropriate procedures. No claims against SPEX CertiPrep, Inc. of any kind whatsoever, whether based on breach of warranty, alleged negligence, or otherwise, with respect to this RM shall be greater than the purchase price. In no event shall SPEX CertiPrep, Inc. be liable for any loss of profits or any incidental, special, or consequential damages.

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CERTIFIED

4837

SPEX CertiPrep
203 Norcross Avenue • Metuchen, NJ 08840 USA

010373

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/3/04
DATE EXPIRED: 11/15/2005 WS
DATE OPENED: 11/3/04
INORG: 4870 PO: F54778

SPEXertificate™

Certificate of Reference Material

Catalog Number: ICMIX2-100 **Lot No.:** 28-138AS
Description: **IC Instrument Check Standard 2**
Matrix: H_2O

This **ASSURANCE** ®certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for Ion Chromatography instrumentation. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

The CRM is prepared from high purity single ion concentrates of individual elements using Class A laboratory ware to give precise concentration.
Refer to side 2 for details of measurement uncertainties.

Instrumental Analysis by ION Chromatography:

Analyte	Labeled (mg/L)	Measured (mg/L)	NIST SRM
F^-	100	100	3183
Cl^-	200	200	3182
Br^-	400	399	3184
NO_3^-	400	402	3185
HPO_4^{-2}	600	600	3186
SO_4^{-2}	400	399	3181

Spex Reference Multi: Lot #IC6-77VY

Balances are calibrated regularly with weight sets traceable to NIST#s 32856, 32867 and others. This CRM is guaranteed stable and accurate to +/- 0.5% on the average of all the certified concentrations with no single component exceeding +/- 2%. This guarantee is valid for a period of one year from the date of certification only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: NOV - - 2004 Certifying Officer: N. Kocherlakota

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010374

Report of Certification

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s=s^2m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U=ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c=\sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

SPEX CertiPrep reference materials are not for any cosmetic, drug or household application and are to be used only by qualified individuals who are trained in appropriate procedures. No claims against SPEX CertiPrep, Inc. of any kind whatsoever, whether based on breach of warranty, alleged negligence, or otherwise, with respect to this RM shall be greater than the purchase price. In no event shall SPEX CertiPrep, Inc. be liable for any loss of profits or any incidental, special, or consequential damages.

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SPEX CertiPrep
203 Norcross Avenue • Metuchen, NJ 08840 USA

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 01/11/05
DATE EXPIRED: 06/30/2005 VOS
DATE OPENED: 01/11/05
INORG: 4954 PO: F55120

SOLUTIONS Plus, Inc.
2275 Cassens Dr., Ste. 147 Fenton MO 63026 636-349-4922 Fax: 636-349-8027 email: solnplus@accessus.net

CERTIFICATE OF ANALYSIS

010375

PRODUCT: Nitrite Solution, APHA, Nitrogen (Nitrite)
1 ml = 1.0 mg Nitrogen

CODE: N065050

LOT: 3412201

INGREDIENTS:

Sodium Nitrite, ACS	(CAS # 7632-00-0)
Reagent Grade I Water	(CAS # 7732-18-5)
with a trace of Chloroform as preservative	(CAS # 67-66-3)

THEORETICAL VALUE: 1000 ppm NO_2^- (990 - 1010 ppm NO_2^-)

Analysis: 1006 ppm NO_2^- (Nitrite)

METHOD OF ANALYSIS: Potassium Permanganate Titration

Potassium Permanganate standardized against Sodium Oxalate, NIST SRM 40h

APPEARANCE: Clear, colorless solution

EXPIRATION DATE: 06/05
(6 months)

NOTE: APHA recommends use of Chloroform to retard bacterial growth, which would convert Nitrite to Nitrate.

Balances are calibrated using NIST-traceable weights whose verification of maintenance and recalibration is documented per in-house Standard Operating Procedures. Class A glassware also is calibrated and routinely rechecked per in-house Standard Operating Procedures.

Date: 12-20-04

Certified By: Neal T. Parmentier

Neal T. Parmentier
Quality Control Supervisor

010376

inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **10000 µg/mL Scandium in 5% (abs) HNO_3**

Catalog Number:	CGSC10-1, CGSC10-2, and CGSC10-5
Lot Number:	**X-SC02061**
Starting Material:	Sc_2O_3
Starting Material Purity (%):	99.996918
Starting Material Lot No	BSC-632-1-5736
Matrix:	5% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 09/01/04
DATE EXPIRED: 10/01/2005 VOS
DATE OPENED: 09/01/04
INORG: 4761 PO: F53434

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 10,007 ± 21 µg/mL

Certified Density: 1.071 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n}$$

$$\text{Uncertainty } (\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum S$ = The summation of all significant estimated errors (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

- "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)
- This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **10,005 ± 26 µg/mL**
ICP Assay NIST SRM 3148a Lot Number: 792111

Assay Method #2 **10,007 ± 21 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	< 0.00100	M	Dy	< 0.00598	M	Li	< 0.00997	M	Pr	< 0.00030	M	Te	< 0.02990
M	Sb	< 0.00050	M	Er	< 0.00498	M	Lu	< 0.00040	M	Re	< 0.00100	M	Tb	< 0.00030
M	As	< 0.00997	M	Eu	< 0.00299	O	Mg	0.00100	M	Rh	< 0.00100	M	Tl	< 0.00100
M	Ba	< 0.00997	M	Gd	< 0.00100	M	Mn	< 0.00399	M	Rb	< 0.00100	M	Th	0.11759
M	Be	< 0.00050	M	Ga	< 0.00100	O	Hg	< 0.01000	M	Ru	< 0.00199	M	Tm	< 0.00040
M	Bi	< 0.00040	M	Ge	< 0.00598	M	Mo	< 0.00199	M	Sm	< 0.00100	M	Sn	< 0.00498
M	B	< 0.06976	M	Au	< 0.00299	M	Nd	< 0.00199	s	Sc		O	Ti	< 0.00100
M	Cd	< 0.00299	M	Hf	< 0.00199	O	Ni	< 0.00090	M	Se	< 0.00797	M	W	< 0.00997
O	Ca	0.11500	M	Ho	< 0.00050	M	Nb	< 0.00050	O	Si	0.02000	M	U	< 0.00199
M	Ce	< 0.00498	M	In	< 0.00997	n	Os		M	Ag	< 0.00199	M	V	< 0.00199
M	Cs	< 0.00030	M	Ir	< 0.00498	M	Pd	< 0.00498	O	Na	< 0.09000	M	Yb	< 0.00100
O	Cr	0.00470	O	Fe	0.00370	n	P		M	Sr	< 0.00050	O	Y	< 0.00100
M	Co	< 0.00299	M	La	< 0.00050	M	Pt	< 0.00199	O	S	< 0.02500	O	Zn	0.00600
O	Cu	< 0.00140	M	Pb	< 0.00299	O	K	< 0.10000	M	Ta	< 0.00698	O	Zr	0.23000

M - Checked by ICP-MS O - Checked by ICP-OES I - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.
Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 44.95591; +3; 6; $Sc(H_2O)_6^{+3}$
Chemical Compatibility - Soluble in HCl, H_2SO_4 and HNO_3. Avoid HF, H_3PO_4 and neutral to basic media. Stable with most metals and inorganic anions forming an insoluble carbonate, oxide, oxalate, and fluoride. Avoid mixing with elements / solutions containing moderate amounts of fluoride. The fluoride is soluble in excess HF forming ScF_6^{3-} (not recommended for standard preparations).
Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 5-10% HNO_3 / LDPE container. Small atomic radius increases hydrolysis requiring higher acid levels than other Rare Earths.
Sc Containing Samples (Preparation and Solution) - Metal (Soluble in acids); Oxide (Dissolve by heating in H_2O / HNO_3); Ores (Carbonate fusion in Pt° followed by HCl dissolution); Organic Matrices (Dry ash and dissolve in 1:1 H_2O / HCl or HNO_3), (Aqua Regia or nitric / perchloric / sulfuric acid digestions can be used. **Exercise caution when using perchloric acid.)**
Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES 335.373 nm	0.004 / 0.00002 µg/mL	1	ion	
ICP-OES 337.215 nm	0.004 / 0.00002 µg/mL	1	ion	Ti, U, Ni, Rh
ICP-OES 424.683 nm	0.003 / 0.00002 µg/mL	1	ion	Ce
ICP-MS 45 amu	2.3 ppt	n/a	M'	$^{16}O_2{}^{12}CH$, $^{29}Si^{16}O$, $^{90}Zr^{12}$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter), Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

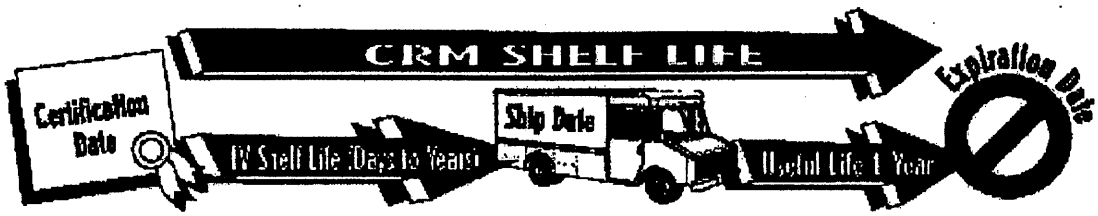
10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

INORGANIC LABS/RADCHEM LABS pg 2 of 2
DATE RECEIVED: 09/01/04
DATE EXPIRED: 10/01/2005 WS
DATE OPENED: 09/01/04
INORG: 4761 PO: F53434

010379

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: July 01, 2004

Expiration Date: EXPIRES 1 9 2005

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Nick Maida, QA Administrator	Nicholas Maida
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010380

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 1/31/05
DATE EXPIRED: 1/31/2006 DR
DATE OPENED: 1/31/05
INORG: 4997 PO: F55139

SPEXertificate™

Certificate of Reference Material

Catalog Number: PLB9-2X/2Y/2T **Lot No.** 11-87B
Description: 1000 mg/L Boron
Matrix: H2O

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 999 mg/L
Uncertainty Associated with Measurement: +/- 3.0 mg/L
Certified Value is Traceable to: NIST SRM #3107

The CRM is prepared gravimetrically using high purity (NH4)2(B)4(O)7-4H2O Lot# 06041B. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 999 mg/L

Method: Titration with Sodium Hydroxide using Phenolphthalein as indicator. Sodium Hydroxide standardized against Potassium Biphthalate NIST SRM #84k

Instrumental Analysis by ICP spectrometer: 999 mg/L

Uncertified Properties:

Density: 1.000 @ 23.7 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Ag	<0.02	Cu	0.01	Pb	<0.001
As	0.006	Fe	0.002	Re	<0.001
Al	0.05	Ga	<0.001	Rb	<0.001
Ba	<0.001	In	<0.001	Sr	<0.001
Be	<0.001	K	0.06	Si	0.04
Bi	<0.001	Li	0.009	Sb	<0.001
Ca	0.013	Mg	0.005	Tl	<0.001
Cd	<0.001	Mn	0.006	Ti	<0.001
Co	<0.001	Mo	0.006	V	0.005
Cr	<0.002	Ni	0.008	Zn	0.02
		Na	0.02	Zr	<0.001

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: JAN. - - 2005 Certifying Officer: N. Kocherlakota

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Report of Certification

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s=s^2m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U=ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c=\sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

SPEX CertiPrep reference materials are not for any cosmetic, drug or household application and are to be used only by qualified individuals who are trained in appropriate procedures. No claims against SPEX CertiPrep, Inc. of any kind whatsoever, whether based on breach of warranty, alleged negligence, or otherwise, with respect to this RM shall be greater than the purchase price. In no event shall SPEX CertiPrep, Inc. be liable for any loss of profits or any incidental, special, or consequential damages.

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010382

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Certificate of Reference Material

Catalog Number: PLLI2-2X/2Y **Lot No.** 11-24LI

Description: 1000 mg/L Lithium

Matrix: 2% HNO3

This ASSURANCE ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 1000.5 mg/L

Uncertainty Associated with Measurement: +/-3 mg/L

Certified Value is Traceable to: NIST SRM #3129a

The CRM is prepared gravimetrically using high purity Lithium Carbonate Lot# 03021A. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1001 mg/L

Method: Evaporate to dryness. Fume with Sulfuric Acid. Ignite and weigh as Li2SO4.

Instrumental Analysis by ICP spectrometer: 1000 mg/L

Uncertified Properties:

Density: 1.015 @ 22.8 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
As	<0.002	Cu	<0.001	Pb	<0.001
Al	0.007	Fe	0.013	Re	<0.001
Ag	<0.001	Ga	<0.001	Rb	<0.001
Be	<0.001	In	<0.001	Sr	<0.001
Ba	<0.001	K	0.027	Sb	<0.001
Bi	<0.001	Mg	0.002	Si	0.014
B	<0.001	Mn	<0.001	Ti	<0.001
Co	<0.001	Mo	<0.001	Tl	<0.001
Ca	0.008	Ni	0.001	V	<0.001
Cr	<0.004	Na	0.01	Zn	3.0
Cd	<0.001			Zr	0.002

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: OCT '04 Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/02/04
DATE EXPIRED: 10/30/2005 WJ
DATE OPENED: 11/02/04
INORG: 4846 PO: F54767

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Report of Certification

010383

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s = s^2 m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U = ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

SPEX CertiPrep reference materials are not for any cosmetic, drug or household application and are to be used only by qualified individuals who are trained in appropriate procedures. No claims against SPEX CertiPrep, Inc. of any kind whatsoever, whether based on breach of warranty, alleged negligence, or otherwise, with respect to this RM shall be greater than the purchase price. In no event shall SPEX CertiPrep, Inc. be liable for any loss of profits or any incidental, special, or consequential damages.

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203 Norcross Avenue • Metuchen, NJ 08840 USA
732-549-7144 • 1-800-LAB-SPEX • Fax: 732-603-9647 • CRMSales@spexcsp.com • www.spexcsp.com

010384

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/03/04
DATE EXPIRED: 10/30/2005 v03
DATE OPENED: 11/03/04
INORG: 4847 PO: 554767

SPEXertificate™

Certificate of Reference Material

Catalog Number: PLMO9-2X/2Y/2T **Lot No.** 11-51MO

Description: 1000 mg/L Molybdenum

Matrix: H2O

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 1000 mg/L

Uncertainty Associated with Measurement: +/-3.0 mg/L

Certified Value is Traceable to: NIST SRM #3134

The CRM is prepared gravimetrically using high purity (NH4)6(Mo)7(O)24-4H2OLot# 03011C. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1000 mg/L

Method: Precipitation using 8-Hydroxy Quinoline. Filter, dry, and weigh as MoO2(C9H6NO)2.

Instrumental Analysis by ICP spectrometer: 1001 mg/L

Uncertified Properties:

Density: 09989 @23.7 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
As	0.03	Cu	0.003	Pb	<0.001
Ag	<0.002	Fe	0.110	Rb	<0.001
Al	<0.002	Ga	<0.001	Re	0.030
Ba	<0.001	In	<0.001	Sr	<0.001
Be	<0.002	K	0.060	Sb	<0.001
B	<0.007	Li	<0.003	Si	<0.200
Bi	<0.001	Mn	0.002	Ti	0.003
Cd	<0.100	Mg	<0.001	Tl	<0.001
Ca	0.010	Ni	<0.001	V	0.004
Cr	<0.003	Na	<0.002	Zr	<0.001
Co	<0.001			Zn	0.006

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: OCT '04 Certifying Officer: N. Kocherlakota

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Report of Certification

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s=s^2m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U=ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c=\sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

SPEX CertiPrep reference materials are not for any cosmetic, drug or household application and are to be used only by qualified individuals who are trained in appropriate procedures. No claims against SPEX CertiPrep, Inc. of any kind whatsoever, whether based on breach of warranty, alleged negligence, or otherwise, with respect to this RM shall be greater than the purchase price. In no event shall SPEX CertiPrep, Inc. be liable for any loss of profits or any incidental, special, or consequential damages.

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010386

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Certificate of Reference Material

Catalog Number: PLP9-2X/2Y/2T **Lot No.** 10-125P

Description: 1000 mg/L Phosphorus

Matrix: H2O

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 1001 mg/L

Uncertainty Associated with Measurement: +/- 3.0 mg/L

Certified Value is Traceable to: NIST SRM 3139a

The CRM is prepared gravimetrically using high purity (NH4)2(H)PO4 Lot# 07901A. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1001 mg/L

Method: Precipitation using Magnesia Mixture. Filter, ignite and weigh as Mg2P2O7.

Instrumental Analysis by ICP spectrometer: 1000 mg/L

Uncertified Properties:

Density: 1.000 @ 22.5 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.001	Cu	<0.001	Pb	<0.001
As	<0.001	Fe	0.002	Rb	<0.001
Ag	<0.001	Ga	<0.001	Re	<0.001
B	<0.01	In	<0.001	Si	0.085
Ba	0.001	K	0.027	Sr	<0.001
Be	<0.001	Li	<0.001	Sb	0.01
Bi	<0.001	Mg	<0.001	Ti	0.002
Ca	0.002	Mn	<0.001	Tl	<0.001
Cr	<0.001	Mo	<0.001	V	<0.001
Cd	<0.001	Na	0.008	Zr	<0.001
Co	<0.001	Ni	<0.001	Zn	0.02

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: AUG 04 Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 09/01/04
DATE EXPIRED: 08/30/2005 VS
DATE OPENED: 09/01/04
INORG: 4758 PO: F53434

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Report of Certification 010387

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s = s^2 m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U = ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

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Certificate of Reference Material

Catalog Number: PLSI9-2X/2Y/2T **Lot No.** 11-13SI

Description: 1000 mg/L Silicon

Matrix: H2O / 0.4% F-

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 998.5 mg/L

Uncertainty Associated with Measurement: +/- 3 mg/L

Certified Value is Traceable to: NIST SRM #3150

The CRM is prepared gravimetrically using high purity (NH4)2SiF6 Lot# 02021D. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 997 mg/L

Method: Precipitation using Ammonium Molybdate and 8-Hydroxy Quinoline. Filter, dry, and weigh as (C9H7ON)4(H4)[Si(Mo12O40)]

Instrumental Analysis by ICP spectrometer: 1000 mg/L

Uncertified Properties:

Density: 1.010 @ 26.5 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.002	Cu	<0.001	Pb	<0.001
As	<0.001	Fe	0.020	Rb	<0.001
Ag	<0.001	Ga	<0.001	Re	<0.001
B	<0.003	In	<0.001	Sr	<0.001
Ba	<0.001	K	<0.010	Sb	0.03
Be	<0.001	Li	<0.001	Ti	<0.001
Bi	<0.001	Mg	<0.001	Tl	<0.001
Ca	0.018	Mn	<0.001	V	<0.001
Cr	<0.002	Mo	<0.001	Zr	0.05
Cd	<0.001	Na	0.02	Zn	0.06
Co	<0.001	Ni	0.001		

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: JUN - - 2004 Certifying Officer: N. Kocherlakota

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DATE EXPIRED: 06/30/2005 VPS
DATE OPENED: 06/29/04
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Report of Certification

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
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Material Source:

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Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s = s^2 m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
$X = x +/- U$ where X =True value (Labeled Value), U= Expanded uncertainty
$U = ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

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Certificate of Reference Material

Catalog Number: PLTI9-2X/2Y/2T **Lot No.** 10-38TI

Description: 1000 mg/L Titanium

Matrix: H2O/ 0.24% F-

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevent to the certified properties listed below.

Certified Value: 1001 mg/L

Uncertainty Associated with Measurement: 3.0mg/L

Certified Value is Traceable to: NIST SRM #3162a

The CRM is prepared gravimetrically using high purity (NH4)2TiF6 Lot# 02021E. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1003 mg/L

Method: Precipitation using Ammonium Hydroxide. Filter, ignite, and weigh as TiO2.

Instrumentation Analysis By ICP spectrometer: 999 mg/L

Uncertified Properties:

Density: 1.001 @ 22.5 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.006	Cu	<0.10	Pb	<0.001
As	<0.001	Fe	<0.01	Rb	<0.001
Ag	<0.001	Ga	<0.001	Re	<0.001
B	0.003	In	<0.001	Si	0.52
Ba	<0.001	K	<0.01	Sr	0.001
Be	<0.001	Li	<0.001	Sb	<0.001
Bi	<0.001	Mg	<0.001	Tl	<0.001
Ca	0.013	Mn	<0.001	V	<0.001
Cr	<0.003	Mo	<0.001	Zr	0.01
Cd	<0.001	Na	0.02	Zn	0.03
Co	0.002	Ni	<0.001		

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: JUN - - 2004 Certifying Officer: N. Kocherlakota

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Report of Certification

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ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s = s^2 m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
$X = x +/- U$ where X =True value (Labeled Value), U= Expanded uncertainty
$U = ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

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Certificate of Reference Material

Catalog Number: PLSR2-2X/2Y/2T **Lot No.** 10-111SR

Description: 1000 mg/L Strontium in 2% HNO3

Matrix: 2% HNO3

This ASSURANCE ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 998 mg/ L

Uncertainty Associated with Measurement: +/-3.0mg/L

Certified Value is Traceable to: NIST SRM #3153a

The CRM is prepared gravimetrically using high purity Strontium Carbonate Lot# 09031B. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 997 mg/L

Method: EDTA titration using Methyl Thymol Blue as indicator. EDTA standardized against Pb(NO3)2 NIST SRM #928

Instrumental Analysis by ICP spectrometer: 999 mg/L

Uncertified Properties:

Density: 1.009 @ 24.1 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.001	Cu	<0.001	Pb	0.001
As	<0.001	Fe	0.001	Rb	<0.001
Ag	<0.001	Ga	<0.001	Re	<0.001
B	<0.004	In	<0.001	Si	0.002
Ba	0.02	K	0.015	Sb	<0.001
Be	<0.001	Li	<0.001	Ti	<0.001
Bi	<0.001	Mg	<0.001	Tl	<0.001
Ca	0.008	Mn	<0.001	V	<0.001
Cr	<0.004	Mo	<0.001	Zr	0.004
Cd	<0.001	Na	0.005	Zn	0.04
Co	<0.001	Ni	<0.001		

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: AUG '04 Certifying Officer: N. Kocherlakota

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DATE OPENED: 09/01/04
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Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s = s^2 m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U = ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

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DATE EXPIRED: 3/28/2006
DATE OPENED: 3/28/05
INORG: 5037 PO: F55146

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Certificate of Reference Material

Catalog Number: PLSN5-2X/2Y/2T **Lot No.** 11-45SN

Description: 1000 mg/L Tin

Matrix: 20% HCL

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 997.5 mg/L

Uncertainty Associated with Measurement: +/- 3.0 mg/L

Certified Value is Traceable to: NIST SRM #3161

The CRM is prepared gravimetrically using high purity Tin Metal Lot# 10951C. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 999 mg/L

Method: Precipitation using Ammonium Hydroxide. Filter, ignite, and weigh as SnO2.

Instrumental Analysis by ICP spectrometer: 996 mg/L

Uncertified Properties:

Density: 1.041 @ 22.7 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
As	<0.10	Cu	<0.001	Pb	0.001
Ag	0.004	Fe	0.10	Re	<0.001
Al	0.007	Ga	<0.001	Rb	<0.001
B	<0.001	In	<0.01	Sb	0.002
Ba	<0.001	K	<0.20	Si	0.09
Be	<0.001	Li	<0.001	Sr	<0.001
Bi	<0.001	Mo	<0.001	Ti	<0.001
Co	0.007	Mn	<0.001	Tl	<0.001
Cd	<0.01	Mg	<0.001	V	<0.20
Ca	0.07	Na	0.045	Zn	0.70
Cr	0.007	Ni	0.045	Zr	<0.001

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: FEB '05 Certifying Officer: N. Kocherlakota

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This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

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Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s=s^2m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U=ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c=\sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

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DATE RECEIVED: 12/03/04
DATE EXPIRED: 11/30/2005 W3
DATE OPENED: 12/03/04
INORG: 4912 PO: 55103

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Certificate of Reference Material

Catalog Number: PLBI4-2X/2Y **Lot No.** 10-173BI

Description: 1000 mg/L Bismuth

Matrix: 10% HNO3

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 1002.5 mg/L

Uncertainty Associated with Measurement: +/- 3.0 mg/L

Certified Value is Traceable to: NIST SRM #3106

The CRM is prepared gravimetrically using high purity Bismuth Metal Lot# 04941B. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1003 mg/L

Method: EDTA titration using xylenol orange as indicator. EDTA standardized against Pb(NO3)2 NIST SRM #928

Instrumental Analysis by ICP spectrometer: 1002 mg/L

Uncertified Properties:

Density: 1.052 @ 24.0 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.02	Cu	<0.001	Pb	0.006
As	<0.001	Fe	0.001	Re	<0.001
Ag	0.002	Ga	<0.001	Rb	<0.001
B	<0.002	In	<0.001	Sr	<0.001
Ba	0.002	K	0.010	Sb	<0.001
Be	<0.002	Li	<0.001	Si	0.005
Cd	<0.001	Mn	<0.001	Ti	<0.002
Co	<0.001	Mo	<0.001	Tl	<0.001
Ca	0.125	Mg	<0.001	V	<0.001
Cr	<0.001	Na	0.006	Zr	<0.001
		Ni	0.002	Zn	0.08

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: NOV '04 Certifying Officer: N. Kocherlakota

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Report of Certification

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s = s^2 m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U = ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

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010398

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/09/04
DATE EXPIRED: 10/30/2005
DATE OPENED: 11/09/04
INORG: 4845 PO: F54767

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Certificate of Reference Material

Catalog Number: PLLA2-2X/2Y **Lot No.** 11-12LA

Description: 1000 mg/L Lanthanum

Matrix: 2% HNO3

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 1000 mg/L

Uncertainty Associated with Measurement: +/-3.0mg/L

Certified Value is Traceable to: NIST SRM #3127a

The CRM is prepared gravimetrically using high purity La(NO3)3-6H2O Lot# 03951B. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1000 mg/L

Method: EDTA titration using Methyl Thymol Blue as indicator. EDTA standardized against Pb(NO3)2 NIST SRM #928.

Instrumental Analysis by ICP spectrometer: 999 mg/L

Uncertified Properties:

Density: 1.010 @ 22.3 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Ce	0.02	Lu	<0.001	Th	<0.001
Ca	0.029	Mn	<0.001	Tm	<0.001
Dy	<0.001	Mo	<0.001	Ti	<0.001
Er	<0.001	Nd	<0.001	Tb	<0.001
Eu	<0.001	Ni	<0.001	Ta	<0.001
Fe	0.005	Na	0.01	Tl	<0.001
Gd	<0.001	Pr	<0.001	V	<0.001
Ga	<0.001	Rb	<0.001	W	<0.001
Hf	<0.001	Sc	0.002	Y	<0.001
Ho	<0.001	Sm	<0.001	Yb	<0.001
In	<0.001			Zr	<0.001

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: OCT '04 Certifying Officer: N. Kocherlakota

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Report of Certification

010399

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s = s^2 m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U = ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

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010400

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DATE RECEIVED: 12/03/04
DATE EXPIRED: 11/30/2005 VX
DATE OPENED: 12/03/04
INORG: 4913 PO: F55103

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Certificate of Reference Material

Catalog Number: PLY2-2X/2Y/2T **Lot No.** 10-121Y

Description: 1,000 mg/L Yttrium

Matrix: 2% HNO3

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 1000 mg/ L

Uncertainty Associated with Measurement: +/-3.0 mg/L

Certified Value is Traceable to: NIST SRM 3167a

The CRM is prepared gravimetrically using high purity Yttrium Oxide Lot# 01031B. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1000 mg/L

Method: EDTA titration using Methyl Thymol Blue as indicator. EDTA standardized against Pb(NO3)2 NIST SRM #928.

Instrumental Analysis by ICP spectrometer: 1000 mg/L

Uncertified Properties:

Density: 1.011 @ 21.8 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Ce	<0.001	La	<0.001	Tb	<0.001
Ca	0.007	Lu	<0.001	Tm	<0.001
Dy	<0.001	Mn	<0.001	Tl	<0.001
Er	<0.001	Mo	<0.001	Th	<0.001
Eu	<0.001	Nd	<0.001	Ta	<0.001
Fe	0.015	Ni	<0.001	Ti	<0.001
Gd	<0.001	Na	0.006	V	<0.001
Ga	<0.001	Pr	<0.001	W	<0.001
Hf	<0.001	Rb	<0.001	Yb	<0.001
Ho	<0.001	Sc	<0.001	Zr	<0.001
In	<0.001	Sm	<0.001		

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: NOV '04 Certifying Officer: N. Kocherlakota

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Report of Certification

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s=s^2m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U=ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c=\sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

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Certificate of Reference Material

Catalog Number: PLPD3-2X/2Y **Lot No.** 9-99PD

Description: 1000 mg/L Palladium

Matrix: 10% HCl

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 999 mg/L

Uncertainty Associated with Measurement: +/-3.0 mg/L

Certified Value is Traceable to: NIST SRM #3138

The CRM is prepared gravimetrically using high purity Palladium Metal Lot# 06021C. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 999 mg/L

Method: Precipitation using Dimethyl Glyoxime. Filter, dry, and weigh as Pd(C4H7O2N2)2.

Instrumental Analysis by ICP spectrometer: 1000 mg/L

Uncertified Properties:

Density: 1.017 @ 24.2 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.002	Fe	0.033	Re	<0.001
Au	0.002	Ga	<0.001	Rh	<0.001
Ag	<0.001	Ir	<0.001	Rb	<0.001
B	<0.001	In	<0.001	Ru	<0.001
Be	<0.001	Mg	0.001	Sn	<0.001
Bi	<0.001	Mn	<0.001	Te	<0.001
Ca	0.006	Na	0.005	Ti	<0.001
Cd	<0.001	Ni	0.001	W	<0.001
Co	<0.001	Pb	0.002	Zr	<0.001
Cr	<0.002	Pt	0.008	Zn	0.06
Cu	0.002				

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: JAN '05 Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 01/17/05
DATE EXPIRED: 01/15/2006 WS
DATE OPENED: 01/19/05
INDRG: 4967 PO: F55130

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Report of Certification

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s = s^2 m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
$X = x +/- U$ where X =True value (Labeled Value), U= Expanded uncertainty
$U = ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i, and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

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Certificate of Reference Material

Catalog Number: PLS9-2X/2Y/2T **Lot No.** 10-122S

Description: 1000 mg/L Sulfur

Matrix: H2O

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 1001 mg/L

Uncertainty Associated with Measurement: +/-3.0mg/L

Certified Value is Traceable to: NIST SRM #3154

The CRM is prepared gravimetrically using high purity Ammonium Sulfate Lot# 05891M. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1002 mg/L

Method: Precipitation using Barium Chloride. Filter, ignite and weigh as BaSO4.

Instrumental Analysis by ICP spectrometer: 1000 mg/L

Uncertified Properties:

Density: 1.001 @ 22.7 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	<0.001	Cu	<0.001	Pb	<0.001
As	0.003	Fe	0.014	Rb	<0.001
Ag	<0.001	Ga	<0.001	Re	<0.001
B	<0.001	In	<0.001	Si	0.003
Ba	<0.001	K	<0.10	Sr	<0.001
Be	<0.001	Li	<0.001	Sb	<0.001
Bi	<0.001	Mg	0.005	Ti	<0.001
Ca	0.012	Mn	<0.002	Tl	<0.001
Cr	<0.001	Mo	<0.001	V	<0.001
Cd	<0.001	Na	0.01	Zr	<0.001
Co	<0.001	Ni	<0.001	Zn	<0.002

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: JUN - - 2004 Certifying Officer: N. Kochotakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 06/25/04
DATE EXPIRED: 06/30/2005 v03
DATE OPENED: 06/29/04
INORG: 4617 PO: F53398

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Report of Certification

010405

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s = s^2 m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U = ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i, and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

SPEX CertiPrep reference materials are not for any cosmetic, drug or household application and are to be used only by qualified individuals who are trained in appropriate procedures. No claims against SPEX CertiPrep, Inc. of any kind whatsoever, whether based on breach of warranty, alleged negligence, or otherwise, with respect to this RM shall be greater than the purchase price. In no event shall SPEX CertiPrep, Inc. be liable for any loss of profits or any incidental, special, or consequential damages.

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Certificate of Reference Material

Catalog Number: PLTH2-2X/2Y **Lot No.** 11-15TH

Description: 1000 mg/L Thorium

Matrix: 2% HNO3

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 999 mg/L

Uncertainty Associated with Measurement: +/- 3.0 mg/L

Certified Value is Traceable to: NIST SRM #3159

The CRM is prepared gravimetrically using high purity Th(NO3)4-4H2O Lot# 01851R. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1000 mg/L

Method: EDTA titration using Xylenol Orange as indicator. EDTA syandardized against Pb(NO3)2 NIST SRM #928.

Instrumental Analysis by ICP spectrometer: 998 mg/L

Uncertified Properties:

Density: 1.010 @ 22.0 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Ce	0.01	La	0.003	Tb	<0.001
Ca	0.27	Lu	<0.001	Tm	<0.001
Dy	<0.001	Mn	<0.001	Ti	<0.002
Er	<0.001	Mo	<0.001	Ta	<0.001
Eu	<0.001	Nd	0.003	Tl	<0.001
Fe	<0.01	Ni	<0.001	V	<0.001
Gd	<0.001	Na	0.04	W	<0.001
Ga	<0.001	Pr	<0.001	Y	0.002
Hf	<0.001	Rb	<0.001	Yb	<0.001
Ho	<0.001	Sc	<0.03	Zr	<0.001
In	<0.001	Sm	<0.001		

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: AUG '04 Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 09/01/04
DATE EXPIRED: 08/30/2005 WS
DATE OPENED: 09/9/04
INORG: 4760 PO: F53435

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Report of Certification

010407

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s = s^2 m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U = ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

SPEX CertiPrep reference materials are not for any cosmetic, drug or household application and are to be used only by qualified individuals who are trained in appropriate procedures. No claims against SPEX CertiPrep, Inc. of any kind whatsoever, whether based on breach of warranty, alleged negligence, or otherwise, with respect to this RM shall be greater than the purchase price. In no event shall SPEX CertiPrep, Inc. be liable for any loss of profits or any incidental, special, or consequential damages.

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SPEX CertiPrep
203 Norcross Avenue • Metuchen, NJ 08840 USA
732-549-7144 • 1-800-LAB-SPEX • Fax: 732-603-9647 • CRMSales@spexcsp.com • www.spexcsp.com

010408

SPEXertificate ™

Certificate of Reference Material

Catalog Number: PLU2-2X/2Y **Lot No.** 10-127U

Description: 1000 mg/L Uranium

Matrix: 2% HNO3

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 1004 mg/L

Uncertainty Associated with Measurement: +/- 3.0 mg/L

Certified Value is Traceable to: NIST SRM #3164

The CRM is prepared gravimetrically using high purity Uranium(V,VI) Oxide Lot# 04001D. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1004 mg/L

Method: Evaporate to dryness. Ignite and weigh as U3O8.

Instrumental Analysis by ICP spectrometer: 1005 mg/L

Uncertified Properties:

Density: 1.010 @ 21.6 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.005	Cu	0.01	Pb	0.008
As	0.04	Fe	0.41	Rb	<0.001
Ag	<0.001	Ga	<0.001	Re	<0.001
B	<0.003	In	<0.001	Si	0.03
Ba	<0.001	K	0.022	Sr	0.003
Be	<0.001	Li	<0.001	Sb	0.003
Bi	<0.001	Mg	0.002	Ti	<0.001
Ca	0.09	Mn	0.003	Tl	<0.001
Cr	<0.002	Mo	0.004	V	0.004
Cd	<0.001	Na	0.08	Zr	0.002
Co	<0.001	Ni	<0.001	Zn	0.06

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: JUN - - 2004 Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 06/25/04
DATE EXPIRED: 06/30/2005 VOI
DATE OPENED: 06/28/04
INORG: 4619 PO: F53398

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Report of Certification 010409

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s = s^2 m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U = ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

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DATE RECEIVED: 07/29/04
DATE EXPIRED: 07/30/2005 VOL
DATE OPENED: 07/29/04
INORG: 4661 PO: F53417

SPEXertificate™

Certificate of Reference Material

010410

Catalog Number: PLW9-2X/2Y **Lot No.** 10-139W
Description: 1000 mg/L Tungsten
Matrix: H2O

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 1003 mg/L
Uncertainty Associated with Measurement: +/-3.0 mg/L
Certified Value is Traceable to: NIST SRM #3163

The CRM is prepared gravimetrically using high purity Ammonium Tungstate Lot# 02001H. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1004 mg/L

Method: Fume with Sulfuric acid to dryness. Ignite and weigh as WO3.

Instrumental Analysis by ICP spectrometer: 1002 mg/L

Uncertified Properties:

Density: 0.9998 @ 21.7 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.003	Cu	<0.001	Pb	<0.001
As	0.004	Fe	<0.01	Rb	<0.001
Ag	<0.001	Ga	<0.001	Re	0.003
B	<0.002	In	<0.001	Si	0.60
Ba	<0.001	K	0.13	Sr	<0.001
Be	<0.01	Li	<0.001	Sb	0.001
Bi	<0.001	Mg	<0.001	Ti	<0.001
Ca	0.006	Mn	<0.001	Tl	<0.001
Cr	<0.003	Mo	0.004	V	<0.003
Cd	<0.001	Na	0.03	Zr	<0.001
Co	<0.001	Ni	<0.001	Zn	0.01

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: 11 '04 Certifying Officer: N. Kocherlakota

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Report of Certification

010411

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s=s^2m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U=ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

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SPEX CertiPrep reference materials are not for any cosmetic, drug or household application and are to be used only by qualified individuals who are trained in appropriate procedures. No claims against SPEX CertiPrep, Inc. of any kind whatsoever, whether based on breach of warranty, alleged negligence, or otherwise, with respect to this RM shall be greater than the purchase price. In no event shall SPEX CertiPrep, Inc. be liable for any loss of profits or any incidental, special, or consequential damages.

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010412

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 2/28/05
DATE EXPIRED: 2/28/2006 DK
DATE OPENED: 2/28/05
INORG: S039 PO: F55148

SPEXertificate™

Certificate of Reference Material

Catalog Number: PLZR2-2X/2Y/2T **Lot No.** 11-69ZR

Description: 1000 mg/L Zirconium

Matrix: 2% HNO3

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 1004 mg/L

Uncertainty Associated with Measurement: +/- 3.0 mg/L

Certified Value is Traceable to: NIST SRM #3169

The CRM is prepared gravimetrically using high purity Zirconyl Nitrate Lot# 02041A. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1004 mg/L

Method: Fume with Sulfuric Acid to dryness. Ignite and weigh as ZrO2.

Instrumental Analysis by ICP spectrometer: 1004 mg/L

Uncertified Properties:

Density: 1.011 @ 22.6 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
As	<0.001	Cu	<0.001	Pb	<0.001
Ag	0.03	Fe	0.02	Re	<0.001
Al	0.004	Ga	<0.001	Rb	<0.001
Ba	<0.002	In	<0.001	Sb	<0.001
Be	<0.001	K	<0.20	Sr	<0.001
Bi	0.15	Li	<0.001	Si	<0.10
B	<0.004	Mn	<0.001	Tl	<0.001
Cr	<0.001	Mg	<0.001	Ti	<0.003
Cd	<0.001	Mo	<0.001	V	<0.001
Co	<0.002	Ni	<0.001	Zn	0.001
Ca	<0.001	Na	0.004		

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: FEB '05 Certifying Officer: N. Kocherlakota

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Report of Certification

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s=s^2m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U=ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

SPEX CertiPrep reference materials are not for any cosmetic, drug or household application and are to be used only by qualified individuals who are trained in appropriate procedures. No claims against SPEX CertiPrep, Inc. of any kind whatsoever, whether based on breach of warranty, alleged negligence, or otherwise, with respect to this RM shall be greater than the purchase price. In no event shall SPEX CertiPrep, Inc. be liable for any loss of profits or any incidental, special, or consequential damages.

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010414

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 1/31/05
DATE EXPIRED: 1/30/2006 DK
DATE OPENED: 1/31/05
INORG: 4998 PO: E55139

SPEXertificate™

Certificate of Reference Material

Catalog Number: PLNA2-3X/3Y **Lot No.** V9-56NA
Description: 10,000 mg/L Sodium
Matrix: 5% HNO3

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 9984 mg/L
Uncertainty Associated with Measurement: +/- 30.0 mg/L
Certified Value is Traceable to: NIST SRM # 3152a

The CRM is prepared gravimetrically using high purity Sodium Carbonate Lot# 05031C. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 9983 mg/L

Method: Evaporate to dryness. Fume with Sulfuric Acid. Ignite and weigh as Na2SO4.

Instrumental Analysis by ICP spectrometer: 9985 mg/L
Uncertified Properties:

Density: 1.048 @ 23.1 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	<0.001	Cu	0.01	Pb	0.009
As	<0.01	Fe	0.02	Re	<0.001
Ag	<0.02	Ga	<0.001	Rb	<0.001
B	<0.05	In	<0.001	Sr	<0.002
Ba	0.01	K	2.50	Sb	<0.001
Be	<0.009	Li	<0.002	Si	0.14
Bi	0.001	Mg	0.20	Ti	<0.02
Ca	0.75	Mn	0.001	Tl	<0.001
Cr	<0.02	Mo	<0.001	V	0.002
Cd	<0.001	Ni	<0.006	Zr	<0.01
Co	<0.001			Zn	0.02

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: JAN. -- 2005 Certifying Officer: N. Kochertakota

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010415

Report of Certification

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s = s^2 m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U = ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

SPEX CertiPrep reference materials are not for any cosmetic, drug or household application and are to be used only by qualified individuals who are trained in appropriate procedures. No claims against SPEX CertiPrep, Inc. of any kind whatsoever, whether based on breach of warranty, alleged negligence, or otherwise, with respect to this RM shall be greater than the purchase price. In no event shall SPEX CertiPrep, Inc. be liable for any loss of profits or any incidental, special, or consequential damages.

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010416

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 12/03/04
DATE EXPIRED: 11/30/2005 KKS
DATE OPENED: 12/03/04
INORG: 4909 PO: F55102

SPEXertificate™

Certificate of Reference Material

Catalog Number: ICV-2A **Lot No.:** 6-114MS
Description: **Initial Calibration Verification Standard II**
Matrix: 5% Nitric Acid

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

The CRM is prepared from high purity single element concentrates of individual elements using Class A laboratory ware to give precise concentration.

Instrumental Analysis by ICP Spectrometer:

Element	Labeled (mg/L)	Measured (mg/L)	NIST SRM	Element	Labeled (mg/L)	Measured (mg/L)	NIST SRM
Ca	2,000	1,995.81	3109a	Ni	500	499.54	3136
K	2,000	1,995.56	3141a	V	500	499.79	3165
Mg	2,000	1,995.61	3131a	Cr	200	199.97	3112a
Na	2,000	1,995.63	3152a	Cu	200	199.98	3114
Al	1,000	989.06	3101a	Ag	100	99.44	3151
Ba	1,000	999.68	3104a	Be	100	99.16	3105a
Fe	1,000	995.89	3126a	Mn	100	100.03	3132
Co	500	500.41	3113	Zn	100	100.06	3168a

Spex Reference Multi: Lot # 1-58GM, 15-37AS, 11-171AS REF

Balances are calibrated regularly with weight sets traceable to NIST#s 32856, 32867 and others. This CRM is guaranteed stable and accurate to +/- 0.5% on the average of all the certified concentrations with no single component exceeding +/- 2%. This guarantee is valid for a period of one year from the date of certification only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: NOV '04 Certifying Officer: N. Kocherlakota

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010417

Report of Certification

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s = s^2 m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
$X = x +/- U$ where X =True value (Labeled Value), U= Expanded uncertainty
$U = ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

SPEX CertiPrep reference materials are not for any cosmetic, drug or household application and are to be used only by qualified individuals who are trained in appropriate procedures. No claims against SPEX CertiPrep, Inc. of any kind whatsoever, whether based on breach of warranty, alleged negligence, or otherwise, with respect to this RM shall be greater than the purchase price. In no event shall SPEX CertiPrep, Inc. be liable for any loss of profits or any incidental, special, or consequential damages.

ISO 9001
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INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 12/09/04
DATE EXPIRED: 11/30/2005 WX
DATE OPENED: 12/09/04
INORG: 4911 PO: E55109

SPEXertificate™ 010418

Certificate of Reference Material

Catalog Number: PLSB7-2X/2Y/2T **Lot No.** 10-43SB
Description: 1000 mg/L Antimony
Matrix: H2O/0.6Tart.Acid/tr.HNO3

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 1004 mg/ L
Uncertainty Associated with Measurement: +/-3.0mg/L
Certified Value is Traceable to: NIST SRM 3102a

The CRM is prepared gravimetrically using high purity Antimony Metal Lot# 04021A. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1005 mg/L

Method: Evaporate to dryness. Fume with Nitric Acid. Ignite and weigh as Sb2O4.

Instrumental Analysis by ICP spectrometer: 1002 mg/ L

Uncertified Properties:

Density: 1.046 @ 25.5 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.03	Cu	0.002	Pb	0.009
As	<0.001	Fe	0.03	Rb	<0.001
Ag	<0.001	Ga	<0.001	Re	<0.001
B	<0.004	In	<0.001	Sr	<0.001
Ba	<0.001	K	0.01	Si	<0.01
Be	<0.001	Li	<0.001	Ti	<0.003
Bi	0.002	Mg	0.005	Tl	<0.001
Ca	0.14	Mn	<0.001	V	<0.001
Cr	<0.002	Mo	<0.001	Zr	<0.001
Cd	<0.001	Na	0.005	Zn	0.02
Co	<0.001	Ni	<0.001		

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: NOV '04 Certifying Officer: N. Kocherlakota

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Report of Certification

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

010419

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s = s^2 m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U = ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

SPEX CertiPrep reference materials are not for any cosmetic, drug or household application and are to be used only by qualified individuals who are trained in appropriate procedures. No claims against SPEX CertiPrep, Inc. of any kind whatsoever, whether based on breach of warranty, alleged negligence, or otherwise, with respect to this RM shall be greater than the purchase price. In no event shall SPEX CertiPrep, Inc. be liable for any loss of profits or any incidental, special, or consequential damages.

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SPEX CertiPrep
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DATE EXPIRED: 11/30/2005 WS
DATE OPENED: 12/02/04
INORG: 4910 PO: F55102

010420

SPEXertificate™

Certificate of Reference Material

Catalog Number: ICV-2C **Lot No.:** 6-146MS
Description: **Initial Calibration Verification Standard II**
Matrix: 5% Nitric Acid

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

The CRM is prepared from high purity single element concentrates of individual elements using Class A laboratory ware to give precise concentration.

Refer to side 2 for details of measurement uncertainties.

Instrumental Analysis by ICP Spectrometer:

Element	Labeled (mg/L)	Measured (mg/L)	NIST SRM
As	500	499.69	3103a
Pb	500	499.61	3128
Se	500	499.91	3149
TL	500	499.92	3158
Cd	100	99.90	3108

Spex Reference Multi: Lot #9-34AS, 11-173AS, 1-57GM, 15-39AS REF.

Balances are calibrated regularly with weight sets traceable to NIST#s 32856, 32867 and others. This CRM is guaranteed stable and accurate to +/- 0.5% on the average of all the certified concentrations with no single element exceeding +/- 2%. This includes uncertainty of measurements and other effects, such as transpiration losses. This guarantee is valid for a period of one year from the date of certification only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: NOV '04 Certifying Officer: N. Kocherlakota

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Report of Certification

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:

Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

010421

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.

The mathematical expression $k_s = s^2 m$ is employed to determine the sampling size

s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)

m = the sub-sampling mass

k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as

X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty

$U = ku_c$ where k=2 is the coverage factor at the 95% confidence level

u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

SPEX CertiPrep reference materials are not for any cosmetic, drug or household application and are to be used only by qualified individuals who are trained in appropriate procedures. No claims against SPEX CertiPrep, Inc. of any kind whatsoever, whether based on breach of warranty, alleged negligence, or otherwise, with respect to this RM shall be greater than the purchase price. In no event shall SPEX CertiPrep, Inc. be liable for any loss of profits or any incidental, special, or consequential damages.

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010422

inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **10000 µg/mL Aluminum in 5% (abs) HNO_3**

Catalog Number:	CGAL10-1 and CGAL10-5
Lot Number:	**X-AL04016**
Starting Material:	Al metal
Starting Material Purity (%):	99.996430
Starting Material Lot No	607116
Matrix:	5% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS pg 1 of 2
DATE RECEIVED: 09/01/04
DATE EXPIRED: 10/01/2005 WOS
DATE OPENED: 09/01/04
INORG: 4762 PO: F53434

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 10,020 ± 40 µg/mL

Certified Density: 1.070 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value ($\bar{x}$) = $\frac{\Sigma x_i}{n}$

Uncertainty (±) = $\frac{2[(\Sigma s_i)^2]^{1/2}}{(n)^{1/2}}$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
Σs_i = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

"Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported. taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **10,020 ± 40 µg/mL**
ICP Assay NIST SRM 3101a Lot Number: 010808

Assay Method #2 **10,043 ± 87 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

s	Al		M	Dy	< 0.02419	O	Li	0.00166	M	Pr	< 0.00121	M	Te	< 0.12095
M	Sb	< 0.00202	M	Er	< 0.02016	M	Lu	< 0.00161	M	Re	< 0.00403	M	Tb	< 0.00121
M	As	< 0.04032	M	Eu	< 0.01210	O	Mg	0.00685	M	Rh	< 0.00403	M	Tl	< 0.00403
M	Ba	< 0.04032	M	Gd	< 0.00403	M	Mn	< 0.01613	M	Rb	< 0.00403	M	Th	< 0.00403
O	Be	< 0.00017	M	Ga	< 0.00403	O	Hg	< 0.00700	M	Ru	< 0.00806	M	Tm	< 0.00161
M	Bi	< 0.00161	M	Ge	< 0.02419	M	Mo	< 0.00806	M	Sm	< 0.00403	M	Sn	< 0.02016
O	B	0.00975	M	Au	< 0.01210	M	Nd	< 0.00806	M	Sc	< 0.04032	O	Ti	0.00705
M	Cd	< 0.01210	M	Hf	< 0.00806	O	Ni	< 0.00600	M	Se	< 0.03225	M	W	< 0.04032
O	Ca	0.10166	M	Ho	< 0.00202	M	Nb	< 0.00202	O	Si	0.07884	M	U	< 0.00806
M	Ce	< 0.02016	O	In	< 0.03000	n	Os		M	Ag	< 0.00806	M	V	< 0.00806
M	Cs	< 0.00121	M	Ir	< 0.02016	M	Pd	< 0.02016	O	Na	0.06639	M	Yb	< 0.00403
O	Cr	0.00581	O	Fe	0.00954	O	P	< 0.03000	M	Sr	< 0.00202	M	Y	< 0.16126
M	Co	< 0.01210	M	La	< 0.00202	M	Pt	< 0.00806	O	S	< 0.10000	O	Zn	0.07676
M	Cu	< 0.02419	M	Pb	< 0.01210	O	K	0.01992	M	Ta	< 0.02822	M	Zr	< 0.02016

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 26.98154; +3; 6; $Al(H_2O)_6^{+3}$

Chemical Compatibility - Soluble in HCl, HNO_3, HF and H_2SO_4. Avoid neutral media. Soluble in strongly basic NaOH forming the $Al(OH)_4(H_2O)_2^-$ species. Stable with most metals and inorganic anions. The phosphate is insoluble in water and only slightly soluble in acid.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 2-5% HNO_3 / LDPE container.

Al Containing Samples (Preparation and Solution) - Metal (Best dissolved in HCl / HNO_3); α- Al_2O_3 (Na_2CO_3 fusion in Pt[a]); γ- Al_2O_3 (Soluble in acids such as HCl); Ores (Carbonate fusion in Pt[a] followed by HCl dissolution); Organic Matrices (sulfuric/peroxide digestion or nitric / sulfuric / perchloric acid decomposition, or dry ash and dissolution in dilute HCl.

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ conc.)
ICP-OES 394.401 nm	0.05 / 0.006 µg/mL	1	atom	U, Ce
ICP-OES 396.152 nm	0.03 / 0.006 µg/mL	1	atom	Mo, Zr, Ce
ICP-OES 167.078 nm	0.1 / 0.009 µg/mL	1	ion	Fe
ICP-MS 27 amu	30 ppt	n/a	M[+]	$^{12}C^{15}N$, $^{13}C^{14}N$, $^{1}H^{12}C^{14}N$, $^{11}B^{16}O$, $^{54}Cr^{2+}$, $^{54}Fe^{2+}$

8.0 HAZARDOUS INFORMATION - *Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.*

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

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DATE RECEIVED: 09/01/04
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010425

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 **IV Shelf Life** - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 **Expiration Date** - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: January 23, 2004

Expiration Date:

EXPIRES
1 2 2005

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010426

inorganic ventures / iv labs

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certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **10000 µg/mL Calcium in 1.4% (abs) HNO_3**

Catalog Number:	CGCA10-1, CGCA10-2, and CGCA10-5
Lot Number:	**X-CA03030**
Starting Material:	CaO
Starting Material Purity (%):	99.999155
Starting Material Lot No	C27L01
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/27/05 DR
DATE EXPIRED: 3/1/06
DATE OPENED: 11/28/05
INORG: 4988 PO: E55133

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 10,035 ± 24 µg/mL

Certified Density: 1.037 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value $(\bar{x}) = \frac{\sum x_i}{n}$

Uncertainty $(\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum S$ = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **10,035 ± 24 µg/mL**
EDTA NIST SRM 928 Lot Number: 392110

Assay Method #2 **10,046 ± 65 µg/mL**
ICP Assay NIST SRM 3109a Lot Number: 000622

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4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	0.00069	M	Dy	< 0.04098	O	Li	< 0.00002	M	Pr	< 0.00205	M	Te	< 0.20492
M	Sb	< 0.00342	M	Er	< 0.03415	M	Lu	< 0.00273	M	Re	< 0.00683	M	Tb	< 0.00205
M	As	< 0.06831	M	Eu	< 0.02049	O	Mg	0.05295	M	Rh	< 0.00683	M	Tl	< 0.00683
O	Ba	0.00065	M	Gd	< 0.00683	O	Mn	0.00038	M	Rb	< 0.00683	M	Th	< 0.00683
O	Be	< 0.00009	M	Ga	< 0.00683	O	Hg	< 0.01100	M	Ru	< 0.01366	M	Tm	< 0.00273
M	Bi	< 0.00273	M	Ge	< 0.04098	M	Mo	< 0.01366	M	Sm	< 0.00683	M	Sn	< 0.03415
O	B	< 0.00054	M	Au	< 0.02049	M	Nd	< 0.01366	O	Sc	< 0.00002	M	Ti	< 0.34153
O	Cd	< 0.00450	M	Hf	< 0.01366	O	Ni	< 0.00230	O	Se	< 0.00620	M	W	< 0.06831
s	Ca		M	Ho	< 0.00342	M	Nb	< 0.00342	O	Si	0.00132	M	U	< 0.01366
M	Ce	< 0.03415	O	In	< 0.00200	n	Os		M	Ag	< 0.01366	O	V	< 0.00090
M	Cs	< 0.00205	M	Ir	< 0.03415	M	Pd	< 0.03415	O	Na	0.01000	M	Yb	< 0.00683
O	Cr	0.00103	O	Fe	< 0.00110	O	P	< 0.00480	O	Sr	0.03530	M	Y	< 0.27323
O	Co	< 0.00120	M	La	< 0.00342	M	Pt	< 0.01366	O	S	0.00412	O	Zn	0.02353
O	Cu	< 0.00400	M	Pb	< 0.02049	O	K	< 0.00170	M	Ta	< 0.04782	M	Zr	< 0.03415

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

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7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 40.078; +2; 6; $Ca(H_2O)_6^{2+}$

Chemical Compatibility - Soluble in HCl and HNO_3. Avoid H_2SO_4, HF, H_3PO_4 and neutral to basic media. Stable with most metals and inorganic anions forming insoluble silicate, carbonate, hydroxide, oxide, fluoride, sulfate, oxalate, chromate, arsenate and tungstate in neutral aqueous media.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-10% HNO_3 / LDPE container.

Ca Containing Samples (Preparation and Solution) - Metal (best dissolved in diluted HNO_3); Ores (Carbonate fusion in Pt* followed by HCl dissolution); Organic Matrices (dry ash and dissolution in dilute HCl. Do not heat when dissolving to avoid precipitation of SiO_2) .The oxide, hydroxide, carbonate, phosphate, and fluoride of calcium are soluble in % levels of HCl or HNO_3. The sulfates (gypsum, anhydrite, etc.), certain silicates and complex compounds require fusion with Na_2CO_3 followed by HCl / water dissolution. Contamination is a very real problem when analyzing for trace levels.

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at= concs.)
ICP-OES	393.366 nm	0.0002 / 0.00004 µg/mL	1	ion	U, Ce
ICP-OES	396.847 nm	0.0005 / 0.00006 µg/mL	1	ion	Th
ICP-OES	422.673 nm	0.01 / 0.001 µg/mL	1	atom	Ge
ICP-MS	44 amu	1200 ppt	n/a	M+	$^{16}O_2$, ^{12}C, $^{28}Si^{16}O$, $^{44}Sr^{2+}$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105

Recognized by:

Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)

Members of IQ Net International Certification Network:

Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:

Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

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11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: September 20, 2004

Expiration Date: EXPIRES 1 FEB 2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Nick Malda, QA Administrator	Nicholas Malda
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **10000 µg/mL Iron in 4.8% (abs) HNO_3**

Catalog Number:	CGFE10-1, CGFE10-2, and CGFE10-5
Lot Number:	**X-FE03041**
Starting Material:	Fe metal
Starting Material Purity (%):	99.998667
Starting Material Lot No	23387
Matrix:	4.8% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 2/28/05
DATE EXPIRED: 3/1/2006 DR
DATE OPENED: 2/28/05
INORG: 5048 PO: F55148

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 10,041 ± 21 µg/mL

Certified Density: 1.061 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n}$$

$$\text{Uncertainty } (\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum S$ = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

- "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)
- This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **10,041 ± 21 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

Assay Method #2 **10,017 ± 40 µg/mL**
ICP Assay NIST SRM 3126a Lot Number: 000606

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4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	< 0.00270	M	Dy	< 0.02528	O	Li	< 0.00003	M	Pr	< 0.00126	M	Te	< 0.12640
M	Sb	< 0.00211	M	Er	< 0.02107	M	Lu	< 0.00169	M	Re	< 0.00421	M	Tb	< 0.00126
M	As	< 0.04213	M	Eu	< 0.01264	O	Mg	< 0.00006	M	Rh	< 0.00421	M	Tl	< 0.00421
M	Ba	< 0.04213	M	Gd	< 0.00421	O	Mn	< 0.05000	M	Rb	< 0.00421	M	Th	< 0.00421
O	Be	< 0.00005	M	Ga	< 0.00421	O	Hg	< 0.01100	M	Ru	< 0.00843	M	Tm	< 0.00169
M	Bi	< 0.00169	I	Ge		M	Mo	< 0.00843	M	Sm	< 0.00421	M	Sn	< 0.02107
O	B	< 0.00090	M	Au	< 0.01264	M	Nd	< 0.00843	M	Sc	< 0.04213	M	Ti	< 0.21066
M	Cd	< 0.01264	M	Hf	< 0.00843	O	Ni	< 0.00230	M	Se	< 0.03371	M	W	< 0.04213
O	Ca	0.03107	M	Ho	< 0.00211	M	Nb	< 0.00211	O	Si	0.01673	M	U	< 0.00843
M	Ce	< 0.02107	M	In	< 0.04213	n	Os		M	Ag	< 0.00843	M	V	< 0.00843
M	Cs	< 0.00126	M	Ir	< 0.02107	M	Pd	< 0.02107	O	Na	0.00956	M	Yb	< 0.00421
M	Cr	< 0.02107	s	Fe		I	P		M	Sr	< 0.00211	M	Y	< 0.16853
O	Co	0.01195	M	La	< 0.00211	M	Pt	< 0.00843	O	S	< 0.07200	M	Zn	0.08761
M	Cu	< 0.02528	M	Pb	< 0.01264	O	K	0.00239	M	Ta	< 0.02949	M	Zr	< 0.02107

M - Checked by ICP-MS O - Checked by ICP-OES I - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

010432

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 55.847; +3; 6; $Fe(H_2O)_6^{3+}$

Chemical Compatibility - Stable in HCl, HNO_3, H_2SO_4, HF and H_3PO_4. Avoid basic media. Stable with most metals and inorganic anions in acidic media.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO_3 / LDPE container.

Fe Containing Samples (Preparation and Solution) - Metal (Soluble in HCl); Oxides (If the oxide has been at a high temperature then Na_2CO_3 fusion in Pt° followed by HCl dissolution otherwise dissolve in dilute HCl); Ores (See Oxides above using only the fusion approach).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES	238.204 nm	0.005 / 0.001 µg/mL	1	ion	Ru, Co
ICP-OES	239.562 nm	0.005 / 0.001 µg/mL	1	ion	Co, W, Cr
ICP-OES	259.940 nm	0.006 / 0.001 µg/mL	1	ion	Hf, Nb
ICP-MS	56 amu	970 ppt	n/a	M⁺	$^{40}Ar^{14}N^{1}H$, $^{40}Ar^{16}O$, $^{38}Ar^{17}O^{1}H$, $^{38}Ar^{18}O$, $^{37}Cl^{18}O^{1}H$, $^{40}Ca^{16}O$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105

Recognized by:

Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)

Members of IQ Net International Certification Network:

Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter), Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:

Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

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11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: July 22, 2004

Expiration Date: EXPIRES 1 MAR 2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Nick Malda, QA Administrator	Nicholas Malda
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **10000 µg/mL Potassium in 1.4% (abs) HNO_3**

Catalog Number:	CGK10-1, CGK10-2, and CGK10-5
Lot Number:	**X-K02116**
Starting Material:	KNO3
Starting Material Purity (%):	99.996753
Starting Material Lot No	K18J19
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 12/02/04
DATE EXPIRED: 12/01/2005 v05
DATE OPENED: 12/02/04
INORG: 4907 PO: F55102

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 9957 ± 28 µg/mL

Certified Density: 1.023 g/mL (measured at 22° C)

The Certified Value is the instrument analysis value. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value $(\bar{x}) = \frac{\sum x_i}{n}$

Uncertainty $(\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum S$ = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **10,011 ± 16 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

Assay Method #2 **9957 ± 28 µg/mL**
ICP Assay NIST SRM 3141a Lot Number: 891312

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001. Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	< 0.00090	M	Dy	< 0.02426	O	Li	< 0.00003	M	Pr	< 0.00121	M	Te	< 0.12131
M	Sb	< 0.00202	M	Er	< 0.02022	M	Lu	< 0.00162	M	Re	< 0.00404	M	Tb	< 0.00121
M	As	< 0.04044	M	Eu	< 0.01213	O	Mg	0.00109	M	Rh	< 0.00404	M	Tl	< 0.00404
M	Ba	< 0.04044	M	Gd	< 0.00404	O	Mn	< 0.00003	M	Rb	0.63001	M	Th	< 0.00404
O	Be	< 0.00020	M	Ga	< 0.00404	O	Hg	< 0.01500	M	Ru	< 0.00809	M	Tm	< 0.00162
M	Bi	< 0.00162	O	Ge	< 0.00150	M	Mo	< 0.00809	M	Sm	< 0.00404	M	Sn	< 0.02022
O	B	< 0.00060	O	Au	< 0.00300	M	Nd	< 0.00809	O	Sc	< 0.00002	O	Ti	< 0.00070
M	Cd	< 0.01213	M	Hf	< 0.00809	O	Ni	< 0.00230	O	Se	< 0.05000	M	W	< 0.04044
O	Ca	0.01360	M	Ho	< 0.00202	M	Nb	< 0.00202	O	Si	< 0.00340	M	U	< 0.00809
M	Ce	< 0.02022	M	In	< 0.04044	n	Os		M	Ag	< 0.00809	O	V	< 0.00090
M	Cs	0.00050	M	Ir	< 0.02022	M	Pd	< 0.02022	O	Na	0.19537	M	Yb	< 0.00404
M	Cr	< 0.02022	O	Fe	0.00297	O	P	< 0.00250	M	Sr	< 0.00202	M	Y	< 0.16175
M	Co	< 0.01213	M	La	< 0.00202	M	Pt	< 0.00809	O	S	< 0.07200	O	Zn	< 0.00020
M	Cu	< 0.02426	M	Pb	< 0.01213	S	K		M	Ta	< 0.02831	M	Zr	< 0.02022

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 29.0983; +1; (6); K^+(aq)
(Coordination Number in parentheses is assumed, not certain.)

Chemical Compatibility - Soluble in HCl, HNO_3, H_2SO_4 and HF aqueous matrices. Avoid use of $HClO_4$ due to insolubility of the perchlorate. Stable with all metals and inorganic anions except ClO_4^-.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO_3 / LDPE container.

K Containing Samples (Preparation and Solution) - Metal (Dissolves very rapidly in water); Ores (Sodium carbonate fusion in Pt° followed by HCl dissolution-blank levels of K in sodium carbonate critical); Organic Matrices (Sulfuric/peroxide digestion)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES 766.490 nm	0.4 / 0.001 µg/mL	1	atom	2nd order radiation from R.E.s on some optical designs
ICP-OES 771.531 nm	1.0 / 0.03 µg/mL	1	atom	2nd order radiation from R.E.s on some optical designs
ICP-OES 404.721 nm	1.1 / 0.05 µg/mL	1	atom	U, Ce,
ICP-MS 39 amu	10 ppt	n/a	M+	$^{37}ArH^+$, $^{23}Na^{16}O^+$, $^{78}Se^{++}$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

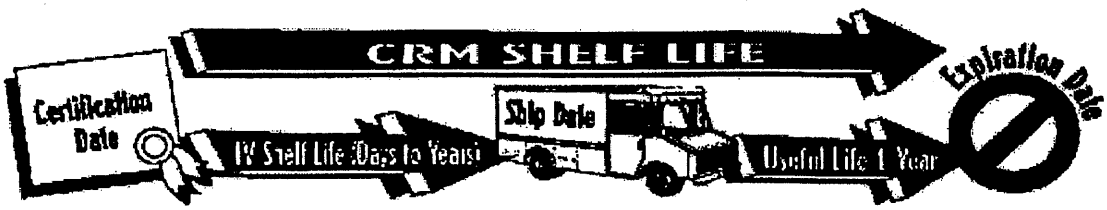
10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: March 30, 2004

Expiration Date:

EXPIRES
12/2005

INORGANIC LABS/RADCHEM LABS Pg 2 of 2
DATE RECEIVED: 12/02/04
DATE EXPIRED: 12/01/2005 vgs
DATE OPENED: 12/02/04
INORG: 4907 PO: F55102

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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inorganic ventures / iv labs

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phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **10000 µg/mL Magnesium in 1.4% (abs) HNO_3**

Catalog Number:	CGMG10-1, CGMG10-2, and CGMG10-5
Lot Number:	**X-MG03018**
Starting Material:	Mg metal
Starting Material Purity (%):	99.994984
Starting Material Lot No	91191
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 07/29/04
DATE EXPIRED: 08/01/2005 V03
DATE OPENED: 07/29/04
INORG: 4656 PO: F53417

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 10,039 ± 31 µg/mL

Certified Density: 1.051 g/mL (measured at 22° C)

The Certified Value is the instrument analysis value. The following equations are used in the calculation of the certified value and the uncertainty:

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n}$$

$$\text{Uncertainty } (\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum s_i$ = The summation of all significant estimated errors (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **10,039 ± 31 µg/mL**
ICP Assay NIST SRM 3131a Lot Number: 991107

Assay Method #2 **10,079 ± 21 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	0.04714	M	Dy	< 0.03601	O	Li	0.00623	M	Pr	< 0.00180	M	Te	< 0.18002
M	Sb	< 0.00300	M	Er	< 0.03000	M	Lu	< 0.00240	M	Re	< 0.00600	M	Tb	< 0.00180
M	As	< 0.06001	M	Eu	< 0.01800	s	Mg		M	Rh	< 0.00600	M	Tl	< 0.00600
M	Ba	< 0.06001	M	Gd	< 0.00600	O	Mn	0.07408	M	Rb	< 0.00600	M	Th	< 0.00600
O	Be	< 0.00017	M	Ga	< 0.00600	O	Hg	< 0.00900	M	Ru	< 0.01200	M	Tm	< 0.00240
M	Bi	< 0.00240	M	Ge	< 0.03601	M	Mo	< 0.01200	M	Sm	< 0.00600	M	Sn	< 0.03000
O	B	0.00303	M	Au	< 0.01800	M	Nd	< 0.01200	M	Sc	< 0.06001	O	Ti	0.09765
M	Cd	< 0.01800	M	Hf	< 0.01200	O	Ni	0.01229	M	Se	< 0.04801	M	W	< 0.06001
O	Ca	0.14984	M	Ho	< 0.00300	M	Nb	< 0.00300	O	Si	0.02357	M	U	< 0.01200
M	Ce	< 0.03000	M	In	< 0.06001	n	Os		M	Ag	< 0.01200	M	V	< 0.01200
M	Cs	< 0.00180	M	Ir	< 0.03000	M	Pd	< 0.03000	O	Na	0.02189	M	Yb	< 0.00600
O	Cr	0.02189	O	Fe	0.03704	O	P	< 0.01600	M	Sr	< 0.00300	M	Y	0.02021
M	Co	< 0.01800	M	La	< 0.00300	M	Pt	< 0.01200	n	S		O	Zn	0.00572
O	Cu	0.00674	O	Pb	0.02694	O	K	< 0.05000	M	Ta	< 0.04201	M	Zr	< 0.03000

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 24.305; +2; 6; $Mg(H_2O)_6^{+2}$

Chemical Compatibility - Soluble in HCl, HNO_3, and H_2SO_4 avoid HF, H_3PO_4 and neutral to basic media. Stable with most metals and inorganic anions forming insoluble silicates, carbonates, hydroxides, oxides, and tungstates in neutral and slightly acidic media.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-10% HNO_3 / LDPE container.

Mg Containing Samples (Preparation and Solution) - Metal (Best dissolved in diluted HNO_3); Oxide (Readily soluble in above compatible aqueous acidic solutions); Ores (Carbonate fusion in Pt^0 followed by HCl dissolution); Organic Matrices (Sulfuric / peroxide digestion or nitric / sulfuric / perchloric acid decomposition, or dry ash and dissolution in dilute HCl).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES	279.553 nm	0.0002 / 0.00003 µg/mL	1	ion	Th
ICP-OES	280.270 nm	0.0003 / 0.00005 µg/mL	1	ion	U, V
ICP-OES	285.213 nm	0.002 / 0.00003 µg/mL	1	atom	U, Hf, Cr, Zr
ICP-MS	24 amu	42 ppt	n/a	M'	$^{7}Li^{16}O$, $^{48}Ti^{+2}$, $^{48}Ca^{+2}$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105

Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)

Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter), Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

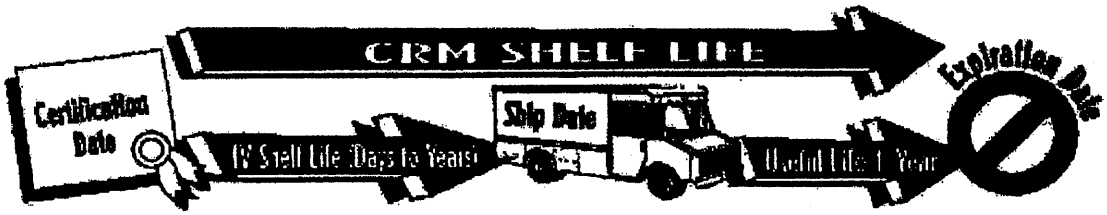
10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 07/29/04
DATE EXPIRED: 08/01/2005 VPJ
DATE OPENED: 07/29/04
INORG: 4656 PO: F53417

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: April 15, 2004

Expiration Date: EXPIRES 1/2005

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010442

inorganic ventures / iv labs

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phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 DESCRIPTION OF CRM

Custom-Grade **10000 µg/mL Sodium in 1.4% (abs) HNO_3**

Catalog Number:	CGNA10-1, CGNA10-2, and CGNA10-5
Lot Number:	**W-NA03010**
Starting Material:	Na_2CO_3
Starting Material Purity (%):	99.999819
Starting Material Lot No	42063
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS PG. 1 of 2
DATE RECEIVED: 07/29/04
DATE EXPIRED: 08/01/2005 WO
DATE OPENED: 07/29/04
INORG: 4657 PO: F53417

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 10,006 ± 6 µg/mL

Certified Density: 1.032 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value ($\bar{x}$) = $\frac{\Sigma x_i}{n}$

Uncertainty (±) = $\frac{2[(\Sigma s_i)^2]^{1/2}}{(n)^{1/2}}$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
Σs = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **10,006 ± 6 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

Assay Method #2 **10,019 ± 33 µg/mL**
ICP Assay NIST SRM 3152a Lot Number: 990907

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O Al < 0.00090	M Dy < 0.00600	O Li < 0.00003	M Pr < 0.00030	M Te < 0.02998
M Sb < 0.00050	M Er < 0.00500	M Lu < 0.00040	M Re < 0.00100	M Tb < 0.00030
M As < 0.00999	M Eu < 0.00300	O Mg 0.00010	M Rh < 0.00100	M Tl < 0.00100
M Ba < 0.00999	M Gd < 0.00100	O Mn < 0.00003	M Rb < 0.00100	M Th < 0.00100
O Be < 0.00020	M Ga < 0.00100	O Hg < 0.01500	M Ru < 0.00200	M Tm < 0.00040
M Bi < 0.00040	O Ge < 0.00150	M Mo < 0.00200	M Sm < 0.00100	M Sn < 0.00500
O B < 0.00060	O Au < 0.00300	M Nd < 0.00200	O Sc < 0.00002	O Ti < 0.00070
M Cd < 0.00300	M Hf < 0.00200	O Ni < 0.00230	O Se < 0.05000	M W < 0.00999
O Ca 0.00050	M Ho < 0.00050	M Nb < 0.00050	O Si < 0.00340	M U < 0.00200
M Ce < 0.00500	M In < 0.00999	n Os	M Ag < 0.00200	O V < 0.00090
M Cs < 0.00030	M Ir < 0.00500	M Pd < 0.00500	S Na	M Yb < 0.00100
M Cr < 0.00500	O Fe < 0.00110	O P < 0.04000	M Sr < 0.00050	M Y < 0.03997
M Co < 0.00300	M La < 0.00050	M Pt < 0.00200	O S < 0.07200	O Zn 0.00250
O Cu < 0.00140	M Pb < 0.00300	O K 0.04000	M Ta < 0.00700	M Zr < 0.00500

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 22.98977; +1; (6); Na^{+}(aq) largely ionic in nature (Coordination Number in parentheses is assumed, not certain.)

Chemical Compatibility - Soluble in HCl, HNO_3, H_2SO_4 and HF aqueous matrices. Stable with all metals and inorganic anions.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO_3 / LDPE container.

Na Containing Samples (Preparation and Solution) - Metal (Dissolves very rapidly in water); Ores (Lithium carbonate fusion in graphite crucible followed by HCl dissolution - blank levels of Na in lithium carbonate critical); Organic Matrices (Sulfuric / peroxide digestion or nitric/sulfuric/perchloric acid decomposition).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ppbncs.)
ICP-OES	589.595 nm	0.07 / 0.00009 µg/mL	1	atom	2nd order radiation from R.E.s on some optical designs
ICP-OES	588.995 nm	0.03 / 0.006 µg/mL	1	atom	2nd order radiation from R.E.s on some optical designs
ICP-OES	330.237 nm	2.0 / 0.09 µg/mL	1	atom	Pd, Zn
ICP-MS	23 amu	310 ppt	n/a	M'	$^{46}Ti^{+2}$, $^{46}Ca^{+2}$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

010444

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: October 27, 2003

Expiration Date:

EXPIRES
1 2 2005

INORGANIC LABS/RADCHEM LABS pg. 2 of 2
DATE RECEIVED: 07/29/04
DATE EXPIRED: 08/01/2005 VOS
DATE OPENED: 07/29/04
INORG: 4657 PO: E53417

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Supervisor	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010446

inorganic ventures / iv labs

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e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Lithium in 0.1% (abs) HNO_3**

Catalog Number:	CGLI1-1 and CGLI1-5
Lot Number:	**W-LI02073**
Starting Material:	Li_2CO_3
Starting Material Purity (%):	99.997165
Starting Material Lot No	1123
Matrix:	0.1% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 07/01/04
DATE EXPIRED: 08/01/2005 VOJ
DATE OPENED: 07/01/04
INORG: 4628 PO: F53406

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 995 ± 2 µg/mL

Certified Density: 1.004 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value ($\bar{x}$) = $\frac{\Sigma x_i}{n}$

Uncertainty (±) = $\frac{2[(\Sigma s_i)^2]^{1/2}}{(n)^{1/2}}$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
Σs_i = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **995 ± 2 µg/mL**
ICP Assay NIST SRM 3129a Lot Number: 000505

Assay Method #2 **995 ± 6 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al		0.00120	M	Dy	<	0.01199	S	Li			M	Pr	<	0.00060	M	Te	<	0.05994
M	Sb	<	0.00100	M	Er	<	0.00999	M	Lu	<	0.00080	M	Re	<	0.00200	M	Tb	<	0.00060
M	As	<	0.01998	M	Eu	<	0.00599	O	Mg		0.00650	M	Rh	<	0.00200	M	Tl	<	0.00200
M	Ba	<	0.01998	M	Gd	<	0.00200	O	Mn		0.00006	M	Rb	<	0.00200	M	Th	<	0.00200
O	Be	<	0.00020	M	Ga	<	0.00200	O	Hg	<	0.01500	M	Ru	<	0.00400	M	Tm	<	0.00080
M	Bi	<	0.00080	M	Ge	<	0.01199	M	Mo	<	0.00400	M	Sm	<	0.00200	O	Sn	<	0.00600
O	B		0.00020	M	Au	<	0.00599	M	Nd	<	0.00400	M	Sc	<	0.01998	O	Ti	<	0.00070
M	Cd	<	0.00599	M	Hf	<	0.00400	O	Ni	<	0.00230	M	Se	<	0.01598	O	W	<	0.00400
O	Ca		0.04050	M	Ho	<	0.00100	M	Nb	<	0.00100	O	Si		0.04650	M	U	<	0.00400
M	Ce	<	0.00999	O	In	<	0.00400	n	Os			M	Ag	<	0.00400	O	V		0.00009
M	Cs	<	0.00060	M	Ir	<	0.00999	M	Pd	<	0.00999	O	Na		0.03200	M	Yb	<	0.00200
M	Cr	<	0.00999	O	Fe		0.00200	O	P	<	0.00250	O	Sr		0.00026	M	Y	<	0.07992
M	Co	<	0.00599	M	La	<	0.00100	M	Pt	<	0.00400	O	S		0.01250	O	Zn		0.00145
O	Cu		0.00100	M	Pb	<	0.00599	O	K		0.00950	M	Ta	<	0.01399	M	Zr	<	0.00999

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

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7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 6.941; +1; (6); $Li^{+}(aq)$ large effective radius due to hydration sphere (Coordination Number in parentheses is assumed, not certain.)

Chemical Compatibility - Soluble in HCl, HNO_3, H_2SO_4 and HF aqueous matrices. Stable with all metals and inorganic anions.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO_3 / LDPE container.

Li Containing Samples (Preparation and Solution) - Metal (Dissolves very rapidly in water); Ores (Sodium carbonate fusion in Pt° followed by HCl dissolution-blank levels of Li in sodium carbonate critical); Organic Matrices (Sulfuric / peroxide digestion or nitric / sulfuric / perchloric acid decomposition).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≤10ppm.)
ICP-OES 670.784 nm	0.002 / 0.00002 µg/mL	1	atom	2nd order radiation from R.E.s on some optical designs
ICP-OES 460.286 nm	0.9 / 0.04 µg/mL	1	atom	Zr, Th
ICP-OES 323.261 nm	1.1 / 0.05 µg/mL	1	atom	Sb, Th, Ni
ICP-MS 7 amu	10 ppt		n/a	M+

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter), Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 07/01/04
DATE EXPIRED: 08/01/2005 v03
DATE OPENED: 07/01/04
INORG: 4628 PO: F53406

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: August 12, 2003

Expiration Date: EXPIRES 01/2005

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Supervisor	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010450

inorganic ventures / iv labs

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phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Barium in 0.1% (abs) HNO_3**

Catalog Number:	CGBA1-1, CGBA1-2, and CGBA1-5
Lot Number:	**X-BA02027**
Starting Material:	Ba(NO3)2
Starting Material Purity (%):	99.999730
Starting Material Lot No	21879
Matrix:	0.1% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 2/18/05
DATE EXPIRED: 3/1/2006 DR
DATE OPENED: 2/18/05
INORG: 5027 PO: F55142

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 1002 ± 3 µg/mL

Certified Density: 0.999 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value $(\bar{x}) = \frac{\sum x_i}{n}$

Uncertainty $(\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum S$ = The summation of all significant estimated errors (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1002 ± 3 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

Assay Method #2 **996 ± 4 µg/mL**
ICP Assay NIST SRM 3104a Lot Number: 992907

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4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	0.00011	M	Dy	< 0.01269	O	Li	< 0.00400	M	Pr	< 0.00063	M	Te	< 0.06343
M	Sb	< 0.00106	M	Er	< 0.01057	M	Lu	< 0.00085	M	Re	< 0.00211	O	Tb	< 0.00390
M	As	< 0.02114	O	Eu	< 0.00040	O	Mg	0.00009	M	Rh	< 0.00211	M	Tl	< 0.00211
s	Ba		O	Gd	< 0.00052	M	Mn	< 0.00846	M	Rb	< 0.00211	M	Th	< 0.00211
M	Be	< 0.00106	M	Ga	< 0.00211	O	Hg	< 0.01200	M	Ru	< 0.00423	M	Tm	< 0.00085
M	Bi	< 0.00085	M	Ge	< 0.01269	M	Mo	< 0.00423	O	Sm	< 0.00071	M	Sn	< 0.01057
M	B	< 0.14800	M	Au	< 0.00634	O	Nd	< 0.00330	M	Sc	< 0.02114	M	Ti	< 0.10571
M	Cd	< 0.00634	M	Hf	< 0.00423	M	Ni	< 0.01691	M	Se	< 0.01691	M	W	< 0.02114
O	Ca	0.00072	M	Ho	< 0.00106	M	Nb	< 0.00106	O	Si	< 0.00340	M	U	< 0.00423
M	Ce	< 0.01057	M	In	< 0.02114	n	Os		M	Ag	< 0.00423	M	V	< 0.00423
M	Cs	< 0.00063	M	Ir	< 0.01057	M	Pd	< 0.01057	M	Na	< 0.21142	M	Yb	< 0.00211
M	Cr	< 0.01057	O	Fe	0.00062	O	P	< 0.00260	O	Sr	0.00379	O	Y	0.00040
M	Co	< 0.00634	M	La	< 0.00106	M	Pt	< 0.00423	O	S	< 0.02500	O	Zn	< 0.00039
M	Cu	< 0.01269	M	Pb	0.00020	O	K	< 0.00180	O	Ta	< 0.00690	M	Zr	< 0.01057

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

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7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 137.33; +2; 6; $Ba(H_2O)_6^{+2}$

Chemical Compatibility - Soluble in HCl, and HNO_3. Avoid H_2SO_4, HF and neutral to basic media. Stable with most metals and inorganic anions forming insoluble silicate, carbonate, hydroxide, oxide, fluoride, sulfate, oxalate, chromate, arsenate, iodate, molybdate, sulfite and tungstate in neutral aqueous media.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1 -10,000 ppm solutions chemically stable for years in 1-3.5% HNO_3 / LDPE container.

Ba Containing Samples (Preparation and Solution) - Metal(is best dissolved in diluted HNO_3); Ores(Carbonate fusion in Pt[a] followed by HCl dissolution. If sulfate is present dissolve the fuseate using HCl /tartaric acid to prevent $BaSO_4$ precipitate); Organic Matrices (dry ash and dissolve in dilute HCl.)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES	455.403 nm	0.002 / 0.0001 µg/mL	1	ion	Zr, U
ICP-OES	233.527 nm	0.004 / 0.0003 µg/mL	1	ion	
ICP-OES	230.424 nm	0.004 / 0.0005 µg/mL	1	ion	Mo, Ir, Co
ICP-MS	138 amu	1 ppt	n/a	M[+]	$^{122}Sn^{16}O$, $^{122}Te^{16}O$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

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11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: May 05, 2004

Expiration Date:

EXPIRES
1 2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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010454

inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Beryllium in 2% (abs) HNO_3**

Catalog Number:	CGBE1-1, CGBE1-2, and CGBE1-5
Lot Number:	**W-BE01104**
Starting Material:	Be(OOCCH3)2
Starting Material Purity (%):	99.999897
Starting Material Lot No	01-10-01
Matrix:	2% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS pg 1 of 2
DATE RECEIVED: 06/01/04
DATE EXPIRED: 06/01/2005 VOS
DATE OPENED: 06/01/04
INORG: 4592 PO: F53393

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 1007 ± 4 µg/mL

Certified Density: 1.023 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value ($\bar{x}$) = $\frac{\Sigma x_i}{n}$

Uncertainty (±) = $\frac{2[(\Sigma s)^2]^{1/2}}{(n)^{1/2}}$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
Σs = The summation of all significant estimated errors (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1007 ± 4 µg/mL**
ICP Assay NIST SRM 3105a Lot Number: 892707

Assay Method #2 **1002 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	<	0.00800	M	Dy	<	0.01305	O	Li	<	0.00002	M	Pr	<	0.00065	M	Te	<	0.06525
M	Sb	<	0.00109	M	Er	<	0.01087	M	Lu	<	0.00087	M	Re	<	0.00218	M	Tb	<	0.00065
M	As	<	0.02175	M	Eu	<	0.00652	O	Mg	<	0.00003	M	Rh	<	0.00218	M	Tl	<	0.00218
M	Ba	<	0.02175	M	Gd	<	0.00218	O	Mn	<	0.00002	M	Rb	<	0.00218	M	Th	<	0.00218
s	Be			M	Ga	<	0.00218	O	Hg	<	0.01500	M	Ru	<	0.00435	M	Tm	<	0.00087
M	Bi	<	0.00087	M	Ge	<	0.01305	M	Mo	<	0.00435	M	Sm	<	0.00218	M	Sn	<	0.01087
O	B	<	0.01200	M	Au	<	0.00652	M	Nd	<	0.00435	O	Sc	<	0.00009	M	Ti	<	0.10874
M	Cd	<	0.00652	M	Hf	<	0.00435	M	Ni	<	0.65245	M	Se	<	0.01740	M	W	<	0.02175
O	Ca		0.00164	M	Ho	<	0.00109	M	Nb	<	0.00109	O	Si		0.00649	M	U	<	0.00435
M	Ce	<	0.01087	M	In	<	0.02175	n	Os			M	Ag	<	0.00435	M	V	<	0.00435
M	Cs	<	0.00065	M	Ir	<	0.01087	M	Pd	<	0.01087	O	Na		0.00368	M	Yb	<	0.00218
O	Cr	<	0.00900	O	Fe		0.00268	n	P			M	Sr	<	0.00109	M	Y	<	0.08699
M	Co	<	0.00652	M	La	<	0.00109	M	Pt	<	0.00435	i	S			M	Zn	<	0.04350
M	Cu	<	0.01305	M	Pb	<	0.00652	O	K	<	0.10000	M	Ta	<	0.01522	M	Zr	<	0.01087

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.
Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 9.01218; +2; 4; $Be^{+2}(H_2O)_4^{+2}$
Chemical Compatibility - Soluble in HCl, HNO_3, H_2SO_4 and HF aqueous matrices. Stable with all metals and inorganic anions.
Stability - 2-100 ppb levels stable for months in 1 % HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 5-10 % HNO_3 / LDPE container.
Be Containing Samples (Preparation and Solution) - Metal (is best dissolved in diluted H_2SO_4); BeO (boiling nitric, hydrochloric, or sulfuric acids or $KHSO_4$ fusion); Ores (H_2SO_4/HF digestion or carbonate fusion in Pt^0); Organic Matrices (sulfuric/peroxide digestion or nitric/sulfuric/perchloric acid decomposition, or dry ash and dissolution according to the BeO procedure above).
Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ conc.)
ICP-OES 313.042 nm	0.0003 / 0.00009 µg/mL	1	ion	V, Ce, U
ICP-OES 234.861 nm	0.0003 / 0.00016 µg/mL	1	atom	Fe, Ta, Mo
ICP-OES 313.107 nm	0.0007 / 0.0005 µg/mL	1	ion	Ce, Th, Tm
ICP-MS 9 amu	4 ppt	n/a	M^+	

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: January 08, 2004

Expiration Date: EXPIRES 1/2005

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 06/01/04
DATE EXPIRED: 06/01/2005 VOS
DATE OPENED: 06/01/04
INORG: 4592 PO: E53393

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Debbie Newman, Production Manager	Debbie Newman
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Chromium (+3) in 1.4% (abs) HNO_3**

Catalog Number:	CGCR(3)1-1, CGCR(3)1-2, and CGCR(3)1-5
Lot Number:	**X-CR02137**
Starting Material:	Cr pieces
Starting Material Purity (%):	99.997404
Starting Material Lot No	F02N38
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS pg 1 of 2
DATE RECEIVED: 12/02/04
DATE EXPIRED: 12/01/2005 VOS
DATE OPENED: 12/02/04
INORG: 4906 PO: F55102

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 1002 ± 2 µg/mL

Certified Density: 1.011 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value $(\bar{x}) = \frac{\sum x_i}{n}$

Uncertainty $(\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum S_i$ = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

- "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)
- This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1002 ± 2 µg/mL (Avg 2 runs)**
ICP Assay NIST SRM 3112a Lot Number: 990607

Assay Method #2 **1004 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	0.00120	M	Dy	< 0.02432	O	Li	< 0.00002	M	Pr	< 0.00122	M	Te	< 0.12159
M	Sb	< 0.00203	M	Er	< 0.02027	M	Lu	< 0.00162	M	Re	< 0.00405	M	Tb	< 0.00122
M	As	< 0.04053	M	Eu	< 0.01216	O	Mg	< 0.00030	M	Rh	< 0.00405	M	Tl	< 0.00405
M	Ba	< 0.04053	M	Gd	< 0.00405	M	Mn	< 0.01621	M	Rb	< 0.00405	M	Th	< 0.00405
M	Be	< 0.00203	M	Ga	< 0.00405	O	Hg	< 0.01500	M	Ru	< 0.00811	M	Tm	< 0.00162
M	Bi	< 0.00162	M	Ge	< 0.02432	M	Mo	< 0.00811	M	Sm	< 0.00405	M	Sn	< 0.02027
O	B	< 0.01000	M	Au	< 0.01216	M	Nd	< 0.00811	M	Sc	< 0.04053	O	Ti	< 0.00100
M	Cd	< 0.01216	M	Hf	< 0.00811	O	Ni	< 0.02000	M	Se	< 0.03242	M	W	< 0.04053
O	Ca	0.01818	M	Ho	< 0.00203	M	Nb	< 0.00203	O	Si	< 0.20000	M	U	< 0.00811
M	Ce	< 0.02027	M	In	< 0.04053	n	Os		M	Ag	< 0.00811	O	V	< 0.02000
M	Cs	< 0.00122	M	Ir	< 0.02027	M	Pd	< 0.02027	O	Na	0.00647	M	Yb	< 0.00405
s	Cr		O	Fe	< 0.01000	O	P	< 0.04000	M	Sr	< 0.00203	M	Y	< 0.16212
M	Co	< 0.01216	M	La	< 0.00203	M	Pt	< 0.00811	i	S		O	Zn	< 0.00400
M	Cu	< 0.02432	M	Pb	0.00089	O	K	< 0.00180	M	Ta	< 0.02837	M	Zr	< 0.02027

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 51.9961; +3; 6; $Cr(H_2O)_6^{3+}$

Chemical Compatibility - Stable in HCl, HNO_3, H_2SO_4, HF, H_3PO_4. Avoid basic media. Stable with most metals and inorganic anions in acidic media.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO_3 / LDPE container.

Cr Containing Samples (Preparation and Solution) - Metal (soluble in HCl); Oxides/Ores (Chrome ore/oxides are very difficult to dissolve. The following procedures [A-D] are commonly used:

A. Fusion with $KHSO_4$ and extraction with hot KCl. The residue fused with Na_2CO_3 and $KClO_3$, 3:1.
B. Fusion with $NaKSO_4$ and NaF, 2:1.
C. Fusion with magnesia or lime and sodium or potassium carbonates, 4:1.
D. Fusion with Na_2O_2 or NaOH and KNO_3 or NaOH and Na_2O_2.
Nickel, iron, copper, or silver crucibles should be used for **D**. Platinum may be used for **A, B and C**.

Organic Matrices (Ash at 450°C followed by one of the fusion methods above or sulfuric/hydrogen peroxide acid digestions **may** be applicable to **non oxide** containing samples).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES	205.552 nm	0.006 / 0.0008 µg/mL	1	ion	Os
ICP-OES	284.325 nm	0.008 / 0.0007 µg/mL	1	ion	
ICP-OES	276.654 nm	0.01 / 0.001 µg/mL	1	ion	Cu, Ta, V
ICP-MS	52 amu	40 ppt	n/a	M^+	$^{35}S^{16}O$, $^{36}Ar^{16}O$ - The ^{52}Cr, ^{53}Cr, ^{54}Cr lines suffer from many more potential interferences from sulfur, chlorine and argon compounds of oxygen, nitrogen and carbon.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter), Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

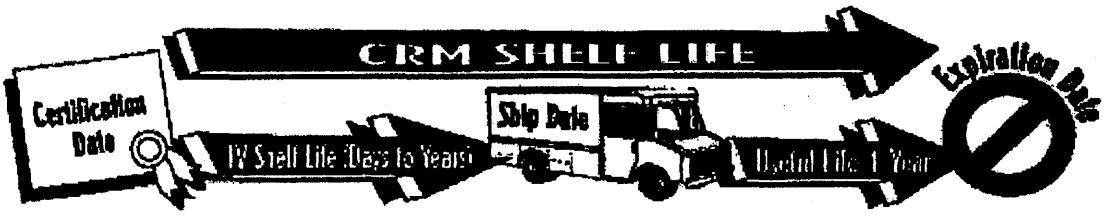
10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

INORGANIC LABS/RADCHEM LABS 3 of 3
DATE RECEIVED: 12/02/04
DATE EXPIRED: 12/01/2005 v03
DATE OPENED: 12/02/04
INORG: 4906 PO: E55102

010461

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: August 16, 2004

Expiration Date: EXPIRES 1 DEC 2005

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Nick Maida, QA Administrator	Nicholas Maida
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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inorganic ventures / iv labs

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phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Copper in 2% (abs) HNO_3**

Catalog Number:	CGCU1-1, CGCU1-2, and CGCU1-5
Lot Number:	**X-CU02067**
Starting Material:	Cu shot
Starting Material Purity (%):	99.999437
Starting Material Lot No	K09C13
Matrix:	2% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 2/28/05
DATE EXPIRED: 3/1/2006
DATE OPENED: 2/28/05 DR
INORG: 5049 PO: F55148

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 1003 ± 3 µg/mL

Certified Density: 1.015 g/mL (measured at 22° C)

The Certified Value is the wet assay value. The following equations are used in the calculations of the certified value and the uncertainty:

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n}$$

$$\text{Uncertainty } (\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum S$ = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

- "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)
- This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1003 ± 3 µg/mL**
EDTA NIST SRM 928 Lot Number: 392110

Assay Method #2 **1001 ± 2 µg/mL**
ICP Assay NIST SRM 3114 Lot Number: 891811

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4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	< 0.00090	M	Dy	< 0.03027	O	Li	< 0.00002	M	Pr	< 0.00151	M	Te	< 0.15134
M	Sb	< 0.00252	M	Er	< 0.02522	M	Lu	< 0.00202	M	Re	< 0.00504	M	Tb	< 0.00151
M	As	< 0.05045	M	Eu	< 0.01513	O	Mg	0.00001	M	Rh	< 0.00504	M	Tl	< 0.00504
M	Ba	< 0.05045	M	Gd	< 0.00504	M	Mn	< 0.02018	M	Rb	< 0.00504	M	Th	< 0.00504
M	Be	< 0.00252	M	Ga	< 0.00504	O	Hg	< 0.01500	M	Ru	< 0.01009	M	Tm	< 0.00202
M	Bi	< 0.00202	M	Ge	< 0.03027	M	Mo	< 0.01009	M	Sm	< 0.00504	O	Sn	0.00439
M	B	< 0.35312	M	Au	< 0.01513	M	Nd	< 0.01009	M	Sc	< 0.05045	M	Ti	< 0.25223
M	Cd	< 0.01513	M	Hf	< 0.01009	M	Ni	< 0.04036	M	Se	< 0.04036	M	W	< 0.05045
O	Ca	0.00011	M	Ho	< 0.00252	M	Nb	< 0.00252	O	Si	< 0.00340	M	U	< 0.01009
M	Ce	< 0.02522	M	In	< 0.05045	n	Os		M	Ag	< 0.01009	O	V	< 0.00300
M	Cs	< 0.00151	M	Ir	< 0.02522	M	Pd	< 0.02522	O	Na	0.00044	M	Yb	< 0.00504
M	Cr	< 0.02522	O	Fe	0.00054	O	P	< 0.00260	M	Sr	< 0.00252	M	Y	< 0.20178
M	Co	< 0.01513	M	La	< 0.00252	M	Pt	< 0.01009	n	S		M	Zn	< 0.10089
s	Cu		M	Pb	0.00050	O	K	< 0.00180	M	Ta	< 0.03531	M	Zr	< 0.02522

M - Checked by ICP-MS O - Checked by ICP-OES I - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

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7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

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Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 63.546; +2; 6; $Cu(H_2O)_6^{2+}$

Chemical Compatibility - Stable in HCl, HNO_3, H_2SO_4, HF, H_3PO_4. Avoid basic media. Stable with most metals and inorganic anions in acidic media.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO_3 / LDPE container.

Cu Containing Samples (Preparation and Solution) - Metal (soluble in HNO_3); Oxides (Soluble in HCl); Ores (Dissolve in HCl / HNO_3).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES	324.754 nm	0.067/.001 µg/mL	1	atom	Nb, U, Th, Mo, Hf
ICP-OES	224.700 nm	0.01/.001 µg/mL	1	ion	Pb, Ir, Ni, W
ICP-OES	219.958 nm	0.01/.002 µg/mL	1	atom	Th, Ta, Nb, U, Hf
ICP-MS	63 amu	10 ppt	n/a	M'	$^{40}Ar^{23}Na$ $^{47}Ti^{16}O$, $^{14}N^{12}C^{35}Cl$, $^{16}O^{12}C^{35}Cl$, $^{44}Ca^{16}O$, $^{23}Na^{40}Ca$

8.0 HAZARDOUS INFORMATION

- Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY

- This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105

Recognized by:

Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)

Members of IQ Net International Certification Network:

Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:

Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

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010465

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: August 16, 2004

Expiration Date: EXPIRES 1 A 2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Nick Maida, QA Administrator	Nicholas Maida
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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inorganic ventures / iv labs

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certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Nickel in 1.4% (abs) HNO_3**

Catalog Number:	CGNI1-1, CGNI1-2, and CGNI1-5
Lot Number:	**X-NI02032**
Starting Material:	Ni pieces
Starting Material Purity (%):	99.999371
Starting Material Lot No	L06L02
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 2/28/05
DATE EXPIRED: 3/1/2006 DR
DATE OPENED: 2/28/05
INORG: 5043 PO: F55148

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 1002 ± 3 µg/mL

Certified Density: 1.011 g/mL (measured at 22° C)

The Certified Value is the instrument analysis value. The following equations are used in the calculation of the certified value and the uncertainty:

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n}$$

$$\text{Uncertainty } (\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum S$ = The summation of all significant estimated errors (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **999 ± 3 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

Assay Method #2 **1002 ± 3 µg/mL**
ICP Assay NIST SRM 3136 Lot Number: 000612

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1 of 1

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	< 0.00938	M	Dy	< 0.06577	O	Li	< 0.00006	M	Pr	< 0.00329	M	Te	< 0.32886
M	Sb	< 0.00548	M	Er	< 0.05481	M	Lu	< 0.00439	M	Re	< 0.01096	M	Tb	< 0.00329
O	As	< 0.01689	M	Eu	< 0.03289	O	Mg	0.00002	M	Rh	< 0.01096	M	Tl	< 0.01096
M	Ba	< 0.10962	M	Gd	< 0.01096	M	Mn	< 0.04385	M	Rb	< 0.01096	M	Th	< 0.01096
O	Be	< 0.00626	M	Ga	< 0.01096	O	Hg	< 0.03441	M	Ru	< 0.02192	M	Tm	< 0.00439
M	Bi	< 0.00439	M	Ge	< 0.06577	M	Mo	< 0.02192	M	Sm	< 0.01096	M	Sn	< 0.05481
O	B	< 0.03097	M	Au	< 0.03289	M	Nd	< 0.02192	M	Sc	< 0.10962	M	Ti	< 0.54811
M	Cd	< 0.03289	M	Hf	< 0.02192	S	Ni		O	Se	< 0.01877	M	W	< 0.10962
O	Ca	< 0.01157	M	Ho	< 0.00548	M	Nb	< 0.00548	O	Si	0.00188	M	U	< 0.02192
M	Ce	< 0.05481	M	In	< 0.10962	n	Os		M	Ag	< 0.02192	M	V	< 0.02192
M	Cs	< 0.00329	M	Ir	< 0.05481	M	Pd	< 0.05481	O	Na	0.00102	M	Yb	< 0.01096
M	Cr	< 0.05481	O	Fe	0.00156	O	P	< 0.31280	M	Sr	< 0.00548	M	Y	< 0.43849
O	Co	0.00182	M	La	< 0.00548	M	Pt	< 0.02192	O	S	< 0.07820	M	Zn	0.00189
M	Cu	< 0.06577	M	Pb	< 0.03289	O	K	0.00043	M	Ta	< 0.07674	M	Zr	< 0.05481

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.
Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 58.69; +2; 6; $Ni(H_2O)_6^{2+}$
Chemical Compatibility - Stable in HCl, HNO_3, H_2SO_4, HF, H_3PO_4. Avoid basic media. Stable with most metals and inorganic anions in acidic media.
Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO_3 / LDPE container.
Ni Containing Samples (Preparation and Solution) - Metal (Soluble in HNO_3) Oxides (Soluble in HCl) Ores (Dissolve in HCl / HNO_3).
Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≠ concs.)
ICP-OES	221.647 nm	0.01 / 0.0009 µg/mL	1	ion	Si
ICP-OES	232.003 nm	0.02 / 0.006 µg/mL	1	atom	Cr, Re, Os, Nb, Ag, Pt, Fe
ICP-OES	231.604 nm	0.02 / 0.002 µg/mL	1	ion	Sb, Ta, Co
ICP-MS	60 amu	100 ppt	n/a	M+	$^{43}Ca^{16}O^{1}H$, $^{44}Ca^{16}O$, $^{23}Na^{37}Cl$

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8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: April 27, 2004

Expiration Date: EXPIRES 1 MAR 2006

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12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul Gaines

010470

inorganic ventures / iv labs

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e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 DESCRIPTION OF CRM

Custom-Grade **1000 µg/mL Cadmium in 2% (abs) HNO_3**

Catalog Number:	CGCD1-1, CGCD1-2, and CGCD1-5
Lot Number:	**Y-QCD01109**
Starting Material:	Cd shot
Starting Material Purity (%):	99.998904
Starting Material Lot No	C14M30
Matrix:	2% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 2/28/05
DATE EXPIRED: 3/1/2005 DR
DATE OPENED: 2/28/05
INORG: 5041 PO: F55147

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1000 ± 3 µg/mL

Certified Density: 1.013 g/mL (measured at 22° C)

The Certified Value is the instrument analysis value. The following equations are used in the calculation of the certified value and the uncertainty:

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n}$$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements

$$\text{Uncertainty } (\pm) = 2\left[\left(\sum s_i\right)^2\right]^{1/2} / (n)^{1/2}$$

$\sum s_i$ = The summation of all significant estimated errors.
(Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

- "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)
- This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1002 ± 3 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

Assay Method #2 **1000 ± 3 µg/mL**
ICP Assay NIST SRM 3108 Lot Number: 890312

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4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	< 0.00090	M	Dy	< 0.01191	O	Li	< 0.00002	M	Pr	< 0.00060	O	Te	< 0.00700
M	Sb	0.00039	M	Er	< 0.00993	M	Lu	< 0.00079	M	Re	< 0.00199	M	Tb	< 0.00060
M	As	< 0.01985	M	Eu	< 0.00596	O	Mg	0.00002	M	Rh	< 0.00199	M	Tl	< 0.00199
M	Ba	< 0.01985	M	Gd	< 0.00199	M	Mn	< 0.00794	M	Rb	< 0.00199	M	Th	< 0.00199
M	Be	< 0.00099	M	Ga	< 0.00199	O	Hg	< 0.01200	M	Ru	< 0.00397	M	Tm	< 0.00079
M	Bi	< 0.00079	M	Ge	< 0.01191	M	Mo	< 0.00397	M	Sm	< 0.00199	M	Sn	< 0.00993
O	B	< 0.00900	M	Au	< 0.00596	M	Nd	< 0.00397	M	Sc	< 0.01985	M	Ti	< 0.09925
s	Cd		M	Hf	< 0.00397	O	Ni	< 0.00300	M	Se	< 0.01588	M	W	< 0.01985
O	Ca	0.00378	M	Ho	< 0.00099	M	Nb	< 0.00099	O	Si	< 0.00340	M	U	< 0.00397
M	Ce	< 0.00993	O	In	< 0.00200	n	Os		M	Ag	< 0.00397	M	V	< 0.00397
M	Cs	< 0.00060	M	Ir	< 0.00993	M	Pd	0.00691	M	Na	< 0.19849	M	Yb	< 0.00199
M	Cr	< 0.00993	O	Fe	< 0.00110	O	P	< 0.00300	M	Sr	< 0.00099	M	Y	< 0.07940
M	Co	< 0.00596	M	La	< 0.00099	M	Pt	< 0.00397	O	S	< 0.03000	O	Zn	0.00040
M	Cu	< 0.01191	M	Pb	< 0.00596	O	K	0.00015	M	Ta	< 0.01389	M	Zr	< 0.00993

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

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7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do r removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Formin Solution - 112.41; +2; 4 ;$Cd_2(OH)$ (aq)$^{3+}$ and Cd(C

Chemical Compatibility - Stable in HCl, HNO_3, H_2SO_4, and HF. Avoid basic media forming insoluble carbonate and hyc most metals and inorganic anions in acidic media. The sulfide, carbonate, oxalate, phosphate, and cyanide are insoluble i in HCl, HNO_3 and NH_4OH. The chloride, bromide and iodide are soluble in water. CdI_2 is one of the fewiodides soluble i com pounds of Cd are soluble in excess NaI, due to the formation of the complex ion, CdI_4^{2-}.

Stability - 2-100 ppb levels stable for months in 1% HNO_3/ LDPE container. 1-10,000 ppm solutions chemically stable fo HNO_3/LDPE container.

Cd Containing Samples (Preparation and Solution) - Metal (soluble in HNO_3); Oxides (Soluble in HCl or HNO_3); Ores HNO_3then take to fumes with H_2SO_4. The silica and lead sulfate are filtered off after addition of water.); Organic based ((and dissolve ash in HCl) (sulfuric/peroxide acid digestion).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe)
ICP-OES	214.438 nm	0.003 / 0.0003 µg/mL	1	ion	Pt, Ir
ICP-OES	228.802 nm	0.003 / 0.0003 µg/mL	1	atom	Co, Ir, As, Pt
ICP-OES	226.502 nm	0.003 / 0.0003 µg/mL	1	ion	Ir
ICP-MS	111 amu	11 ppt	n/a	M^+	$^{95}Mo^{16}O$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105

Recognized by:

Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)

Members of IQ Net International Certification Network:

Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:

Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

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11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: January 19, 2005

Expiration Date: EXPIRES 1 MAR 2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Nick Maida, QA Administrator	Nicholas Maida
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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4 of 4

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inorganic ventures / iv labs

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e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Cobalt in 2% (abs) HNO_3**

Catalog Number:	CGCO1-1, CGCO1-2, and CGCO1-5
Lot Number:	**X-CO01123**
Starting Material:	Co powder
Starting Material Purity (%):	99.999403
Starting Material Lot No	23171
Matrix:	2% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 2/28/05
DATE EXPIRED: 3/1/06 DR
DATE OPENED: 2/28/05
INORG: 5044 PO: F55148

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 1003 ± 2 µg/mL

Certified Density: 1.016 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value $(\bar{x}) = \frac{\sum x_i}{n}$

Uncertainty $(\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum S$ = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1007 ± 5 µg/mL**
ICP Assay NIST SRM 3181 Lot Number: 000630

Assay Method #2 **1003 ± 2 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

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4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al		0.00030	M	Dy	<	0.02394	O	Li		0.00001	M	Pr	<	0.00120	M	Te	<	0.11970
M	Sb	<	0.00200	M	Er	<	0.01995	M	Lu	<	0.00160	M	Re	<	0.00399	M	Tb	<	0.00120
O	As	<	0.10000	M	Eu	<	0.01197	O	Mg		0.00128	M	Rh	<	0.00399	M	Tl	<	0.00399
M	Ba	<	0.03990	M	Gd	<	0.00399	O	Mn	<	0.00400	M	Rb	<	0.00399	M	Th	<	0.00399
M	Be	<	0.00200	M	Ga	<	0.00399	O	Hg	<	0.05000	M	Ru	<	0.00798	M	Tm	<	0.00160
M	Bi		0.00020	M	Ge	<	0.02394	M	Mo	<	0.00798	M	Sm	<	0.00399	M	Sn	<	0.01995
O	B		0.00103	M	Au	<	0.01197	M	Nd	<	0.00798	M	Sc	<	0.03990	M	Ti	<	0.19949
M	Cd	<	0.01197	M	Hf	<	0.00798	O	Ni	<	0.02000	M	Se	<	0.03192	M	W	<	0.03990
O	Ca		0.00168	M	Ho	<	0.00200	M	Nb	<	0.00200	O	Si	<	0.00400	M	U	<	0.00798
M	Ce	<	0.01995	M	In	<	0.03990	n	Os			M	Ag	<	0.00798	M	V	<	0.00798
M	Cs	<	0.00120	M	Ir	<	0.01995	M	Pd	<	0.01995	O	Na		0.00095	M	Yb	<	0.00399
M	Cr		0.00080	O	Fe	<	0.00400	n	P			M	Sr	<	0.00200	M	Y	<	0.15960
s	Co			M	La	<	0.00200	M	Pt	<	0.00798	n	S			O	Zn		0.00020
M	Cu		0.00023	M	Pb		0.00150	O	K		0.00048	M	Ta	<	0.02793	M	Zr	<	0.01995

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.
Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 58.9332; +2; 6; $Co(H_2O)_6^{2+}$
Chemical Compatibility - Stable in HCl, HNO_3, H_2SO_4, HF, H_3PO_4. Avoid basic media. Stable with most metals and inorganic anions in acidic media.
Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO_3 / LDPE container.
Co Containing Samples (Preparation and Solution) - Metal (soluble in HNO_3); Oxides (Soluble in HCl); Ores (Dissolve in HCl / HNO_3).
Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES	238.892 nm	0.01/.002 µg/mL	1	ion	Fe, W, Ta
ICP-OES	228.616 nm	0.01/.001 µg/mL	1	ion	
ICP-OES	237.862 nm	0.01/.002 µg/mL	1	ion	W, Re, Al, Ta
ICP-MS	59 amu	2 ppt	n/a	M+	$^{43}Ca^{16}O^{1}H$, $^{40}Ar^{18}O^{1}H$, $^{40}Ar^{23}Na$, $^{43}Ca^{16}O$, $^{25}Mg^{34}Cl$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

010476

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: March 30, 2004

Expiration Date: EXPIRES 1 M 2006

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12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

010477

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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010478

inorganic ventures / iv labs

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phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Manganese in 2% (abs) HNO_3**

Catalog Number:	CGMN1-1, CGMN1-2, and CGMN1-5
Lot Number:	**X-MN02037**
Starting Material:	Mn pieces
Starting Material Purity (%):	99.995300
Starting Material Lot No	21563
Matrix:	2% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 1/27/05
DATE EXPIRED: 2/1/06 DR
DATE OPENED: 1/28/05
INORG: 4989 PO: F55133

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 1006 ± 2 µg/mL

Certified Density: 1.014 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n}$$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements

$$\text{Uncertainty } (\pm) = 2\left[\frac{\sum s_i}{(n)^{1/2}}\right]^{1/2}$$

$\sum s_i$ = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

- "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)
- This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1006 ± 2 µg/mL**
ICP Assay NIST SRM 3132 Lot Number: 890903

Assay Method #2 **1008 ± 2 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	0.00221	M	Dy	< 0.02471	O	Li	0.00020	M	Pr	< 0.00124	M	Te	< 0.12355
M	Sb	< 0.00206	M	Er	< 0.02059	M	Lu	< 0.00165	M	Re	< 0.00412	M	Tb	< 0.00124
M	As	< 0.04118	M	Eu	< 0.01236	O	Mg	0.03350	M	Rh	< 0.00412	M	Tl	< 0.00412
M	Ba	< 0.04118	M	Gd	< 0.00412	s	Mn		M	Rb	< 0.00412	M	Th	< 0.00412
M	Be	< 0.00206	O	Ga	< 0.05000	i	Hg		M	Ru	< 0.00824	M	Tm	< 0.00165
M	Bi	< 0.00165	O	Ge	< 0.00300	M	Mo	< 0.00824	M	Sm	< 0.00412	M	Sn	< 0.02059
O	B	0.00295	M	Au	< 0.01236	M	Nd	< 0.00824	M	Sc	< 0.04118	M	Ti	< 0.20592
M	Cd	< 0.01236	M	Hf	< 0.00824	M	Ni	< 0.03295	M	Se	< 0.03295	M	W	< 0.04118
O	Ca	0.00340	M	Ho	< 0.00206	M	Nb	< 0.00206	O	Si	0.00275	M	U	< 0.00824
M	Ce	< 0.02059	M	In	< 0.04118	n	Os		M	Ag	< 0.00824	M	V	< 0.00824
M	Cs	< 0.00124	M	Ir	< 0.02059	M	Pd	< 0.02059	O	Na	0.00225	M	Yb	< 0.00412
M	Cr	< 0.02059	O	Fe	< 0.01000	i	P		M	Sr	< 0.00206	M	Y	< 0.16474
M	Co	< 0.01236	M	La	< 0.00206	M	Pt	< 0.00824	i	S		O	Zn	0.00250
M	Cu	< 0.02471	M	Pb	< 0.01236	O	K	0.00105	M	Ta	< 0.02883	M	Zr	< 0.02059

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

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7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.
Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 54.9380; +2; 6; $Mn(H_2O)_6^{2+}$
Chemical Compatibility - Stable in HCl, HNO_3, H_2SO_4, HF, H_3PO_4. Avoid basic media. Stable with most metals and inorganic anions in acidic media.
Stability - 2-100 ppb levels stable for months in 1% HNO_3/ LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5 % HNO_3/LDPE container.
Mn Containing Samples (Preparation and Solution) - Metal (Soluble in dilute acids); Oxides (Soluble in dilute acids); Ores (Dissolve with HCl. If silica is present add HF and then fume off silica by adding H_2SO_4 and heat to SO_3 fumes - dense white fumes).
Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe)
ICP-OES	257.610nm	0.0014 / 0.00002 µg/mL	1	ion	Ce, W, Re
ICP-OES	259.373 nm	0.0016 / 0.00002 µg/mL	1	ion	U, Ta, Mo, Fe, Nb
ICP-OES	260.569 nm	0.0021 / 0.00002 µg/mL	1	ion	Co
ICP-MS	55 amu	10 ppt	n/a	M^+	$^{40}Ar^{14}N^1H$, $^{39}K^{16}O$, $^{37}Cl^{18}O$, $^{40}Ar^{15}N$, $^{38}Ar^{17}O$, $^{40}Ar^{16}O^1H$, $^{38}Ar^{16}O^1H$, $^{37}Cl^{17}O^1H$, $^{23}Na^{32}S$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

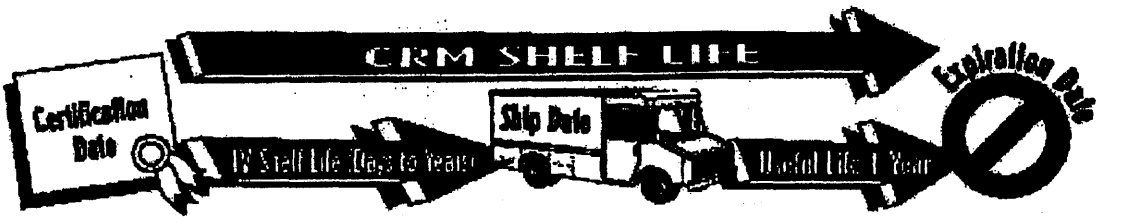
10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: April 13, 2004

Expiration Date: EXPIRES 1/2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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inorganic ventures / iv labs

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certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Vanadium in 1.4% (abs) HNO_3**

Catalog Number:	CGV1-1, CGV1-2, and CGV1-5
Lot Number:	**X-QV01102**
Starting Material:	V_2O_5
Starting Material Purity (%):	99.986532
Starting Material Lot No	Stractor 46
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Page 1 of 2
DATE RECEIVED: 12/9/2004
DATE EXPIRED: 01/01/2006
DATE OPENED: 12/9/04 KG
INORG: 4916 PD: F55102 VOS 12/15/04

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 999 ± 3 µg/mL

Certified Density: 1.014 g/mL (measured at 22° C)

The Certified Value is the instrument analysis value. The following equations are used in the calculation of the certified value and the uncertainty:

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n}$$

$$\text{Uncertainty } (\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum S$ = The summation of all significant estimated errors (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

- "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)
- This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **999 ± 3 µg/mL**
ICP Assay NIST SRM 3165 Lot Number: 992706

Assay Method #2 **1007 ± 3 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	< 0.00600	M	Dy	< 0.00597	O	Li	< 0.00002	M	Pr	< 0.00030	M	Te	< 0.02984
M	Sb	0.04543	M	Er	< 0.00497	M	Lu	< 0.00040	M	Re	< 0.00100	M	Tb	< 0.00030
M	As	< 0.00995	M	Eu	< 0.00298	O	Mg	< 0.10000	M	Rh	< 0.00100	M	Tl	< 0.00100
M	Ba	< 0.00995	M	Gd	< 0.00100	M	Mn	0.00069	M	Rb	< 0.00100	M	Th	< 0.00100
M	Be	< 0.00050	M	Ga	< 0.00100	O	Hg	< 0.01200	M	Ru	< 0.00199	M	Tm	< 0.00040
M	Bi	< 0.00040	M	Ge	< 0.00597	M	Mo	0.01481	M	Sm	< 0.00100	M	Sn	< 0.00497
O	B	< 0.04000	M	Au	< 0.00298	M	Nd	< 0.00199	M	Sc	< 0.00995	M	Ti	< 0.04973
M	Cd	< 0.00298	M	Hf	< 0.00199	M	Ni	< 0.07957	M	Se	< 0.00796	M	W	< 0.00995
O	Ca	0.00596	M	Ho	< 0.00050	M	Nb	< 0.00050	O	Si	0.04964	M	U	< 0.00199
M	Ce	< 0.00497	M	In	< 0.00995	n	Os		M	Ag	< 0.00199	s	V	
M	Cs	< 0.00030	M	Ir	< 0.00497	M	Pd	< 0.00497	O	Na	< 0.01000	M	Yb	< 0.00100
O	Cr	< 0.10000	O	Fe	0.08936	O	P	< 0.10000	M	Sr	< 0.00050	M	Y	< 0.03979
O	Co	< 0.00200	M	La	< 0.00050	M	Pt	< 0.00199	n	S		M	Zn	< 0.01989
M	Cu	< 0.00597	M	Pb	< 0.00298	O	K	0.03276	M	Ta	< 0.00696	M	Zr	< 0.00497

M - Checked by ICP-MS O - Checked by ICP-OES I - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 50.9415; +5; 6; $H_2V_{10}O_{28}^{4-}$

Chemical Compatibility - Soluble in HCl, HNO_3, H_2SO_4, HF, H_3PO_4 and strong basic media. Stable with most metals and inorganic anions in acidic media.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO_3 / LDPE container.

V Containing Samples (Preparation and Solution) - Metal (Fusion with NaOH or KOH in Ni* or Na_2CO_3 / KNO_3); Oxides (V_2O_3 - use HCl, V_2O_4 - use HCl or HNO_3, V_2O_5 - use concentrated acids); Ores (Na_2CO_3 / KNO_3 in Pt* ***caution - nitrates attack Pt*** followed by water extraction of fusate); Organic Matrices (Ash at 450 °C followed by dissolving according to V_2O_5 above).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES 309.311 nm	0.005 / 0.001 µg/mL	1	ion	Mg, U, Th
ICP-OES 292.402 nm	0.006 / 0.001 µg/mL	1	ion	Th
ICP-OES 290.882 nm	0.008 / 0.0008 µg/mL	1	atom	Hf, Nb
ICP-MS 51 amu	4 ppt	n/a	M⁺	$^{34}S^{16}O^{1}H$, $^{35}Cl^{16}O$, $^{40}Ar^{12}C$, $^{40}Ar^{14}N$, $^{36}Ar^{14}N^{1}H$, $^{37}Cl^{14}N$, $^{34}S^{14}N$, $^{34}S^{16}O$, $^{35}S^{16}O$, $^{102}Ru^{2+}$, $^{102}Pd^{2+}$

8.0 HAZARDOUS INFORMATION

- Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY

- This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105

Recognized by:

Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)

Members of IQ Net International Certification Network:

Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter), Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:

Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

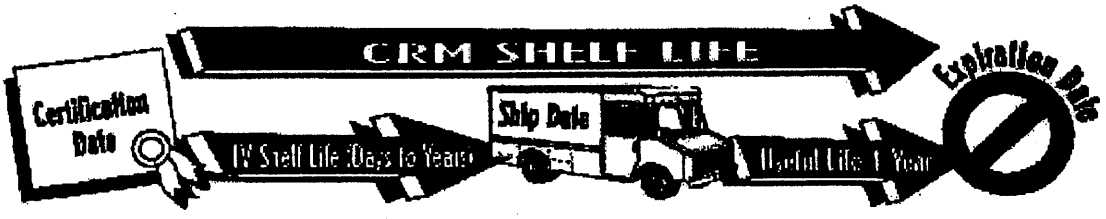
10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 12/9/2004
DATE EXPIRED: 01/01/2006 vos for KE
DATE OPENED: 12/9/04
INORG: 4916 PO: F55102

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010485



11.1 **IV Shelf Life** - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 **Expiration Date** - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: July 26, 2004

Expiration Date: EXPIRES 01.2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Nick Malda, QA Administrator	Nicholas Malda
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

inorganic ventures / iv labs
195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Zinc in 1.4% (abs) HNO_3**

Catalog Number:	CGZN1-1, CGZN1-2, and CGZN1-5
Lot Number:	**X-ZN02020**
Starting Material:	Zn shot
Starting Material Purity (%):	99.999889
Starting Material Lot No	J17L26
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Pg 1 of 2
DATE RECEIVED: 12/03/04
DATE EXPIRED: 01/01/2006 WDS
DATE OPENED: 12/07/04
INORG: 4915 PO: E55106

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 1002 ± 2 µg/mL

Certified Density: 1.010 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value ($\bar{x}$) = $\frac{\sum x_i}{n}$

Uncertainty (±) = $\frac{2[(\sigma s_i)^2]^{1/2}}{(n)^{1/2}}$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
σs_i = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1005 ± 4 µg/mL**
ICP Assay NIST SRM 3168a Lot Number: 001402

Assay Method #2 **1002 ± 2 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	< 0.00200	M	Dy	< 0.02440	O	Li	0.00001	M	Pr	< 0.00122	M	Te	< 0.12198
M	Sb	< 0.00203	M	Er	< 0.02033	M	Lu	< 0.00163	M	Re	< 0.00407	M	Tb	< 0.00122
M	As	< 0.04066	M	Eu	< 0.01220	O	Mg	0.00011	M	Rh	< 0.00407	M	Tl	< 0.00407
M	Ba	< 0.04066	M	Gd	< 0.00407	M	Mn	< 0.01626	M	Rb	< 0.00407	M	Th	< 0.00407
M	Be	< 0.00203	M	Ga	< 0.00407	O	Hg	< 0.01000	M	Ru	< 0.00813	M	Tm	< 0.00163
M	Bi	< 0.00163	M	Ge	< 0.02440	M	Mo	< 0.00813	M	Sm	< 0.00407	M	Sn	< 0.02033
O	B	0.00015	M	Au	< 0.01220	M	Nd	< 0.00813	M	Sc	< 0.04066	M	Ti	< 0.20331
M	Cd	< 0.01220	M	Hf	< 0.00813	O	Ni	0.00009	M	Se	< 0.03253	M	W	< 0.04066
O	Ca	0.00022	M	Ho	< 0.00203	M	Nb	< 0.00203	O	Si	< 0.00400	M	U	< 0.00813
M	Ce	< 0.02033	M	In	< 0.04066	n	Os		M	Ag	< 0.00813	M	V	< 0.00813
M	Cs	< 0.00122	M	Ir	< 0.02033	M	Pd	< 0.02033	O	Na	0.00055	M	Yb	< 0.00407
O	Cr	< 0.00100	O	Fe	0.00005	O	P	< 0.00300	M	Sr	< 0.00203	M	Y	< 0.16264
M	Co	< 0.01220	M	La	< 0.00203	M	Pt	< 0.00813	O	S	< 0.02000	s	Zn	
O	Cu	< 0.00050	M	Pb	< 0.01220	O	K	0.00018	M	Ta	< 0.02846	M	Zr	< 0.02033

M - Checked by ICP-MS O - Checked by ICP-OES I - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

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7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 65.39; +2; 4; $Zn(OH)(aq)^{+}$

Chemical Compatibility - Stable in HCl, HNO_3, H_2SO_4, HF, H_3PO_4. Avoid basic media that promotes the formation of insoluble carbonate and hydroxide. Stable with most metals and inorganic anions in acidic media.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO_3 / LDPE container.

Zn Containing Samples (Preparation and Solution) - Metal (Soluble in HNO_3); Oxides (Soluble in HCl); Ores (Dissolve in HCl /HNO_3); Organic based (Dry ash at 450°C and dissolve ash in HCl) (Sulfuric/peroxide acid digestion)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≤50ppm)
ICP-OES 213.856 nm	0.002 / 0.0004 µg/mL	1	atom	Ni, Cu, V
ICP-OES 202.548 nm	0.004 / 0.0002 µg/mL	1	ion	Nb, Cu, Co, Hf
ICP-OES 206.200 nm	0.006 / 0.0006 µg/mL	1	ion	Sb, Ta, Bi, Os
ICP-MS 66 amu	7 ppt	n/a	M+	$^{48}Ti^{16}O$, $^{50}Cr^{16}O$, $^{50}V^{16}O$, $^{32}S^{16}O_2$, $^{32}S^{16}O^{16}O$, $^{32}S^{18}O_2$, $^{32}S^{16}O^{18}O$, $^{32}S^{34}S$, $^{32}S_2$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter), Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

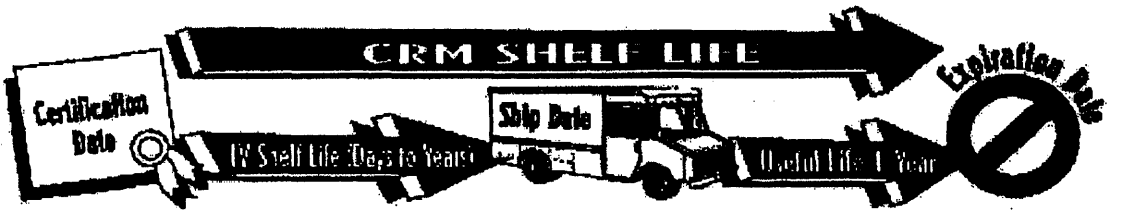
10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

INORGANIC LABS/RADCHEM LABS Page 2 of 2
DATE RECEIVED: 12/03/04
DATE EXPIRED: 01/01/2006 NOS
DATE OPENED: 12/07/04
INORG: 4915 PO: F55106

010489

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: February 19, 2004

Expiration Date:

EXPIRES
1 JAN 2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010490

inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

CUSTOM-GRADE SOLUTION 1000 µg/mL Silver in 3.5% HNO_3 (abs)

Catalog Number: CGAG1-1, CGAG1-2 and CGAG1-5

Lot Number: **W-AG02018**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 09/01/04
DATE EXPIRED: 10/01/2005 103
DATE OPENED: 09/01/04
INORG: 4764 PO: F53434

Starting Material:	Silver Metal
Starting Material Purity:	99.999%
Starting Material Lot No:	G14K25

CERTIFIED CONCENTRATION: 996 ± 3 µg/mL

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n} \qquad \text{Uncertainty } (\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$$

$(\bar{x})$ = mean x_i = individual results n = number of measurements $\sum S_i$ = The summation of all significant estimated errors.

Classical Wet Assay: 999 ± 3 µg/mL
Method: Volhard Titration vs NIST SRM 999a Potassium Chloride

Instrument Analysis: 996 ± 3 µg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3151.

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

TRACE METALLIC IMPURITIES DETERMINED BY ICP-MS AND ICP-OES IN µg/mL:

Custom-Grade solutions tested for trace metallic impurities by **ICP-MS** were analyzed in an **ULPA-Filtered Clean Room.**
An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	<0.00010	M	Dy	<0.00060	O	Li	<0.000030	M	Pr	<0.000030	O	Te	<0.030
M	Sb	<0.000050	M	Er	<0.00050	M	Lu	<0.000040	M	Re	<0.00010	M	Tb	<0.000030
O	As	<0.0050	M	Eu	<0.00030	O	Mg	<0.000040	M	Rh	<0.00010	M	Tl	<0.00010
M	Ba	<0.0010	M	Gd	<0.00010	O	Mn	<0.00030	M	Rb	<0.00010	M	Th	<0.00010
O	Be	<0.00050	M	Ga	<0.00010	O	Hg	0.00090	M	Ru	<0.00020	M	Tm	<0.000040
M	Bi	<0.000040	M	Ge	<0.00060	M	Mo	<0.00020	M	Sm	<0.00010	M	Sn	<0.00050
O	B	<0.0020	O	Au	<0.012	M	Nd	<0.00020	M	Sc	<0.0010	O	Ti	<0.00070
O	Cd	<0.0020	M	Hf	<0.00020	O	Ni	<0.0070	O	Se	<0.036	M	W	<0.0010
O	Ca	<0.000050	M	Ho	<0.000050	M	Nb	<0.000050	O	Si	<0.0030	M	U	<0.00020
M	Ce	<0.00050	O	In	<0.020	n	Os		s	Ag		M	V	<0.00020
M	Cs	<0.000030	M	Ir	<0.00050	M	Pd	<0.00050	O	Na	<0.090	M	Yb	<0.00010
O	Cr	<0.0020	O	Fe	<0.00070	O	P	<0.030	M	Sr	<0.000050	M	Y	<0.0040
M	Co	<0.00030	M	La	<0.000050	M	Pt	<0.00020	O	S	<0.020	O	Zn	<0.0010
M	Cu	<0.00060	M	Pb	<0.00030	O	K	<0.0060	M	Ta	<0.00070	M	Zr	<0.00050

M - checked by ICP-MS O - checked by ICP-OES i - spectral interference n - not checked for s - solution standard element

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 1.024 g/mL

QA:KL Rev.072103JTS

Paul R. Haines

Quality Assurance Manager

Expires: EXPIRES 1/2005

QUALITY STANDARD DOCUMENTATION

1. ISO 9001:2000 QMI Registered Quality System (Certificate Number 010105)

   Members of IQ Net : Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

2. ISO/IEC Guide 34-2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate 883.02
3. ISO/IEC17025-1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate 883.01
4. MIL-STD-45662A
5. 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licencing of Production and Utilization Facilities
6. 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

   Please contact our Quality Assurance Department for further information and copies of documents pertaining to our Quality Standard certifications.

STABILITY/ EXPIRATION DOCUMENTATION

Shelf Life - The length of time that a properly stored and packaged standard will remain within the specified uncertainty. Shelf life is affected by chemical stability and transpiration issues. Inorganic Ventures' Standard Solutions are chemically stable indefinitely. Transpiration loss is linear with time and limits the time a standard can be used with confidence. The smaller the bottle the higher the rate of transpiration. Inorganic Ventures' studies indicate that the shelf life of our 500 mL bottle is 4 years and the shelf life of our 125 mL bottle is 21 months.

Expiration Date - The date after which a standard solution should not be used. A one year expiration date is recommended by most state and federal regulatory agencies. Transpiration issues and repeated use of solutions over a one year period may adversely affect the integrity of the standard.

PACKAGING DOCUMENTATION

Purified acid, 18 megohm double deionized water that has been filtered through a 0.2 μm filter and in-house procedure IV-PACK-001 is used to clean all bottles. Contact us for technical information relating to contamination issues in packaging materials.

GLASSWARE CALIBRATION

In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

BALANCE CALIBRATION

All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 428359B and 454678. The NIST test number is 822/260017-98.

All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-8.

THERMOMETER CALIBRATION

The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

TECHNICAL SUPPORT

All customers are encouraged to contact us for technical support for the proper use of our products.

TEL 1-800-569-6799 INT'L 1-732-901-1900 FAX 1-732-901-1903 E-MAIL IVtech@ivstandards.com

010492

inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Arsenic in 1.4% (abs) HNO_3**

Catalog Number:	CGAS1-1, CGAS1-2, and CGAS1-5
Lot Number:	**X-AS02026**
Starting Material:	As Polycrystaline lump
Starting Material Purity (%):	99.998994
Starting Material Lot No	23115
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 1/27/05
DATE EXPIRED: 3/11/06 DR
DATE OPENED: 1/28/05
INORG: 4987 PO: E55132

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 997 ± 3 µg/mL

Certified Density: 1.010 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value ($\bar{x}$) = $\frac{\sum x_i}{n}$

Uncertainty (±) = $\frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
$\sum S$ = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **997 ± 3 µg/mL (Avg 2 runs)**
ICP Assay NIST SRM 3103a Lot Number: 010713

Assay Method #2 **1002 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

4987

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	0.00038	M	Dy	< 0.01596	O	Li	0.00009	M	Pr	< 0.00080	M	Te	< 0.07978
O	Sb	< 0.01000	M	Er	< 0.01330	M	Lu	< 0.00106	O	Re	< 0.01000	M	Tb	< 0.00080
s	As		M	Eu	< 0.00798	O	Mg	0.00009	M	Rh	< 0.00266	M	Tl	< 0.00266
M	Ba	< 0.02660	M	Gd	< 0.00266	O	Mn	< 0.00003	M	Rb	< 0.00266	M	Th	< 0.00266
M	Be	< 0.00133	M	Ga	< 0.00266	O	Hg	< 0.01200	M	Ru	< 0.00532	M	Tm	< 0.00106
M	Bi	< 0.00106	M	Ge	< 0.01596	M	Mo	< 0.00532	M	Sm	< 0.00266	O	Sn	0.00049
O	B	< 0.01200	M	Au	< 0.00798	M	Nd	< 0.00532	M	Sc	< 0.02660	M	Ti	< 0.13297
M	Cd	< 0.00798	M	Hf	< 0.00532	M	Ni	< 0.02128	M	Se	< 0.02128	M	W	< 0.02660
O	Ca	0.00189	M	Ho	< 0.00133	O	Nb	< 0.00200	O	Si	0.00415	M	U	< 0.00532
M	Ce	< 0.01330	M	In	< 0.02660	n	Os		M	Ag	< 0.00532	M	V	< 0.00532
M	Cs	< 0.00080	M	Ir	< 0.01330	M	Pd	< 0.01330	O	Na	0.00159	M	Yb	< 0.00266
M	Cr	< 0.01330	O	Fe	< 0.00110	O	P	< 0.00260	M	Sr	< 0.00133	M	Y	< 0.10638
M	Co	< 0.00798	M	La	< 0.00133	M	Pt	< 0.00532	O	S	< 0.02500	O	Zn	0.00057
M	Cu	< 0.01596	M	Pb	< 0.00798	O	K	0.00132	M	Ta	< 0.01862	M	Zr	< 0.01330

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

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4987

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 74.9216; mix of +3 and +5; 6; H_3AsO_4 and $HAsO_2$

Chemical Compatibility - Arsenic has no cationic chemistry. It is soluble in HCl, HNO_3, H_3PO_4, H_2SO_4 and HF aqueous matrices water and NH_4OH. It is stable with most inorganic anions (forms arsenate when boiled with chromate) but many cationic metals form the insoluble arsenates under pH neutral conditions. When fluorinated and / or under acidic conditions arsenate formation is typically not a problem at moderate to low concentrations.

Stability - 2-100 ppb levels stable for months alone or mixed with other elements at equivalent levels in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO_3 / LDPE container.

As Containing Samples (Preparation and Solution) - As^0 (soluble in 1:1 H_2O / HNO_3); Oxides (the oxide exists in crystalline and amorphous forms where the amorphoric form is more water soluble. The oxides typically dissolve in dilute acidic solutions when boiled); Minerals (One gram of powered sample is fused in a Ni^0 crucible with 10 grams of a 1:1 mix of K_2CO_3 and KNO_3 and the melt extracted with hot water); Organic Matrices (0.2 to 0.5 grams of the sample are fused with 15 grams of a 1:1 Na_2CO_3 / Na_2O_2 mix in a Ni^0 crucible. The fuseate is extracted with water and acidified with HNO_3)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at = concs.)
ICP-OES 189.042 nm	0.05 / 0.005 µg/mL	1	atom	Cr
ICP-OES 193.696 nm	0.1 / 0.01 µg/mL	1	atom	V, Ge
ICP-OES 228.812 nm	0.1 / 0.01 µg/mL	1	atom	Cd, Pt, Ir, Co
ICP-MS 75 amu	20 ppt	n/a	M⁺	$^{40}Ar^{35}Cl$, $^{59}Co^{16}O$, $^{40}Ar^{40}Ar^{1}H$, $^{40}Ar^{35}Cl$, $^{40}Ar^{40}K$, $^{150}Nd^{2+}$, $^{150}Sm^{2+}$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

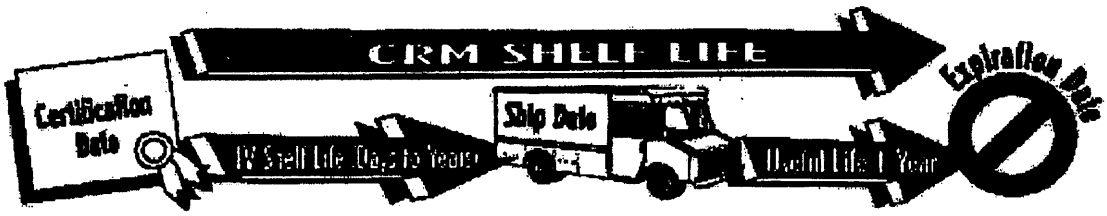
10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

010495

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: August 17, 2004

Expiration Date: EXPIRES 1 FEB 2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Nick Maida, QA Administrator	Nicholas Maida
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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inorganic ventures / iv labs

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e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: **Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 DESCRIPTION OF CRM Custom-Grade **1000 µg/mL Lead in 0.35% (abs) HNO_3**

Catalog Number:	CGPB1-1, CGPB1-2, and CGPB1-5
Lot Number:	**W-PB02115**
Starting Material:	Pb(NO3)2
Starting Material Purity (%):	99.999974
Starting Material Lot No	22150
Matrix:	0.35% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 09/17/04
DATE EXPIRED: 10/01/2005 NOS
DATE OPENED: 09/17/04
INORG: 4774 PO: F54731

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1002 ± 3 µg/mL

Certified Density: 1.002 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value ($\bar{x}$) = $\frac{\Sigma x_i}{n}$

Uncertainty (±) = $\frac{2[(\Sigma s)^2]^{1/2}}{(n)^{1/2}}$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
Σs = The summation of all significant estimated errors (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

• "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

• This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1002 ± 3 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

Assay Method #2 **998 ± 3 µg/mL**
ICP Assay NIST SRM 3128 Lot Number: 991504

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	< 0.00270	M	Dy	< 0.01193	O	Li	< 0.00002	M	Pr	< 0.00060	M	Te	< 0.05965
M	Sb	< 0.00099	M	Er	< 0.00994	M	Lu	< 0.00080	M	Re	< 0.00199	M	Tb	< 0.00060
M	As	< 0.01989	M	Eu	< 0.00597	O	Mg	0.00008	O	Rh	< 0.00900	O	Tl	0.00130
M	Ba	< 0.01989	M	Gd	< 0.00199	M	Mn	< 0.00795	M	Rb	< 0.00199	M	Th	< 0.00199
M	Be	< 0.00099	M	Ga	< 0.00199	O	Hg	< 0.01500	M	Ru	< 0.00398	M	Tm	< 0.00080
O	Bi	< 0.02000	M	Ge	< 0.01193	M	Mo	< 0.00398	M	Sm	< 0.00199	M	Sn	< 0.00994
O	B	< 0.04000	M	Au	< 0.00597	M	Nd	< 0.00398	M	Sc	< 0.01989	M	Ti	< 0.09942
M	Cd	< 0.00597	M	Hf	< 0.00398	M	Ni	< 0.01591	M	Se	< 0.01591	M	W	< 0.01989
O	Ca	0.00009	M	Ho	< 0.00099	M	Nb	< 0.00099	O	Si	< 0.00340	M	U	< 0.00398
M	Ce	< 0.00994	M	In	< 0.01989	n	Os		M	Ag	< 0.00398	M	V	< 0.00398
M	Cs	< 0.00060	M	Ir	< 0.00994	M	Pd	< 0.00994	O	Na	< 0.00600	M	Yb	< 0.00199
M	Cr	< 0.00994	O	Fe	0.00011	O	P	< 0.00500	M	Sr	< 0.00099	M	Y	< 0.07954
M	Co	< 0.00597	M	La	< 0.00099	M	Pt	< 0.00398	O	S	< 0.10000	M	Zn	< 0.03977
M	Cu	< 0.01193	s	Pb		O	K	< 0.00180	M	Ta	< 0.01392	M	Zr	< 0.00994

M - Checked by ICP-MS O - Checked by ICP-OES I - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4 °C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 207.2; +2; 6; $Pb(H_2O)_6^{2+}$

Chemical Compatibility - Soluble in HCl, HF and HNO_3. Avoid H_2SO_4. Stable with most metals and inorganic anions forming insoluble carbonate, borate, sulfate, sulfite, sulfide, phosphate, oxalate, chromate, tannate, iodate, and cyanide in neutral aqueous media.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 2-5% HNO_3 / LDPE container.

Pb Containing Samples (Preparation and Solution) - Metal (Best dissolved in 1:1 H_2O / HNO_3.) Oxides (The many different Pb oxides are soluble in HNO_3 with the exception of PbO_2 which is soluble in HCl or HF); Ores and Alloys (Best attacked using 1:1 H_2O / HNO_3.) Organic Matrices (Dry ash and dissolve in dilute HCl.).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≤10ppm.)
ICP-OES 168.215 nm	0.03 / 0.003 µg/mL	1	ion	Co
ICP-OES 220.353 nm	0.04 / 0.006 µg/mL	1	ion	Bi, Nb
ICP-OES 217.000 nm	0.09 / 0.03 µg/mL	1	atom	W, Ir, Hf, Sb, Th
ICP-MS 208 amu	5 ppt	n/a	M⁺	$^{192}Pt^{16}O$, $^{192}Os^{16}O$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter), Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 09/17/04
DATE EXPIRED: 10/01/2005 VOS
DATE OPENED: 09/17/04
INORG: 4774 PO: F54731

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: September 17, 2003

Expiration Date:

EXPIRES
01/2005

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	
Certificate Approved By:	Katalin Le, QC Manager	
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	

010500

inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Antimony in 0.7% (abs) HNO_3 / 3% Tartaric Acid**

Catalog Number:	CGSB1-1, CGSB1-2 and CGSB1-5
Lot Number:	**X-SB02083**
Starting Material:	Sb shot
Starting Material Purity (%):	99.993665
Starting Material Lot No	D29N32
Matrix:	0.7% (abs) HNO_3 / 3% Tartaric Acid

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 2/28/05
DATE EXPIRED: 3/1/2016
DATE OPENED: 2/28/05
INORG: 5042 PO: F55149

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 999 ± 3 µg/mL

Certified Density: 1.020 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value $(\bar{x}) = \frac{\Sigma x_i}{n}$

Uncertainty $(\pm) = 2[(\Sigma s_i)^2]^{1/2} / (n)^{1/2}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
Σs_i = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **999 ± 3 µg/mL (Avg 2 runs)**
ICP Assay NIST SRM 3102a Lot Number: 990707

Assay Method #2 **1001 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

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1 of 4

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	0.02186	M	Dy	< 0.00598	O	Li	< 0.00002	M	Pr	< 0.00030	M	Te	< 0.02988
s	Sb		M	Er	< 0.00498	M	Lu	< 0.00040	M	Re	< 0.00100	M	Tb	< 0.00030
M	As	< 0.00996	M	Eu	< 0.00299	O	Mg	0.00074	M	Rh	< 0.00100	M	Tl	0.00015
O	Ba	0.00011	M	Gd	< 0.00100	O	Mn	0.00139	M	Rb	< 0.00100	M	Th	< 0.00100
O	Be	< 0.00001	M	Ga	< 0.00100	O	Hg	< 0.01500	M	Ru	< 0.00199	M	Tm	< 0.00040
M	Bi	0.00386	M	Ge	< 0.00598	M	Mo	< 0.00199	M	Sm	< 0.00100	M	Sn	< 0.00498
O	B	0.00045	M	Au	< 0.00299	M	Nd	< 0.00199	O	Sc	< 0.00016	O	Ti	0.00056
M	Cd	< 0.00299	M	Hf	< 0.00199	O	Ni	0.00219	M	Se	< 0.00797	M	W	< 0.00996
O	Ca	0.00521	M	Ho	< 0.00050	M	Nb	< 0.00050	O	Si	0.00388	M	U	< 0.00199
O	Ce	< 0.00300	M	In	< 0.00996	n	Os		M	Ag	< 0.00199	M	V	< 0.00199
M	Cs	< 0.00030	M	Ir	< 0.00498	M	Pd	< 0.00498	O	Na	0.00298	M	Yb	< 0.00100
O	Cr	0.00696	O	Fe	0.00715	O	P	< 0.04000	M	Sr	< 0.00050	M	Y	< 0.03984
M	Co	0.00052	O	La	< 0.00120	M	Pt	< 0.00199	n	S		M	Zn	< 0.01992
O	Cu	0.00239	M	Pb	0.00040	O	K	0.00497	M	Ta	< 0.00697	M	Zr	< 0.00498

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.
Atomic Weight; Valence; Coordination Number; Chemical Formin Solution - 121.75; +3 ; 6; $Sb(O)C_4H_4O_6^{-1}$
Chemical Compatibility - Stable in concentrated HCl, dilute or concentrated HF. Stable in dilute HNO_3 as the fluoride or tartrate complex. Avoid basic media. Stable with most metals and inorganic anions in acidic media as the tartrate provided the acidity is not too high or the acid is oxidizing causing loss of the stabilizing tartrate ion. The fluoride complex of antimony is stable in strong acid but you should only mix with other metals that are fluorinated.
Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-2% HNO_3 / LDPE container.
Sb Containing Samples (Preparation and Solution) - Metal and alloys (Soluble in H_2O / HF / HNO_3 mixture); Oxides (Soluble in HCl and tartaric acid or H_2O / HF / HNO_3 mixtures); Ores (Fusion with Na_2CO_3 in Pt followed by dissolving the fuseate in a H_2O / HF / HNO_3 mixture); Organic based (Sulfuric acid / hydrogen peroxide digestion)
Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe)
ICP-OES 206.833 nm	0.03 / 0.003 µg/mL	1	atom	Ta, Cr, Ge, Hf
ICP-OES 217.581 nm	0.05 / 0.005 µg/mL	1	atom	Nb, W, Re, Fe,
ICP-OES 231.147 nm	0.06 / 0.006 µg/mL	1	atom	Ni, Co, Pt
ICP-MS 121 amu	5 ppt	n/a	M^+	$^{105}Pd^{16}O$, $^{89}Y^{16}O_2$

8.0 HAZARDOUS INFORMATION

- Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY

- This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

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11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: April 22, 2004

Expiration Date:

EXPIRES
1 MAR 2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	
Certificate Approved By:	Katalin Le, QC Manager	
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	

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4864

010504

inorganic ventures / iv labs

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phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Selenium in 1.4% (abs) HNO_3**

Catalog Number:	CGSE1-1, CGSE1-2, and CGSE1-5
Lot Number:	**X-QSE01091**
Starting Material:	Se shot
Starting Material Purity (%):	99.997834
Starting Material Lot No	I20L45
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS 8-1 of 2
DATE RECEIVED: 07/01/04
DATE EXPIRED: 08/01/2005 1005
DATE OPENED: 07/01/04
INORG: 4630 PO: 553406

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 1005 ± 2 µg/mL

Certified Density: 1.009 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value ($\bar{x}$) = $\frac{\Sigma x_i}{n}$

Uncertainty (±) = $\frac{2[(\Sigma s)^2]^{1/2}}{(n)^{1/2}}$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
Σs = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1005 ± 2 µg/mL (Avg 2 runs)**
ICP Assay NIST SRM 3149 Lot Number: 992106

Assay Method #2 **1004 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al		0.00030	M	Dy	<	0.01196	O	Li	<	0.00003	M	Pr	<	0.00060	M	Te	<	0.05982
M	Sb	<	0.00100	M	Er	<	0.00997	M	Lu	<	0.00080	O	Re	<	0.00900	M	Tb	<	0.00060
O	As	<	0.00500	M	Eu	<	0.00598	O	Mg		0.00021	M	Rh	<	0.00199	M	Tl	<	0.00199
M	Ba	<	0.01994	M	Gd	<	0.00199	M	Mn	<	0.00798	M	Rb	<	0.00199	M	Th	<	0.00199
O	Be	<	0.00009	M	Ga	<	0.00199	O	Hg		0.01054	O	Ru	<	0.00700	M	Tm	<	0.00080
M	Bi	<	0.00080	M	Ge	<	0.01196	O	Mo	<	0.00400	M	Sm	<	0.00199	M	Sn	<	0.00997
O	B	<	0.00006	M	Au	<	0.00598	M	Nd	<	0.00399	M	Sc	<	0.01994	M	Ti	<	0.09969
M	Cd		0.00060	M	Hf	<	0.00399	O	Ni		0.00028	S	Se			M	W	<	0.01994
O	Ca		0.00100	M	Ho	<	0.00100	O	Nb	<	0.00400	O	Si	<	0.00300	M	U	<	0.00399
M	Ce	<	0.00997	M	In	<	0.01994	n	Os			M	Ag	<	0.00399	M	V	<	0.00399
M	Cs	<	0.00060	M	Ir	<	0.00997	M	Pd	<	0.00997	O	Na		0.00402	M	Yb	<	0.00199
M	Cr		0.00080	O	Fe		0.00271	O	P	<	0.00300	M	Sr	<	0.00100	M	Y	<	0.07976
M	Co	<	0.00598	M	La	<	0.00100	M	Pt	<	0.00399	O	S	<	0.04000	M	Zn		0.00400
M	Cu		0.00130	M	Pb	<	0.00598	O	K		0.00060	M	Ta	<	0.01396	O	Zr		0.00005

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments Including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 78.96; +4; 6; H_2SeO_3

Chemical Compatibility - Soluble in HCl, HNO_3, H_3PO_4, H_2SO_4 and HF aqueous matrices and water. It is stable with most inorganic anions but many cationic metals form the insoluble selenites under pH neutral conditions. When fluorinated and/or under acidic conditions precipitation is typically not a problem at moderate to low concentrations.

Stability - 2-100 ppb levels - stable for months alone or mixed with other elements at equivalent levels - in 1 % HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO_3 / LDPE container.

Se Containing Samples (Preparation and Solution) - Metal (Soluble in HNO_3); Oxides (Readily soluble in water); Minerals and alloys (Acid digestion with HNO_3 or HNO_3 / HF); Organic Matrices (Acid digestion with hot concentrated H_2SO_4 accompanied by the careful dropwise addition of H_2O_2 until clear)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≤ppm conc.)
ICP-OES 196.026 nm	0.08 / 0.006 µg/mL	1	atom	Fe
ICP-OES 203.985 nm	0.2 / 0.05 µg/mL	1	atom	Sb, Ir, Cr, Ta
ICP-OES 206.279 nm	0.3 / 0.16 µg/mL	1	atom	Cr, Pt
ICP-MS 82 amu	200 ppt	n/a	M^+	$^{12}C^{35}Cl_2$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter), Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

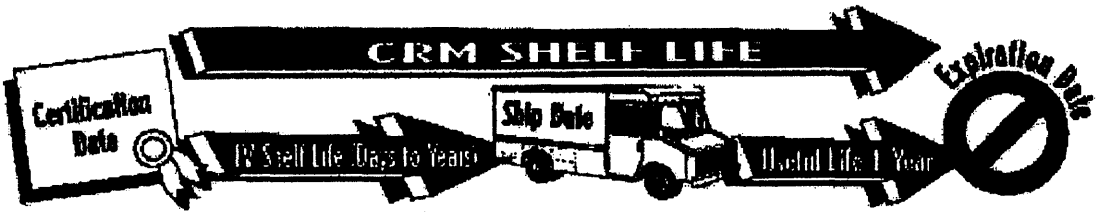
10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

INORGANIC LABS/RADCHEM LABS Pg 2 of 2
DATE RECEIVED: 07/01/04
DATE EXPIRED: 08/01/2005 NOS
DATE OPENED: 07/01/04
INORG: 4630 PO: F53406

010507

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: February 23, 2004

Expiration Date: EXPIRES 01 AUG 2005

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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inorganic ventures / iv labs

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phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 DESCRIPTION OF CRM

Custom-Grade **1000 µg/mL Thallium in 0.5% (abs) HNO_3**

Catalog Number:	CGTL1-1, CGTL1-2, and CGTL1-5
Lot Number:	**X-TL01091**
Starting Material:	TINO3
Starting Material Purity (%):	99.999824
Starting Material Lot No	G09P28
Matrix:	0.5% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 1/27/05
DATE EXPIRED: 2/1/06
DATE OPENED: 1/28/05 DR
INORG: 4990 PO: F55133

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 999 ± 3 µg/mL

Certified Density: 1.001 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value $(\bar{x}) = \frac{\sum x_i}{n}$

Uncertainty $(\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum S$ = The summation of all significant estimated errors (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

• "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

• This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **999 ± 3 µg/mL (Avg of 2 runs)**
ICP Assay NIST SRM 3158 Lot Number: 993012

Assay Method #2 **1000 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

M	Al	< 0.02018	M	Dy	< 0.01211	O	Li	< 0.00002	M	Pr	< 0.00061	M	Te	< 0.06055
M	Sb	< 0.00101	M	Er	< 0.01009	M	Lu	< 0.00081	M	Re	< 0.00202	M	Tb	< 0.00061
M	As	< 0.02018	M	Eu	< 0.00606	O	Mg	0.00030	M	Rh	< 0.00202	s	Tl	
M	Ba	< 0.02018	M	Gd	< 0.00202	M	Mn	< 0.00807	M	Rb	< 0.00202	M	Th	< 0.00202
M	Be	< 0.00101	M	Ga	< 0.00202	O	Hg	< 0.01200	M	Ru	< 0.00404	M	Tm	< 0.00081
M	Bi	< 0.00081	M	Ge	< 0.01211	M	Mo	< 0.00404	M	Sm	< 0.00202	M	Sn	< 0.01009
O	B	< 0.00140	M	Au	< 0.00606	M	Nd	< 0.00404	M	Sc	< 0.02018	M	Ti	< 0.10091
O	Cd	< 0.00540	M	Hf	< 0.00404	O	Ni	< 0.00090	M	Se	< 0.01615	M	W	< 0.02018
O	Ca	0.00015	M	Ho	< 0.00101	M	Nb	< 0.00101	O	Si	< 0.00340	M	U	< 0.00404
M	Ce	< 0.01009	M	In	< 0.02018	n	Os		M	Ag	< 0.00404	M	V	< 0.00404
M	Cs	< 0.00061	M	Ir	< 0.01009	M	Pd	< 0.01009	O	Na	0.00124	M	Yb	< 0.00202
M	Cr	< 0.01009	O	Fe	< 0.00100	O	P	< 0.00260	M	Sr	< 0.00101	M	Y	< 0.08073
M	Co	< 0.00606	M	La	< 0.00101	M	Pt	< 0.00404	O	S	< 0.03000	O	Zn	0.00154
M	Cu	< 0.01211	M	Pb	< 0.00606	O	K	< 0.00180	M	Ta	< 0.01413	M	Zr	< 0.01009

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

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7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 204.383; +1; 6; $Tl(H_2O)_6^{+}$

Chemical Compatibility - Soluble in HCl, HNO_3, and H_2SO_4. Stable with most metals and inorganic anions. The sulfite, thiocyanate and oxalate are moderately soluble; the phosphate and arsenite are slightly soluble and the sulfide is insoluble.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 2-5% HNO_3 / LDPE container.

Tl Containing Samples (Preparation and Solution) - Metal (Best dissolved in HNO_3 which forms chiefly the Tl^{+} ion.) Oxide (The thallous oxide is readily soluble in water. The thallic oxide requires high levels of acid); Ores (Carbonate fusion in Pt^{+} followed by HCl dissolution); Organic Matrices (Sulfuric/peroxide digestion or dry ash and dissolution in HCl).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES	190.864 nm	0.04 / 0.004 µg/mL	1	ion	V, Ti
ICP-OES	276.787 nm	0.1 / 0.01 µg/mL	1	atom	Ta, V, Fe, Cr
ICP-OES	351.924 nm	0.2 / 0.02 µg/mL	1	atom	Th, Ce, Zr
ICP-MS	205 amu	2 ppt	n/a	M^{+}	^{187}OsO

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105

Recognized by:

Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)

Members of IQ Net International Certification Network:

Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter), Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:

Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

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11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

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11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: August 05, 2004

Expiration Date: EXPIRES 1 FEB 2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Nick Maida, QA Administrator	Nicholas Maida
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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inorganic ventures / iv labs

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e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Boron in H_2O**

Catalog Number:	CGB1-1, CGB1-2, and CGB1-5
Lot Number:	**X-B02047**
Starting Material:	H3BO3
Starting Material Purity (%):	99.999998
Starting Material Lot No	OV0133
Matrix:	H_2O

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 2/28/05
DATE EXPIRED: 3/1/2006 DR
DATE OPENED: 2/28/05
INORG: 5047 PO: F55148

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 1005 ± 2 µg/mL

Certified Density: 0.999 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value $(\bar{x}) = \frac{\sum x_i}{n}$

Uncertainty $(\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum S$ = The summation of all significant estimated errors (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1005 ± 2 µg/mL (Avg 2 runs)**

ICP Assay NIST SRM 3107 Lot Number: 991907

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4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O Al < 0.00090	M Dy < 0.00600	O Li < 0.00002	M Pr < 0.00030	M Te < 0.03000
M Sb < 0.00050	M Er < 0.00500	M Lu < 0.00040	M Re < 0.00100	M Tb < 0.00030
M As < 0.01000	M Eu < 0.00300	O Mg < 0.00006	M Rh < 0.00100	M Tl < 0.00100
O Ba < 0.00010	M Gd < 0.00100	O Mn < 0.00002	M Rb < 0.00100	M Th < 0.00100
O Be < 0.00017	O Ga < 0.00160	O Hg < 0.01500	M Ru < 0.00200	M Tm < 0.00040
M Bi < 0.00040	M Ge < 0.00600	M Mo < 0.00200	M Sm < 0.00100	M Sn < 0.00500
s B	M Au < 0.00300	M Nd < 0.00200	O Sc < 0.00002	M Ti < 0.05000
M Cd < 0.00300	M Hf < 0.00200	O Ni < 0.00230	O Se < 0.00620	M W < 0.01000
O Ca < 0.00007	M Ho < 0.00050	M Nb < 0.00050	O Si 0.00067	M U < 0.00200
O Ce < 0.00300	M In < 0.01000	n Os	M Ag < 0.00200	O V < 0.00083
M Cs < 0.00030	M Ir < 0.00500	M Pd < 0.00500	O Na < 0.00010	M Yb < 0.00100
M Cr < 0.00500	O Fe < 0.00110	O P < 0.00250	M Sr < 0.00050	M Y < 0.04000
O Co < 0.00110	M La < 0.00050	M Pt < 0.00200	O S < 0.10000	O Zn < 0.00019
M Cu < 0.00600	M Pb < 0.00300	O K < 0.00300	M Ta < 0.00700	M Zr < 0.00500

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 10.811; +3; 4; $B(OH)_3$ and $B(OH)_4^-$

Chemical Compatibility - Moderately soluble in HCl, HNO_3, H_2SO_4 and HF aqueous matrices and very soluble in NH_4OH. Stable with all metals and inorganic anions at low to moderate ppm levels.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-1,000 ppm solutions chemically stable for years in 1% HNO_3 / LDPE container. 1000 -10,000 ppm stable for years in dilute NH_4OH / LDPE container.

B Containing Samples (Preparation and Solution) - Metal (Crystalline form is scarcely attacked by acids or alkaline solutions; amorphous form is soluble in conc. HNO_3 or H_2SO_4); $B(OH)_3$ (water soluble); Ores(avoid acid digestions and use caustic fusions in Pt*); Organic Matrices (dry ash mixed with Na_2CO_3 in Pt* at 450°C then increase heat to 1000°C to fuse; or perform a Na_2O_2 fusion in a Ni* crucible / Parr bomb).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES	249.773 nm	0.003 / 0.001 µg/mL	1	atom	W, Ce, Co, Th, Ta, Mn, Mo, Fe
ICP-OES	249.678 nm	0.004 / 0.003 µg/mL	1	atom	Os, W, Co, Cr, Hf
ICP-OES	208.959 nm	0.007 / 0.0005 µg/mL	1	atom	Mo
ICP-MS	11 amu	700 ppt	n/a	M'	

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

010515

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: April 13, 2004

Expiration Date: EXPIRES 1 MAR 2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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inorganic ventures / iv labs

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e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Molybdenum in H_2O tr. NH_4OH**

Catalog Number:	CGMO1-1, CGMO1-2, and CGMO1-5
Lot Number:	**X-MO02004**
Starting Material:	$(NH_4)_6Mo_7O_{24}xH_2O$
Starting Material Purity (%):	99.995645
Starting Material Lot No	23221
Matrix:	H_2O tr. NH_4OH

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 2/28/05
DATE EXPIRED: 3/1/2006
DATE OPENED: 2/28/05 DR
INORG: 5050 PO: F55148

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 1002 ± 3 µg/mL

Certified Density: 0.998 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value $(\bar{x}) = \frac{\sum x_i}{n}$

Uncertainty $(\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum S$ = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1000 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

Assay Method #2 **1002 ± 3 µg/mL (Avg 2 runs)**
ICP Assay NIST SRM 3134 Lot Number: 891307

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1 of 4

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	< 0.05000	M	Dy	< 0.01202	O	Li	< 0.01000	O	Pr	< 0.10000	i	Te				
M	Sb	< 0.00100	M	Er	< 0.01002	M	Lu	< 0.00080	M	Re	0.00541	M	Tb	< 0.00060			
M	As	0.00801	M	Eu	< 0.00601	O	Mg	< 0.05000	M	Rh	< 0.00200	M	Tl	< 0.00200			
M	Ba	< 0.02004	M	Gd	< 0.00200	M	Mn	< 0.00801	M	Rb	< 0.00200	M	Th	< 0.00200			
M	Be	< 0.00100	M	Ga	< 0.00200	i	Hg		M	Ru	< 0.00401	M	Tm	< 0.00080			
M	Bi	< 0.00080	M	Ge	< 0.01202	s	Mo		M	Sm	< 0.00200	M	Sn	< 0.01002			
O	B	< 0.50000	M	Au	< 0.00601	O	Nd	< 0.05000	O	Sc	< 0.05000	O	Ti	< 0.00500			
O	Cd	< 0.50000	M	Hf	< 0.00401	M	Ni	< 0.01603	M	Se	< 0.01603	M	W	0.03907			
O	Ca	0.00150	M	Ho	< 0.00100	M	Nb	< 0.00100	O	Si	< 0.10000	M	U	< 0.00401			
O	Ce	< 0.05000	M	In	< 0.02004	n	Os		M	Ag	< 0.00401	M	V	< 0.00401			
M	Cs	< 0.00060	M	Ir	< 0.01002	M	Pd	< 0.01002	O	Na	< 0.10000	M	Yb	< 0.00200			
M	Cr	< 0.01002	O	Fe	< 0.50000	i	P		M	Sr	< 0.00100	M	Y	< 0.08014			
M	Co	< 0.00601	M	La	< 0.00100	M	Pt	< 0.00401	i	S		M	Zn	< 0.04007			
M	Cu	< 0.01202	M	Pb	< 0.00601	O	K	0.03500	M	Ta	< 0.01403	M	Zr	< 0.01002			

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

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7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 95.94; +6; 6,7,8,9; $[MoO_4]^{-2}$ (chemical form as received)

Chemical Compatibility - Mo is received in a NH_4OH matrix giving the operator the option of using HCl or HF to stabilize acidic solutions. The $[MoO_4]^{-2}$ is soluble in concentrated HCl $[MoOCl_4]^{-2}$, dilute HF / HNO_3 $[MoOF_5]^{-2}$ and basic media $[MoO_4]^{-2}$. Stable at ppm levels with some metals provided it is fluorinated. Do not mix with Alkaline or Rare Earths when HF is present. Stable with most inorganic anions provided it is in the $[MoO_4]^{-2}$ chemical form.

Stability - 2-100 ppb levels stable (alone or mixed with all other metals that are at comparable levels) as the $[MoOF_5]^{-2}$ for months in 1% HNO_3 / LDPE container. 1-10,000 ppm single element solutions as the $[MoO_4]^{-2}$ chemically stable for years in 1% NH_4OH in a LDPE container.

Mo Containing Samples (Preparation and Solution) - Metal (Soluble in HF / HNO_3 or hot dilute HCl); Oxide (soluble in HF or NH_4OH) ; Organic Matrices (Dry ash at 450°C in Pt^4 and dissolve oxide with HF or HCl).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES	202.030 nm	0.008 / 0.0002 µg/mL	1	ion	Os, Hf
ICP-OES	203.844 nm	0.012 / 0.002 µg/mL	1	ion	
ICP-OES	204.598 nm	0.012 / 0.001 µg/mL	1	ion	Ir, Ta
ICP-MS	95 amu	3 ppt	n/a	M⁺	$^{40}Ar^{39}K^{16}O$, $^{79}Br^{16}O$, $^{95}Os^{+}$, $^{195}Pt^{+}$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105

Recognized by:

Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)

Members of IQ Net International Certification Network:

Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:

Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

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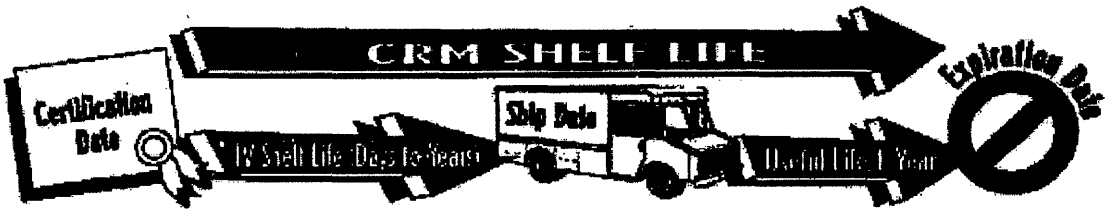
11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: May 26, 2004

Expiration Date: EXPIRES 1 MAR 2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

CUSTOM-GRADE SOLUTION 1000 µg/mL Phosphorus in H_2O

Catalog Number: CGP1-1, CGP1-2 and CGP1-5

Lot Number: **W-P01123**

Starting Material:	Phosphoric Acid
Starting Material Purity:	99.999%
Starting Material Lot No:	J18804

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 06/01/04
DATE EXPIRED: 06/01/2005 V03
DATE OPENED: 06/01/04
INORG: 4593 PO: E53393

CERTIFIED CONCENTRATION: 1006 ± 4 µg/mL

The Certified Value is the wet assay value. The following equations are used in the calculation of the certified value and the uncertainty:

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n} \qquad \text{Uncertainty } (\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$$

($\bar{x}$) = mean x_i = individual results n = number of measurements $\sum S_i$ = The summation of all significant estimated errors.

Classical Wet Assay: 1006 ± 4 µg/mL
Method: Acidimetric Titration vs NIST SRM 84k KHP.

Instrument Analysis: 1002 ± 4 µg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3139a.

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

TRACE METALLIC IMPURITIES DETERMINED BY ICP-MS AND ICP-OES IN µg/mL:

Custom-Grade solutions tested for trace metallic impurities by **ICP-MS** *were analyzed in an* **ULPA-Filtered Clean Room.** An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	<0.040	M	Dy	<0.00060	M	Li	<0.0010	M	Pr	<0.000030	M	Ta	<0.0030
M	Sb	0.012	M	Er	<0.00050	M	Lu	<0.000040	M	Re	<0.00010	M	Tb	<0.000030
M	As	<0.0010	M	Eu	<0.00030	M	Mg	<0.0030	M	Rh	<0.00010	M	Tl	<0.00010
M	Ba	<0.0010	M	Gd	<0.00010	M	Mn	<0.00040	M	Rb	<0.00010	M	Th	<0.00010
M	Be	<0.000050	M	Ga	0.00070	O	Hg	<0.020	M	Ru	<0.00020	M	Tm	<0.000040
M	Bi	<0.000040	M	Ge	<0.00060	M	Mo	<0.00020	M	Sm	<0.00010	M	Sn	<0.00050
M	B	<0.0070	M	Au	<0.00030	M	Nd	<0.00020	n	Sc		n	Ti	
M	Cd	<0.00030	M	Hf	<0.00020	O	Ni	<0.050	O	Se	<0.40	M	W	<0.0010
O	Ca	<0.010	M	Ho	<0.000050	M	Nb	<0.000050	O	Si	<0.020	M	U	<0.00020
M	Ce	<0.00050	M	In	<0.030	n	Os		M	Ag	<0.00020	M	V	<0.00020
M	Cs	<0.000030	M	Ir	<0.00050	M	Pd	<0.00050	O	Na	<0.090	M	Yb	<0.00010
M	Cr	<0.00050	O	Fe	<0.050	s	P		M	Sr	<0.000050	M	Y	<0.0040
M	Co	<0.00030	M	La	<0.000050	M	Pt	<0.00020	n	S		M	Zn	0.0035
M	Cu	0.080	M	Pb	<0.00030	n	K		M	Ta	<0.00070	M	Zr	<0.00050

M - checked by ICP-MS O - checked by ICP-OES i - spectral interference n - not checked for s - solution standard element

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 1.001 g/mL (over)

QA:KL Rev.010804DN

Paul R. Haines
Quality Assurance Manager

Expires: EXPIRES 1 2005

010521

QUALITY STANDARD DOCUMENTATION

1. ISO 9001:2000 QMI Registered Quality System (Certificate Number 010105)

   Members of IQ Net : Argentina **(IRAM)**, Australia **(QAS)**, Austria **(ÖQS)**, Belgium **(Avinter)** , Brazil **(FCAV)**, Canada **(QMI)**, Hong Kong **(HKQAA)**, Columbia **(ICONTEC)**, Czech Republic **(CQS)**, Denmark **(DS)**, Finland **(SFS)**, France **(AFAQ)**, Germany **(DQS)**, Greece **(ELOT)**, Hungary **(MSZT)**, Ireland **(NSAI)**, Israel **(SII)**, Italy **(CISQ)**, Japan **(JQA)**, Korea **(KSA-QA)**, Netherlands **(KEMA)**, Norway **(NCS)**, Poland**(PCBC)**, Portugal **(APCER)**, Singapore **(PSB)**, Slovenia **(SIQ)**, Spain **(AENOR)**, Switzerland **(SQS)**

2. ISO/IEC Guide 34-2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate 883.02
3. ISO/IEC17025-1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate 883.01
4. MIL-STD-45662A
5. 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licencing of Production and Utilization Facilities
6. 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

   Please contact our Quality Assurance Department for further information and copies of documents pertaining to our Quality Standard certifications.

STABILITY/ EXPIRATION DOCUMENTATION

Shelf Life - The length of time that a properly stored and packaged standard will remain within the specified uncertainty. Shelf life is affected by chemical stability and transpiration issues. Inorganic Ventures' Standard Solutions are chemically stable indefinitely. Transpiration loss is linear with time and limits the time a standard can be used with confidence. The smaller the bottle the higher the rate of transpiration. Inorganic Ventures' studies indicate that the shelf life of our 500 mL bottle is 4 years and the shelf life of our 125 mL bottle is 21 months.

Expiration Date - The date after which a standard solution should not be used. A one year expiration date is recommended by most state and federal regulatory agencies. Transpiration issues and repeated use of solutions over a one year period may adversely affect the integrity of standard.

PACKAGING DOCUMENTATION

Purified acid, 18 megohm double deionized water that has been filtered through a 0.2 μm filter and in-house procedure IV-PACK-001 is used to clean all bottles. Contact us for technical information relating to contamination issues in packaging materials.

GLASSWARE CALIBRATION

In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

BALANCE CALIBRATION

All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 428359B and 454678. The NIST test number is 822/260017-98.

All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-8.

THERMOMETER CALIBRATION

The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceabl to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

TECHNICAL SUPPORT

All customers are encouraged to contact us for technical support for the proper use of our products.

TEL 1-800-569-6799 INT'L 1-732-901-1900 FAX 1-732-901-1903 E-MAIL IVtech@ivstandards.com

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inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Silicon in H_2O tr. HNO_3 tr. HF**

Catalog Number:	CGSI1-1, CGSI1-2, and CGSI1-5
Lot Number:	**X-SI02087**
Starting Material:	SiO2
Starting Material Purity (%):	99.996367
Starting Material Lot No	C05310C
Matrix:	H_2O tr. HNO_3 tr. HF

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 1/31/05 AR
DATE EXPIRED: 3/1/2006 AR
DATE OPENED: 1/31/05
#NORG: 4999 PO: E55139

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 996 ± 2 µg/mL

Certified Density: 1.002 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value ($\bar{x}$) = $\frac{\Sigma x_i}{n}$

Uncertainty (±) = $\frac{2[(\Sigma s_i)^2]^{1/2}}{(n)^{1/2}}$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
Σs_i = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **996 ± 2 µg/mL**
ICP Assay NIST SRM 3150 Lot Number: 991108

Assay Method #2 **999 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

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4999

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	0.02730	M	Dy	< 0.01358	O	Li	< 0.00009	M	Pr	< 0.00068	M	Te	< 0.06791
M	Sb	< 0.00113	M	Er	< 0.01132	M	Lu	< 0.00091	M	Re	< 0.00226	M	Tb	< 0.00068
M	As	< 0.02264	M	Eu	< 0.00679	O	Mg	< 0.04991	M	Rh	< 0.00226	M	Tl	< 0.00226
M	Ba	< 0.02264	M	Gd	< 0.00226	M	Mn	< 0.00906	M	Rb	< 0.00226	M	Th	< 0.00226
O	Be	< 0.00091	M	Ga	< 0.00226	O	Hg	< 0.04991	M	Ru	< 0.00453	M	Tm	< 0.00091
M	Bi	< 0.00091	M	Ge	< 0.01358	M	Mo	< 0.00453	M	Sm	< 0.00226	M	Sn	< 0.01132
O	B	0.02409	M	Au	< 0.00679	M	Nd	< 0.00453	O	Sc	< 0.00091	O	Ti	0.01325
M	Cd	< 0.00679	M	Hf	< 0.00453	O	Ni	< 0.01044	M	Se	< 0.01811	M	W	< 0.02264
O	Ca	0.00135	M	Ho	< 0.00113	M	Nb	< 0.00113	s	Si		M	U	< 0.00453
M	Ce	< 0.01132	M	In	< 0.02264	n	Os		M	Ag	< 0.00453	O	V	< 0.00408
M	Cs	< 0.00068	M	Ir	< 0.01132	M	Pd	< 0.01132	O	Na	0.02008	M	Yb	< 0.00226
O	Cr	< 0.00681	O	Fe	< 0.00499	O	P	< 0.02269	O	Sr	< 0.00032	M	Y	< 0.09055
M	Co	< 0.00679	M	La	< 0.00113	M	Pt	< 0.00453	O	S	< 0.11342	M	Zn	< 0.04528
O	Cu	< 0.00454	M	Pb	< 0.00679	O	K	< 0.00771	M	Ta	0.00200	M	Zr	< 0.01132

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

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7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 28.0855; +4; 6; $Si(OH)_4(F)_2^{2-}$

Chemical Compatibility - Soluble in HCl, HF, H_3PO_4, H_2SO_4 and HNO_3 as the $Si(OH)_4(F)_2^{2-}$. Avoid neutral to basic media. Unstable at ppm levels with metals that would pull F^- away (i.e. Do not mix with Alkaline or Rare Earths, or high levels of transition elements unless they are fluorinated). Stable with most inorganic anions with a tendency to hydrolyze forming silicic acid (silicic acid is soluble up to ~100 ppm in water) in all dilute acids except HF.

Stability - 2-100 ppb levels - stability unknown - (alone or mixed with all other metals) as the $Si(OH)_4(F)_2^{2-}$. 1-10,000 ppm single element solutions as the $Si(OH)_4(F)_2^{2-}$ chemically stable for years in 2-5 % HNO_3 / trace HF in a LDPE container.

Si Containing Samples (Preparation and Solution) - Metal (Soluble in 1:1:1 H_2O / HF / HNO_3); Oxide - SiO_2, amorphic (Dissolve by heating in 1:1:1 H_2O / HF / HNO_3); Oxide - quartz (Fuse in Pt^0 with Na_2CO_3); Geological Samples (Fuse in Pt^0 with Na_2CO_3 followed by HCl solution of the fuseate); Organic Matrices containing silicates and non volatile silicon compounds (Dry ash at 450°C in Pt^0 and dissolve by gently warming with 1:1:1 H_2O / HF / H_2SO_4 or fuse / ash with Na_2CO_3 and dissolve fuseate with HCl / H_2O); Silicone Oils - dimethyl silicones depolymerize to form volatile monomer units when heated (Measure directly in alcoholic KOH / xylene mixture where sample is treated first with the KOH at 60-100 °C to "unzip" the Si-O-Si polymeric structure or digest with concentrated H_2SO_4/H_2O_2 followed by cooling and dissolution of the dehydrated silica with HF.) Note that the direct analysis of silicone oils in an organic solvent will result in false high results due to high vapor pressure of volatile monomer units like hexamethylcyclotrisiloxane. The KOH forms the $K_2^+Si(CH_3)_2O^-$ salt which is not volatile at room temperature.

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at 1000 ppm.)
ICP-OES	251.611 nm	0.012 / 0.003 µg/mL	1	ion	Ta, U, Zn, Th
ICP-OES	212.412 nm	0.02 / 0.01 µg/mL	1	ion	Hf, Os, Mo, Ta
ICP-OES	288.158 nm	0.03 / 0.004 µg/mL	1	ion	Ta, Ce, Cr, Cd, Th
ICP-MS	28 amu	4000 - 8000 ppt	n/a	M⁺	$^{14}N_2$, $^{12}C^{16}O$

HF Note: This standard should not be prepared or stored in glass.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter), Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

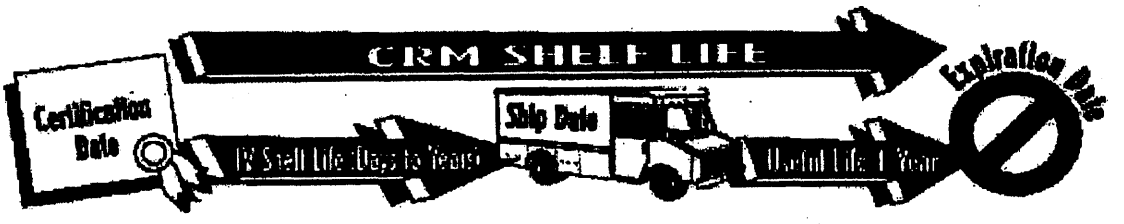
10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

010525

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: March 24, 2004

Expiration Date: EXPIRES 01/2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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4999

010526

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195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Titanium in 1.4% (abs) HNO_3 tr. HF**

Catalog Number:	CGTI1-1, CGTI1-2, and CGTI1-5
Lot Number:	**X-QTI01116**
Starting Material:	Ti granules
Starting Material Purity (%):	99.960814
Starting Material Lot No	K27M07
Matrix:	1.4% (abs) HNO_3 tr. HF

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 998 ± 4 µg/mL

Certified Density: 1.010 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value $(\bar{x}) = \frac{\sum_{i=1} x_i}{n}$

Uncertainty $(\pm) = \frac{2(\sum s_i)^2)^{1/2}}{(n)^{1/2}}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum S$ = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

- "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)
- This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **998 ± 4 µg/mL (Avg 2 runs)**
ICP Assay NIST SRM 3162a Lot Number: 992801

Assay Method #2 **1002 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

INORGANIC LABS/RADCHEM LABS pg. 1 of 2
DATE RECEIVED: 12/02/04
DATE EXPIRED: 12/01/2005 VOS
DATE OPENED: 12/02/04
INORG: 4908 PO: F55102

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	< 0.01201	M	Dy	< 0.01190	O	Li	< 0.00080	M	Pr	< 0.00060	M	Te	< 0.05951
M	Sb	< 0.00099	M	Er	< 0.00992	M	Lu	< 0.00079	M	Re	< 0.00198	M	Tb	< 0.00060
M	As	< 0.01984	M	Eu	< 0.00595	O	Mg	< 0.00040	M	Rh	< 0.00198	M	Tl	< 0.00198
M	Ba	< 0.01984	M	Gd	< 0.00198	O	Mn	0.00161	M	Rb	< 0.00198	M	Th	< 0.00198
M	Be	< 0.00099	M	Ga	< 0.00198	O	Hg	< 0.06004	M	Ru	< 0.00397	M	Tm	< 0.00079
M	Bi	< 0.00079	M	Ge	< 0.01190	M	Mo	< 0.00397	M	Sm	< 0.00198	M	Sn	< 0.00992
O	B	< 0.00801	M	Au	< 0.00595	M	Nd	< 0.00397	O	Sc	< 0.00008	s	Ti	
M	Cd	< 0.00595	M	Hf	< 0.00397	M	Ni	< 0.01587	M	Se	< 0.01587	M	W	< 0.01984
O	Ca	< 0.00024	M	Ho	< 0.00099	M	Nb	< 0.00099	O	Si	< 0.01601	M	U	< 0.00397
M	Ce	< 0.00992	M	In	< 0.01984	n	Os		M	Ag	< 0.00397	O	V	< 0.00801
M	Cs	< 0.00060	M	Ir	< 0.00992	M	Pd	< 0.00992	O	Na	0.14051	M	Yb	< 0.00198
M	Cr	< 0.00992	O	Fe	< 0.00400	O	P	< 0.02001	M	Sr	< 0.00099	M	Y	< 0.07935
M	Co	< 0.00595	M	La	< 0.00099	M	Pt	< 0.00397	I	S		O	Zn	< 0.00080
O	Cu	< 0.01201	M	Pb	< 0.00595	O	K	0.26095	M	Ta	< 0.01389	M	Zr	< 0.00992

M - Checked by ICP-MS O - Checked by ICP-OES I - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

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7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 47.867; +4; 6; $Ti(F)_6^{=}$

Chemical Compatibility - Soluble in concentrated HCl, HF, H_3PO_4, H_2SO_4 and HNO_3. Avoid neutral to basic media. Unstable at ppm levels with metals that would pull F away (i.e. Do not mix with Alkaline or Rare Earths or high levels of transition elements unless they are fluorinated). Stable with most inorganic anions with a tendency to hydrolyze forming the hydrated oxide in all dilute acids except HF.

Stability - 2-100 ppb levels stable (Alone or mixed with all other metals) as the $Ti(F)_6^{=}$ for months in 1% HNO_3 / LDPE container. 1-10,000 ppm single element solutions as the $Ti(F)_6^{=}$ chemically stable for years in 2-5% HNO_3 / trace HF in an LDPE container.

Ti Containing Samples (Preparation and Solution) - Metal (Soluble in H_2O / HF *caution -powder reacts violently*); Oxide - low temperature history *anatase or rutile* (Dissolved by heating in 1:1:1 H_2O / HF / H_2SO_4); Oxide - high temperature history (~800°C) *brookite* (fuse in Pt* with $K_2S_2O_7$); Ores (fuse in Pt* with KF + $K_2S_2O_7$ - no KF if silica not present); Organic Matrices (Dry ash at 450°C in Pt* and dissolve by heating with 1:1:1 H_2O / HF / H_2SO_4 or fuse ash with pyrosulfate if oxide is as plastic pigment and likely in brookite crystalline form).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES 334.941 nm	0.0038 / 0.000028 µg/mL	1	ion	Nb, Ta, Cr, U
ICP-OES 336.121 nm	0.0053 / 0.000034 µg/mL	1	ion	W, Mo, Co
ICP-OES 323.452 nm	0.0054 / 0.00092 µg/mL	1	ion	Ce, Ar, Ni
ICP-MS 48 amu	14 ppt	n/a	M^+	$^{32}S^{16}O$, $^{32}S^{14}N$, $^{14}N^{16}O^{16}O$, $^{14}N^{14}N$, $^{40}Ar^{12}C$, ^{48}Ca, [$^{96}X^{+}$ (where X = Zr, Mo, Ru)]

HF Note: This standard should not be prepared or stored in glass.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010106
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter), Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

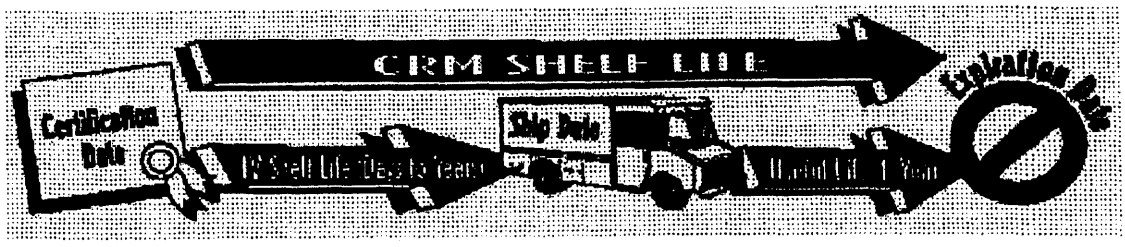
10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

INORGANIC LABS/RADCHEM LABS Pg 2 of 2
DATE RECEIVED: 12/02/04
DATE EXPIRED: 12/01/2005 v03
DATE OPENED: 12/02/04
INORG: 4908 PO: F55102

010529

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: September 28, 2004

Expiration Date:

EXPIRES
1 2 2005

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Nick Maida, QA Administrator	Nicholas T Maida
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul Gaines

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inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
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certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Strontium in 0.1% (abs) HNO_3**

Catalog Number:	CGSR1-1, CGSR1-2, and CGSR1-5
Lot Number:	**W-SR01124**
Starting Material:	$SrCO_3$
Starting Material Purity (%):	99.996751
Starting Material Lot No	22593, 22878
Matrix:	0.1% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS 1 of 2
DATE RECEIVED: 7/8/04
DATE EXPIRED: 8/1/2005 DR
DATE OPENED: 7/8/04
INORG: 4635 PO: F53408

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 1004 ± 2 µg/mL

Certified Density: 1.001 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value ($\bar{x}$) = $\frac{\Sigma x_i}{n}$

Uncertainty (±) = $\frac{2[(\Sigma s_i)^2]^{1/2}}{(n)^{1/2}}$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
Σs_i = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1005 ± 2 µg/mL**
ICP Assay NIST SRM 3153a Lot Number: 990906

Assay Method #2 **1004 ± 2 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	<	0.00090	M	Dy	<	0.00055	O	Li	<	0.00003	M	Pr	<	0.00003	O	Te	<	0.10000
M	Sb	<	0.00005	M	Er	<	0.00046	M	Lu	<	0.00004	M	Re	<	0.00009	M	Tb	<	0.00003
O	As	<	0.00500	M	Eu	<	0.00028	O	Mg		0.00030	O	Rh	<	0.00600	M	Tl	<	0.00009
O	Ba		0.02200	M	Gd	<	0.00009	O	Mn	<	0.00003	i	Rb			M	Th	<	0.00009
O	Be	<	0.00009	M	Ga	<	0.00009	O	Hg	<	0.01500	O	Ru	<	0.00300	M	Tm	<	0.00004
M	Bi	<	0.00004	M	Ge	<	0.00055	M	Mo	<	0.00018	M	Sm	<	0.00009	M	Sn	<	0.00046
O	B	<	0.00060	M	Au	<	0.00028	M	Nd	<	0.00018	M	Sc	<	0.00092	M	Ti	<	0.00459
M	Cd	<	0.00028	M	Hf	<	0.00018	O	Ni	<	0.00300	O	Se	<	0.05000	M	W	<	0.00092
O	Ca		0.02500	M	Ho	<	0.00005	M	Nb	<	0.00005	O	Si	<	0.00340	M	U	<	0.00018
M	Ce	<	0.00046	O	In	<	0.00200	n	Os			M	Ag	<	0.00018	M	V	<	0.00018
M	Cs	<	0.00003	M	Ir	<	0.00046	O	Pd	<	0.00400	O	Na		0.00410	M	Yb	<	0.00009
O	Cr	<	0.00080	O	Fe	<	0.00110	O	P	<	0.00480	s	Sr			O	Y	<	0.00004
M	Co	<	0.00028	M	La	<	0.00005	M	Pt	<	0.00018	n	S			O	Zn		0.00720
O	Cu	<	0.00140	M	Pb	<	0.00028	O	K	<	0.00170	M	Ta	<	0.00064	M	Zr	<	0.00046

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.
Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 87.62; +2; 6; $Sr(H_2O)_6^{+2}$
Chemical Compatibility - Soluble in HCl, and HNO_3. Avoid H_2SO_4, HF and neutral to basic media. Stable with most metals and inorganic anions forming insoluble silicate, carbonate, hydroxide, oxide, fluoride, sulfate, oxalate, chromate, arsenate and tungstate in neutral aqueous media.
Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1 - 3.5% HNO_3 / LDPE container.
Sr Containing Samples (Preparation and Solution) - Metal (Best dissolved in diluted HNO_3); Ores (Carbonate fusion in Pt* followed by HCl dissolution); Organic Matrices (Dry ash and dissolution in dilute HCl).
Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≤50ppm.)
ICP-OES	407.771 nm	0.0004 / 0.00008 µg/mL	1	ion	U, Ce
ICP-OES	421.552 nm	0.0008 / 0.00004 µg/mL	1	ion	Rb
ICP-OES	460.733 nm	0.07 / 0.003 µg/mL	1	atom	Ce
ICP-MS	88 amu	1200 ppt	n/a	M+	$^{72}Ge^{16}O$, $^{176}Yb^{+2}$, $^{176}Lu^{+2}$, $^{176}Hf^{+2}$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

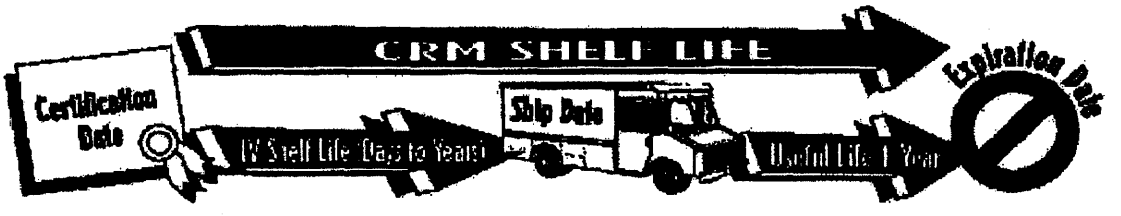
10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: October 22, 2003

Expiration Date: EXPIRES 01 2005

INORGANIC LABS/RADCHEM LABS 2 of 2
DATE RECEIVED: 7/8/04
DATE EXPIRED: 8/1/2005
DATE OPENED: 7/8/04
INORG: 4635 PO: DR/F53408

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Supervisor	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010534

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phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Tin in H_2O tr. HNO_3 tr. HF**

Catalog Number:	CGSN1-1, CGSN1-2, and CGSN1-5
Lot Number:	**X-SN01115**
Starting Material:	Sn Shot
Starting Material Purity (%):	99.999438
Starting Material Lot No	G12M23
Matrix:	H_2O tr. HNO_3 tr. HF

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 995 ± 2 µg/mL

Certified Density: 0.998 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value ($\bar{x}$) = $\frac{\Sigma x_i}{n}$

Uncertainty (±) = $\frac{2[(\Sigma s_i)^2]^{1/2}}{(n)^{1/2}}$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
Σs_i = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **995 ± 2 µg/mL (Avg 2 runs)**
ICP Assay NIST SRM 3161a Lot Number: 993107

Assay Method #2 **998 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 03/30/04
DATE EXPIRED: 04/01/2005 VOS
DATE OPENED: 03/30/04
INORG: 4512 PO: E53361

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al		0.00050	M	Dy	<	0.01205	O	Li	<	0.00002	M	Pr	<	0.00060	M	Te	<	0.06026
O	Sb	<	0.01000	M	Er	<	0.01004	M	Lu	<	0.00080	M	Re	<	0.00201	M	Tb	<	0.00060
M	As	<	0.02009	M	Eu	<	0.00603	O	Mg	<	0.00003	M	Rh	<	0.00201	M	Tl	<	0.00201
O	Ba	<	0.00070	M	Gd	<	0.00201	M	Mn	<	0.00804	M	Rb	<	0.00201	M	Th	<	0.00201
M	Be	<	0.00100	M	Ga	<	0.00201	O	Hg	<	0.01500	M	Ru	<	0.00402	M	Tm	<	0.00080
M	Bi	<	0.00080	M	Ge	<	0.01205	M	Mo	<	0.00402	M	Sm	<	0.00201	s	Sn		
O	B	<	0.01200	M	Au	<	0.00603	M	Nd	<	0.00402	M	Sc	<	0.02009	M	Ti	<	0.10043
O	Cd		0.00009	M	Hf	<	0.00402	O	Ni	<	0.01000	M	Se	<	0.01607	M	W	<	0.02009
O	Ca	<	0.00150	M	Ho	<	0.00100	M	Nb	<	0.00100	O	Si	<	0.00340	M	U	<	0.00402
M	Ce	<	0.01004	M	In	<	0.02009	n	Os			M	Ag	<	0.00402	M	V	<	0.00402
M	Cs	<	0.00060	M	Ir	<	0.01004	M	Pd	<	0.01004	O	Na	<	0.00010	M	Yb	<	0.00201
M	Cr	<	0.01004	O	Fe	<	0.00110	O	P	<	0.00500	M	Sr	<	0.00100	M	Y	<	0.08035
O	Co	<	0.00200	M	La	<	0.00100	M	Pt	<	0.00402	n	S			M	Zn	<	0.04017
M	Cu	<	0.01205	M	Pb		0.00593	O	K	<	0.00200	M	Ta	<	0.01406	M	Zr	<	0.01004

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 118.710; +4; 4,5, 6,7,8 $Sn(OH)_xF_y^{z-}$

Chemical Compatibility - Soluble in HCl and dilute HF / HNO_3. Avoid neutral to basic media. Unstable at ppm levels with metals that would pull F^- away. (i.e. Do not mix with Alkaline or Rare Earths or high levels of transition elements unless they are fluorinated.) Stable with most inorganic anions provided it is in the chemical form shown above.

Stability - 2-100 ppb levels stable (alone or mixed with all other metals that are at comparable levels) as the $Sn(OH)_xF_y^{z-}$ for 1 year in 1% HNO_3 / LDPE container. 1-10,000 ppm single element solutions as the $Sn(OH)_xF_y^{z-}$ chemically stable for years in 2-5% HNO_3 / trace HF in a LDPE container.

Sn Containing Samples (Preparation and Solution) - Metal (Soluble in HF / HNO_3 or HCl); Oxides - SnO (soluble in HCl), SnO_2 -very resistant to all acids including HF (Fusion with equal parts of Na_2CO_3 and S. It is then soluble in water or dilute acids as the thiostannate.); Alloys (Treat first 0.1 g with 10 mL conc. H_2SO_4 to boiling until the alloy disintegrates and nearly all of the sulfuric acid is expelled. Then add 100 mL O_2 free water and 50 mL of conc HCl or transfer to a plastic container and add 1 mL HF in either case warming gently to bring about solution.); Organic Matrices (Volatility and precipitation of the insoluble stannic oxide are problems. Consultation of the literature should be made for individual matrices / Sn compounds.)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ppm conc.)
ICP-OES 189.989 nm	0.03 / 0.003 µg/mL	1	ion	
ICP-OES 242.949 nm	0.1 / 0.01 µg/mL	1	atom	W, Mo, Rh, Ta, Co
ICP-MS 120 amu	5 ppt	n/a	M⁺	^{120}Te, $^{104}Ru^{16}O$, $^{104}Pd^{16}O$

HF Note: This standard should not be prepared or stored in glass.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter), Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

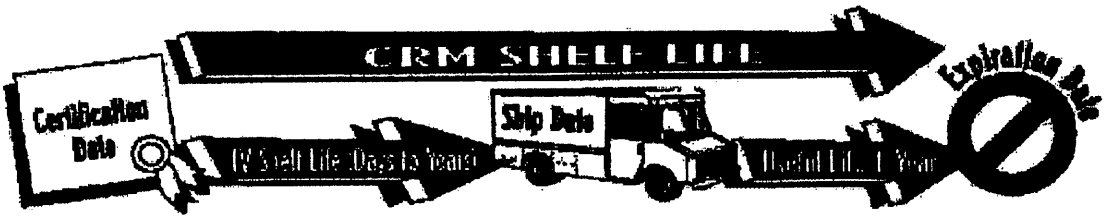
10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

INORGANIC LABS/RADCHEM LABS P3-2 of 2
DATE RECEIVED: 03/30/04
DATE EXPIRED: 04/01/2005 V05
DATE OPENED: 03/30/04
INORG: 4512 PO: E53361

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 **IV Shelf Life** - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 **Expiration Date** - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: February 11, 2004

Expiration Date: EXPIRES 1/2/2005

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010538

inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Bismuth in 3.5% (abs) HNO_3**

Catalog Number:	CGBI1-1, CGBI1-2, and CGBI1-5
Lot Number:	**X-BI01091**
Starting Material:	Bi needles
Starting Material Purity (%):	99.999090
Starting Material Lot No	G25L16
Matrix:	3.5% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 07/29/04
DATE EXPIRED: 08/01/2005 V05
DATE OPENED: 07/29/04
INORG: 4658 PO: E53417

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 999 ± 2 µg/mL

Certified Density: 1.026 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value ($\bar{x}$) = $\frac{\Sigma x_i}{n}$

Uncertainty (±) = $\frac{2[(\Sigma s_i)^2]^{1/2}}{(n)^{1/2}}$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
Σs_i = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **999 ± 2 µg/mL (Avg 2 runs)**
ICP Assay NIST SRM 3106 Lot Number: 991212

Assay Method #2 **1003 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	0.00012	M	Dy	< 0.01202	O	Li	< 0.00002	M	Pr	< 0.00060	M	Te	< 0.06008
M	Sb	< 0.00100	M	Er	< 0.01001	M	Lu	< 0.00080	M	Re	< 0.00200	M	Tb	< 0.00060
M	As	< 0.02003	M	Eu	< 0.00601	O	Mg	0.00070	M	Rh	< 0.00200	M	Tl	< 0.00200
M	Ba	< 0.02003	M	Gd	< 0.00200	O	Mn	< 0.00020	M	Rb	< 0.00200	M	Th	< 0.00200
M	Be	< 0.00100	M	Ga	< 0.00200	O	Hg	< 0.01500	M	Ru	< 0.00401	M	Tm	< 0.00080
s	Bi		M	Ge	< 0.01202	M	Mo	< 0.00401	M	Sm	< 0.00200	M	Sn	< 0.01001
M	B	< 0.14018	M	Au	< 0.00601	M	Nd	< 0.00401	M	Sc	< 0.02003	M	Ti	< 0.10013
O	Cd	0.00017	M	Hf	< 0.00401	M	Ni	< 0.01602	M	Se	< 0.01602	M	W	< 0.02003
O	Ca	0.00245	M	Ho	< 0.00100	M	Nb	< 0.00100	O	Si	0.00105	M	U	< 0.00401
M	Ce	< 0.01001	O	In	0.00105	n	Os		M	Ag	< 0.00401	M	V	< 0.00401
M	Cs	< 0.00060	M	Ir	< 0.01001	O	Pd	< 0.00400	O	Na	0.00240	M	Yb	< 0.00200
O	Cr	0.00020	O	Fe	0.00014	O	P	< 0.01000	M	Sr	< 0.00100	M	Y	< 0.08011
M	Co	< 0.00601	M	La	< 0.00100	M	Pt	< 0.00401	O	S	< 0.03000	O	Zn	0.00008
O	Cu	0.00014	O	Pb	0.00135	O	K	0.00039	M	Ta	< 0.01402	M	Zr	< 0.01001

M - Checked by ICP-MS O - Checked by ICP-OES I - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 208.9804; +3; 6 ;$Bi(O)(H_2O)_6^{3+}$

Chemical Compatibility - Stable in HCl, HNO_3, H_2SO_4 and HF. **Avoid** basic media forming insoluble hydroxide. Stable with most metals and inorganic anions in acidic media. Many salts that are insoluble in water are soluble in HCl, HNO_3 and HF. The major problem with Bi^{3+} is its tendency to hydrolyze at higher concentrations or in dilute acid. Nitric acid solutions should be 5% to hold the Bi in solution in the 100 to 10000 µg/mL concentration range

Stability - 2-100 ppb levels stable for months in 1 % HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 5 - 7% HNO_3 / LDPE container.

Bi Containing Samples (Preparation and Solution) - Metal (soluble in HNO_3); Oxides (Soluble in HNO_3); Alloys (Dissolve in conc. 4:1 HCl /HNO_3. Heating may be required.); Organic based (dry ash at 450°C and dissolve ash in HNO_3 or acid digestion with conc. hot sulfuric acid adding hydrogen peroxide dropwise and carefully until clear.)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe interferences.)
ICP-OES	223.061 nm	0.04 / 0.005 µg/mL	1	atom	Th, Ir, Ti Cu
ICP-OES	306.772 nm	0.08 / 0.01 µg/mL	1	atom	Th, U, Zr, Hf, Fe
ICP-OES	222.825 nm	0.1 / 0.02 µg/mL	1	atom	Cr, Hf, Ce, Os
ICP-MS	209 amu	2 ppt	n/a	M^+	$^{193}Ir^{16}O$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO-ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 07/29/04
DATE EXPIRED: 08/01/2005 VOS
DATE OPENED: 07/29/04
INORG: 4658 PO: F53417

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

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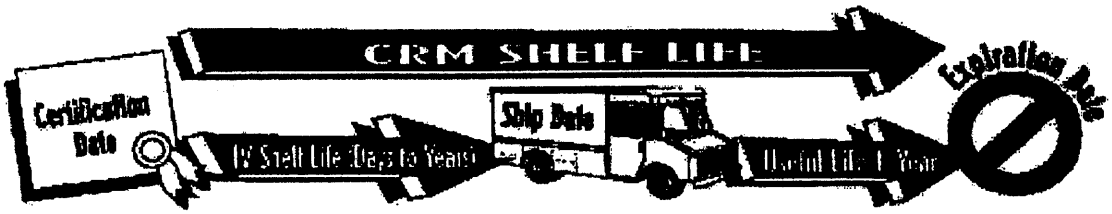

11.1 **IV Shelf Life** - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 **Expiration Date** - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: February 19, 2004

Expiration Date:

EXPIRES
1 2005

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010542

inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Lanthanum in 1.4% (abs) HNO_3**

Catalog Number:	CGLA1-1 and CGLA1-5
Lot Number:	**W-LA01094**
Starting Material:	La2O3
Starting Material Purity (%):	99.991832
Starting Material Lot No	RP-LA-0-5-017
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS 1 of 2
DATE RECEIVED: 09/01/04
DATE EXPIRED: 10/01/2005 VRJ
DATE OPENED: 09/01/04
INORG: 4763 PO: F53434

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 1003 ± 3 µg/mL

Certified Density: 1.010 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value ($\bar{x}$) = $\frac{\Sigma x_i}{n}$

Uncertainty (±) = $\frac{2[(\Sigma s_i)^2]^{1/2}}{(n)^{1/2}}$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
Σs_i = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1003 ± 3 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

Assay Method #2 **1003 ± 4 µg/mL**
ICP Assay NIST SRM 3127a Lot Number: 890402

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

M	Al	< 0.00992	M	Dy	< 0.00595	O	Li	< 0.00002	M	Pr	< 0.00030	M	Te	< 0.02975
M	Sb	< 0.00050	M	Er	< 0.00496	M	Lu	< 0.00040	M	Re	< 0.00099	M	Tb	< 0.00030
M	As	< 0.00992	M	Eu	< 0.00298	O	Mg	0.00281	M	Rh	< 0.00099	M	Tl	< 0.00099
M	Ba	< 0.00992	O	Gd	< 0.00080	O	Mn	< 0.00002	M	Rb	< 0.00099	M	Th	< 0.00099
M	Be	< 0.00050	M	Ga	< 0.00099	i	Hg		M	Ru	< 0.00198	M	Tm	< 0.00040
M	Bi	< 0.00040	M	Ge	< 0.00595	M	Mo	< 0.00198	M	Sm	< 0.00099	M	Sn	< 0.00496
O	B	< 0.03600	M	Au	< 0.00298	M	Nd	0.00020	O	Sc	< 0.00003	M	Ti	< 0.04958
M	Cd	< 0.00298	M	Hf	< 0.00198	M	Ni	< 0.00793	M	Se	< 0.00793	M	W	< 0.00992
O	Ca	0.00903	M	Ho	< 0.00050	M	Nb	< 0.00050	O	Si	< 0.01000	M	U	< 0.00198
O	Ce	< 0.00300	M	In	< 0.00992	n	Os		M	Ag	< 0.00198	O	V	< 0.00080
M	Cs	< 0.00030	M	Ir	< 0.00496	M	Pd	< 0.00496	O	Na	< 0.05000	M	Yb	< 0.00099
M	Cr	< 0.00496	O	Fe	< 0.00150	n	P		O	Sr	< 0.00004	M	Y	< 0.03966
M	Co	< 0.00298	s	La		M	Pt	< 0.00198	O	S	< 0.04300	O	Zn	0.10539
M	Cu	< 0.00595	M	Pb	< 0.00298	O	K	< 0.10000	M	Ta	< 0.00694	O	Zr	< 0.00070

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

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7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 138.9055; +3; 6 to 8, 9,10 for some compounds; $La(OH)_x(H_2O)_y^{3-x}$

Chemical Compatibility - Soluble in HCl, and HNO_3. Avoid HF, H_3PO_4, H_2SO_4 and neutral to basic media. Stable with most metals and inorganic anions forming an insoluble carbonate, oxide, oxalate, and fluoride and sparingly soluble sulfates (La - Eu exhibit low sulfate solubility). Avoid mixing with elements / solutions containing moderate amounts of fluoride.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 2-5 % HNO_3 / LDPE container.

La Containing Samples (Preparation and Solution) - Metal (Soluble in acids); Oxide (Dissolved by heating in H_2O / HNO_3); Ores (Carbonate fusion in Pt° followed by HCl dissolution); Organic Matrices (Dry ash and dissolve in 1:1 H_2O / HCl or HNO_3).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ppm conc.)
ICP-OES	333.749 nm	0.01 / 0.001 µg/mL	1	ion	
ICP-OES	408.672 nm	0.01 / 0.001 µg/mL	1	ion	Th
ICP-OES	412.323 nm	0.01 / 0.001 µg/mL	1	ion	Ce, Th
ICP-MS	139 amu	1 ppt	n/a	M'	$^{123}Sb^{16}O$, $^{123}Te^{16}O$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105

Recognized by:

Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)

Members of IQ Net International Certification Network:

Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:

Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

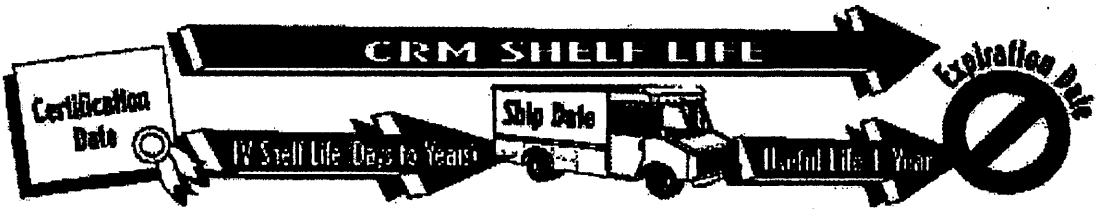
10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

INORGANIC LABS/RADCHEM LABS Pg 2 of 2
DATE RECEIVED: 09/01/04
DATE EXPIRED: 10/01/2005 VOS
DATE OPENED: 09/01/04
INORG: 4763 PO: E53434

010545

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability.

- Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: October 23, 2003

Expiration Date:

EXPIRES
1 2005

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Supervisor	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010546

inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Palladium in 3.3% (abs) HCl**

Catalog Number:	CGPD1-1, CGPD1-2, and CGPD1-5
Lot Number:	**X-PD02027**
Starting Material:	Pd(NO3)2
Starting Material Purity (%):	99.999248
Starting Material Lot No	11974A-00
Matrix:	3.3% (abs) HCl

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 2/28/05 DR
DATE EXPIRED: 3/1/2006
DATE OPENED: 2/28/05
INORG: 5045 PO: F55148

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 1004 ± 1 µg/mL

Certified Density: 1.022 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value $(\bar{x}) = \frac{\sum x_i}{n}$

Uncertainty $(\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum S$ = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1004 ± 1 µg/mL (Avg 2 runs)**
ICP Assay NIST SRM 3138 Lot Number: 990207

Assay Method #2 **1002 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

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1 of 4

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al		0.00400	M	Dy	<	0.00060	O	Li	<	0.04000	M	Pr	<	0.00003	O	Te	<	0.01300
O	Sb	<	0.00500	M	Er	<	0.00050	M	Lu	<	0.00004	M	Re	<	0.00010	M	Tb	<	0.00003
O	As	<	0.01400	M	Eu	<	0.00030	O	Mg	<	0.01100	O	Rh	<	0.00600	M	Tl	<	0.00010
M	Ba	<	0.00100	M	Gd	<	0.00010	O	Mn	<	0.00650	M	Rb	<	0.00010	M	Th	<	0.00010
O	Be	<	0.00009	M	Ga	<	0.00010	O	Hg	<	0.01100	O	Ru	<	0.00200	M	Tm	<	0.00004
M	Bi	<	0.00004	M	Ge	<	0.00060	M	Mo	<	0.00020	M	Sm	<	0.00010	O	Sn	<	0.00700
O	B	<	0.00090	O	Au	<	0.00300	M	Nd	<	0.00020	O	Sc	<	0.00009	O	Ti	<	0.00100
O	Cd	<	0.00600	M	Hf	<	0.00020	O	Ni		0.01800	M	Se	<	0.00080	M	W	<	0.00100
O	Ca		0.00700	M	Ho	<	0.00005	M	Nb	<	0.00005	O	Si		0.00600	M	U	<	0.00020
M	Ce	<	0.00050	O	In	<	0.03300	n	Os			O	Ag	<	0.00670	M	V	<	0.00020
M	Cs	<	0.00003	M	Ir	<	0.00050	s	Pd			O	Na		0.01500	M	Yb	<	0.00010
O	Cr		0.00450	O	Fe		0.04600	O	P		0.00600	M	Sr	<	0.00005	M	Y	<	0.00400
M	Co	<	0.00030	M	La	<	0.00005	O	Pt	<	0.00600	O	S	<	0.02500	O	Zn	<	0.00060
O	Cu		0.00360	M	Pb	<	0.00030	O	K	<	0.02000	M	Ta	<	0.00070	M	Zr	<	0.00050

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.
Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 106.42; +2; 6; $Pd(H_2O)_6^{2+}$
Chemical Compatibility - Stable in HCl, HNO_3, H_2SO_4, HF, H_3PO_4. Avoid basic media. Stable with most metals and inorganic anions in acidic media. Avoid contact with water soluble organics such as aldehydes since Pd^{2+} is easily reduced.
Stability - 2-100 ppb levels. 2ppb Pd is stable for 1 day in 1% HNO_3 / LDPE container. 10 ppb is stable for 3 days in 1% HNO_3 / LDPE container. 100 ppb is stable for ≥ 5 months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO_3 / LDPE container.
Pd Containing Samples (Preparation and Solution) - Metal (Soluble in HNO_3 or Aqua Regia); Oxides (Soluble in HCl); Ores (Dissolve in HCl / HNO_3).
Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES	340.458 nm	0.04 / 0.003 µg/mL	1	atom	Ce, Th, Zr
ICP-OES	363.470 nm	0.05 / 0.007 µg/mL	1	atom	
ICP-OES	229.651 nm	0.07 / 0.004 µg/mL	1	ion	Co
ICP-MS	105 amu	2 ppt	n/a	M'	$^{40}Ar^{65}Cu$, $^{89}Y^{16}O$

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2 of 4

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: July 13, 2004

Expiration Date: EXPIRES 1 MAR 2006

5045

3 of 4

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Nick Maida, QA Administrator	Nicholas Maida
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010550

inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Sulfur in H_2O**

Catalog Number:	CGS1-1, CGS1-2, and CGS1-5
Lot Number:	**X-S01069**
Starting Material:	H2SO4
Starting Material Purity (%):	99.999965
Starting Material Lot No	N38818
Matrix:	H_2O

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 12/9/04
DATE EXPIRED: 01/01/2006 KE
DATE OPENED: 12/19/04
INORG: 49/7 PO: F55102 WS 12/19/04

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 1007 ± 7 µg/mL

Certified Density: 1.000 g/mL (measured at 22° C)

The Certified Value is the instrument analysis value. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value $(\bar{x}) = \frac{\sum x_i}{n}$

Uncertainty $(\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum S_i$ = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1012 ± 2 µg/mL**
Acidimetric NIST SRM 84k Lot Number: 84k

Assay Method #2 **1007 ± 7 µg/mL**
ICP Assay NIST SRM 3154 Lot Number: 892205

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	0.00025	M	Dy	< 0.01197	O	Li	< 0.00016	M	Pr	< 0.00060	M	Te	< 0.05984
M	Sb	< 0.00100	M	Er	< 0.00997	M	Lu	< 0.00080	M	Re	< 0.00200	M	Tb	< 0.00060
M	As	< 0.01995	M	Eu	< 0.00598	O	Mg	< 0.00004	M	Rh	< 0.00200	M	Tl	< 0.00200
M	Ba	< 0.01995	M	Gd	< 0.00200	M	Mn	< 0.00798	M	Rb	< 0.00200	M	Th	< 0.00200
O	Be	< 0.00200	M	Ga	< 0.00200	O	Hg	< 0.01100	M	Ru	< 0.00399	M	Tm	< 0.00080
M	Bi	< 0.00080	M	Ge	< 0.01197	M	Mo	< 0.00399	M	Sm	< 0.00200	M	Sn	< 0.00997
O	B	< 0.00990	M	Au	< 0.00598	M	Nd	< 0.00399	M	Sc	< 0.01995	M	Ti	< 0.09974
M	Cd	< 0.00598	M	Hf	< 0.00399	O	Ni	< 0.00230	O	Se	< 0.00620	M	W	< 0.01995
O	Ca	0.00020	M	Ho	< 0.00100	M	Nb	< 0.00100	O	Si	< 0.00410	M	U	< 0.00399
M	Ce	< 0.00997	M	In	< 0.01995	n	Os		M	Ag	< 0.00399	M	V	< 0.00399
M	Cs	< 0.00060	M	Ir	< 0.00997	M	Pd	< 0.00997	O	Na	< 0.00010	M	Yb	< 0.00200
M	Cr	< 0.00997	O	Fe	0.00015	O	P	< 0.00480	M	Sr	< 0.00100	M	Y	< 0.07979
M	Co	< 0.00598	M	La	< 0.00100	M	Pt	< 0.00399	s	S		O	Zn	0.00125
M	Cu	< 0.01197	M	Pb	< 0.00598	O	K	< 0.00170	M	Ta	< 0.01396	M	Zr	< 0.00997

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 32.066; +6; 6; (O=)$_4$ S(OH)$_2$

Chemical Compatibility - Soluble in HCl, HNO_3, H_3PO_4 and HF aqueous matrices water and NH_4OH . Stable with all metals and inorganic anions at low to moderate ppm levels under acidic conditions except Ba and Pb and to a lesser extent Sr, and Ca.

Stability - 2-100 ppb levels - stability unknown - in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in LDPE container.

S Containing Samples (Preparation and Solution) - We most often get questions about the determination of S in Rocks, Silicates and insoluble sulfates (the finely powered sample is fused in a Pt* crucible with ≥ 6 times its weight of Na_2CO_3 + 0.5 grams KNO_3. The fuseate is extracted with water. Any $BaSO_4$ present in the sample is transposed by the carbonate fusion to the $BaCO_3$ which is left behind in the water-insoluble residue. If $PbSO_4$ is present the fuseate should be boiled with a sodium carbonate saturated with CO_2 solution for 1 hour or more where the $PbSO_4$ will be transposed to the water insoluble carbonate which can be filtered off. Boiling the fuseate with a saturated carbonate solution is good insurance for samples containing Ba, Sr, and Ca. The Ba, Pb, Sr, Ca, free filtrate can be acidified and measured by ICP.)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES	166.669nm	0.2 / 0.19 µg/mL	1	atom	Si, B
ICP-OES	182.034 nm	0.3 / 0.024 µg/mL	1	atom	
ICP-OES	143.328 nm	0.4 / 0.035 µg/mL	1	atom	
ICP-MS	32 amu	30,000 ppt	n/a	M$^+$	$^{16}O_2$, $^{14}N^{16}O$, $^{15}N^{17}O$, $^{14}N^{17}O$, $^{14}N^{16}O^1H$, $^{15}N^{16}O^1H$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105

Recognized by:

Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)

Members of IQ Net International Certification Network:

Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:

Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

INORGANIC LABS/RADCHEM LABS PS-2 of 2
DATE RECEIVED: 12/9/2004
DATE EXPIRED: 01/01/2006 WS for KE
DATE OPENED: 12/9/04
INORG: 4917 PO: F55162

010553

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: April 30, 2004

Expiration Date: EXPIRES 01.2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010554

inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Thorium in 3% (abs) HNO_3**

Catalog Number:	CGTH1-1, CGTH1-2, and CGTH1-5
Lot Number:	**X-TH01064**
Starting Material:	Th(NO3)4x4H2O
Starting Material Purity (%):	99.998809
Starting Material Lot No	X-25828-7
Matrix:	3% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 11/02/04
DATE EXPIRED: 12/01/2005 VOS
DATE OPENED: 11/02/04
INORG: 4844 PO: F54766

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 998 ± 3 µg/mL

Certified Density: 1.022 g/mL (measured at 22° C)

The Certified Value is the instrument analysis value. The following equations are used in the calculation of the certified value and the uncertainty:

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n}$$

$$\text{Uncertainty } (\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum S$ = The summation of all significant estimated errors (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

- "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)
- This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **998 ± 3 µg/mL**
ICP Assay NIST SRM 3159 Lot Number: 992912

Assay Method #2 **999 ± 3 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

M	Al	< 0.00998	M	Dy	< 0.00599	O	Li	< 0.05000	M	Pr	< 0.00030	M	Te	< 0.02995
M	Sb	< 0.00050	M	Er	< 0.00499	M	Lu	< 0.00040	M	Re	< 0.00100	M	Tb	< 0.00030
M	As	< 0.00998	M	Eu	< 0.00300	O	Mg	< 0.02000	M	Rh	< 0.00100	M	Tl	< 0.00100
M	Ba	< 0.00998	M	Gd	< 0.00100	M	Mn	0.00049	M	Rb	< 0.00100	s	Th	
M	Be	< 0.00050	M	Ga	< 0.00100	i	Hg		M	Ru	< 0.00200	M	Tm	< 0.00040
M	Bi	< 0.00040	M	Ge	< 0.00599	M	Mo	< 0.00200	M	Sm	< 0.00100	M	Sn	< 0.00499
M	B	< 0.06987	M	Au	< 0.00300	M	Nd	0.00044	M	Sc	< 0.00998	M	Ti	< 0.04991
M	Cd	< 0.00300	M	Hf	< 0.00200	M	Ni	< 0.00799	M	Se	< 0.00799	M	W	< 0.00998
O	Ca	< 0.10000	M	Ho	< 0.00050	M	Nb	< 0.00050	i	Si		M	U	0.00406
M	Ce	0.00267	M	In	< 0.00998	n	Os		M	Ag	< 0.00200	M	V	< 0.00200
M	Cs	< 0.00030	M	Ir	< 0.00499	M	Pd	< 0.00499	O	Na	< 0.05000	M	Yb	< 0.00100
M	Cr	< 0.00499	O	Fe	< 0.05000	i	P		M	Sr	< 0.00050	M	Y	< 0.03993
M	Co	< 0.00300	M	La	0.00076	M	Pt	< 0.00200	i	S		M	Zn	0.00425
M	Cu	< 0.00599	M	Pb	< 0.00300	O	K	< 0.03000	M	Ta	< 0.00699	M	Zr	0.01978

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL 010556

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 232.0381; +4; 8; $Th(OH)^{+4}$ and $Th(OH)_2^{+2}$

Chemical Compatibility - Soluble in HCl, and HNO_3. Avoid H_3PO_4, H_2SO_4 and HF although solubilities may not be a problem depending upon pH and matrix (For example: ThF_4 is soluble in acids). Avoid neutral to basic media. Th^{+4} is stable with most metals and inorganic anions forming an insoluble carbonate, oxide, fluoride, oxalate, sulfate and phosphate in neutral to slightly acidic media.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 2-5% HNO_3 / LDPE container.

Th Containing Samples (Preparation and Solution) - Metal (Soluble in Aqua Regia); Oxide (The heated oxide is not soluble in acids except hot conc. H_2SO_4); Ores (Na_2O_2 fusion at 480 ± 20°C for 7 minutes, cool and treat sintered mass with 50 mL cold water and stand until disintegrated. The mass is transferred to a beaker and acidified with HCl with 25 mL excess HCl added. Any residue is collected on a Whatman No. 42 filter, dried and ignited to 1000 °C in Pt* crucible and the ash treated with H_2SO_4 / HF and fumed. If residue remains, then treat it by peroxide fusion as above.)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES 283.730 nm	0.07 / 0.007 µg/mL	1	ion	U, Zr
ICP-OES 283.231 nm	0.07 / 0.007 µg/mL	1	ion	U, Mo, Ti, Fe, Cr
ICP-OES 274.716 nm	0.08 / 0.008 µg/mL	1	ion	Ti, Ta, Fe, V
ICP-MS 232 amu	1 ppt		n/a	M^+

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105

Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)

Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter), Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

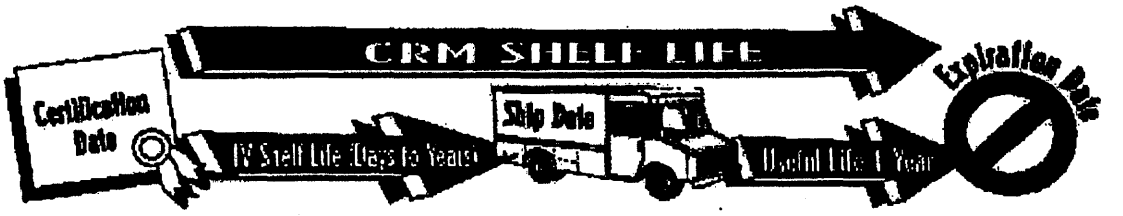
10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 11/02/04
DATE EXPIRED: 12/01/2005 VOS
DATE OPENED: 11/02/04
INORG: 4844 PO: F54766

010557

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: June 24, 2004

Expiration Date:

EXPIRES
1/2005

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010558

inorganic ventures / iv labs

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e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Uranium in 1% (abs) HNO_3**

Catalog Number:	CGU1-1, CGU1-2, and CGU1-5
Lot Number:	**X-U01061**
Starting Material:	$UO_2(NO_3)_2.6H_2O$
Starting Material Purity (%):	99.994419
Starting Material Lot No	RB0018
Matrix:	1% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 10/14/04 DR
DATE EXPIRED: 11/1/2005
DATE OPENED: 10/15/04
INORG: 4828 PO: F54761

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 997 ± 2 µg/mL

Certified Density: 1.007 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value $(\bar{x}) = \frac{\sum x_i}{n}$

Uncertainty $(\pm) = \frac{2[(\sum s)^2]^{1/2}}{(n)^{1/2}}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum s$ = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1002 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

Assay Method #2 **997 ± 2 µg/mL (Avg 2 runs)**
ICP Assay NIST SRM 3164 Lot Number: 891509

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

M	Al		0.05166	M	Dy	<	0.01494	M	Li	<	0.02490	M	Pr	<	0.00075	M	Te	<	0.07470
M	Sb	<	0.00125	M	Er	<	0.01245	M	Lu	<	0.00100	M	Re	<	0.00249	M	Tb		0.00003
M	As	<	0.02490	M	Eu	<	0.00747	M	Mg	<	0.07470	M	Rh	<	0.00249	M	Tl	<	0.00249
M	Ba	<	0.02490	M	Gd		0.00310	M	Mn		0.00083	M	Rb	<	0.00249	M	Th	<	0.00249
M	Be	<	0.00125	M	Ga	<	0.00249	i	Hg			M	Ru	<	0.00498	M	Tm	<	0.00100
M	Bi	<	0.00100	M	Ge	<	0.01494	M	Mo		0.00093	M	Sm		0.00010	O	Sn	<	0.10000
M	B	<	0.17429	M	Au	<	0.00747	M	Nd	<	0.00498	M	Sc	<	0.02490	M	Ti		0.00258
M	Cd		0.00103	M	Hf	<	0.00498	M	Ni	<	0.01992	M	Se	<	0.01992	M	W	<	0.02490
O	Ca		0.05395	M	Ho		0.00052	M	Nb	<	0.00125	i	Si			s	U		
M	Ce		0.00010	M	In	<	0.02490	n	Os			M	Ag	<	0.00498	M	V	<	0.00498
M	Cs	<	0.00075	M	Ir	<	0.01245	M	Pd	<	0.01245	O	Na		0.00664	M	Yb	<	0.00249
M	Cr	<	0.01245	M	Fe	<	0.49798	i	P			M	Sr	<	0.00125	M	Y		0.00062
M	Co	<	0.00747	M	La		0.00145	M	Pt	<	0.00498	i	S			M	Zn		0.00114
M	Cu		0.00072	M	Pb		0.00217	i	K			M	Ta	<	0.01743	M	Zr	<	0.01245

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 238.0289; +6; 8; UO_2^{2+}(uranyl)

Chemical Compatibility - Soluble in HCl and HNO_3. Avoid H_3PO_4. H_2SO_4 and HF matrices should not be a problem depending upon [U]. Although the UO_2^{2+} ion is distinctly basic, any U^{4+} will precipitate in basic media. UO_2^{2+} salts are generally soluble in water and UO_2^{2+} is stable with most metals and inorganic anions. The uranyl phosphate is insoluble in water. UF_4 and UF_6 are water soluble.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 2-5% HNO_3 / LDPE container.

U Containing Samples (Preparation and Solution) - Metal (Dissolves rapidly in HCl and HNO_3); Oxide (Soluble in HNO_3); Ores (Digest for 1-2 hours with 1 gram of ore to 30 mL 1:1 HNO_3. Silica insolubles are removed by filtration after bringing the sample to fumes with conc. H_2SO_4.)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES	385.958 nm	0.3 / 0.01 µg/mL	1	ion	Th, Fe
ICP-OES	367.007 nm	0.3 / 0.02 µg/mL	1	ion	Th, Ce
ICP-OES	263.553 nm	0.3 / 0.01 µg/mL	1	ion	Ce, Ir, Th, Rh, W, Zr, Ta, Ti, V, Hf, Fe, Re, Ru
ICP-MS	238 amu	2 ppt	n/a	M^+	$^{206}Pb^{16}O_2$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter), Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

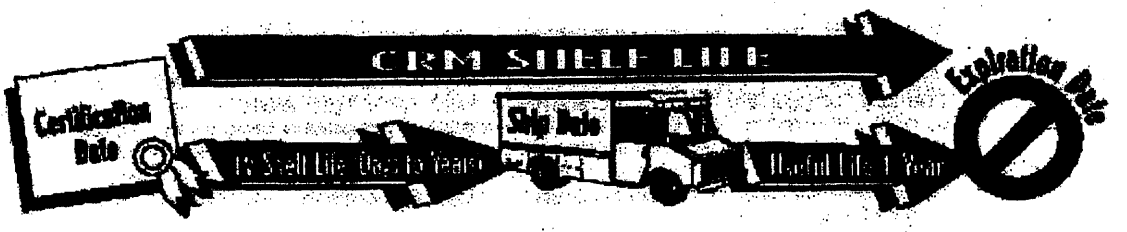
10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

010561

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: April 15, 2004

Expiration Date: EXPIRES 1 2005

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010562

inorganic ventures / iv labs

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phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Tungsten in 1% (abs) HNO_3/1% (abs) HF**

Catalog Number:	CGW1-1 and CGW1-5
Lot Number:	**W-W01082**
Starting Material:	W Powder
Starting Material Purity (%):	99.990703
Starting Material Lot No	21418,C31H46,D02J21,E03K06,D11F29
Matrix:	1% (abs) HNO_3/1% (abs) HF

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 1001 ± 3 µg/mL

Certified Density: 1.007 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value ($\bar{x}$) = $\frac{\Sigma x_i}{n}$

Uncertainty (±) = $\frac{2[(\Sigma s_i)^2]^{1/2}}{(n)^{1/2}}$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
Σs_i = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1001 ± 3 µg/mL (Avg 2 runs)**
ICP Assay NIST SRM 3163 Lot Number: 990209

Assay Method #2 **1001 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 07/29/04
DATE EXPIRED: 08/01/2005 VOC
DATE OPENED: 07/29/04
INORG: 4660 PO: E53417

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	0.01792	M	Dy	< 0.00595	O	Li	< 0.00008	M	Pr	< 0.00030	M	Te	< 0.02974
M	Sb	< 0.00050	M	Er	< 0.00496	M	Lu	< 0.00040	i	Re		M	Tb	< 0.00030
M	As	< 0.00991	M	Eu	< 0.00297	O	Mg	0.00120	M	Rh	< 0.00099	M	Tl	< 0.00099
M	Ba	< 0.00991	M	Gd	< 0.00099	M	Mn	< 0.00397	M	Rb	< 0.00099	M	Th	< 0.00099
M	Be	< 0.00050	M	Ga	< 0.00099	O	Hg	< 0.04778	M	Ru	< 0.00198	M	Tm	< 0.00040
M	Bi	< 0.00040	M	Ge	< 0.00595	M	Mo	0.00050	M	Sm	< 0.00099	M	Sn	< 0.00496
O	B	< 1.19460	M	Au	< 0.00297	M	Nd	< 0.00198	O	Sc	< 0.00036	M	Ti	0.00198
M	Cd	< 0.00297	M	Hf	< 0.00198	M	Ni	< 0.00793	M	Se	< 0.00793	S	W	
O	Ca	0.00080	M	Ho	< 0.00050	O	Nb	< 0.06371	O	Si	< 0.01354	M	U	< 0.00198
M	Ce	< 0.00496	M	In	< 0.00991	n	Os		M	Ag	< 0.00198	M	V	< 0.00198
M	Cs	< 0.00030	M	Ir	< 0.00496	M	Pd	< 0.00496	O	Na	0.04778	M	Yb	< 0.00099
M	Cr	< 0.00496	O	Fe	< 0.03982	n	P		M	Sr	< 0.00050	M	Y	< 0.03965
M	Co	< 0.00297	M	La	< 0.00050	M	Pt	< 0.00198	n	S		M	Zn	< 0.01983
M	Cu	< 0.00595	M	Pb	0.00060	O	K	0.03146	O	Ta	< 0.39820	M	Zr	0.00079

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

010564

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 183.85; +6; 6,7,8,9; WOF_4^{-2} (chemical form as received)

Chemical Compatibility - W is very readily hydrolyzed requiring 0.1 to 1% HF solutions for stable acidic solutions. The WOF_4^{-2} is soluble in % levels of HCl and HNO_3 provided it is in the WOF_4^{-2} form. Stable at ppm levels with some metals provided it is fluorinated. Do not mix with Alkaline or Rare Earths. Is best to be mixed only with other fluorinated metals (Ti, Zr, Hf, Nb, Ta, Mo, Si, Sn, Ge). Look for yellow WO_3 precipitate if mixed with other transition elements at higher levels indicating instability. The yellow WO_3 will form over a period of weeks even in trace HF, therefore, HF levels of W multi- element blends should be ~ 1 %.

Stability - 2-100 ppb levels stable (Alone or mixed with all other metals that are at comparable levels) as the WOF_4^{-2} for months in 1% HNO_3 / LDPE container. 1-10,000 ppm single element solutions as the WOF_4^{-2} chemically stable for years in 1% HF in an LDPE container.

W Containing Samples (Preparation and Solution) - Metal (Soluble in HF / HNO_3); Oxide (Soluble in HF or NH_4OH) ; Organic Matrices (Dry ash at 450 °C in Pt^4 and dissolve oxide with HF).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ppm conc.)
ICP-OES 207.911 nm	0.03 / 0.001 µg/mL	1	ion	Ru, In
ICP-OES 224.875 nm	0.05 / 0.005 µg/mL	1	ion	Co, Rh, Ag
ICP-OES 209.475 nm	0.05 / 0.005 µg/mL	1	ion	Mo
ICP-MS 182 amu	5 ppt	n/a	M'	$^{166}Er^{16}O$

HF Note: This standard should not be prepared or stored in glass.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105

Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)

Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 07/29/04
DATE EXPIRED: 08/01/2005 v05
DATE OPENED: 07/29/04
INORG: 4660 PO: F53417

010565

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 **IV Shelf Life** - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 **Expiration Date** - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: December 18, 2003

Expiration Date:

EXPIRES
1 2005

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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Inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statistical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Yttrium in 1.4% (abs) HNO_3**

Catalog Number:	CGY1-1, CGY1-2, and CGY1-5
Lot Number:	**Y-QY01107**
Starting Material:	Y2O3
Starting Material Purity (%):	99.999896
Starting Material Lot No	9918901OYL
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 1/31/05
DATE EXPIRED: 3/1/2006 DR
DATE OPENED: 1/31/05
INORG: 5000 PO: F55139

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 998 ± 2 µg/mL

Certified Density: 1.011 g/mL (measured at 22° C)

The Certified Value is the wet assay value. The following equations are used in the calculations of the certified value and the uncertainty:

Certified Value $(\bar{x}) = \frac{\sum x_i}{n}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements

Uncertainty $(\pm) = 2\left[\frac{\sum s_i^2}{(n)}\right]^{1/2}$

$\sum s_i$ = The summation of all significant estimated errors.
(Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

- "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)
- This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **996 ± 2 µg/mL**
ICP Assay NIST SRM 3167a Lot Number: 790412

Assay Method #2 **998 ± 2 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

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4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	< 0.00090	M	Dy	0.00030	O	Li	< 0.00002	M	Pr	< 0.00030	M	Te	< 0.02985
M	Sb	< 0.00050	M	Er	< 0.00498	M	Lu	< 0.00040	M	Re	< 0.00100	M	Tb	0.00099
M	As	< 0.00995	M	Eu	0.00027	O	Mg	0.00001	M	Rh	< 0.00100	M	Tl	< 0.00100
M	Ba	< 0.00995	M	Gd	< 0.00100	O	Mn	< 0.00002	M	Rb	< 0.00100	M	Th	< 0.00100
M	Be	< 0.00050	M	Ga	< 0.00100	O	Hg	< 0.02000	M	Ru	< 0.00199	M	Tm	0.00007
M	Bi	< 0.00040	M	Ge	< 0.00597	M	Mo	< 0.00199	M	Sm	0.00014	M	Sn	< 0.00498
O	B	< 0.00100	M	Au	< 0.00299	M	Nd	0.00008	O	Sc	< 0.00003	M	Ti	< 0.04976
M	Cd	< 0.00299	M	Hf	< 0.00199	M	Ni	< 0.00796	M	Se	< 0.00796	M	W	< 0.00995
O	Ca	0.00026	M	Ho	0.00006	M	Nb	< 0.00050	O	Si	0.00016	M	U	< 0.00199
M	Ce	0.00010	M	In	< 0.00995	n	Os		O	Ag	< 0.02000	O	V	< 0.00080
M	Cs	< 0.00030	M	Ir	< 0.00498	O	Pd	< 0.10000	O	Na	< 0.05000	M	Yb	0.00028
M	Cr	< 0.00498	O	Fe	0.00079	O	P	< 0.07000	O	Sr	< 0.00004	s	Y	
M	Co	< 0.00299	M	La	0.00025	M	Pt	< 0.00199	O	S	< 0.04300	O	Zn	< 0.00040
M	Cu	< 0.00597	M	Pb	< 0.00299	O	K	< 0.10000	M	Ta	< 0.00697	O	Zr	< 0.00070

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

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7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 88.9059; +3; 6; $Y(OH)(H_2O)_x^{+2}$

Chemical Compatibility - Soluble in HCl, H_2SO_4 and HNO_3. Avoid HF, H_3PO_4 and neutral to basic media. Stable with most metals and inorganic anions forming an insoluble carbonate, oxide, oxalate, and fluoride. Avoid mixing with elements / solutions containing moderate amounts of fluoride.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 2-5% HNO_3 / LDPE container.

Y Containing Samples (Preparation and Solution) - Metal (Soluble in acids); Oxide (Dissolve by heating in H_2O/ HNO_3); Ores (Carbonate fusion in Pt followed by HCl dissolution); Organic Matrices (Dry ash and dissolve in 1:1 H_2O / HCl or HNO_3).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/azial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe)
ICP-OES 360.073 nm	0.005 / 0.000036 µg/mL	1	ion	Ce, Th
ICP-OES 371.030 nm	0.004 / 0.00007 µg/mL	1	ion	Ce
ICP-OES 377.433 nm	0.005 / 0.0009 µg/mL	1	ion	Ta, Th
ICP-MS 89 amu	0.8 ppt	n/a	M^+	$^{74}Ge^{16}O$, $^{178}Hf^{+2}$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105

Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)

Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter), Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

010569

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: January 19, 2005

Expiration Date: EXPIRES 01/2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Debbie Newman, Production Manager	Debbie Newman
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 **DESCRIPTION OF CRM** Custom-Grade **1000 µg/mL Zirconium in H_2O tr. HNO_3 tr. HF**

Catalog Number:	CGZR1-1 and CGZR1-5
Lot Number:	**W-ZR01056**
Starting Material:	ZrO_2
Starting Material Purity (%):	99.994542
Starting Material Lot No	22855
Matrix:	H_2O tr. HNO_3 tr. HF

INORGANIC LABS/RADCHEM LABS Pg 1 of 2
DATE RECEIVED: 01/23/04
DATE EXPIRED: 08/01/2005 v03
DATE OPENED: 01/23/04
INORG: 4442 PO: F52306

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 1004 ± 2 µg/mL

Certified Density: 0.999 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value ($\bar{x}$) = $\frac{\Sigma x_i}{n}$

Uncertainty (±) = $\frac{2[(\Sigma s_i)^2]^{1/2}}{(n)^{1/2}}$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
Σs_i = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1004 ± 2 µg/mL (Avg 2 runs)**
ICP Assay NIST SRM 3169 Lot Number: 990109

Assay Method #2 **1000 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	0.01416	M	Dy	< 0.01188	O	Li	< 0.00012	M	Pr	< 0.00059	M	Te	< 0.05942
M	Sb	< 0.00099	M	Er	< 0.00990	M	Lu	< 0.00079	M	Re	< 0.00198	M	Tb	< 0.00059
M	As	< 0.01981	M	Eu	< 0.00594	O	Mg	< 0.00012	M	Rh	< 0.00198	M	Tl	< 0.00198
M	Ba	< 0.01981	M	Gd	< 0.00198	O	Mn	< 0.00401	M	Rb	< 0.00198	M	Th	< 0.00198
O	Be	< 0.40048	M	Ga	< 0.00198	O	Hg	< 0.04405	M	Ru	< 0.00396	M	Tm	< 0.00079
M	Bi	< 0.00079	M	Ge	< 0.01188	O	Mo	< 0.40048	M	Sm	< 0.00198	M	Sn	< 0.00990
M	B	< 0.13864	M	Au	< 0.00594	M	Nd	< 0.00396	O	Sc	< 0.00064	O	Ti	< 0.16019
O	Cd	< 0.02123	M	Hf	0.04403	O	Ni	0.01214	M	Se	< 0.01585	M	W	< 0.01981
O	Ca	0.00809	M	Ho	< 0.00099	O	Nb	< 0.08010	O	Si	< 0.80096	M	U	< 0.00396
M	Ce	< 0.00990	M	In	< 0.01981	n	Os		O	Ag	< 0.40048	M	V	< 0.00396
M	Cs	< 0.00059	M	Ir	< 0.00990	M	Pd	< 0.00990	O	Na	< 0.02803	M	Yb	< 0.00198
O	Cr	< 0.00881	O	Fe	0.00344	O	P	< 0.01922	M	Sr	< 0.00099	O	Y	< 0.00401
M	Co	< 0.00594	M	La	< 0.00099	M	Pt	< 0.00396	O	S	< 0.28033	O	Zn	< 0.04005
M	Cu	< 0.01188	M	Pb	< 0.00594	O	K	< 0.00681	M	Ta	< 0.01386	s	Zr	

M - Checked by ICP-MS O - Checked by ICP-OES I - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 91.224; +4; 6,7,8; $Zr(F)_6^{-2}$

Chemical Compatibility - Soluble in concentrated HCl, HF, H_2SO_4 (very hot) and HNO_3. Avoid H_3PO_4 and neutral to basic media. Unstable at ppm levels with metals that would pull F^- away (i.e. Do not mix with Alkaline or Rare Earths or high levels of transition elements unless they are fluorinated). Stable with most inorganic anions but precipitation with phosphate, oxalate, and tartrate with a tendency to hydrolyze forming the hydrated oxide in all dilute acids except HF.

Stability - 2-100 ppb levels stable (alone or mixed with all other metals that are at comparable levels) as the $Zr(F)_6^{-2}$ + $Zr(OH)_2F_2^{-2}$ for months in 1% HNO_3 / LDPE container. 1-10,000 ppm single element solutions as the $Zr(F)_6^{-2}$ chemically stable for years in 2-5% HNO_3 / trace HF in an LDPE container.

Zr Containing Samples (Preparation and Solution) - Metal (Soluble in H_2O / HF / HNO_3); Oxide - unlike TiO_2 the ZrO_2 is best fused in one of the following ways (Na_2O_2 in Ni^0, Na_2CO_3 in Pt^0 or Borax in Pt^0); Organic Matrices (Dry ash at 450 °C in Pt^0 and dissolve by fusing with Na_2CO_3 and dissolving in HF / HNO_3 / H_2O).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≤5ppm conc.)
ICP-OES	343.823 nm	0.007 / 0.0004 µg/mL	1	ion	Hf, Nb
ICP-OES	339.198 nm	0.008 / 0.0007 µg/mL	1	ion	Th, Mo
ICP-OES	272.261 nm	0.018 / 0.001 µg/mL	1	ion	Cr, V, Th, W
ICP-MS	90 amu	2 ppt	n/a	M^+	$^{74}Ge^{16}O$, $^{74}Se^{16}O$, [$^{180}X^{16}O$ (where X = Hf, Ta, W)]

HF Note: This standard should not be prepared or stored in glass.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter), Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

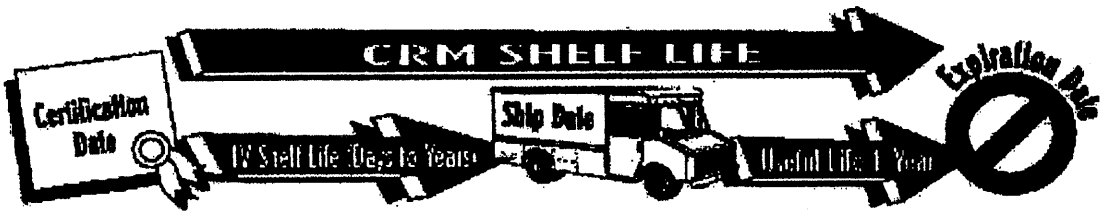
10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 01/23/04
DATE EXPIRED: 08/01/2005 VOS
DATE OPENED: 01/23/04
INORG: 4442 PO: E52306

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 **IV Shelf Life** - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 **Expiration Date** - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: March 19, 2003

Expiration Date: EXPIRES 01/02/05

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Supervisor	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010574

SPEXertificate™

Certificate of Reference Material

Catalog Number: AS-F9-2X/2Y **Lot No.** 27-122AS

Description: 1000 mg/L Fluoride

Matrix: H2O

This **ASSURANCE**® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for Ion Chromatography instrumentation. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 998 mg/L

Uncertainty Associated with Measurement: +/- 3.0 mg/L

Certified Value is Traceable to: NIST SRM 3183

The CRM is prepared gravimetrically using high purity Sodium Fluoride Lot# M44142 . The certified value listed is the average of values obtained by classical wet assay and Ion Chromatography analysis.

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 997 mg/L:

Method: Potentiometric using Fluoride combination electrode

Instrumentation Analysis By Ion Chromatography: 999 mg/L:

Uncertified Properties:

Trace Ionic Impurities in the Actual Solution via IC Analysis:

Ion	mg/L	Ion	mg/L
Br	<0.2	NO3	<0.2
Cl	<10	PO4	<1
NO2	<0.2	SO4	<0.5

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: JAN. -- 2005 Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 01/19/05
DATE EXPIRED: 01/15/2006 VOS
DATE OPENED: 01/11/05
INORG: 4951 PO: F55119

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010575

Report of Certification

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:
Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.
The mathematical expression $k_s=s^2m$ is employed to determine the sampling size
s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)
m = the sub-sampling mass
k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as
X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty
$U=ku_c$ where k=2 is the coverage factor at the 95% confidence level
u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c=\sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

SPEX CertiPrep reference materials are not for any cosmetic, drug or household application and are to be used only by qualified individuals who are trained in appropriate procedures. No claims against SPEX CertiPrep, Inc. of any kind whatsoever, whether based on breach of warranty, alleged negligence, or otherwise, with respect to this RM shall be greater than the purchase price. In no event shall SPEX CertiPrep, Inc. be liable for any loss of profits or any incidental, special, or consequential damages.

ISO 9001
CERTIFIED

SPEX CertiPrep
203 Norcross Avenue • Metuchen, NJ 08840 USA

010576

SPEXertificate™

Certificate of Reference Material

Catalog Number: AS-NO2N9-2X/2Y **Lot No.** 7-158VY

Description: 1000 mg/L Nitrite-N

Matrix: H2O

This **ASSURANCE**® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for Ion Chromatography instrumentation. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 1001.5 mg/L

Uncertainty Associated with Measurement: +/- 3.0 mg/L

Certified Value is Traceable to: SPEX CRM 0902

The CRM is prepared gravimetrically using high purity Sodium Nitrite Lot# 0791R . The certified value listed is the average of values obtained by classical wet assay and Ion Chromatography analysis.

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1000mg/L

Method: Titration with KMNO4 that was standardized against Sodium Oxalate NIST SRM 40h.

Instrumentation Analysis By Ion Chromatography: 1003 mg/L

Uncertified Properties:

Trace Ionic Impurities in the Actual Solution via IC Analysis:

Ion	mg/L	Ion	mg/L
Br	<20	NO3	<40
Cl	<20	PO4	<0.8
F	<0.4	SO4	<0.4

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: MAR -- 2004 Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 03/05/04
DATE EXPIRED: 03/15/2005 YES
DATE OPENED: 03/05/04
INORG: 4480 PO: 52327

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SPEXertificate™

Certificate of Reference Material

Catalog Number: AS-BR9-2X/2Y **Lot No.** 27-128AS

Description: 1000 mg/L Bromide

Matrix: H2O

This ASSURANCE ®certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for Ion Chromatography instrumentation. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 1003.5 mg/L

Uncertainty Associated with Measurement: +/- 3.0 mg/L

Certified Value is Traceable to: NIST SRM 3184

The CRM is prepared gravimetrically using high purity Sodium Bromide Lot# 017400 . The certified value listed is the average of values obtained by classical wet assay and Ion Chromatography analysis.

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1003 mg/L:

Method: Precipitation using Silver Nitrate, filter, dry and weigh as AgBr.

Instrumentation Analysis By Ion Chromatography: 1004 mg/L:

Uncertified Properties:

Trace Ionic Impurities in the Actual Solution via IC Analysis:

Ion	mg/L	Ion	mg/L
Cl	<1.50	NO3	<0.05
F	<0.02	PO4	<0.20
NO2	<0.05	SO4	<0.05

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: JUN - - 2004 Certifying Officer: N. Kocherlakota

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INORGANIC LABS/RAW MATL LABS
DATE RECEIVED: 06/15/04
DATE EXPIRED: 06/15/2005 WS
DATE OPENED: 06/15/04
INORG: 4603 PO: F53592

010578

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Certificate of Reference Material

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 01/10/05
DATE EXPIRED: 01/15/2006 NOS
DATE OPENED: 01/11/05
INORG: 4952 PO: F55119

Catalog Number: AS-NO_3N9-2X/2Y **Lot No.:** 27-120AS
Description: 1000 mg/L of Nitrate-N
Matrix: H_2O

This **ASSURANCE** ®certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for Ion Chromatography instrumentation. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: Nitrate-N (NO_3^--N): 1002.5 mg/L ± 3 mg/L
Traceable to: NIST SRM 3185

The CRM is prepared gravimetrically using high purity Sodium Nitrate ($NaNO_3$) Lot#M14156. The certified value listed is the average of values obtained by classical wet assay and Ion Chromatography analysis.

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1001 mg/L
Method: Gravimetric analysis by precipitation using Nitron Acetate, filtering, drying and weighing as Nitron Nitrate ($C_{20}H_{17}N_4.NO_3$).

Instrumental Analysis by Ion Chromatography: 1004 mg/L

Trace Anion Impurities in the Actual Solution via IC Analysis:

Element	mg/L
F^-	<0.05
Cl^-	<0.2
NO_2^-	<0.2
Br^-	<0.5
SO_4^-	<0.5
PO_4^{3-}	<2.0

Balances are calibrated regularly with weight sets traceable to NIST#s 32856, 32867 and others. This CRM is guaranteed stable to +/- 0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: JAN. – – 2005 Certifying Officer: N. Kocherlakota

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Certificate of Reference Material

Catalog Number: AS-PO_4P9-2X/2Y **Lot No.:** 27-23AS
Description: 1000 mg/L of Phosphate-Phosphorus
Matrix: H2O

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 01/11/05
DATE EXPIRED: 01/15/2006 V03
DATE OPENED: 01/11/05
INORG: 4953 PO: F55119

This **ASSURANCE** ®certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for Ion Chromatography instrumentation. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: Phosphate-Phosphorus (P): 1002.5 mg/L ± 3 mg/L
Traceable to: NIST SRM 3186

The CRM is prepared gravimetrically using high purity (99.999%) Potassium Dihydrogen Orthophosphate (KH_2PO_4) Lot#07991C. The certified value listed is the average of values obtained by classical wet assay and Ion Chromatography analysis.

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1003 mg/L
Method: Gravimetric analysis by precipitation using Magnesia Mixture, filtering, drying and weighing as $Mg_2P_2O_7$.

Instrumental Analysis by Ion Chromatography: 1002 mg/L

Trace Anion Impurities in the Actual Solution via IC Analysis:

Element	mg/L	Element	mg/L
F^-	<0.1	NO_3^-	<0.2
Br^-	<0.1	NO_2^-	<0.2
SO_4^{-2}	<0.1	Cl^-	<2.0

Balances are calibrated regularly with weight sets traceable to NIST#s 32856, 32867 and others. This CRM is guaranteed stable and accurate to +/- 0.5% of the certified concentration value for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: JAN. -- 2005 Certifying Officer: N. Kocherlakota

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010580

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Certificate of Reference Material

Catalog Number: AS-SO49-2X/2Y **Lot No.** 27-53AS

Description: 1000 mg/L Sulfate

Matrix: H2O

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for Ion Chromatography instrumentation. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 997 mg/L

Uncertainty Associated with Measurement: +/- 3.0 mg/L

Certified Value is Traceable to: NIST SRM 3181

The CRM is prepared gravimetrically using high purity Potassium Sulfate Lot# X34146 . The certified value listed is the average of values obtained by classical wet assay and Ion Chromatography analysis.

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 998 mg/L

Method: Precipitated using Barium Chloride, filtered, ignited and weighed as BaSO4

Instrumentation Analysis By Ion Chromatography: 996 mg/L

Uncertified Properties:

Trace Ionic Impurities in the Actual Solution via IC Analysis:

Ion	mg/L	Ion	mg/L
Cl	<0.01	Br	<0.01
F	<0.005	NO3	<0.01
NO2	<0.01	PO4	<0.10

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: JUN - - 2004 Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 06/24/04
DATE EXPIRED: 06/30/2005 YOA
DATE OPENED: 06/24/04
INORG: 4610 PO: F5392

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010581

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 01/11/05
DATE EXPIRED: 06/30/2005 VOS
DATE OPENED: 01/11/05
INORG: 4954 PO: F55120

SOLUTIONS Plus, Inc.
2275 Cassens Dr., Ste. 147 Fenton MO 63026 636-349-4922 Fax: 636-349-8027 email: solplus@accessus.net

CERTIFICATE OF ANALYSIS

PRODUCT: Nitrite Solution, APHA, Nitrogen (Nitrite)
1 ml = 1.0 mg Nitrogen

CODE: N065050

LOT: 3412201

INGREDIENTS:

Sodium Nitrite, ACS	(CAS # 7632-00-0)
Reagent Grade I Water	(CAS # 7732-18-5)
with a trace of Chloroform as preservative	(CAS # 67-66-3)

THEORETICAL VALUE: 1000 ppm NO_2^- (990 - 1010 ppm NO_2^-)

Analysis: 1006 ppm NO_2^- (Nitrite)

METHOD OF ANALYSIS: Potassium Permanganate Titration

Potassium Permanganate standardized against Sodium Oxalate, NIST SRM 40h

APPEARANCE: Clear, colorless solution

EXPIRATION DATE: 06/05
(6 months)

NOTE: APHA recommends use of Chloroform to retard bacterial growth, which would convert Nitrite to Nitrate.

Balances are calibrated using NIST-traceable weights whose verification of maintenance and recalibration is documented per in-house Standard Operating Procedures. Class A glassware also is calibrated and routinely rechecked per in-house Standard Operating Procedures.

Date: 12-20-04

Certified By: Neal T. Parmentier

Neal T. Parmentier
Quality Control Supervisor

010582

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/3/04
DATE EXPIRED: 11/15/2005 WS
DATE OPENED: 11/3/04
INORG: 4870 PO: F54778

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Certificate of Reference Material

Catalog Number: ICMIX2-100 **Lot No.:** 28-138AS
Description: **IC Instrument Check Standard 2**
Matrix: H_2O

This **ASSURANCE** ®certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for Ion Chromatography instrumentation. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

The CRM is prepared from high purity single ion concentrates of individual elements using Class A laboratory ware to give precise concentration.
Refer to side 2 for details of measurement uncertainties.

Instrumental Analysis by ION Chromatography:

Analyte	Labeled (mg/L)	Measured (mg/L)	NIST SRM
F^-	100	100	3183
Cl^-	200	200	3182
Br^-	400	399	3184
NO_3^-	400	402	3185
HPO_4^{-2}	600	600	3186
SO_4^{-2}	400	399	3181

Spex Reference Multi: Lot #IC6-77VY

Balances are calibrated regularly with weight sets traceable to NIST#s 32856, 32867 and others. This CRM is guaranteed stable and accurate to +/- 0.5% on the average of all the certified concentrations with no single component exceeding +/- 2%. This guarantee is valid for a period of one year from the date of certification only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: NOV - - 2004 Certifying Officer: N. Kocherlakota

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010583

1001 West Saint Paul Avenue
Milwaukee, WI 53233 USA
Tel.: 800-558-9160 • (414) 273-3850
Fax: 800-962-9591 • (414) 273-4979
e-mail: aldrich@sial.com

ALDRICH®

Certificate of Analysis

SOUTHWEST RESEARCH INST
DANNY RAMIREZ
6220 CULEBRA RD
SAN ANTONIO TX 78238

PO NBR: 130686E

INORGANICS LAB 27/28/29/30/34
DATE RECEIVED: 1/9/2001
DATE EXPIRED: 1/9/2012 DR
DATE OPENED: 1/9/2001
INCRE: 2626 PO: 130686E

PRODUCT NUMBER: 236527-500G

LOT NUMBER: 15308EI

PRODUCT NAME: SODIUM HYDROGENCARBONATE, 99.7+%, A.C.S. REAGENT

FORMULA: NAHCO3

FORMULA WEIGHT: 84.01

APPEARANCE	WHITE POWDER
TITRATION	100.3 % (WITH HCL)
ICP ASSAY	CONFIRMS SODIUM COMPONENT
INSOLUBLE MATTER	0.001% *
CALCIUM	0.0050%
CHLORIDE	0.0014% *
IRON	< 0.0001% *
HEAVY METALS	<5PPM (AS PB) *
POTASSIUM	<0.0020 % *
MAGNESIUM	0.00025%
AMMONIUM	<5PPM *
PHOSPHATE	<0.001% *
CALCIUM, MAGNESIUM & R2O3 PRECIPITATE	0.016% *

CONTINUED ON NEXT PAGE

ALDRICH CHEMICAL COMPANY
DAVID SWESSEL
JANUARY 5, 2001

Sigma-Aldrich, Inc. warrants that its products conform to the information contained in this and other Sigma-Aldrich publications. Purchaser must determine the suitability of the product(s) for their particular use. Additional terms and conditions may apply. Please see reverse side of the invoice or packing slip.

Aldrich brand products are sold exclusively through Sigma-Aldrich, Inc.

Organics and Inorganics for Chemical Synthesis.

We are Committed to the Success of our Customers through Science, Technology and Service.

010584

SIGMA-ALDRICH

Certificate of Analysis

Product Name	Sodium carbonate, ACS reagent (primary standard), anhydrous 99.95-100.05% as dry basis
Product Number	22,348-4
Product Brand	ALDRICH
CAS Number	497-19-8
Molecular Formula	CNa_2O_3
Molecular Weight	105.99

TEST	**LOT 04922MO RESULTS**
APPEARANCE	WHITE GRANULAR POWDER
TITRATION	99.97% (WITH HCL)
LOSS ON DRYING	<0.1% (285 DEG C) *
ICP ASSAY	CONFIRMS SODIUM COMPONENT
INSOLUBLE MATTER	<0.002 (10%, H2O) *
AMMONIUM HYDROXIDE PRECIPITATE	0.002% *
CALCIUM	0.004% *
CHLORIDE	0.0006% *
IRON	<3 PPM *
HEAVY METALS	<3 PPM (AS PB) *
POTASSIUM	0.0005% *
MAGNESIUM	0.002% *
NITROGEN COMPOUNDS	<0.001% *
PHOSPHATE	0.0005% *
SULFUR COMPOUNDS	<0.003% *
SILICA	<0.005% *
	* SUPPLIER DATA
	MEETS REQUIREMENTS OF ACS 9TH ED
QUALITY CONTROL ACCEPTANCE DATE	DECEMBER, 2001

Ronnie J. Martin, Supervisor
Quality Control
Milwaukee, Wisconsin USA

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/11/02
DATE EXPIRED: 11/11/2012
DATE OPENED: 11/11/02
INORG: 3757 PO: 334588E

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050119-1
SRR: 27044
SDG: 257326
CASE: CNWRA
VTSR: January 06, 2005
PROJECT#: 06002.01.211

010585

Pipette Calibrations

Book/Page 04 011

SwRI - Div. 01, Inorganic Labs' Fixed Volume Pipette Verification Log

Balance #: 12 Thermometer #: 6011 diH20 Temperature (°C): 22.5

010586

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
Lab30	1000	1.0042	1.0091	1.0095
TMA1	1000	.9939	.9971	.9966
TMA2	1000	1.0005	1.0030	1.0026
TMA3	1000	NOT		FOUND
TMA6	1000	1.0019	1.0065	1.0073
TMB1	900	.8970	AD 2-10-05 ~~.8979~~ .8979	.8926
TMC1	800	.7922	.7954	.7961
TMDD1	750	.7458	.7525	.7465
TMD1	700	.6944	.6987	.6989
TMD2	700	.7015	.7031	AD 2-10-05 ~~.6974~~ .6994
TME1	600	.5948	.5997	.5970
TMF2	500	.5028	.5040	.5069
TMF5	500	.5068	.5055	.5051
ICF1	500	.4955	.4958	.4968
L30-500	500	.5005	.5016	.5005
TMG3	400	.3960	AD 2-10-05 ~~.3974~~ .3974	.3936
TMH1	300	OUT	OF	SERVICE
TMH2	300	.2994	.2981	.2977
TMJ1	250	.2534	.2520	.2505
TMJ2	250	.2489	.2487	.2493
TMJ3	250	.2515	.2502	.2541
TMK2	200	AD 2-10-05 ~~.198~~ .1993	.2009	.2002
TML1	150	.1467	.1478	.1473
TMM1	120	AD 2-10-05 ~~OT~~ .1188	.1176	.1188
TMN3	100 AD 2-10-05	AD ~~OUT~~ .0985	AD ~~OF~~ .0990	AD ~~SERVICE~~ .0990
ICN1	100	OUT	OF	SERVICE
TMQ1	80	.0793	.0798	.0804
TMR1	70	OUT	OF	SERVICE
TMS1	60	OUT	OF	SERVICE
LAB-30A	50	NOT		FOUND
TMU1	40	.0385	.0398	.0398
TMU2	40	.0397	.0396	.0392
TMV1	30	.0296	.0295	.0291
L30-20	20	.0197	.0200	.0198
TMW1	25	.0230	.0262	.0263
TMY1	15	OUT	OF	SERVICE

Analyst: [signature] Date: 2-10-05

Reviewed by: John Willis Date: 2-11-05

FRM-243-b (Rev 3/Mar 03)

Book/Page: 04 012

SwRI – Div. 01, Inorganic Labs' Fixed Volume Pipette Verification Log

(Space provide for Inorganic Laboratories' Fixed Volume Pipette Verification Spreadsheet)

010587

2-18-05

Labs' Fixed Volume Pipette Spreadsheet						
Eppendorf #	True Value (uL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
Lab30	1000	1.0092	1.0091	1.0095	1.0093	100.93
TMA1	1000	0.9939	0.9971	0.9966	0.9959	99.59
TMA2	1000	1.0005	1.0030	1.0026	1.0020	100.20
TMA3	1000	NOT		FOUND		
TMA6	1000	1.0019	1.0065	1.0073	1.0052	100.52
TMB1	900	0.8970	0.8979	0.8926	0.8958	99.54
TMC1	800	0.7922	0.7954	0.7961	0.7946	99.32
TMDD1	750	0.7458	0.7525	0.7465	0.7483	99.77
TMD1	700	0.6944	0.6987	0.6989	0.6973	99.62
TMD2	700	0.7015	0.7031	0.6994	0.7013	100.19
TME1	600	0.5948	0.5997	0.5970	0.5972	99.53
TMF2	500	0.5028	0.5040	0.5069	0.5046	100.91
TMF5	500	0.5068	0.5055	0.5051	0.5058	101.16
ICF1	500	0.4955	0.4958	0.4968	0.4960	99.21
L30-500	500	0.5005	0.5016	0.5005	0.5009	100.17
TMG3	400	0.3960	0.3974	0.3936	0.3957	98.92
TMH1	300	OUT		OF		SERVICE
TMH2	300	0.2994	0.2981	0.2977	0.2984	99.47
TMJ1	250	0.2534	0.2520	0.2505	0.2520	100.79
TMJ2	250	0.2489	0.2487	0.2493	0.2490	99.59
TMJ3	250	0.2515	0.2502	0.2541	0.2519	100.77
TMK2	200	0.1993	0.2009	0.2002	0.2001	100.07
TML1	150	0.1467	0.1478	0.1473	0.1473	98.18
TMM1	120	0.1188	0.1176	0.1188	0.1184	98.67
TMN3	100	0.0985	0.0990	0.0990	0.0988	98.83
ICN1	100	NOT			FOUND	
TMQ1	80	0.0793	0.0798	0.0804	0.0798	99.79
TMR1	70	OUT		OF		SERVICE
TMS1	60	OUT		OF		SERVICE
LAB-30A	50	NOT			FOUND	
TMU1	40	0.0385	0.0398	0.0398	0.0394	98.42
TMU2	40	0.0397	0.0396	0.0392	0.0395	98.75
TMV1	30	0.0295	0.0295	0.0291	0.0294	97.89
L30-20	20	0.0197	0.0200	0.0198	0.0198	99.17
TMW1	25	0.0230	0.0262	0.0263	0.0252	100.67
TMY1	15	OUT		OF		SERVICE
	FRM-246 (Rev 1/Mar 03)					

Book/page: 07 039

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

010588

Warren A. Naegeli 02/04/05

SwRI – Div. 01, Inorganic Laboratory Adjustable Pipette Verification Spreadsheet

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	20					
ADJ200-A	100					
	200					
	20					
ADJ200-C	100					
	200					
	20					
ADJ200-D	100					
	200					
	20	0.0201	0.0200	0.0200	0.020	100.17
ADJ200-G	100	0.0983	0.0986	0.0983	0.098	98.40
	200	0.1974	0.1978	0.1968	0.197	98.67
	20	0.0197	0.0203	0.0202	0.020	100.33
ADJ200-H	100	0.0998	0.0994	0.0993	0.100	99.50
	200	0.1993	0.1991	0.1994	0.199	99.63
	20	0.0201	0.0201	0.0201	0.020	100.50
ADJ200-J	100	0.0993	0.0989	0.0991	0.099	99.10
	200	0.1996	0.1987	0.1984	0.199	99.45
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200-K	100					
	200					

FRM-247a (Rev 3/Oct 03)

Book/page: 07 040

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010589

Balance #: 12 Thermometer #: 6011 diH20 Temperature (° C) 22.7

	Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
20 µL – 200 µL		20			
	ADJ200-A	100			
		200			
		20			
	ADJ200-C	100			
		200			
		20			
	ADJ200-D	100			
		200			
		20	0.0201	0.0200	0.0200
	ADJ200-G	100	0.0983	0.0986	0.0983
		200	0.1974	0.1978	0.1968
		20	0.0197	0.0203	0.0202
	ADJ200-H	100	0.0998	0.0994	0.0993
		200	0.1993	0.1991	0.1994
		20	0.0201	0.0201	0.0201
	ADJ200-J	100	0.0993	0.0989	0.0991
		200	0.1996	0.1987	0.1984
		20			
	ADJ200-K	100			
		200			
		20			
	ADJ200	100			
		200			

WAN 02/03/05

WAN 02/03/05

Analyst: Warren G. Maggi Date: 02/03/05

Reviewed by: Michael Hardy Date: 2/8/05

Book/page: 07 041

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

010590

9-05

SwRI – Div. 01, Inorganic Laboratory Adjustable Pipette Verification Spreadsheet

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	20	0.0203	0.0201	0.0200	0.0201	100.67
ADJ200-A	100	0.0986	0.0987	0.0986	0.0986	98.63
	200	0.1984	0.1979	0.1978	0.1980	99.02
	20					
ADJ200-C	100	OUT		OF		SERVICE
	200					
	20	0.0201	0.0202	0.0202	0.0202	100.83
ADJ200-D	100	0.0986	0.0991	0.0992	0.0990	98.97
	200	0.1987	0.1991	0.1993	0.1990	99.52
	20					
ADJ200-G	100					
	200					
	20					
ADJ200-H	100					
	200					
	20					
ADJ200-J	100					
	200					
	20					
ADJ200-K	100	NOT		IN		USE
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					

FRM-247a (Rev 4/Apr 04)

Book/page: 07 042

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

010591

Balance #: 12 Thermometer #: ~~22.5~~ AD 2-9-05 G011 diH20 Temperature (° C) 22.5

	Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
20 µL – 200 µL		20	.0203	.0201	.0200
	ADJ200-A	100	.0986	.0987	.0986
		200	.1984	.1979	.1978
		20			
	ADJ200-C	100	OUT	OF	SERVICE
		200			
		20	.0201	.0202	.0202
	ADJ200-D	100	.0986	.0991	.0992
		200	.1987	.1991	.1993
		20			
	ADJ200-G	100			
		200			
		20			
	ADJ200-H	100			
		200			AD 2-9-05
		20			
	ADJ200-J	100			
		200			
		20			
	ADJ200-K	100	Not in Use – glovebox		
		200			
		20			AD 2-9-05
	ADJ200	100			
		200			

Analyst: [signature] Date: 2-9-05

Reviewed by: [signature] Date: 2-9-05

Book/page: 07 101

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

010592

Warren A. Naegeli 02/08/05

SwRI – Div. 01, Inorganic Laboratory Adjustable Pipette Verification Spreadsheet

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	100					
ADJ1000-C	500					
	1000					
	100					
ADJ1000-D	500					
	1000					
	100					
ADJ1000-E	500					
	1000					
	100					
ADJ1000-F	500					
	1000					
	100	0.0994	0.1005	0.1002	0.100	100.03
ADJ1000-G	500	0.4913	0.4913	0.4922	0.492	98.32
	1000	0.9851	0.9870	0.9886	0.987	98.69
	100	0.1010	0.0994	0.1019	0.101	100.77
ADJ1000-H	500	0.4991	0.5007	0.5019	0.501	100.11
	1000	1.0022	1.0008	0.9995	1.001	100.08
	100	0.0990	0.0997	0.0995	0.099	99.40
ADJ1000-J	500	0.4940	0.4929	0.4936	0.494	98.70
	1000	0.9958	0.9936	0.9936	0.994	99.43
	100					
ADJ1000	500					
	1000					
	100					
ADJ1000-K	500					
	1000					

FRM-247b (Rev 2/Oct 03)

Book/page: 07 102

010593

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 12 Thermometer #: 6011 diH20 Temperature (° C) 22.7

	Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
100 µL – 1000 µL		100			
	ADJ1000-C	500			
		1000			
		100			
	ADJ1000-D	500			
		1000			
		100			
	ADJ1000-E	500			
		1000			
		100			
	ADJ1000-F	500			
		1000			
		100	0.0994	0.1005	0.1002
	ADJ1000-G	500	0.4913	0.4913	0.4922
		1000	0.9851	0.9870	0.9886
		100	0.1010	0.0994	0.1019
	ADJ1000-H	500	0.4991	0.5007	0.5019
		1000	1.0022	1.0008	0.9995
		100	0.0990	0.0997	0.0995
	ADJ1000-J	500	0.4940	0.4929	0.4936
		1000	0.9958	0.9936	0.9936
		100			
	ADJ1000-K	500			
		1000			
		100			
	ADJ1000	500			
		1000			

WAN 02/03/05

WAN 02/03/05

Analyst: [signature] Date: 02/03/05

Reviewed by: [signature] Date: 2/8/05

Book/page: 07 103

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

010594

2-9-05

SwRI Div. 01, Inorganic Laboratory Adjustable Pipette Verification Spreadsheet

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	100	0.1001	0.0995	0.1011	0.100	100.23
ADJ1000-C	500	0.4931	0.4916	0.4947	0.493	98.63
	1000	0.9889	0.9872	0.9896	0.989	98.86
	100	0.0987	0.1005	0.0999	0.100	99.70
ADJ1000-D	500	0.4912	0.4925	0.4936	0.492	98.49
	1000	0.9858	0.9878	0.9869	0.987	98.68
	100	0.1010	0.1018	0.1023	0.102	101.70
ADJ1000-E	500	0.4958	0.4965	0.4965	0.496	99.25
	1000	0.9943	0.9929	0.9915	0.993	99.29
	100	0.1018	0.1018	0.1020	0.102	101.87
ADJ1000-F	500	0.4967	0.4963	0.4975	0.497	99.37
	1000	1.0040	0.9992	1.0013	1.002	100.15
	100					
ADJ1000-G	500					
	1000					
	100					
ADJ1000-H	500					
	1000					
	100					
ADJ1000-J	500					
	1000					
	100					
ADJ1000-K	500	NOT		IN		USE
	1000					
	100					
ADJ1000	500					
	1000					

FRM-247b (Rev 2/Oct 03)

Book/page: 07 104

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

010595

Balance #: 12 Thermometer #: G011 diH20 Temperature (° C) 22.5

100 µL – 1000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	100	.1001	.0995	.1011
ADJ1000-C	500	.4931	.4916	.4947
	1000	.9889	.9872	.9896
	100	.0987	.1005	~~.0999~~ .0999 AD 2-9-05
ADJ1000-D	500	.4912	.4925	.4936
	1000	.9858	.9878	.9869
	100	.1010	.1018	.1023
ADJ1000-E	500	.4958	.4965	.4965
	1000	.9943	.9929	.9915
	100	.1018	.1018	.1020
ADJ1000-F	500	.4967	.4963	.4975
	1000	1.0046	.9992	1.0013
	100			
ADJ1000-G	500			
	1000			
	100		AD 2-9-05	
ADJ1000-H	500			
	1000			
	100			
ADJ1000-J	500			
	1000			
	100			
ADJ1000-K	500	Not in use – glovebox		
	1000			
	100			
ADJ1000	500			AD 2-9-05
	1000			

Analyst: [signature] Date: 2-9-05

Reviewed by: [signature] Date: 2-9-05

Book/page: 07 163

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

010596

Warren A. Naegeli 02/08/05

SwRI – Div. 01, Inorganic Laboratory Adjustable Pipette Verification Spreadsheet

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	500					
ADJ5000-C	2500					
	5000					
	500					
ADJ5000-G	2500					
	5000					
	500					
ADJ5000-H	2500					
	5000					
	500					
ADJ5000-I	2500					
	5000					
	500	0.5038	0.5065	0.5041	0.505	100.96
ADJ5000-J	2500	2.4983	2.4989	2.4987	2.499	99.95
	5000	5.0677	5.0055	5.0042	5.026	100.52
	500	0.4908	0.4937	0.4906	0.492	98.34
ADJ5000-K	2500	2.4804	2.4742	2.4778	2.477	99.10
	5000	5.0241	4.9896	4.9795	4.998	99.95
	500	0.4993	0.4997	0.5002	0.500	99.95
ADJ5000-L	2500	2.4900	2.4853	2.4882	2.488	99.51
	5000	5.0013	4.9802	4.9825	4.988	99.76
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000-M	2500					
	5000					

FRM-247c (Rev 2/Mar 03)

Book/page: 07 164

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010597

Balance #: 12 Thermometer #: G011 diH20 Temperature (° C) 22.7

500 µL – 5000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	500			
ADJ5000-C	2500			
	5000			
	500			
ADJ5000-G	2500			
	5000			
	500			
ADJ5000-H	2500			
	5000			
	500			
ADJ5000-I	2500			
	5000			
	500	0.5038	0.5065	0.5041
ADJ5000-J	2500	2.4983	2.4989	2.4987
	5000	5.0677	5.0055	5.0042
	500	0.4908	0.4937	0.4906
ADJ5000-K	2500	2.4804	2.4742	2.4778
	5000	5.0241	4.9896	4.9795
	500	0.4993	0.4997	0.5002
ADJ5000-L	2500	2.4900	2.4853	2.4882
	5000	5.0013	4.9802	4.9825
	500			
ADJ5000-M	2500			
	5000			
	500			
ADJ5000-N	2500			
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			

WAN 02/03/05

WAN 02/03/05

Analyst: William A. Naegeli Date: 02/03/05

Reviewed by: Michael Handy Date: 2/8/05

FRM-244 (c) (Rev 3/Apr 04)

Book/page: 07 165

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

010598

2-9-05

SwRI – Div. 01, Inorganic Laboratory Adjustable Pipette Verification Spreadsheet

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	500	0.5063	0.5078	0.5046	0.506	101.25
ADJ5000-C	2500	2.4873	2.4908	2.4921	2.490	99.60
	5000	5.0100	5.0034	4.9864	5.000	100.00
	500					
ADJ5000-G	2500	OUT		OF		SERVICE
	5000					
	500					
ADJ5000-H	2500	OUT		OF		SERVICE
	5000					
	500	0.4962	0.4935	0.4950	0.495	98.98
ADJ5000-I	2500	2.4613	2.4654	2.4722	2.466	98.65
	5000	4.9364	4.9451	4.9317	4.938	98.75
	500					
ADJ5000-J	2500					
	5000					
	500					
ADJ5000-K	2500					
	5000					
	500					
ADJ5000-L	2500					
	5000					
	500					
ADJ5000-M	2500	NOT		IN		USE
	5000					
	500	0.5019	0.5029	0.5037	0.503	100.57
ADJ5000-N	2500	2.5269	2.4923	2.4917	2.504	100.15
	5000	5.1779	4.9836	4.9907	5.051	101.01
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					

FRM-247c (Rev 3/Apr 04)

Book/page: 07 166

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010599

Balance #: 12 Thermometer #: G011 diH20 Temperature (° C) 22.5

500 µL – 5000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	500	.5063	.5078	.5046
ADJ5000-C	2500	2.4873	2.4908	2.4921
	5000	5.0100	5.0034	4.9864
	500			
ADJ5000-G	2500	OUT	OF	SERVICE
	5000			
	500			
ADJ5000-H	2500	OUT	OF	SERVICE
	5000			
	500	.4962	.4935	.4950
ADJ5000-I	2500	~~2.4445~~ 2.4613	~~2.4474~~ 2.4654	~~2.4477~~ 2.4722 AD 2-9-05
	5000	4.9364	4.9451	4.9317
	500			
ADJ5000-J	2500			
	5000			
	500			
ADJ5000-K	2500			
	5000		AD 2-9-05	
	500			
ADJ5000-L	2500			
	5000			
	500			
ADJ5000-M	2500	NOT	IN	USE
	5000		(glovebox)	
	500	.5019	.5029	.5037
ADJ5000-N	2500	2.5269	2.4923	2.4917
	5000	5.1779	4.9836	4.9907
	500			
ADJ5000	2500			
	5000			
	500		AD 2-9-05	
ADJ5000	2500			
	5000			

Analyst: [signature] Date: 2-9-05

Reviewed by: [signature] Date: 2-9-05

Book/page: 07 161

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

010600

SwRI – Div. 01, Inorganic Laboratory Adjustable Pipette Verification Spreadsheet

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	500				0.000	0.00
ADJ5000-C	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000-G	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000-H	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000-I	2500				0.000	0.00
	5000				0.000	0.00
	500	0.5058	0.5054	0.5049	0.505	101.07
ADJ5000-J	2500	2.4994	2.4998	2.4956	2.498	99.93
	5000	4.9974	4.9922	4.9991	4.996	99.92
	500	0.5013	0.4996	0.5021	0.501	100.20
ADJ5000-K	2500	2.4665	2.4743	2.4717	2.471	98.83
	5000	5.0004	4.9989	5.0011	5.000	100.00
	500	0.5015	0.4995	0.5025	0.501	100.23
ADJ5000-L	2500	2.4967	2.4931	2.4901	2.493	99.73
	5000	5.0043	5.0077	5.0133	5.008	100.17
	500				0.000	0.00
ADJ5000-M	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000-N	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00

FRM-247c (Rev 3/Apr 04)

1/5/05

Book/page: 07 162

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010601

Balance #: 34 Thermometer #: G011 diH20 Temperature (° C) 21

500 µL – 5000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	500			
ADJ5000-C	2500			
	5000			
	500			
ADJ5000-G	2500		1/5/05	
	5000			
	500			
ADJ5000-H	2500			
	5000			
	500			
ADJ5000-I	2500			
	5000			
	500	0.5058	0.5054	0.5049
ADJ5000-J	2500	2.4994	2.4998	2.4956
	5000	4.9974	4.9922	4.9991
	500	0.5013	0.4996	0.5021
ADJ5000-K	2500	2.4665	2.4743	2.4717
	5000	5.0004	4.9989	5.0011
	500	0.5015	0.4995	0.5025
ADJ5000-L	2500	2.4967	2.4931	2.4901
	5000	5.0043	~~2.~~ 5.0077	~~2.~~ 5.0133
	500		1/5/05	
ADJ5000-M	2500			
	5000			
	500			
ADJ5000-N	2500		1/5/05	
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			

Analyst: [signature] Date: 1/5/05

Reviewed by: [signature] Date: 1-5-05

Book/page: 07 183

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

010602

SwRI – Div. 01, Inorganic Laboratory Adjustable Pipette Verification Spreadsheet

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	500				0.000	0.00
ADJ5000-C	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000-G	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000-H	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000-I	2500				0.000	0.00
	5000				0.000	0.00
	500	0.4935	0.4879	0.4945	0.492	98.39
ADJ5000-J	2500	2.4603	2.4791	2.4893	2.476	99.05
	5000	5.0293	4.9750	4.9793	4.995	99.89
	500	0.5081	0.5063	0.5091	0.508	101.57
ADJ5000-K	2500	2.5214	2.5187	2.5101	2.517	100.67
	5000	5.0511	5.0111	5.0093	5.024	100.48
	500	0.5052	0.5031	0.5028	0.504	100.74
ADJ5000-L	2500	2.4913	2.4943	2.4911	2.492	99.69
	5000	5.0187	5.0219	5.0224	5.021	100.42
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00

JV 03/01/05

JV 03/01/05

FRM-247c (Rev 2/Mar 03)

JV 03/01/05

FRM-244 (Rev 2/Sept 02)

Book/page: 07 184

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010603

Balance #: 16 Thermometer #: G011 diH20 Temperature (° C) 22

500 µL – 5000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	500			
ADJ5000-C	2500			
	5000			
	500			
ADJ5000-G	2500			
	5000			
	500			
ADJ5000-H	2500			
	5000			
	500			
ADJ5000-I	2500			
	5000			
	500	.4935	.4874	.4945
ADJ5000-J	2500	2.4603	2.4791	2.4893
	5000	5.0293	4.9750	4.9793
	500	.5081	.5063	.5091
ADJ5000-K	2500	2.5214	2.5187	2.5101
	5000	5.0511	5.0111	5.0093
	500	.5052	.5031	.5028
ADJ5000-L	2500	2.4913	2.4993	2.4911
	5000	5.0187	5.0219	5.0224
	500			
ADJ5000-M	2500			
	5000			
	500			
ADJ5000-N	2500			
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			

J.V. 03/01/05

Analyst: [signature] Date: 03/01/05

Reviewed by: [signature] Date: 04/06/05

FRM-244 (c) (Rev 3/Apr 04)

Book/page: 07 123

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

010604

SwRI – Div. 01, Inorganic Laboratory Adjustable Pipette Verification Spreadsheet

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	100				0.000	0.00
ADJ1000-C	500				0.000	0.00
	1000				0.000	0.00
	100				0.000	0.00
ADJ1000-D	500		JV 03/01/05		0.000	0.00
	1000				0.000	0.00
	100				0.000	0.00
ADJ1000-E	500				0.000	0.00
	1000				0.000	0.00
	100				0.000	0.00
ADJ1000-F	500				0.000	0.00
	1000				0.000	0.00
	100	0.1001	0.0989	0.0991	0.099	99.37
ADJ1000-G	500	0.4913	0.4922	0.4916	0.492	98.34
	1000	0.9924	0.9953	0.9915	0.993	99.31
	100	0.1014	0.1022	0.1013	0.102	101.63
ADJ1000-H	500	0.4975	0.4958	0.4971	0.497	99.36
	1000	0.9985	0.9986	0.9992	0.999	99.88
	100	0.0995	0.0983	0.0981	0.099	98.63
ADJ1000-J	500	0.5001	0.5004	0.5009	0.500	100.09
	1000	0.9976	0.9971	0.9968	0.997	99.72
	100				0.000	0.00
ADJ1000	500				0.000	0.00
	1000	JV	03/01/05		0.000	0.00
	100				0.000	0.00
ADJ1000	500				0.000	0.00
	1000				0.000	0.00

FRM-247b (Rev 2/Oct 03)

JV 03/01/05

Book/page: 07 124

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

010605

Balance #: 16 Thermometer #: G 011 diH20 Temperature (° C) 21

100 µL – 1000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	100			
ADJ1000-C	500			
	1000			
	100			
ADJ1000-D	500			
	1000			
	100			
ADJ1000-E	500			
	1000			
	100			
ADJ1000-F	500			
	1000			
	100	.1001	.0989	0.0991
ADJ1000-G	500	.4913	.4922	.4916
	1000	.9924	.9953	.9915
	100	~~.1034~~ .1014 JV 03/01/05	.1022	.1013
ADJ1000-H	500	.4975	.4958	.4971
	1000	.9985 JV	.9986 JV	.9992
	100	.0995 JV 03/01/05	.0983 JV 03/01/05	.0981 JV 03/01/05
ADJ1000-J	500	.5001	.5004	.5009
	1000	.9976	.9971	.9968
	100			
ADJ1000-K	500			
	1000			
	100			
ADJ1000	500			
	1000			

JV 03/01/05

Analyst: [signature] Date: 03/01/05

Reviewed by: [signature] Date: 04/06/05

Book/page: 07 059

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

010606

SwRI – Div. 01, Inorganic Laboratory Adjustable Pipette Verification Spreadsheet

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	20					
ADJ200-A	100					
	200					
	20					
ADJ200-C	100					
	200					
	20					
ADJ200-D	100					
	200					
	20	0.0201	0.0201	0.0200	0.020	100.33
ADJ200-G	100	0.0989	0.0985	0.0983	0.099	98.57
	200	0.1976	0.1979	0.1982	0.198	98.95
	20	0.0203	0.0201	0.0202	0.020	101.00
ADJ200-H	100	0.0993	0.0990	0.0989	0.099	99.07
	200	0.1991	0.1994	0.1979	0.199	99.40
	20	0.0205	0.0201	0.0203	0.020	101.50
ADJ200-J	100	0.0991	0.0989	0.0990	0.099	99.00
	200	0.1979	0.1974	0.1978	0.198	98.85
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200-K	100					
	200					

TV 03/01/05

FRM-247a (Rev 3/Oct 03)

TV 03/01/05

Book/page: 07 060

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

010607

Balance #: 16 Thermometer #: G011 diH20 Temperature (° C) 22

	Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
20 µL – 200 µL		20			
	ADJ200-A	100			
		200			
		20			
	ADJ200-C	100			
		200			
		20			
	ADJ200-D	100			
		200			
		20	0.0201	0.0201	0.0200
	ADJ200-G	100	0.0989	0.0985	0.0983
		200	.1976	.1979	.1982
		20	0.0203	0.0201	0.0202
	ADJ200-H	100	0.0939993 JV 03/01/05	0.0990	0.0989 JV 03/01/05
		200	.1991	.1994	.1979
		20	.0205	.0201	.0203
	ADJ200-J	100	.0991	.0989	.0990
		200	.1979	.1974	.1978
		20			
	ADJ200-K	100			
		200			
		20			
	ADJ200	100			
		200			

J.V. 03/01/05

Analyst: [signature] Date: 03/01/05

Reviewed by: [signature] Date: 04/06/05

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050119-1
SRR: 27044
SDG: 257326
CASE: CNWRA
VTSR: January 06, 2005
PROJECT#: 06002.01.211

010608

Balance Calibrations

Southwest Research Institute®
Division 01

BALANCE VERIFICATION LOG

BALANCE #:	LOCATION:	SERIAL #:	TOLERANCE:	COMMENTS:
12	Bldg. 70 Lab 27	1122510787	±0.0005	
Date	**Std Wt (g)**	**Recorded Wt (g)**	**Operator**	
2-8-05	2.0000	2.0000	KE	SN:99-J50526-15
2-9-05	2.0000	2.0000	KE	"
2-10-05	2.0000	2.0000	KE	"
2-11-05	2.0000	2.0001	AD	"
2-13-05	2.0000	2.0000	KE	"
2-14-05	2.0000	1.9999	KE	"
2-15-05	2.0000	2.0000	KE	"
2-16-05	2.0000	2.0000	KE	"
2-17-05	2.0000	2.0000	KE	"
2-18-05	2.0000	2.0000	KE	"

If balance is out of limits, clean the balance and re-calibrate using Class "S" weights.
If balance is still out of limits, place a "DO NOT USE" sign on it and call (DQA) for service.

FRM-112 (Rev 2/Aug 03)

010609

Southwest Research Institute
Division 01

BALANCE VERIFICATION LOG

BALANCE #:	LOCATION:	SERIAL #:	TOLERANCE:	COMMENTS:
19	Bldg. 70 Lab 27	0068597	±0.05	
Date	**Std Wt (g)**	**Recorded Wt (g)**	**Operator**	KE 2/2/05
2-9-05	~~10.002 0000~~ KE 2/9/05 ~~2.0000~~ 10.00		KE	SN, 99-J58624-5
2-10-05	10.00	10.00	KE	"
2-11-05	10.00	10.00	AO	"
2.13.05	10.00	10.00	KE	"
2.14.05	10.00	10.00	KE	"
2-15-05	10.00	10.00	KE	"
2-16-05	10.00	10.00	KE	"
2-17-05	10.00	10.00	KE	"
2-18-05	10.00	10.00	KE	"
2-21-05	10.00	10.00	KE	"

If balance is out of limits, clean the balance and re-calibrate using Class "S" weights.
If balance is still out of limits, place a "DO NOT USE" sign on it and call (DQA) for service.

FRM-112 (Rev 2/Aug 03)

010610

Southwest Research Institute®
Division 01

BALANCE VERIFICATION LOG

BALANCE #:	LOCATION:	SERIAL #:	TOLERANCE:	COMMENTS:
34	Bldg. 70 Lab 27	1116031935	±0.0005	
Date	**Std Wt (g)**	**Recorded Wt (g)**	**Operator**	SN: 99-J50526-15
2-8-05	2.0000	2.0000	KE	~~SN: J-99-~~ KE 2/7/05
2-9-05	2.0000	2.0000	KE	SN: 99-J50526-15
2-10-05	2.0000	2.0000	KE	"
2-11-05	2.0000	2.0001	AO	"
2-12-05	2.0000	2.0000	[illegible]	"
2-14-05	2.0000	2.0000	KE	"
2-15-05	2.0000	2.0000	KE	"
2-16-05	2.0000	2.0000	KE	"
2-17-05	2.0000	2.0000	KE	"
2-18-05	2.0000	2.0001	KE	"

If balance is out of limits, clean the balance and re-calibrate using Class "S" weights.
If balance is still out of limits, place a "DO NOT USE" sign on it and call (DQA) for service.

FRM-112 (Rev 2/Aug 03)

010611

Southwest Research Institute
Division 01

BALANCE VERIFICATION LOG

BALANCE #:	LOCATION:	SERIAL #:	TOLERANCE:	COMMENTS:
12	Bldg. 70 Lab 27	1122510787	±0.0005	
Date	**Std Wt (g)**	**Recorded Wt (g)**	**Operator**	KE 2/21/05.
2-21-05	2.0000	2.0001	KE	99:J-50526-15
2-22-05	2.0000	2.0000	KE	~~SN: J~~ SN: 99-J50526-15
2-23-05	2.0000	2.0000	KE	~
2-24-05	2.0000	2.0000	KE	~
2-25-05	2.0000	2.0000	KE	~
02-28-05	2.0000	2.0000	JW	"
3-1-05	2.0000	2.0000	[illegible]	"
3-2-05	2.0000	2.0001	RB	"
3-3-05	2.0000	2.0000	KE	~
3-4-05	2.0000	2.0000	KE	~

If balance is out of limits, clean the balance and re-calibrate using Class "S" weights.
If balance is still out of limits, place a "DO NOT USE" sign on it and call (DQA) for service.

Southwest Research Institute®
Division 01

BALANCE VERIFICATION LOG

BALANCE #:	LOCATION:	SERIAL #:	TOLERANCE:	COMMENTS:
12	Bldg. 70 Lab 27	1122510787	±0.0005	
Date	**Std Wt (g)**	**Recorded Wt (g)**	**Operator**	
3-7-05	2.0000	1.9999	KE	SN:99-J50526-15
3-8-05	2.0000	2.0000	KE	"
3-9-05	2.0000	2.0000	KE	"
3-10-05	2.0000	2.0000	JW	"
3-11-05	2.0000	2.0000	KE	"
3-14-05	2.0000	2.0000	KE	"
3-15-05	2.0000	2.0000	KE	"
3-16-05	2.0000	1.9999	JW	"
3-17-05	2.0000	2.0000	KE	"
3-18-05	2.0000	2.0000	JW	"

If balance is out of limits, clean the balance and re-calibrate using Class "S" weights.
If balance is still out of limits, place a "DO NOT USE" sign on it and call (DQA) for service.

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050119-1
SRR: 27044
SDG: 257326
CASE: CNWRA
VTSR: January 06, 2005
PROJECT#: 06002.01.211

010614

DI Water Verification

D.I. WATER SYSTEM NOTEBOOK
SOUTHWEST RESEARCH INSTITUTE
BUILDING 70

Contact U.S. Filter (1-800-466-7873) for repairs/exchanges. (Make sure to have a P.O.)

010615

HIGH PURITY SYSTEM (HP)

DATE / TIME	INITIALS	RESISTIVITY MONITOR (M OHMS)	RESISTIVITY MONITOR QC LT.	QC LIGHTS QC 1	QC LIGHTS QC 2	USAGE (GALS)	COMMENTS
2/2/05 8:05pm	DR	18.02	✓	X	✓	7290.7	need PO to place service call
2/3/05 10:43pm	DR	18.01	✓	X	✓	7318.1	awaiting P.O.
2/4/05 9:11pm	DR	18.02	✓	X	✓	7345.6	U.S. Filter called!
2/7/05 8:15pm	DR	18.02	✓	✓	✓	7382.2	tank changing was done, all ok.
2/8/05 10:35pm	DR	18.02	✓	✓	✓	7402.4	✓
2/9/05 9:05pm	DR	18.02	✓	✓	✓	7437.3	✓
2/10/05 10:10pm	DR	18.02	✓	✓	✓	7467.5	✓
2/11/05 5:40pm	DR	18.02	✓	✓	✓	~~7508~~ 7509.3	✓
2/14/05 9:30pm	DR	18.01	✓	✓	✓	7561.7	✓
2/15/05 8:50pm	DR	18.01	✓	✓	✓	7598.7	✓
2/16/05 10:40pm	DR	18.01	✓	✓	✓	7645.2	
2/17/05 8:34pm	DR	18.02	✓	✓	✓	7674.9	✓
2/18/05 6:58pm	DR	18.01	✓	✓	✓	7700.4	✓
2/21/05 6:50pm	DR	18.01	✓	✓	✓	7735.0	✓
2/22/05 6:31pm	DR	18.02	✓	✓	✓	7760.5	✓
2/24/05 6:20pm	DR	18.02	✓	✓	✓	7823.2	✓

Legend: Check = Green (OK); X = Red (call for service)

LOW PURITY SYSTEM (LP)

DATE / TIME	INITIALS	QC LIGHTS QC 1	QC LIGHTS QC 2	USAGE (GALS)	COMMENTS
2/2/05 8:00pm	DR	~~18.02~~ ✓	(18.5) ✓	30019.6	✓
2/3/05 10:44pm	DR	X	(9) ✓	30029.3	waiting PO to place service call
2/4/05 9:10pm	DR	✓	(9) ✓	30031.8	light ok, changing tank anyway.
2/7/05 8:16pm	DR	✓	(15.5) ✓	30035.0	tank exchange, all ok
2/8/05 10:39pm	DR	✓	(15) ✓	30035.3	✓
2/9/05 9:05pm	DR	✓	(14.5) ✓	30035.7	✓
2/10/05 10:11pm	DR	✓	(13.5) ✓	30036.1	✓
2/11/05 5:41pm	DR	✓	(12.5) ✓	30036.9	✓
2/14/05 9:30pm	DR	✓	(10) ✓	30050.4	✓
2/15/05 8:51pm	DR	✓	(9.5) ✓	30069.2	✓
2/16/05 10:41pm	DR	✓	(9.5) ✓	30071.4	✓
2/17/05 8:34pm	DR	✓	(9.5) ✓	30072.0	✓
2/18/05 6:59pm	DR	✓	(9.5) ✓	30076.9	✓
2/21/05 6:50pm	DR	✓	(9) ✓	30077.5	✓
2/22/05 6:30pm	DR	✓	(18.5) ✓	30083.4	✓
2/24/05 6:20pm	DR	✓	(9) ✓	30083.6	✓

Legend: Check = Green (OK); X = Red (call for service)

D.I. WATER SYSTEM NOTEBOOK
SOUTHWEST RESEARCH INSTITUTE
BUILDING 70

Contact U.S. Filter (1-800-466-7873) for repairs/exchanges. (Make sure to have a P.O.)

010616

HIGH PURITY SYSTEM (HP)

DATE / TIME	INITIALS	RESISTIVITY MONITOR (M OHMS)	QC LIGHTS QC LT.	QC 1	QC 2	USAGE (GALS)	COMMENTS
1/1/05 11pm	DR	18.0	✓	✓	✓	6901.4	✓
1/2/05 11:11pm	DR	18.01	✓	✓	✓	6913.1	✓
1/3/05 10:05pm	DR	18.01	✓	✓	✓	6936.8	✓
1/4/05 4:45pm	DR	18.02	✓	✓	✓	6941.2	✓
1/7/05 7:30pm	DR	18.02	✓	✓	✓	6955.6	✓
1/8/05 7:15pm	DR	18.01	✓	✓	✓	6967.8	✓
1/9/05 7:30pm	DR	18.01	✓	✓	✓	6993.1	✓
1/20/05 6:30pm	DR	18.01	✓	✓	✓	7024.3	✓
1/21/05 3:45pm	DR	18.00	✓	✓	✓	7050.8	✓
1/24/05 7:30pm	DR	18.02	✓	✓	✓	7090.1	✓
1/25/05 7:50pm	DR	18.02	✓	✓	✓	7110.8	✓
1/26/05 10pm	DR	18.01	✓	✓	✓	7152.5	✓
1/27/05 11:31pm	DR	18.02	✓	✓	✓	7186.6	✓
1/28/05 7:30pm	DR	18.01	✓	✓	✓	7219.8	✓
1/29/05 9pm	DR	18.02	✓	✓	✓	7247.5	✓
1/31/05 4:45pm	DR	18.01	✓	✓	✓	7263.0	✓

Legend: Check = Green (OK); X = Red (call for service)

LOW PURITY SYSTEM (LP)

DATE / TIME	INITIALS	QC LIGHTS QC 1	QC 2	USAGE (GALS)	COMMENTS
1/1/05 11pm	DR	✓	✓ (9)	29975.4	✓
1/2/05 11:12pm	DR	✓	(8.5) ✓	29976.8	✓
1/3/05 10:06pm	DR	✓	(8.5) ✓	29978.0	✓
1/4/05 4:46pm	DR	✓	(8.5) ✓	29979.2	✓
1/7/05 7:21pm	DR	✓	(9.5) ✓	29992.7	✓
1/8/05 7:16pm	DR	✓	(9.5) ✓	29994.3	✓
1/9/05 7:21pm	DR	✓	(9.5) ✓	29996.1	✓
1/20/05 6:21pm	DR	✓	(10.5) ✓	30005.1	✓
1/21/05 3:45pm	DR	✓	(10) ✓	30006.5	✓
1/24/05 7:30pm	DR	✓	(9.5) ✓	30007.8	✓
1/25/05 7:51pm	DR	✓	(9) ✓	30005.9	✓
1/26/05 10pm	DR	✓	(9.5) ✓	30011.9	✓
1/27/05 11:30pm	DR	✓	(9) ✓	30012.8	✓
1/28/05 7:21pm	DR	✓	(9) ✓	30013.6	✓
1/31/05 9pm	DR	✓	(9) ✓	30015.5	✓
2/1/05 4:46pm	DR	✓	(8.5) ✓	30016.1	✓

Legend: Check = Green (OK); X = Red (call for service)

D.I. WATER SYSTEM NOTEBOOK
SOUTHWEST RESEARCH INSTITUTE
BUILDING 70

Contact U.S. Filter (1-800-466-7873) for repairs/exchanges. (Make sure to have a P.O.)

010617

HIGH PURITY SYSTEM (HP)

DATE / TIME	INITIALS	RESISTIVITY MONITOR (M OHMS)	RESISTIVITY MONITOR QC LT.	QC LIGHTS QC 1	QC LIGHTS QC 2	USAGE (GALS)	COMMENTS
2/25/05 10pm	DR	18.01	✓	✓	✓	7662.2	✓
2/28/05 5pm	DR	18.02	✓	✓	✓	7683.2	✓
3/1/05 9:50pm	DR	18.02	✓	✓	✓	7918.0	✓
3/2/05 2:45pm	DR	18.02	✓	✓	✓	7952.3	✓
3/3/05 8:30pm	DR	18.01	✓	✓	✓	7968.6	✓
3/4/05 8:39pm	DR	18.02	✓	✓	✓	7990.7	✓
3/7/05 4pm	DR	18.04	✓	X	✓	8027.0	✓ Need to replace filter tomorrow
3/8/05 7:20pm	DR	18.02	✓	X	✓	8058.3	waiting for P.O. #
3/9/05 7:55pm	DR	18.01	✓	X	✓	8112.2	waiting for PO#
3/10/05 8pm	DR	18.02	✓	X	✓	8142.6	U.S. Filter called
3/11/05 3pm	DR	18.02	✓	X	✓	8179.6	U.S. Filter came, had wrong part, will [illegible] on 3/14
3/14/05 9:01pm	DR	18.02	✓	✓	✓	8194.9	tank exchange. All ok
3/15/05 8:10pm	DR	18.02	✓	✓	✓	8254.3	✓
3/16/05 7pm	DR	18.03	✓	✓	✓	8287.0	✓
3/17/05 9:11pm	DR	18.01	✓	✓	✓	8312.6	✓
3/21/05 6:15pm	DR	18.02	✓	✓	✓	8342.7	✓

Legend: Check = Green (OK); X = Red (call for service)

LOW PURITY SYSTEM (LP)

DATE / TIME	INITIALS	QC LIGHTS QC 1	QC LIGHTS QC 2	USAGE (GALS)	COMMENTS
2/25/05 10pm	DR	✓	(9) ✓	30084.2	✓
2/28/05 5:01pm	DR	X	(8.5) ✓	30089.1	Light red, need to double check [illegible]
3/1/05 9:51pm	DR	✓	(8) ✓	30089.2	Light green, ALL APPEARS ok
3/2/05 2:49pm	DR	✓	(8.5) ✓	30089.2	All ok ✓
3/3/05 8:31pm	DR	✓	(8.5) ✓	30089.2	✓
3/4/05 8:39pm	DR	✓	(8.5) ✓	30089.9	✓
3/7/05 4pm	DR	✓	(8) ✓	30093.7	✓
3/8/05 7:20pm	DR	✓	(8.5) ✓	30097.5	✓
3/9/05 8:52pm	DR	✓	(10) ✓	30115.4	✓
3/10/05 8:01pm	DR	✓	(10) ✓	30118.5	✓
3/11/05 7:01pm	DR	✓	(10) ✓	30120.1	✓
3/14/05 9:01pm	DR	✓	(9.5) ✓	30128.9	✓
3/15/05 8:11pm	DR	✓	(9.5) ✓	30129.1	✓
3/16/05 7:01pm	DR	✓	(9.5) ✓	30129.8	✓
3/18/05 9:12pm	DR	✓	(9) ✓	30130.1	✓
3/21/05 6:16pm	DR	✓	(9) ✓	30130.1	✓

Legend: Check = Green (OK); X = Red (call for service)

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050119-1
SRR: 27044
SDG: 257326
CASE: CNWRA
VTSR: January 06, 2005
PROJECT#: 06002.01.211

010618

SURVEILLANCE REPORTS
From Division 30

010619

Institute Quality Assurance Surveillance Report

Project Number: 20.06002.01.031	**Report Number:** 2005-SR-0182	**Page 1 of** 1

Surveillance Scope: Monitor tests for anions, phosphates, cations, and silicon. The client is SwRI Division 20 and this is a QA Nuclear surveillnace.

Reference Documents: Task Order 050222-4, 050302-3, 050119-1, and 041203-7. TAP 01-0406-038, Inductive by Coupled Plasma/Atomic Emission Spectrometric Method for Trace Elemental Analysis; TAP 01-0406-042, Ion Chromatography for the Measurement of Inorganic Ions, Method 365.3, Phosphorus

Starting Date: 5/3/2005 **Ending Date:** 5/3/2005

Institute QA Representative: Mark R. Ehnstrom MRE

Person(s) Conducting Test/Exam/Procedure: K. Edrisi and D. Harris

Satisfactory Findings: Test records of liquid and rock samples were reviewed for Anions, and Phosphates; Cations, and Silicon by IC and ICP for Division 20. Test notes clearly indicated that 10 CFR 50, Appendix B and 10 CFR Part 21 were applicable to this testing. The sample Reciept and Laboratory Sample Identification numbers were noted. Documentation packages included DI Water Systems High and Low Purity Information; Laboratory Fixed and Adjustable Pipette Verification Log information; Balance Verification Logs; ICP Calibration Blank Solution Information; and Certificates of Analysis and of Reference Materials from the suppliers who provided materials during the test. Data was recorded, signed, and reviewed by project and quality assurance personnel prior to submittal to the client.

Unsatisfactory Findings: N/A

Nonconformance Report Number: N/A **CAR/SCAR Number:** N/A

Attachments: None

Recommendations/Actions: N/A

Equipment Calibration: Standards used for calibration were traceable to NIST.

Approved: _____
Institute Quality Assurance

Date: 05/05/2005

Distribution: Original – IQS Records
Cc: PM- R. Presas (01)
CC30- C. Hobson