010001

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050722-11
SRR: 27844
SDG: 265478
CASE: CNWRA
VTSR: July 22, 2005
PROJECT#: 06002.01.242

FINAL REPORT

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET 010002

Sample ID
MC711-1

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265477

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

DUPLICATE SUMMARY

010003

Sample ID
MC711-1

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265477

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

MATRIX SPIKE SUMMARY

010004

Sample ID
MC711-1

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265477

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010005

Sample ID
MC711-10

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265478

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

DUPLICATE SUMMARY

010006

Sample ID
MC711-10

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265478

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

MATRIX SPIKE SUMMARY

010007

Sample ID
MC711-10

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265478

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010008

Sample ID
MC711-11

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265479

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010009

Sample ID
MC711-12

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265480

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010010

Sample ID
MC711-13

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265481

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010011

Sample ID
MC711-14

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265482

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010012

Sample ID
MC711-15

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265483

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010013

Sample ID
MC711-16

Lab Name: Southwest Research Institute

Lab Code: SwRI

Matrix: Water

Lab System ID: 265484

Method: ICP SW846 6010B

Client: Division 20

Date Received: 07/22/05

Project No.: 06002.01.242

SRR: 27844

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010014

Sample ID
MC711-17

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265485

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET 010015

Sample ID
MC711-18

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265486

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010016

Sample ID
MC711-19

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265487

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010017

Sample ID
MC711-2

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265488

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET 010018

Sample ID
MC711-20

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265489

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010019

Sample ID
MC711-21

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265490

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

DUPLICATE SUMMARY

010020

Sample ID
MC711-21

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265490

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

MATRIX SPIKE SUMMARY

010021

Sample ID
MC711-21

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265490

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET 010022

Sample ID
MC711-22

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265491

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

DUPLICATE SUMMARY

010023

Sample ID
MC711-22

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265491

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

MATRIX SPIKE SUMMARY

010024

Sample ID
MC711-22

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265491

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010025

Sample ID
MC711-23

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265492

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010026

Sample ID
MC711-24

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265493

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010027

Sample ID
MC711-25

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265494

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET 010028

Sample ID
MC711-26

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265495

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010029

Sample ID
MC711-3

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265496

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010030

Sample ID
MC711-4

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265497

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010031

Sample ID
MC711-5

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265498

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SAMPLE ANALYSIS DATA SHEET

010032

Sample ID
MC711-6

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265499

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010033

Sample ID
MC711-7

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265500

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010034

Sample ID
MC711-8

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265501

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010035

Sample ID
MC711-9

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 07/22/05

Matrix: Water

Project No.: 06002.01.242

Lab System ID: 265502

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

LABORATORY CONTROL SAMPLE

010036

Sample ID
LCSW - H15H1 / H17H1

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Water

Project No.: 06002.01.242

Lab System ID: NA

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

LABORATORY CONTROL SAMPLE

010037

Sample ID
LCSW - H15H2 / H17H2

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Water

Project No.: 06002.01.242

Lab System ID: NA

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

BLANK SUMMARY

010038

Sample ID
PBW - H15H1 / H17H1

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Water

Project No.: 06002.01.242

Lab System ID: NA

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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SOUTHWEST RESEARCH INSTITUTE

BLANK SUMMARY

010039

Sample ID
PBW - H15H2 / H17H2

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Water

Project No.: 06002.01.242

Lab System ID: NA

SRR: 27844

Method: ICP SW846 6010B

Task Order: 050722-11

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

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010040

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050722-11
SRR: 27844
SDG: 265478
CASE: CNWRA
VTSR: July 22, 2005
PROJECT#: 06002.01.242

Task Orders/01-QPP-015

Southwest Research Institute

Laboratory Task Order

010041

TO #: 050722-11 Revision: 0

SDG: 265478
VTSR: 07/22/05
CASE: CNWRA

SRR #'s: 27844
Client(s): Div. 20

Project(s): 06002.01.242
Manager(s): DAMMANN, MIKE
To PM: 08/17/05
To QA: 08/17/05
To Client: 08/19/05

Instructions

DIVISION 20 - CNWRA. 4-WEEK TAT requested on COC. Using 26-day TAT for preliminary, 26-day TAT for QAU; 28-day TAT on hardcopy; subject to change.
TWENTY-SIX samples received on 07/22/05 for Al, Si, Mn, Mg, Ca, K, Na and Sr by ICP.
Point of contact is Bradley A Werling, ext. 6565, bradley.werling@swri.org.
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 MARK EHNSTROM (ext. 3530) or JOANN BOYD (ext. 2169)
CONTACT PM WITH ANY ADDITIONAL QUESTIONS.

Documents Related to this task order: 18407[COC 27844]

Test: DIL-DILUTION
Section: METALPREP

Holding: 28 days from CED
Prep, Dilution
Cnt: 26

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
265477		1	Water	MC711-1	15 Jul 05	12 Aug 05
265478		1	Water	MC711-10	15 Jul 05	12 Aug 05
265479		1	Water	MC711-11	15 Jul 05	12 Aug 05
265480		1	Water	MC711-12	15 Jul 05	12 Aug 05
265481		1	Water	MC711-13	15 Jul 05	12 Aug 05
265482		1	Water	MC711-14	15 Jul 05	12 Aug 05
265483		1	Water	MC711-15	15 Jul 05	12 Aug 05
265484		1	Water	MC711-16	15 Jul 05	12 Aug 05
265485		1	Water	MC711-17	15 Jul 05	12 Aug 05
265486		1	Water	MC711-18	15 Jul 05	12 Aug 05
265487		1	Water	MC711-19	15 Jul 05	12 Aug 05
265488		1	Water	MC711-2	15 Jul 05	12 Aug 05
265489		1	Water	MC711-20	15 Jul 05	12 Aug 05
265490		1	Water	MC711-21	15 Jul 05	12 Aug 05
265491		1	Water	MC711-22	15 Jul 05	12 Aug 05
265492		1	Water	MC711-23	15 Jul 05	12 Aug 05
265493		1	Water	MC711-24	15 Jul 05	12 Aug 05
265494		1	Water	MC711-25	15 Jul 05	12 Aug 05
265495		1	Water	MC711-26	15 Jul 05	12 Aug 05
265496		1	Water	MC711-3	15 Jul 05	12 Aug 05
265497		1	Water	MC711-4	15 Jul 05	12 Aug 05
265498		1	Water	MC711-5	15 Jul 05	12 Aug 05
265499		1	Water	MC711-6	15 Jul 05	12 Aug 05
265500		1	Water	MC711-7	15 Jul 05	12 Aug 05
265501		1	Water	MC711-8	15 Jul 05	12 Aug 05
265502		1	Water	MC711-9	15 Jul 05	12 Aug 05

Test: ICP-SWRI
Section: METALS

Holding: 180 days from CED
ICP Analysis by SwRI Method
Cnt: 26

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
265477		1	Water	MC711-1	15 Jul 05	11 Jan 06
265478		1	Water	MC711-10	15 Jul 05	11 Jan 06
265479		1	Water	MC711-11	15 Jul 05	11 Jan 06
265480		1	Water	MC711-12	15 Jul 05	11 Jan 06
265481		1	Water	MC711-13	15 Jul 05	11 Jan 06

Southwest Research Institute

Laboratory Task Order

TO #: 050722-11 Revision: 0

010042

SDG: 265478
VTSR: 07/22/05
CASE: CNWRA

SRR #'s: 27844
Client(s): Div. 20

Project(s): 06002.01.242
Manager(s): DAMMANN, MIKE
To PM: 08/17/05
To QA: 08/17/05
To Client: 08/19/05

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
265482		1	Water	MC711-14	15 Jul 05	11 Jan 06
265483		1	Water	MC711-15	15 Jul 05	11 Jan 06
265484		1	Water	MC711-16	15 Jul 05	11 Jan 06
265485		1	Water	MC711-17	15 Jul 05	11 Jan 06
265486		1	Water	MC711-18	15 Jul 05	11 Jan 06
265487		1	Water	MC711-19	15 Jul 05	11 Jan 06
265488		1	Water	MC711-2	15 Jul 05	11 Jan 06
265489		1	Water	MC711-20	15 Jul 05	11 Jan 06
265490		1	Water	MC711-21	15 Jul 05	11 Jan 06
265491		1	Water	MC711-22	15 Jul 05	11 Jan 06
265492		1	Water	MC711-23	15 Jul 05	11 Jan 06
265493		1	Water	MC711-24	15 Jul 05	11 Jan 06
265494		1	Water	MC711-25	15 Jul 05	11 Jan 06
265495		1	Water	MC711-26	15 Jul 05	11 Jan 06
265496		1	Water	MC711-3	15 Jul 05	11 Jan 06
265497		1	Water	MC711-4	15 Jul 05	11 Jan 06
265498		1	Water	MC711-5	15 Jul 05	11 Jan 06
265499		1	Water	MC711-6	15 Jul 05	11 Jan 06
265500		1	Water	MC711-7	15 Jul 05	11 Jan 06
265501		1	Water	MC711-8	15 Jul 05	11 Jan 06
265502		1	Water	MC711-9	15 Jul 05	11 Jan 06

ver 8/30/2005

Client: Div. 20
SRR: 27844
Project #: 06002.01.242
Case #: CNWRA
VTSR: 07/22/2005 Time: 11:25 A.M.
All samples received at SwRI intact.

010043

01-QPP-015
Division 01
Revision 5
June 2004

Document No._____

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

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:

JO ANN BOYD Quality Assurance Manager	(210) 522-2169	6/4/04 **DATE**
REZA KARIMI Director, Department of Analytical and Environmental Chemistry	(210) 522-2412	6/4/04 **DATE**
MICHAEL G. MACNAUGHTON Vice President, Chemistry and Chemical Engineering Division	(210) 522-5162	6/4/04 **DATE**
CHRISTOPHER HOBSON Quality Assurance Engineer	(210) 522-5838	6/4/2004 **DATE**

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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. This training will be conducted either by Institute Quality Systems (IQS) or Division 01 Quality Assurance personnel and documentation shall be evident in the personnel training files maintained in Division

01 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, Task 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 or Division 01 Quality Assurance.

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. Task 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) Task 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 task 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 task order shall specify all applicable documents and appropriate document revision level for each document. The task order shall then serve as the Valid Documents List (VDL) for each individual project.

5.0 HISTORY OF REVISIONS

Versions 0 through 3 of this plan are maintained on record in Division 01 Quality Assurance.

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.*

Revision 5
Revised 4.1.1 to include designated Division 01 QA staff to conduct pertinent nuclear training sessions to the SwRI Program Quality Plan (PQP-Nuclear), *Nuclear Services*
Revised step 4.2.4 to include Division QA as an entity along with IQS, to maintain documented evidence of qualifications

QA GRAD

010053

Southwest Research Institute®

PERSONNEL SIGNATURE SHEET FOR PLANS

I have read, and understand the document listed below. By affixing my signature below, I am aware that I am responsible for abiding by and following the requirements identified in the plan specified below. If I become aware of any deviations from this document, I will inform my supervisor.

QPP-015, Performance of Chemical Analyses for Commercial Nuclear Power Plants within the Dept of Analytical & Environmental Chemistry (Rev 5/June 04)

(Document Title and Number)

Printed Name	Signature	Date	Extension
David A. Aneda	David A. Aneda	6.7.2004	2776
Roger Presas	Roger Presas	6/7/04	3682
Jeanette Garcia	Jeanette Garcia	6/7/04	6569
Cynthia A. Sanceda	Cynthia A. Sanceda	06/07/2004	5896
Joe Morin	Joe Morin	6/7/04	~~7025~~ 2792
Dino Roman	D Roman	6/7/04	x 3128
Priscilla Brockhouse	Priscilla Brockhouse	6/7/04	6078
Margaret Acevedo	M. Acevedo	6-7-04	3725
Marissa A. Rodriguez	Marissa A. Rodriguez	6/7/04	2474

Supervisor's/Manager's Signatures

The personnel whose signatures appear above have been trained and certified in the contents of this document:

010054

Southwest Research Institute®

PERSONNEL SIGNATURE SHEET FOR PLANS

I have read, and understand the document listed below. By affixing my signature below, I am aware that I am responsible for abiding by and following the requirements identified in the plan specified below. If I become aware of any deviations from this document, I will inform my supervisor.

QPP-015, Performance of Chemical Analyses for Commercial Nuclear Power Plants within the Dept of Analytical & Environmental Chemistry (Rev 5/June 04)

(Document Title and Number)

Printed Name	Signature	Date	Extension
Robert M. Acosta	Robert M Acosta	06/04/04	x6847
Pamela R. Piccini	Pamela R Piccini	6/4/04	x2167
Charles R Cartwright	Charles R Cartwright	06/04/04	x5924
Jason D. Herrera	[illegible]	6/4/04	2186
Shraddha Quarderer	Shraddha Quarderer	6/4/04	8641

Supervisor's/Manager's Signatures

The personnel whose signatures appear above have been trained and certified in the contents of this document:

METALS / Inog / Vetchem

Southwest Research Institute®

010055

PERSONNEL SIGNATURE SHEET FOR PLANS

I have read, and understand the document listed below. By affixing my signature below, I am aware that I am responsible for abiding by and following the requirements identified in the plan specified below. If I become aware of any deviations from this document, I will inform my supervisor.

QPP-015, Performance of Chemical Analyses for Commercial Nuclear Power Plants within the Dept of Analytical & Environmental Chemistry (Rev 5/June 04)

(Document Title and Number)

Printed Name	Signature	Date	Extension
Radonna Spies	RSpies	6/14/04	x 3242
Valerie DeJesus	Valerie DeJesus	06/14/04	x 3129
Carolina Orduña	COrduña	6/21/04	3146
Darian Harris	DH	6-21-04	12974
Jackie Ranger	JRanger	6/21/04	3320
Warren A. Naegeli	Warren A. Naegeli	6/21/04	5792
Michael Hardy	Michael Hardy	6/21/04	6079
JAMES TITTER	Jeff Titter	21-JUNE-2004	2487
JAMES VOOS	James Voos	06/21/04	5897
Khaled Edrisi	Khaled Edrisi	6-21-04	6630
John Wilks	John Wilks	6-21-04	V-01 2536
Bernie Villasenor	[illegible]	6-21-04	x 2702
Daniel Ramirez	Daniel Ramirez	6/21/04	x 3867
Terence O'Brien	Terence O'Brien	6/21/04	x 3066

Supervisor's/Manager's Signatures

The personnel whose signatures appear above have been trained and certified in the contents of this document:

[illegible]	Mike [illegible]	6-21-04	5428

010056

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050722-11
SRR: 27844
SDG: 265478
CASE: CNWRA
VTSR: July 22, 2005
PROJECT#: 06002.01.242

Chain of Custody/Login Paperwork

Doc# 18407

SAMPLE LIST/CHAIN OF CUSTODY

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

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

Shipper Name/Address: BRADLEY WERLING
DIV 20
BLD 57

Client:

Client Purchase Order/Other ID:

Site/Zone ID:

SwRI Contact: Mike Dammann

Analyses Requested

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers	Al, Si, Mn, Mg, Ca, K, Na, Sr by ICP								
MC711-1	7-15-05		W		1	X								INTACT
MC711-2						X								
MC711-3						X								
MC711-4						X								
MC711-5						X								
MC711-6						X								
MC711-7						X								
MC711-8						X								
MC711-9						X								
MC711-10						X								

Client: Div. 20
SRR: 27844
Project #: 06002.01.242
Case #: CNWRA
VTSR: 07/22/2005 Time: 11:25 A.M.
All samples received at SwRI intact.

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

Nuclear Safety Related - use appropriate QA procedures

POC - Brad Werling
ext 6565
fax 5184

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: RADIOACTIVE - Np237 at 8.5×10^{-7} M or 1.4×10^{-4} μCi/mL
SN 711/74

Relinquished by (Print/Signature)	Date	Time
Nicola Roberts Nicola Roberts	7-22-05	11.25
Received by (Print/Signature)	Date	Time
Relinquished by (Print/Signature)	Date	Time
Received by (Print/Signature)	Date	Time
Relinquished by (Print/Signature)	Date	Time

SwRI Project#: 20.06002.01.242

Received by SwRI Lab: (Signature)

Date	Time
7/22/05	1125

Samples Disposed:

Date	Time

Samples Disposed by:

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

010057

Doc# 18407

SAMPLE LIST/CHAIN OF CUSTODY

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

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

Shipper Name/Address: BRADLEY WERLING DIV 20 BLD 57

Client:

Client Purchase Order/Other ID:

Site/Zone ID:

SwRI Contact: Mike Dammann

Analyses Requested

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers	Al, Si, Mn, Mg, Ca, K, Na, Sr by ICP								
MC711-11	7-15-05		W		1	X								INTACT
MC711-12						X								
MC711-13						X								
MC711-14						X								
MC711-15						X								
MC711-16						X								
MC711-17						X								
MC711-18						X								
MC711-19						X								
MC711-20						X								

Client: Div. 20
SRR: 27844
Project #: 06002.01.242
Case #: CNWRA
VTSR: 07/22/2005 Time: 11:25 A.M.
All samples received at SwRI intact.

REMARKS

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

Nuclear Safety Related - use appropriate QA procedures

POC - Brad Werling ext 6565 fax 5154

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: RADIOACTIVE - Np 237 at 8.5×10⁻⁷ M or 1.4×10⁻⁴ µCi/mL
SN 711/74

Relinquished by (Print/Signature)	Date	Time
Maria Roberts Maria Roberts	7-22-05	11:22
Received by (Print/Signature)	Date	Time
Relinquished by (Print/Signature)	Date	Time
Received by (Print/Signature)	Date	Time
Relinquished by (Print/Signature)	Date	Time

SwRI Project#: 20.06002.01.242

Received by SwRI Lab: (Signature)

Date	Time
7/22/05	1125

Samples Disposed:

Date	Time

Samples Disposed by:

010058

Doc# 18407

SAMPLE LIST/CHAIN OF CUSTODY

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

Shipper Name/Address: BRADLEY WERLING
DIV 20
BLD 57

Client:

Client Purchase Order/Other ID:

Site/Zone ID:

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

SwRI Contact: Mike Dammann

Analyses Requested

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers	Al, Sr, Mn, Mg, Ca, K, Na, Si by ICP										REMARKS
MC711-21	7-15-05		W		1	X									INTACT	Nuclear Safety
MC711-22						X							INTACT		~~MISSING~~ 07/22/05	Related - use
MC711-23						X									INTACT	appropriate QA
MC711-24						X										procedures
MC711-25						X										
MC711-26						X										
																POC Brad Werling
																ext 6565
																fax 5184

Client: Div. 20
SRR: 27844
Project #: 06002.01.242
Case #: CNWRA
VTSR: 07/22/2005 Time: 11:25 A.M.
All samples received at SwRI intact.

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

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: RADIOACTIVE - Np-237 at 8.5×10^{-7} M or 1.4×10^{-4} µCi/ML
SN 711/4

Relinquished by (Print/Signature)	Date	Time
Marla Roberts, Marla Roberts	7-22-05	11:22
Received by (Print/Signature)	Date	Time
Relinquished by (Print/Signature)	Date	Time
Received by (Print/Signature)	Date	Time
Relinquished by (Print/Signature)	Date	Time

SwRI Project#: 20.06002.01.242

Received by SwRI Lab: (Signature)

Date	Time
7/22/05	1125

Samples Disposed:

Date	Time

Samples Disposed by:

010059

SAMPLE LOG-IN SHEET

010060

Lab Name: Southwest Research Institute	Page 1 of 2
Received By (Print Name): CYNTHIA SAUCEDA	Log-in Date: 07/22/2005
Received By (Signature): Cynthia Saucedo	
Case Number: CNWRA	Sample Delivery Group No.
	SAS Number: N/A

Remarks: 06002.01.242

1.	Custody Seal(s)	Present/Absent* Intact/Broken
2.	Custody Seal Nos.	N/A
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	07/22/2005
12.	Time Received	11:25:00

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc
MC711-1	None	265477	Intact
MC711-10	None	265478	Intact
MC711-11	None	265479	Intact
MC711-12	None	265480	Intact
MC711-13	None	265481	Intact
MC711-14	None	265482	Intact
MC711-15	None	265483	Intact
MC711-16	None	265484	Intact
MC711-17	None	265485	Intact
MC711-18	None	265486	Intact
MC711-19	None	265487	Intact
MC711-2	None	265488	Intact
MC711-20	None	265489	Intact
MC711-21	None	265490	Intact
MC711-22	None	265491	Intact
MC711-23	None	265492	Intact
MC711-24	None	265493	Intact
MC711-25	None	265494	Intact
MC711-26	None	265495	Intact
MC711-3	None	265496	Intact
MC711-4	None	265497	Intact
MC711-5	None	265498	Intact
MC711-6	None	265499	Intact

Sample Transfer

Fraction: INORGANIC	Fraction:
Area #: INORGANIC CMB	Area #:
By: CYNTHIA SAUCEDA	By:
On: 07/22/2005	On: 07/22/2005

* Contact SMO and attach record of resolution

Reviewed By: Cynthia A. Saucedo	Logbook No.: Sample Receipt (27844)
Date: 07/22/2005	Logbook Page No.: 5506 (SECTION 3-4 OF 4)

SAMPLE LOG-IN SHEET

010061

Lab Name: Southwest Research Institute	Page 2 of 2
Received By (Print Name): CYNTHIA SAUCEDA	Log-in Date: 07/22/2005
Received By (Signature): Cynthia Saucedo	
Case Number: CNWRA	Sample Delivery Group No.
SAS Number: N/A	

Remarks: 06002.01.242

1.	Custody Seal(s)	Present/Absent* Intact/Broken
2.	Custody Seal Nos.	N/A
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	07/22/2005
12.	Time Received	11:25:00

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc
MC711-7	None	265500	Intact
MC711-8	None	265501	Intact
MC711-9	None	265502	Intact

Sample Transfer

Fraction: INORGANIC	Fraction:
Area #: INORG CAB	Area #:
By: CYNTHIA SAUCEDA	By:
On: 07/22/2005	On:

07/22/2005

* Contact SMO and attach record of resolution

Reviewed By: CYNTHIA A. SAUCEDA	Logbook No. Sample Receipt (27844)
Date: 07/22/2005	Logbook Page No. 5506 (SECTION 3 of 4)

FORM DC-1

OLMO4.2

010062

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050722-11
SRR: 27844
SDG: 265478
CASE: CNWRA
VTSR: July 22, 2005
PROJECT#: 06002.01.242

Copies of Login Book

Sample Login Book

Jul 22, 2005

SwRI Login Area
Division 1

Sample Receipt: 27843	Project: 06685.43.00X	Client: U. S. EPA Region
VTSR Date: Jul 22, 2005	VTSR Time: 08:30:00	Manager: TAN, CK

System ID	Customer Sample ID	Matrix
265462	C21R1	Ground Water
265463	C21R4	Ground Water
265464	C21R9	Ground Water
265465	C21S3	Ground Water
265466	C21S7	Ground Water
265467	C21S9	Sediment
265468	C21T0	Sediment
265469	C21T1	Sediment
265470	C21T2	Sediment
265471	C21T3	SurfaceWater
265472	C21T4	SurfaceWater
265473	C21T5	SurfaceWater
265474	C21T6	SurfaceWater

Sample Receipt: 27844	Project: 06002.01.242	Client: Div. 20
VTSR Date: Jul 22, 2005	VTSR Time: 11:25:00	Manager: DAMMANN, MIKE

System ID	Customer Sample ID	Matrix
265477	MC711-1	Water
265478	MC711-10	Water
265479	MC711-11	Water
265480	MC711-12	Water
265481	MC711-13	Water
265482	MC711-14	Water
265483	MC711-15	Water
265484	MC711-16	Water
265485	MC711-17	Water
265486	MC711-18	Water
265487	MC711-19	Water
265488	MC711-2	Water
265489	MC711-20	Water
265490	MC711-21	Water

Sample Login Book

Jul 22, 2005

SwRI Login Area
Division 1

Sample Receipt: 27844	Project: 06002.01.242	Client: Div. 20
VTSR Date: Jul 22, 2005	VTSR Time: 11:25:00	Manager: DAMMANN, MIKE

System ID	Customer Sample ID	Matrix
265491	MC711-22	Water
265492	MC711-23	Water
265493	MC711-24	Water
265494	MC711-25	Water
265495	MC711-26	Water
265496	MC711-3	Water
265497	MC711-4	Water
265498	MC711-5	Water
265499	MC711-6	Water
265500	MC711-7	Water
265501	MC711-8	Water
265502	MC711-9	Water

Number of samples for today: 76

Number of Containers for today: 108

010065

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050722-11
SRR: 27844
SDG: 265478
CASE: CNWRA
VTSR: July 22, 2005
PROJECT#: 06002.01.242

RAW DATA

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

BOOK / PAGE: 61 104

CLIENT(S): Div 20 010066
TASK ORDER(S): 050722-11 SDG(S):
PROJECT NO(S): 06002.01.242
METHOD: 3005A___3050B___3050B-7.5___3010A___3020A___7760A___7740A___$HClO_4$___$HClO_4/H_2SO_4$
Microwave___: Vision___Teflon___Rock___OTHER dilutions
MATRIX: Water ✓ Soil___Biota___Solid___Liquid___TCLP Ext___OTHER
INSTRUMENT: GFAA___ICP ✓ ICP-MS___IC___FLAA___HYDRIDE___OTHER
ACID INORG #: HNO_3# 5314 HCl# 5335 H_2SO_4#___ $HClO_4$#___ HF#___ H_2O_2#___
INTERNAL STD: Sc @ 10 PPM ✓ Be @ 10 PPM___SOURCE: IV INORG# ~~5248~~ 5245 EXP: 6/1/06 AMT: 100uL
Oven/Hotplate/ Block ID: N/A Temperature (°C): N/A

Sample Identification		df	WT(g)	I.V.(ml)	F.V.(ml)
PBW-H17H1		1		10	10
LCSW-H17H1*		1		10	10
265477		20		0.5	10
265478		20		0.5	10
265478d		20		0.5	10
265478s*		20		0.5	10
265479		20		0.5	10
265480		20		0.5	10
265481		20		0.5	10
265482		20		0.5	10
265483		20		0.5	10
265484		20		0.5	10
265485		20		0.5	10
265486		20		0.5	10
265487		20		0.5	10
265488		20		0.5	10
265489		20		0.5	10

*40uL Sr IV#5243 Exp.6/01/06 *40uL Si IV#4999 Exp.3/1/06
*40uL ICAL-1 Spex#5288 exp. 06/06 *100uL Spike-1 #5197 Exp.4/30/06
PBW&LCSW are prepared as 10mls 1%HNO_3 / 5% HCL

Contacts
Charlie Butler

LOCATION:
N/A

PREPARED BY: DATE: 8-17-05
REVIEWED BY: DATE: 8-18-05
DISPOSAL INT/DATE/LOC:

FRM-191 (Rev 4/Jan 05)

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

BOOK / PAGE: 61 105

010067

CLIENT(S): Div 20
TASK ORDER(S): 050722-11 SDG(S):
PROJECT NO(S): 06002.01.242
METHOD: 3005A 3050B 3050B-7.5 3010A 3020A 7760A 7740A $HClO_4$ $HClO_4/H_2SO_4$
Microwave Fusion Teflon Rock OTHER dilutions
MATRIX: Water ✓ Soil Biota Solid Liquid TCLP Ext OTHER
INSTRUMENT: GFAA ICP ✓ ICP-MS IC FLAA HYDRIDE OTHER
ACID INORG #: HNO_3# ~~5317~~ 5318 HCl# 5335 H_2SO_4# $HClO_4$# HF# H_2O_2#
INTERNAL STD: Sc @ 10 PPM ✓ Be @ 10 PPM SOURCE: IV INORG# ~~5245~~ 5245 EXP: 6/1/06 AMT: 100uL
Oven/Hotplate/ Block ID: N/A Temperature (°C): N/A

Sample Identification		df	WT(g)	I.V.(ml)	F.V.(ml)
PBW-H17H2		1		10	10
LCSW-H17H2*		1		10	10
265490		20		0.5	10
265491		20		0.5	10
265491d		20		0.5	10
265491s*		20		0.5	10
265492		20		0.5	10
265493		20		0.5	10
265494		20		0.5	10
265495		20		0.5	10
265496		20		0.5	10
265497		20		0.5	10
265498		20		0.5	10
265499		20		0.5	10
265500		20		0.5	10
265501		20		0.5	10
265502		20		0.5	10

*40uL Sr IV#5243 Exp.6/01/06 *40uL Si IV#4999 Exp.3/1/06
*40uL ICAL-1 Spex#5288 exp. 06/06 *100uL Spike-1 #5197 Exp.4/30/06
PBW&LCSW are prepared as 10mls 1%HNO_3 / 5% HCL

8-17-05

Centrifuged
Charlie Butler

LOCATION:
N/A

PREPARED BY: DATE: 8-17-05
REVIEWED BY: DATE: 8-18-05
DISPOSAL INT/DATE/LOC:

FRM-191 (Rev 4/Jan 05)

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

BOOK / PAGE: 61 103

010068

CLIENT(S): D.V. 20
TASK ORDER(S): 050722-11 SDG(S): 265475
PROJECT NO(S): 06002.01.242
METHOD: 3005A ___ 3050B ___ 3050B-7.5 ___ 3010A ___ 3020A ___ 7760A ___ 7740A ___ $HClO_4$ ___ $HClO_4/H_2SO_4$ ___
Microwave ___ Fusion ___ Teflon ___ Rock ___ OTHER dilutions
MATRIX: Water ✓ Soil ___ Biota ___ Solid ___ Liquid ___ TCLP Ext ___ OTHER ___
INSTRUMENT: GFAA ___ ICP ✓ ICP-MS ___ IC ___ FLAA ___ HYDRIDE ___ OTHER ___
ACID INORG #: HNO_3# ~~5317~~ 5318 ~~5317~~ 5320 HCl# 5335 H_2SO_4# ___ $HClO_4$# ___ HF# ___ H_2O_2# ___
INTERNAL STD: Sc @ 10 PPM ✓ Be @ 10 PPM ___ SOURCE: IV INORG# ~~5244~~ 5245 EXP: 6/1/06 AMT: 525
Oven/Hotplate/ Block ID: N/A Temperature (°C): N/A

Sample Identification		df	WT(g)	I.V.(ml)	F.V.(ml)
PBW-H16H1		1		5	5
LCSW-H16H1*		1		5	5
265477		10		0.5	5
265477d		10		0.5	5
265490		10		0.5	5
265490d		10		0.5	5

~~*200L ICAL-1 Spex#5288 exp. 06/06~~ 8-16-05

PBW&LCSW are prepared as 5mls 1%HNO_3 / 5% HCL

8-18-05

LOCATION:

PREPARED BY: [signature] DATE: 8-18-05
REVIEWED BY: John Walker DATE: 8-19-05
DISPOSAL INT/DATE/LOC: ___

FRM-191 (Rev 4/Jan 05)

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

BOOK / PAGE: 61 110

010069

CLIENT(S): Div. 20
TASK ORDER(S): 050722-11 SDG(S): 265478
PROJECT NO(S): 06002.01.242
METHOD: 3005A___ 3050B___ 3050B-7.5___ 3010A___ 3020A___ 7760A___ 7740A___ $HClO_4$___ $HClO_4/H_2SO_4$___
Microwave___ Fusion___ Teflon___ Rock___ OTHER dilutions
MATRIX: Water ✓ Soil___ Biota___ Solid___ Liquid___ TCLP Ext___ OTHER___
INSTRUMENT: GFAA___ ICP ✓ ICP-MS___ IC___ FLAA___ HYDRIDE___ OTHER___
ACID INORG #: HNO_3# ~~5315~~ 5318 HCl# 5335 H_2SO_4#___ $HClO_4$#___ HF#___ H_2O_2#___
INTERNAL STD: Sc @ 10 PPM ✓ Be @ 10 PPM___ SOURCE: IV INORG# ~~5245~~ 5245 EXP: 6/1/06 AMT: 50uL
Oven/Hotplate/ Block ID: N/A Temperature (°C): N/A

Sample Identification		df	WT(g)	I.V.(ml)	F.V.(ml)
PBW-H19H1		1		5	5
LCSW-H19H1*		1		5	5
265496		50		0.1	5
265497		50		0.1	5
265498		50		0.1	5
265499		50		0.1	5
265500		50		0.1	5
265501		50		0.1	5
265502		50		0.1	5

*20uL Sr IV# 5243 Exp.6/01/06 *20uL Si IV#4999 Exp.3/1/06
*20uL ICAL-1 Spex#5288 exp. 06/06 *50uL Spike-1 #5197 Exp.4/30/06
PBW&LCSW are prepared as 10mls 1%HNO_3 / 5% HCL

LOCATION:

PREPARED BY: DATE: 8-19-05
REVIEWED BY: Ordiña DATE: 8/19/05
DISPOSAL INT/DATE/LOC:

FRM-191 (Rev 4/Jan 05)

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

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010070

CLIENT(S): Div 20
TASK ORDER(S): 050722-11 SDG(S): 265478
PROJECT NO(S): 06002.01.2A2
METHOD: 3005A___3050B___3050B-7.5___3010A___3020A___7760A___7740A___$HClO_4$___$HClO_4/H_2SO_4$___
Microwave___Fusion___Teflon___Rock___OTHER dilutions
MATRIX: Water ✓ Soil___Biota___Solid___Liquid___TCLP Ext___OTHER___
INSTRUMENT: GFAA___ICP ✓ ICP-MS___IC___FLAA___HYDRIDE___OTHER___
ACID INORG #: HNO_3#5318___HCl#5302___H_2SO_4#___$HClO_4$#___HF#___H_2O_2#___
INTERNAL STD: Sc @ 10 PPM ✓ Be @ 10 PPM___SOURCE: IX INORG# 5243 EXP: 6/1/06 AMT: 100uL
Oven/Hotplate/ Block ID: N/A Temperature (°C): N/A

Sample Identification		df	WT(g)	I.V.(ml)	F.V.(ml)
PBW-H15H1		1		10	10
LCSW-H15H1*		1		10	10
265477		10		1	10
265477d		10		1	10
265477s*		10		1	10
265478		10		1	10
265479		10		1	10
265480		10		1	10
265481		10		1	10
265482		10		1	10
265483		10		1	10
265484		10		1	10
265485		10		1	10
265486		10		1	10
265487		10		1	10
265488		10		1	10
265489		10		1	10

*40uL Sr IV#5243 Exp.6/01/06 *40uL Si IV#4999 Exp.3/1/06
*40uL ICAL-1 Spex#5288 exp. 06/06 *100uL Spike-1 #5197 Exp.4/30/06
PBW&LCSW are prepared as 10mls 1%HNO_3 / 5% HCL

Contacted Charlie Butcher

LOCATION: N/A

PREPARED BY: [signature] DATE: ~~8-12-05~~ 8-15-05
REVIEWED BY: John Walker DATE: 8-15-05
DISPOSAL INT/DATE/LOC:

FRM-191 (Rev 4/Jan 05)

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

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~~010071~~

CLIENT(S): Div. 20
TASK ORDER(S): 050722-11 SDG(S): 265478
PROJECT NO(S): 06002.01.242
METHOD: 3005A___3050B___3050B-7.5___3010A___3020A___7760A___7740A___$HClO_4$___$HClO_4/H_2SO_4$___
Microwave___Fusion___Teflon___Rock___OTHER dilutions
MATRIX: Water ✓ Soil___Biota___Solid___Liquid___TCLP Ext___OTHER___
INSTRUMENT: GFAA___ICP ✓ ICP-MS___IC___FLAA___HYDRIDE___OTHER___
ACID INORG #: HNO_3# 5318 HCl# 5302 H_2SO_4#___ $HClO_4$#___ HF#___ H_2O_2#___
INTERNAL STD: Sc @ 10 PPM ✓ Be @ 10 PPM ✓ SOURCE: I-V INORG# ~~5246~~ 5245 EXP: 6/1/06 AMT: 100uL
Oven/Hotplate/ Block ID: N/A Temperature (°C): N/A

Sample Identification	df	WT(g)	I.V.(ml)	F.V.(ml)
PBW-H15H2	1		10	10
LCSW-H15H2*	1		10	10
265490	10		1	10
265490d	10		1	10
265490s*	10		1	10
265491	10		1	10
265492	10		1	10
265493	10		1	10
265494	10		1	10
265495	10		1	10
265496	10		1	10
265497	10		1	10
265498	10		1	10
265499	10		1	10
265500	10		1	10
265501	10		1	10
265502	10		1	10

*40uL Sr IV# 5243 Exp.6/01/06 *40uL Si IV#4999 Exp.3/1/06
*40uL ICAL-1 Spex#5288 exp. 06/06 *100uL Spike-1 #5197 Exp.4/30/06
PBW&LCSW are prepared as 10mls 1%HNO_3 / 5% HCL

8-15-05

Contracted Charlie Butler

LOCATION: N/A

PREPARED BY: [signature] DATE: ~~8-12-05~~ 8-15-05
REVIEWED BY: [signature] DATE: 8-15-05
DISPOSAL INT/DATE/LOC:

FRM-191 (Rev 4/Jan 05)

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SOUTHWEST RESEARCH INSTITUTE®

6220 Culebra Rd
San Antonio, Texas 78228

TJA_2 TRACE ICP DAILY LOG

ANALYST [signature]

DATE 8-17-05

As 189.042 Profile Line

As Intensity: 724.82

PEAK POSITION -.005449

VERNIER POSITION 748

QC PREP DATE:	
CCV/ICV	051601
CRI	
ICSA	
ICSAB	051601

STDs PREP DATE:	
CLP_STD1_SC	051601
CLP_STD2_SC	
CLP_STD3_SC	
CLP_STD4_SC	
CLP_STD5_SC	
CLP_STD6_SC	
BLK_SC	051601

COMMENTS	FILE	CLIENT	TO#	PROJECT NO.	METHOD
B508162	Y05Aug	Amstar Co.	050816-2	10939.06.034	6010B 61-102
B050817	Y05Aug	CH2M	050719-10	11543.01.006	61-092
B050817A	Y05Aug	O.V. 20	050722-11	06002.01.242	61-104
B050817A	Y05Aug	O.V. 20	050722-11	06002.01.242	61-105

8-17-05

COMMENTS:

MAINTENANCE: Changed pump tubes

REVIEWED BY: Ordiña

DATE: 8/26/05

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6220 Culebra Rd
San Antonio, Texas 78228

TJA_2 TRACE ICP DAILY LOG

ANALYST [illegible]

DATE 8-19-05

As 189.042 Profile Line

As Intensity: 671.75

PEAK POSITION .046309

VERNIER POSITION 751

STDs PREP DATE:	
CLP_STD1_SC	05H01
CLP_STD2_SC	
CLP_STD3_SC	
CLP_STD4_SC	
CLP_STD5_SC	
CLP_STD6_SC	
BLK_SC	05H01

QC PREP DATE:	
CCV/ICV	05H01
CRI	
ICSA	
ICSAB	05H01

COMMENTS	FILE	CLIENT	TO#	PROJECT NO.	METHOD
B050819	YOSANG	Div. 20	050722-11	06002.01.242	6010B
B508108	YOSANG	CH2M-WG	050810-8	11543.01.006	6010B 61-101
B508108	YOSANG	CH2M-WG	050810-7	11543.01.006	6010B 61-100

8-19-05

COMMENTS:

MAINTENANCE:
Changed Pump tubing

REVIEWED BY: Ordiña

DATE: 8/26/05

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SOUTHWEST RESEARCH INSTITUTE®
6220 Culebra Rd
San Antonio, Texas 78228

SPECTRO ICP DAILY LOG

ANALYST [illegible]

DATE 8-15-05

POWER: 1200

FLOWS:
Aux 40
Coolant 60
Mass Flow Controller 886

CURRENT	PROPOSED	
5088	5092	Na
4783	4778	Fe
4940	4936	Sr

QC PREP DATE:	
CCV/ICV	05H01
CRI	
ICSA	
ICSAB	05H01

CLP_STD1_SC	05H01
CLP_STD2_SC	
CLP_STD3_SC	
CLP_STD4_SC	
CLP_STD5_SC	
BLK_SC	05H01

FILE	CLIENT	TO#	PROJECT NO.	METHOD	PREP PAGE
050815A	D.V. 20	050722-11	06002.01.242	6010B	62-086
050815A	D.V. 20	050722-11	06002.01.242	6010B	62-087

8-15-05

COMMENTS:

MAINTENANCE:

Cleaned Torch: _____ YES
Changed Pump Tubing: X YES
Cleaned Optics: _____ YES
Polished Optics: _____ YES

OTHER:

REVIEWED BY: Adriana

DATE: 8/26/05

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SOUTHWEST RESEARCH INSTITUTE®
6220 Culebra Rd
San Antonio, Texas 78228

SPECTRO ICP DAILY LOG

ANALYST [signature]

DATE 8-16-05

POWER: 1kw

FLOWS:
Aux 40
Coolant 60
Mass Flow Controller 886

CURRENT	PROPOSED	
5092	5097	Na
4778	4782	Fe
4936	4941	Sr

QC PREP DATE:	
CCV/ICV	051701
CRI	
ICSA	
ICSAB	051701

CLP_STD1_SC	051701
CLP_STD2_SC	
CLP_STD3_SC	
CLP_STD4_SC	[signature] 8-16-05
CLP_STD5_SC	
BLK_SC	051701

FILE	CLIENT	TO#	PROJECT NO.	METHOD	PREP PAGE
050816	DIV 20	050722-11	06002.03.242	6010B	61-10
		8-16-05			

COMMENTS:

MAINTENANCE:

Cleaned Torch: ✓ YES
Changed Pump Tubing: _____ YES
Cleaned Optics: _____ YES
Polished Optics: _____ YES

OTHER:

REVIEWED BY: Orduña

DATE: 8/26/05

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010076

SOUTHWEST RESEARCH INSTITUTE®
6220 Culebra Rd
San Antonio, Texas 78228

SPECTRO ICP DAILY LOG

ANALYST [illegible]

DATE 8.17.05

POWER: 1200

FLOWS:
Aux 40
Coolant 60
Mass Flow Controller 8.86

CURRENT	PROPOSED	
5047	5054	Na
4782	4785	Fe
4941	4948	Sr

QC PREP DATE:	
CCV/ICV	05H01
CRI	
ICSA	
ICSAB	05H01

CLP_STD1_SC	05H01
CLP_STD2_SC	
CLP_STD3_SC	
CLP_STD4_SC	
CLP_STD5_SC	
BLK_SC	05H01

FILE	CLIENT	TO#	PROJECT NO.	METHOD	PREP PAGE
050817	Amstar CO	050816-2	10939.06.04	6010B	61-102
050817A	Div 20	050722-11	06002.01.242	6010B	61-104
050817A	Div 20	050722-11	06002.01.242	6010B	61-105

8-17-05

COMMENTS:

MAINTENANCE:

Cleaned Torch: _____ YES
Changed Pump Tubing: ✓ YES
Cleaned Optics: _____ YES
Polished Optics: _____ YES

OTHER:

REVIEWED BY: [illegible]

DATE: 8/26/05

010077

ICP Calibration Blank/ICB/CCB Solution

ID: BLK- 05G-5

Date Prepared: 7-5-05 Prepared By: [signature]

Make up as needed in 1000ml volumetric flask.

Added ✓ 10 ml HNO3 INORG #: 5258

Added ✓ 50 ml HCL INORG #: 5237

Added ✓ 1000ul of 10000ppm Sc (INORG. VENT.) EXP. Date: 5-1-06 INORG #: 5175

ICP Calibration Blank/ICB/CCB Solution

ID: BLK- 05G28

Date Prepared: 7-28-05 Prepared By: [signature]

Make up as needed in 1000ml volumetric flask.

Added ✓ 10 ml HNO3 INORG #: 5260

Added ✓ 50 ml HCL INORG #: 5299

Added ✓ 1000ul of 10000ppm Sc (INORG. VENT.) EXP. Date: 5-1-06 INORG #: 5175

ICP Calibration Blank/ICB/CCB Solution

ID: BLK- 05H01

Date Prepared: 8-1-05 Prepared By: [signature]

Make up as needed in 1000ml volumetric flask.

Added ✓ 10 ml HNO3 INORG #: 5260

Added ✓ 50 ml HCL INORG #: 5299

Added ✓ 1000ul of 10000ppm Sc (INORG. VENT.) EXP. Date: 5/06 INORG #: 5175

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 ICV/CCV SOLUTION

010078

CCV- 05H01

Date Prepared: 8-1-05 Prepared By: D

HNO3 INORG #: 5260 HCl INORG #: 5299

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	5175	10000	5-1-06
B	5	5ml	✓	SPEX	4966	1000	1-15-06
Li	5	5ml	✓	SPEX	4846	1000	10-30-05
Mo	5	5ml	✓	SPEX	4847	1000	10-30-05
P	5	5ml	✓	SPEX	5280	1000	6-30-06
Si	5	5ml	✓	SPEX	5038	1000	2-28-06
Ti	5	5ml	✓	SPEX	5040	1000	2-28-06
Sr	5	5ml	✓	SPEX	5246	1000	5-30-06
Sn	5	5ml	✓	SPEX	5037	1000	2-28-06
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	5296	1000	7-15-06
Th	1	1ml	✓	SPEX	4760	1000	8-30-05
U	1	1ml	✓	SPEX	5279	1000	6-30-06
W	1	1ml	✓	SPEX	5314	1000	7-30-06
Zr	5	5ml	✓	SPEX	5039	1000	2-26-06
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: 8-30-05

010079

ICP Calibration Standards

Date Prepared: 8-1-05 Prepared By: [illegible]

HNO3 INORG #: 5260 HCl INORG #: 5299

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
05HCl 8-1-05	STD1- 05HCl	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	5048	10000	3-1-06
		K	50	2.50	✓	INORVENT	4907	10000	12-1-05
		Mg	25	1.25	✓	INORVENT	5312	10000	8-1-06
		Na	50	2.50	✓	INORVENT	5310	10000	8-1-06
		Li	10	5.00	✓	INORVENT	5244	1000	8-1-06
		Sc	10	0.500	✓	INORVENT	5175	10000	5-1-06
	STD2- 05HCl	Ba	10	5.00	✓	INORVENT	5027	1000	3-1-06
		Be	5	2.50	✓	INORVENT	5253	1000	6-1-06
		Cr	10	5.00	✓	INORVENT	4906	1000	12-1-05
		Cu	10	5.00	✓	INORVENT	5049	1000	3-1-06
		Ni	10	5.00	✓	INORVENT	5043	1000	3-1-06
		Sc	10	0.500	✓	INORVENT	5175	10000	5-1-06
	STD3- 05HCl	Cd	10	5.00	✓	INORVENT	5041	1000	3-1-06
		Co	10	5.00	✓	INORVENT	5044	1000	3-1-06
		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	5175	10000	5-1-06
	STD4- 05HCl	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	5255	1000	6-1-06
		Sb	10	5.00	✓	INORVENT	5042	1000	3-1-06
		Se	10	5.00	✓	INORVENT	5313	1000	8-1-06
		TL	10	5.00	✓	INORVENT	4990	1000	2-1-06
		Sc	10	0.500	✓	INORVENT	5175	10000	5-1-06
	STD5- 05HCl	B	10	5.00	✓	INORVENT	5047	1000	3-1-06
		Mo	10	5.00	✓	INORVENT	5050	1000	3-1-06
		P	10	5.00	✓	INORVENT	5254	1000	6-1-06
		Si	10	5.00	✓	INORVENT	5046	1000	3-1-06
		Ti	10	5.00	✓	INORVENT	4908	1000	12-1-05
		Sr	10	5.00	✓	INORVENT	5243	1000	6-1-06
		Sn	10	5.00	✓	INORVENT	5174	1000	5-1-06
		Bi	5	2.50	✓	INORVENT	5309	1000	8-1-06
		Sc	10	0.500	✓	INORVENT	5175	10000	5-1-06
8-1-05 05HCl	STD6- 05HCl	La	10	5.00	✓	INORVENT	4763	1000	10-1-05
		Na	1	0.05	✓	INORVENT	5310	10000	8-1-06
		Pd	10	5.00	✓	INORVENT	5045	1000	3-1-06
		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	4928	1000	11-1-05
		W	5	2.50	✓	INORVENT	5308	1000	8-1-06
		Y	10	5.00	✓	INORVENT	5000	1000	3-1-06
		Zr	10	5.00	✓	INORVENT	5311	1000	8-1-06
		SC	10	0.500	✓	INORVENT	5175	10000	5-1-06

Expiration Dates:

STD1: 10-1-05 **STD4:** 10-1-05

STD2: 10-1-05 **STD5:** 10-1-05

STD3: 10-1-05 **STD6:** 10-1-05

Div. 20
TO#050722-11
Project No. 06002.01.242
Prep. Pages 62-086/087

8-19-05

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	mg/L	sigwt	Dilution	Calc RL	ug/ml	Date	Time
pbw-H15H1	K_766	2.50	U		mg/L	2.5				0.250	-0.608235199	-0.608	1	2.5	-0.06082352	08/15/05	5:06 PM
lcsw-H15H1	K_766	187			mg/L	2.5		93.5%	200	0.250	186.9707185	187	1	2.5	18.69707185	08/15/05	5:08 PM
265477	K_766	3.19			mg/L	2.5				0.250	3.188	3.19	1	2.5	0.3188	08/16/05	4:43 PM
265477d	K_766	2.57		*	mg/L	2.5	21.5%			0.250	2.568	2.57	1	2.5	0.2568	08/16/05	4:45 PM
265477s	K_766	195			mg/L	2.5		95.9%	200	0.250	194.8791319	195	1	2.5	19.48791319	08/15/05	5:14 PM
265478	K_766	2.50	U		mg/L	2.5				0.250	1.703360267	1.7	1	2.5	0.170336027	08/15/05	5:17 PM
265479	K_766	2.50	U		mg/L	2.5				0.250	1.382211181	1.38	1	2.5	0.138221118	08/15/05	5:19 PM
265480	K_766	2.50	U		mg/L	2.5				0.250	1.324814574	1.32	1	2.5	0.132481457	08/15/05	5:22 PM
265481	K_766	7.89			mg/L	2.5				0.250	7.891654737	7.89	1	2.5	0.789165474	08/15/05	5:25 PM
265482	K_766	8.39			mg/L	2.5				0.250	8.389275785	8.39	1	2.5	0.838927579	08/15/05	5:27 PM
265483	K_766	5.11			mg/L	2.5				0.250	5.107880801	5.11	1	2.5	0.51078808	08/15/05	5:37 PM
265484	K_766	4.99			mg/L	2.5				0.250	4.994277928	4.99	1	2.5	0.499427793	08/15/05	5:40 PM
265485	K_766	4.42			mg/L	2.5				0.250	4.415841652	4.42	1	2.5	0.441584165	08/15/05	5:43 PM
265486	K_766	4.64			mg/L	2.5				0.250	4.636973603	4.64	1	2.5	0.46369736	08/15/05	5:45 PM
265487	K_766	3.76			mg/L	2.5				0.250	3.75860441	3.76	1	2.5	0.375860441	08/15/05	5:48 PM
265488	K_766	2.50	U		mg/L	2.5				0.250	2.085204219	2.09	1	2.5	0.208520422	08/15/05	5:51 PM
265489	K_766	4.67			mg/L	2.5				0.250	4.668869771	4.67	1	2.5	0.466886977	08/15/05	5:53 PM
pbw-H15H2	K_766	2.50	U		mg/L	2.5				0.250	0.718425004	0.718	1	2.5	0.0718425	08/15/05	6:03 PM
lcsw-H15H2	K_766	184			mg/L	2.5		92.0%	200	0.250	184.4097902	184	1	2.5	18.44097902	08/15/05	6:05 PM
265490	K_766	3.86			mg/L	2.5				0.250	3.857453881	3.86	1	2.5	0.385745388	08/15/05	6:08 PM
265490d	K_766	4.50			mg/L	2.5	15.3%			0.250	4.499535114	4.5	1	2.5	0.449953511	08/15/05	6:09 PM
265490s	K_766	191			mg/L	2.5		93.6%	200	0.250	191.0441832	191	1	2.5	19.10441832	08/15/05	6:11 PM
265491	K_766	3.62			mg/L	2.5				0.250	3.616098667	3.62	1	2.5	0.361609867	08/15/05	6:14 PM
265492	K_766	3.39			mg/L	2.5				0.250	3.394325115	3.39	1	2.5	0.339432512	08/15/05	6:17 PM
265493	K_766	3.86			mg/L	2.5				0.250	3.858566902	3.86	1	2.5	0.38585669	08/15/05	6:19 PM
265494	K_766	3.15			mg/L	2.5				0.250	3.148623248	3.15	1	2.5	0.314862325	08/15/05	6:22 PM
265495	K_766	3.24			mg/L	2.5				0.250	3.243460558	3.24	1	2.5	0.324346056	08/15/05	6:24 PM
265496	K_766	2.50	U		mg/L	2.5				0.250	2.194229743	2.19	1	2.5	0.219422974	08/15/05	6:35 PM
265497	K_766	2.50	U		mg/L	2.5				0.250	0.569942972	0.57	1	2.5	0.056994297	08/15/05	6:37 PM
265498	K_766	2.50	U		mg/L	2.5				0.250	2.23648256	2.24	1	2.5	0.223648256	08/15/05	6:40 PM
265499	K_766	2.50	U		mg/L	2.5				0.250	1.230628338	1.23	1	2.5	0.123062834	08/15/05	6:43 PM
265500	K_766	2.50	U		mg/L	2.5				0.250	1.464101224	1.46	1	2.5	0.146410122	08/15/05	6:45 PM
265501	K_766	2.50	U		mg/L	2.5				0.250	1.943841965	1.94	1	2.5	0.194384196	08/15/05	6:48 PM
265502	K_766	2.50	U		mg/L	2.5				0.250	0.210679865	0.211	1	2.5	0.021067987	08/15/05	6:50 PM

010080

DIV20_050722_11Spec

8/19/05

265477

$$\frac{0.3188\ \text{ug/ml} \times 5\ \text{ml}}{0.5\ \text{ml}} = 3.19\ \frac{\text{mg}}{\text{L}}$$

010081

QC STD. ID's	
CCV	05H01
CRI	
ICSA	
ICSAB	05H01

ICP CAL.STD. ID's	
Std0	05H01
Std1	05H01
Std2	
Std3	
Std4	
Std5	
Std6	

☐ 200.7 TAP No. 01-0406-028 Rev2/Mar02

☑ 6010B TAP No. 01-0406-130 Rev3/Mar05

☐ Other_____

K 8/19/05

PROJ. NO.	PROJECT	TO#	DATE	MATRIX	LOGBK PG
06002.01.242	DIV 20	050722-11	8-15-05	WATER	62-086
06002.01.242	DIV 20	050722-11	8-15-05	WATER	62-087

INSTRUMENT: Specto FILENAME: 050815

File converted to wsl? ☑ N/A

010082

:VOLUTION by Micro-Active Australia Pty Ltd 4:37:58 PM August 15, 2005

:eep last result visible enabled ...
;tarting run ...
:reating high priority queue entries ...
;ACKGROUND CORRECTED INTENSITIES
:dentity 1 : BLK_SC Identity 2 : Type : STD
!eight : 1.0000 Volume : 1.00 Printed : 4:37:42 PM August 15, 2005

	K_766	Na589	Sc361
# 1	19.5	45.5	5443.0
# 2	26.5	34.5	5419.0
!ean	23.0	40.0	5431.0
;D	4.9	7.8	17.0
:RSD	21.5	19.4	0.3

:NTENSITIES
:dentity 1 : BLK_SC Identity 2 : Type : STD
!eight : 1.0000 Volume : 1.00 Printed : 4:37:42 PM August 15, 2005

	K_766	Na589	Sc361
# 1	0.0	0.0	5443.0
# 2	0.0	0.0	5419.0
!ean	0.0	0.0	5431.0
;D	0.0	0.0	17.0
:RSD	21.8	19.1	0.3

8/16/05

8-15-05

:VOLUTION by Micro-Active Australia Pty Ltd 4:47:32 PM August 15, 2005

BACKGROUND CORRECTED INTENSITIES
Identity 1 : CLP_STD1_SC Identity 2 : Type : STD
Weight : 1.0000 Volume : 1.00 Printed : 4:40:36 PM August 15, 2005

	K_766	Na589
# 1	5015.5	29186.0
# 2	4995.5	29018.0
Mean	5005.5	29102.0
SD	14.1	118.8
CRSD	0.3	0.4

INTENSITIES
Identity 1 : CLP_STD1_SC Identity 2 : Type : STD
Weight : 1.0000 Volume : 1.00 Printed : 4:40:36 PM August 15, 2005

	K_766	Na589
# 1	0.9	5.4
# 2	0.9	5.4
Mean	0.9	5.4
SD	0.0	0.0
CRSD	0.2	0.1

BACKGROUND CORRECTED INTENSITIES
Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 4:43:28 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	2020.0	17625.0	5454.5	5454.5
# 2	1997.0	17429.0	5389.5	5389.5
Mean	2008.5	17527.0	5422.0	5422.0
SD	16.3	138.6	46.0	46.0
CRSD	0.8	0.8	0.8	0.8

APPARENT CONCENTRATIONS
Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 4:43:28 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	19.7572	29.8293	5454.500 H	100.4332
# 2	19.7679	29.8534	5389.500	99.2350
Mean	19.7626	29.8413	5422.000	99.8341
SD	0.0076	0.0170	45.962	0.8472
CRSD	0.0384	0.0571	0.848	0.8486

Checking calibration verification ...
Identity 1 : CLP_CCV_SC Identity 2 :

Report name	Low limit	Value	High limit
K_766	18.000	19.763	22.000
Na589	27.000	29.841	33.000

BACKGROUND CORRECTED INTENSITIES
Identity 1 : Calibration blank Identity 2 : Type : CB
Weight : 1.0000 Volume : 1.00 Printed : 4:47:20 PM August 15, 2005

# 1	16.0	29.5	5449.5	5449.5
# 2	8.0	32.5	5459.5	5459.5
ean	12.0	31.0	5454.5	5454.5

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D	5.7	2.1	7.1	7.1
RSD	47.1	6.8	0.1	0.1

PPARENT CONCENTRATIONS
dentity 1 : Calibration blank Identity 2 : Type : CB
eight : 1.0000 Volume : 1.00 Printed : 4:47:20 PM August 15, 2005

		K_766 ppm		Na589 ppm		Sc		Sc361 ppm
# 1	L	-0.0701	L	-0.0181		5449.500	H	100.3410
# 2	L	-0.1495	L	-0.0131		5459.500	H	100.5253
ean	L	-0.1098	L	-0.0156		5454.500	H	100.4332
D		0.0561		0.0035		7.071		0.1303
RSD		51.1220		22.6841		0.130		0.1298

hecking calibration blank ...
dentity 1 : Calibration blank Identity 2 :

eport name	CRDL	Value	
_766	0.100	-0.110	Contaminated
a589	0.050	-0.016	
c361	0.000	100.433	

ACKGROUND CORRECTED INTENSITIES
dentity 1 : CRI Identity 2 : Type : CV
eight : 1.0000 Volume : 1.00 Printed : 4:50:14 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	7.0	19.0	5394.5	5394.5
# 2	16.0	34.0	5360.5	5360.5
ean	11.5	26.5	5377.5	5377.5
D	6.4	10.6	24.0	24.0
RSD	55.3	40.0	0.4	0.4

PPARENT CONCENTRATIONS
dentity 1 : CRI Identity 2 : Type : CV
eight : 1.0000 Volume : 1.00 Printed : 4:50:14 PM August 15, 2005

		K_766 ppm		Na589 ppm		Sc	Sc361 ppm
# 1	L	-0.1585	L	-0.0356		5394.500	99.3272
# 2	L	-0.0675	L	-0.0095		5360.500	98.7005
ean	L	-0.1130	L	-0.0225		5377.500	99.0138
D		0.0644		0.0185		24.042	0.4432
RSD		56.9801		81.9843		0.447	0.4476

hecking calibration verification ...
dentity 1 : CRI Identity 2 :

eport name	Low limit	Value	High limit	
_766	0.900	-0.113	1.100	Failed
a589	0.900	-0.023	1.100	Failed

ACKGROUND CORRECTED INTENSITIES
dentity 1 : ICSA Identity 2 : Type : INTRF
eight : 1.0000 Volume : 1.00 Printed : 4:53:06 PM August 15, 2005

K_766 Na589 Sc Sc361

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# 2	24.0	46.5	5089.5	5089.5
lean	24.5	45.5	5130.0	5130.0
SD	0.7	1.4	57.3	57.3

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RSD	2.9	3.1	1.1	1.1

APPARENT CONCENTRATIONS
Identity 1 : ICSA Identity 2 : Type : INTRF
Weight : 1.0000 Volume : 1.00 Printed : 4:53:06 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.0324	0.0115	5170.500	95.1982
# 2	0.0259	0.0164	5089.500	93.7051
lean	0.0292	0.0139	5130.000	94.4516
SD	0.0046	0.0035	57.276	1.0558
RSD	15.6403	24.8761	1.116	1.1178

BACKGROUND CORRECTED INTENSITIES
Identity 1 : ICSAB Identity 2 : Type : ICSAB
Weight : 1.0000 Volume : 1.00 Printed : 4:56:00 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	19.0	21.5	5121.5	5121.5
# 2	10.0	42.5	5092.5	5092.5
lean	14.5	32.0	5107.0	5107.0
SD	6.4	14.8	20.5	20.5
RSD	43.9	46.4	0.4	0.4

APPARENT CONCENTRATIONS
Identity 1 : ICSAB Identity 2 : Type : ICSAB
Weight : 1.0000 Volume : 1.00 Printed : 4:56:00 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1 L	-0.0283 L	-0.0293	5121.500	94.2949
# 2 L	-0.1226	0.0091	5092.500	93.7604
ean L	-0.0755 L	-0.0101	5107.000	94.0276
D	0.0666	0.0271	20.506	0.3780
RSD	88.3097	268.2458	0.402	0.4020

hecking interference check standard ...
Identity 1 : ICSAB Identity 2 :

eport name	Low limit	Value	High limit	
_766	0.000	-0.075	0.000	Failed
a589	0.000	-0.010	0.000	Failed

ACKGROUND CORRECTED INTENSITIES
Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 4:59:54 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	1994.0	17531.0	5454.5	5454.5
# 2	2010.0	17567.0	5434.5	5434.5
ean	2002.0	17549.0	5444.5	5444.5
D	11.3	25.5	14.1	14.1
RSD	0.6	0.1	0.3	0.3

APPARENT CONCENTRATIONS

Weight : 1.0000 Volume : 1.00 Printed : 4:59:54 PM August 15, 2005

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	K_766 ppm	Na589 ppm	Sc	Sc361 ppm

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# 1	19.5000	29.6698	5454.500 H	100.4332
# 2	19.7314	29.8406	5434.500 H	100.0645
Mean	19.6157	29.7552	5444.500 H	100.2488
SD	0.1637	0.1207	14.142	0.2607
%RSD	0.8345	0.4057	0.260	0.2600

Checking calibration verification ...
Identity 1 : CLP_CCV_SC Identity 2 :

Report name	Low limit	Value	High limit
K_766	18.000	19.616	22.000
Na589	27.000	29.755	33.000

BACKGROUND CORRECTED INTENSITIES
Identity 1 : Calibration blank Identity 2 : Type : CB
Weight : 1.0000 Volume : 1.00 Printed : 5:03:46 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	14.0	50.0	5484.5	5484.5
# 2	18.0	56.0	5435.5	5435.5
Mean	16.0	53.0	5460.0	5460.0
SD	2.8	4.2	34.6	34.6
%RSD	17.7	8.0	0.6	0.6

APPARENT CONCENTRATIONS
Identity 1 : Calibration blank Identity 2 : Type : CB
Weight : 1.0000 Volume : 1.00 Printed : 5:03:46 PM August 15, 2005

		K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	L	-0.0908	0.0162	5484.500 H	100.9862
# 2	L	-0.0498	0.0272	5435.500 H	100.0829
Mean	L	-0.0703	0.0217	5460.000 H	100.5346
SD		0.0290	0.0078	34.648	0.6387
%RSD		41.1895	35.7713	0.635	0.6353

Checking calibration blank ...
Identity 1 : Calibration blank Identity 2 :

Report name	CRDL	Value
K_766	0.100	-0.070
Na589	0.050	0.022
Sc361	0.000	100.535

BACKGROUND CORRECTED INTENSITIES
Identity 1 : pbw-H15H1 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:06:38 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	17.0	53.5	5454.5	5454.5
# 2	17.0	52.5	5485.5	5485.5
Mean	17.0	53.0	5470.0	5470.0
SD	0.0	0.7	21.9	21.9
%RSD	0.0	1.3	0.4	0.4

APPARENT CONCENTRATIONS

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	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1 L	-0.0603	0.0226	5454.500 H	100.4332

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# 2 L	-0.0613	0.0204	5485.500 H	101.0046
ean L	-0.0608	0.0215	5470.000 H	100.7189
D	0.0007	0.0016	21.920	0.4041
RSD	1.1050	7.2319	0.401	0.4012

ACKGROUND CORRECTED INTENSITIES
dentity 1 : lcsw-H15H1 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 5:08:22 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	1963.5	11440.5	5576.0	5576.0
# 2	1956.5	11421.5	5602.0	5602.0
ean	1960.0	11431.0	5589.0	5589.0
D	4.9	13.4	18.4	18.4
RSD	0.3	0.1	0.3	0.3

PPARENT CONCENTRATIONS
dentity 1 : lcsw-H15H1 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 5:08:22 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	18.7749	18.9156	5576.000 H	102.6728
# 2	18.6193	18.7961	5602.000 H	103.1521
ean	18.6971	18.8558	5589.000 H	102.9124
D	0.1100	0.0845	18.385	0.3389
RSD	0.5886	0.4481	0.329	0.3293

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265477 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 5:11:00 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	65.0	6554.0	5575.0	5575.0
# 2	55.0	6625.0	5551.0	5551.0
ean	60.0	6589.5	5563.0	5563.0
D	7.1	50.2	17.0	17.0
RSD	11.8	0.8	0.3	0.3

PPARENT CONCENTRATIONS
dentity 1 : 265477 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 5:11:00 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.4007	10.8092	5575.000 H	102.6544
# 2	0.3062	10.9745	5551.000 H	102.2120
ean	0.3534	10.8918	5563.000 H	102.4332
D	0.0668	0.1169	16.971	0.3128
RSD	18.9074	1.0736	0.305	0.3054

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265477d Identity 2 : Type : SAMPLE

	K_766	Na589	Sc	Sc361
# 1	52.5	6631.0	5615.5	5615.5
# 2	48.5	6600.0	5594.5	5594.5

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lean	50.5	6615.5	5605.0	5605.0
SD	2.8	21.9	14.8	14.8
:RSD	5.6	0.3	0.3	0.3

APPARENT CONCENTRATIONS
Identity 1 : 265477d Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:12:44 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.2760	10.8576	5615.500 H	103.4009
# 2	0.2393	10.8473	5594.500 H	103.0138
lean	0.2576	10.8524	5605.000 H	103.2074
SD	0.0259	0.0073	14.849	0.2737
RSD	10.0699	0.0668	0.265	0.2652

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265477s Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 5:14:26 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	2046.5	18550.5	5626.0	5626.0
# 2	2047.5	18401.5	5580.0	5580.0
ean	2047.0	18476.0	5603.0	5603.0
D	0.7	105.4	32.5	32.5
RSD	0.0	0.6	0.6	0.6

PPARENT CONCENTRATIONS
dentity 1 : 265477s Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 5:14:26 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	19.4022	30.4400	5626.000 H	103.5945
# 2	19.5737	30.4444	5580.000 H	102.7465
ean	19.4879	30.4422	5603.000 H	103.1705
D	0.1213	0.0031	32.527	0.5996
RSD	0.6223	0.0103	0.581	0.5811

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265478 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 5:17:10 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	37.0	5791.5	5598.5	5598.5
# 2	45.0	5728.5	5505.5	5505.5
ean	41.0	5760.0	5552.0	5552.0
D	5.7	44.5	65.8	65.8
RSD	13.8	0.8	1.2	1.2

PPARENT CONCENTRATIONS
dentity 1 : 265478 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 5:17:10 PM August 15, 2005

K_766 Na589 Sc Sc361

# 1	0.1281	9.5033	5598.500 H	103.0876
# 2	0.2126	9.5591	5505.500 H	101.3733
lean	0.1703	9.5312	5552.000 H	102.2304

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SD	0.0597	0.0395	65.761	1.2122
RSD	35.0544	0.4140	1.184	1.1857

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265479 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:19:52 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	33.5	5741.5	5606.5	5606.5
# 2	42.5	5787.5	5579.5	5579.5
lean	38.0	5764.5	5593.0	5593.0
SD	6.4	32.5	19.1	19.1
RSD	16.7	0.6	0.3	0.3

APPARENT CONCENTRATIONS
Identity 1 : 265479 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:19:52 PM August 15, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	0.0939	9.4072	5606.500 H	103.2350
# 2	0.1825	9.5293	5579.500 H	102.7373
lean	0.1382	9.4682	5593.000 H	102.9862
SD	0.0627	0.0864	19.092	0.3519
RSD	45.3313	0.9121	0.341	0.3417

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265480 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:22:28 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	37.0	7919.5	5632.5	5632.5
# 2	38.0	7835.5	5579.5	5579.5
lean	37.5	7877.5	5606.0	5606.0
SD	0.7	59.4	37.5	37.5
RSD	1.9	0.8	0.7	0.7

APPARENT CONCENTRATIONS
Identity 1 : 265480 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:22:28 PM August 15, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	0.1260	12.9412	5632.500 H	103.7143
# 2	0.1390	12.9255	5579.500 H	102.7373
lean	0.1325	12.9334	5606.000 H	103.2258
SD	0.0092	0.0111	37.477	0.6908
RSD	6.9598	0.0860	0.669	0.6692

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265481 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:25:06 PM August 15, 2005

	K_766	Na589	Sc	Sc361

ean	104.5	611.5	5541.0	5541.0
D	10.6	0.0	7.1	7.1
RSD	10.1	0.0	0.1	0.1

VOLUTION by Micro-Active Australia Pty Ltd 5:31:28 PM August 15, 2005

010090

PPARENT CONCENTRATIONS
dentity 1 : 265481 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 5:25:06 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.8613	0.9520	5546.000 H	102.1198
# 2	0.7170	0.9539	5536.000 H	101.9355
ean	0.7892	0.9530	5541.000 H	102.0276
D	0.1020	0.0013	7.071	0.1303
RSD	12.9256	0.1367	0.128	0.1278

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265482 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 5:27:44 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	105.0	588.0	5523.0	5523.0
# 2	113.0	592.0	5499.0	5499.0
ean	109.0	590.0	5511.0	5511.0
D	5.7	2.8	17.0	17.0
RSD	5.2	0.5	0.3	0.3

PPARENT CONCENTRATIONS
dentity 1 : 265482 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 5:27:44 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.7974	0.9169	5523.000 H	101.6959
# 2	0.8804	0.9279	5499.000 H	101.2535
ean	0.8389	0.9224	5511.000 H	101.4747
D	0.0587	0.0078	16.971	0.3128
RSD	6.9949	0.8455	0.308	0.3083

ACKGROUND CORRECTED INTENSITIES
dentity 1 : CLP_CCV_SC Identity 2 : Type : CV
eight : 1.0000 Volume : 1.00 Printed : 5:31:06 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	1990.5	17419.5	5426.0	5426.0
# 2	1975.5	17374.5	5400.0	5400.0
ean	1983.0	17397.0	5413.0	5413.0
D	10.6	31.8	18.4	18.4
RSD	0.5	0.2	0.3	0.3

PPARENT CONCENTRATIONS
dentity 1 : CLP_CCV_SC Identity 2 : Type : CV
eight : 1.0000 Volume : 1.00 Printed : 5:31:06 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	19.5688	29.6359	5426.000	99.9078
# 2	19.5142	29.7010	5400.000	99.4286

Mean	19.5415	29.6688	5413.000	99.6682
SD	0.0386	0.0466	18.385	0.3389
%RSD	0.1975	0.1571	0.340	0.3400

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Checking calibration verification ...
Identity 1 : CLP_CCV_SC Identity 2 :

Report name	Low limit	Value	High limit
K_766	18.000	19.541	22.000
Na589	27.000	29.669	33.000

BACKGROUND CORRECTED INTENSITIES
Identity 1 : Calibration blank Identity 2 : Type : CB
Weight : 1.0000 Volume : 1.00 Printed : 5:35:00 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	16.0	58.5	5488.5	5488.5
# 2	18.0	33.5	5445.5	5445.5
Mean	17.0	46.0	5467.0	5467.0
SD	1.4	17.7	30.4	30.4
%RSD	8.3	38.4	0.6	0.6

APPARENT CONCENTRATIONS
Identity 1 : Calibration blank Identity 2 : Type : CB
Weight : 1.0000 Volume : 1.00 Printed : 5:35:00 PM August 15, 2005

		K_766 ppm		Na589 ppm	Sc		Sc361 ppm
# 1	L	-0.0712		0.0305	5488.500	H	101.0599
# 2	L	-0.0502	L	-0.0112	5445.500	H	100.2673
Mean	L	-0.0607		0.0096	5467.000	H	100.6636
SD		0.0149		0.0295	30.406		0.5605
%RSD		24.5400		306.3815	0.556		0.5568

Checking calibration blank ...
Identity 1 : Calibration blank Identity 2 :

Report name	CRDL	Value
K_766	0.100	-0.061
Na589	0.050	0.010
Sc361	0.000	100.664

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265483 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:37:52 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	74.5	4612.0	5547.5	5547.5
# 2	77.5	4647.0	5547.5	5547.5
Mean	76.0	4629.5	5547.5	5547.5
SD	2.1	24.7	0.0	0.0
%RSD	2.8	0.5	0.0	0.0

APPARENT CONCENTRATIONS
Identity 1 : 265483 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:37:52 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc		Sc361 ppm
# 1	0.4962	7.6241	5547.500	H	102.1475
# 2	0.5254	7.6824	5547.500	H	102.1475

SD	0.0206	0.0413	0.000	0.0000
%RSD	4.0401	0.5393	0.000	0.0000

BACKGROUND CORRECTED INTENSITIES
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Identity 1 : 265484 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:40:32 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	80.5	4601.0	5547.0	5547.0
# 2	69.5	4621.0	5575.0	5575.0
Mean	75.0	4611.0	5561.0	5561.0
SD	7.8	14.1	19.8	19.8
%RSD	10.4	0.3	0.4	0.4

APPARENT CONCENTRATIONS
Identity 1 : 265484 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:40:32 PM August 15, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	0.5546	7.6064	5547.000 H	102.1382
# 2	0.4442	7.6011	5575.000 H	102.6544
Mean	0.4994	7.6037	5561.000 H	102.3963
SD	0.0781	0.0038	19.799	0.3650
%RSD	15.6328	0.0498	0.356	0.3564

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265485 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:43:08 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	70.0	4628.5	5570.5	5570.5
# 2	68.0	4623.5	5542.5	5542.5
Mean	69.0	4626.0	5556.5	5556.5
SD	1.4	3.5	19.8	19.8
%RSD	2.0	0.1	0.4	0.4

APPARENT CONCENTRATIONS
Identity 1 : 265485 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:43:08 PM August 15, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	0.4496	7.6197	5570.500 H	102.5714
# 2	0.4336	7.6502	5542.500 H	102.0553
Mean	0.4416	7.6350	5556.500 H	102.3134
SD	0.0113	0.0216	19.799	0.3650
%RSD	2.5697	0.2824	0.356	0.3567

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265486 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:45:46 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	69.5	4619.5	5531.0	5531.0
# 2	72.5	4633.5	5539.0	5539.0
Mean	71.0	4626.5	5535.0	5535.0
SD	[illegible]	[illegible]	[illegible]	[illegible]

PPARENT CONCENTRATIONS
dentity 1 : 265486 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 5:45:46 PM August 15, 2005
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	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.4496	7.6596	5531.000 H	101.8433
# 2	0.4778	7.6718	5539.000 H	101.9908
lean	0.4637	7.6657	5535.000 H	101.9171
D	0.0200	0.0086	5.657	0.1043
RSD	4.3079	0.1128	0.102	0.1023

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265487 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 5:48:24 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	65.5	4616.5	5542.5	5542.5
# 2	58.5	4668.5	5528.5	5528.5
lean	62.0	4642.5	5535.5	5535.5
D	4.9	36.8	9.9	9.9
RSD	8.0	0.8	0.2	0.2

PPARENT CONCENTRATIONS
dentity 1 : 265487 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 5:48:24 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.4092	7.6385	5542.500 H	102.0553
# 2	0.3425	7.7451	5528.500 H	101.7972
lean	0.3759	7.6918	5535.500 H	101.9263
D	0.0472	0.0753	9.899	0.1825
RSD	12.5512	0.9795	0.179	0.1790

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265488 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 5:51:02 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	47.5	5901.5	5562.5	5562.5
# 2	42.5	5838.5	5549.5	5549.5
lean	45.0	5870.0	5556.0	5556.0
D	3.5	44.5	9.2	9.2
RSD	7.9	0.8	0.2	0.2

PPARENT CONCENTRATIONS
dentity 1 : 265488 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 5:51:02 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.2323	9.7482	5562.500 H	102.4240
# 2	0.1847	9.6662	5549.500 H	102.1843
lean	0.2085	9.7072	5556.000 H	102.3041
D	0.0336	0.0580	9.192	0.1694

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265489 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:53:40 PM August 15, 2005

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	K_766	Na589	Sc	Sc361
# 1	71.5	4665.0	5543.5	5543.5
# 2	71.5	4623.0	5553.5	5553.5
Mean	71.5	4644.0	5548.5	5548.5
SD	0.0	29.7	7.1	7.1
%RSD	0.0	0.6	0.1	0.1

APPARENT CONCENTRATIONS
Identity 1 : 265489 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:53:40 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.4675	7.7181	5543.500 H	102.0737
# 2	0.4663	7.6341	5553.500 H	102.2581
Mean	0.4669	7.6761	5548.500 H	102.1659
SD	0.0009	0.0594	7.071	0.1303
%RSD	0.1898	0.7737	0.127	0.1276

BACKGROUND CORRECTED INTENSITIES
Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 5:57:02 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	2005.0	17434.0	5466.0	5466.0
# 2	1971.0	17195.0	5381.0	5381.0
Mean	1988.0	17314.5	5423.5	5423.5
SD	24.0	169.0	60.1	60.1
%RSD	1.2	1.0	1.1	1.1

APPARENT CONCENTRATIONS
Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 5:57:02 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	19.5671	29.4431	5466.000 H	100.6452
# 2	19.5388	29.4983	5381.000	99.0783
Mean	19.5529	29.4707	5423.500	99.8618
SD	0.0200	0.0390	60.104	1.1079
%RSD	0.1023	0.1325	1.108	1.1094

Checking calibration verification ...
Identity 1 : CLP_CCV_SC Identity 2 :

Report name	Low limit	Value	High limit
K_766	18.000	19.553	22.000
Na589	27.000	29.471	33.000

BACKGROUND CORRECTED INTENSITIES
Identity 1 : Calibration blank Identity 2 : Type : CB
Weight : 1.0000 Volume : 1.00 Printed : 6:00:54 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	13.0	50.5	5466.5	5466.5
# 2	24.0	22.5	5442.5	5442.5

Mean	18.5	42.0	5454.5	5454.5
SD	7.8	12.0	17.0	17.0
%RSD	42.0	28.6	0.3	0.3

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APPARENT CONCENTRATIONS
Identity 1 : Calibration blank Identity 2 : Type : CB
Weight : 1.0000 Volume : 1.00 Printed : 6:00:54 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1 L	-0.1002	0.0173	5466.500 H	100.6544
# 2	0.0094 L	-0.0112	5442.500 H	100.2120
Mean L	-0.0454	0.0031	5454.500 H	100.4332
SD	0.0775	0.0202	16.971	0.3128
%RSD	170.8133	657.4900	0.311	0.3115

Checking calibration blank ...
Identity 1 : Calibration blank Identity 2 :

Report name	CRDL	Value
K_766	0.100	-0.045
Na589	0.050	0.003
Sc361	0.000	100.433

BACKGROUND CORRECTED INTENSITIES
Identity 1 : pbw-H15H2 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 6:03:48 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	28.0	52.5	5498.5	5498.5
# 2	33.0	56.5	5463.5	5463.5
Mean	30.5	54.5	5481.0	5481.0
SD	3.5	2.8	24.7	24.7
%RSD	11.6	5.2	0.5	0.5

APPARENT CONCENTRATIONS
Identity 1 : pbw-H15H2 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 6:03:48 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.0463	0.0202	5498.500 H	101.2442
# 2	0.0974	0.0275	5463.500 H	100.5991
Mean	0.0718	0.0239	5481.000 H	100.9217
SD	0.0362	0.0052	24.749	0.4562
%RSD	50.3429	21.7456	0.452	0.4520

BACKGROUND CORRECTED INTENSITIES
Identity 1 : lcsw-H15H2 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 6:05:30 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	1956.5	11505.0	5618.0	5618.0
# 2	1917.5	11370.0	5580.0	5580.0
Mean	1937.0	11437.5	5599.0	5599.0
SD	27.6	95.5	26.9	26.9
%RSD	1.4	0.8	0.5	0.5

APPARENT CONCENTRATIONS

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	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	18.5656	18.8799	5618.000 H	103.4470

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# 2	18.3164	18.7851	5580.000 H	102.7465
ean	18.4410	18.8325	5599.000 H	103.0968
D	0.1762	0.0670	26.870	0.4953
RSD	0.9555	0.3560	0.480	0.4804

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265490 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 6:08:08 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	61.0	4692.0	5611.5	5611.5
# 2	66.0	4663.0	5548.5	5548.5
ean	63.5	4677.5	5580.0	5580.0
D	3.5	20.5	44.5	44.5
RSD	5.6	0.4	0.8	0.8

PPARENT CONCENTRATIONS
dentity 1 : 265490 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 6:08:08 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.3581	7.6682	5611.500 H	103.3272
# 2	0.4134	7.7077	5548.500 H	102.1659
ean	0.3857	7.6880	5580.000 H	102.7465
D	0.0391	0.0279	44.548	0.8212
RSD	10.1356	0.3631	0.798	0.7992

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265490d Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 6:09:52 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	64.0	4661.5	5636.5	5636.5
# 2	77.0	4641.5	5583.5	5583.5
ean	70.5	4651.5	5610.0	5610.0
D	9.2	14.1	37.5	37.5
RSD	13.0	0.3	0.7	0.7

PPARENT CONCENTRATIONS
dentity 1 : 265490d Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 6:09:52 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.3842	7.5839	5636.500 H	103.7880
# 2	0.5157	7.6234	5583.500 H	102.8111
ean	0.4500	7.6036	5610.000 H	103.2995
D	0.0930	0.0279	37.477	0.6908
RSD	20.6600	0.3673	0.668	0.6687

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265490s Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 6:11:46 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	1995.0	16005.0	5535.0	5535.0
# 2	1996.0	16190.0	5606.0	5606.0

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Mean	1995.5	16097.5	5570.5	5570.5
SD	0.7	130.8	50.2	50.2
%RSD	0.0	0.8	0.9	0.9

APPARENT CONCENTRATIONS
Identity 1 : 265490s Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 6:11:46 PM August 15, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	19.2228	26.6864	5535.000 H	101.9171
# 2	18.9861	26.6529	5606.000 H	103.2258
Mean	19.1044	26.6696	5570.500 H	102.5714
SD	0.1674	0.0237	50.205	0.9254
%RSD	0.8762	0.0888	0.901	0.9022

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3ACKGROUND CORRECTED INTENSITIES
:dentity 1 : 265491 Identity 2 : Type : SAMPLE
/eight : 1.0000 Volume : 1.00 Printed : 6:14:24 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	64.5	4573.5	5709.0	5709.0
# 2	60.5	4626.5	5722.0	5722.0
/ean	62.5	4600.0	5715.5	5715.5
3D	2.8	37.5	9.2	9.2
:RSD	4.5	0.8	0.2	0.2

\PPARENT CONCENTRATIONS
[dentity 1 : 265491 Identity 2 : Type : SAMPLE
/eight : 1.0000 Volume : 1.00 Printed : 6:14:24 PM August 15, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	0.3812	7.3441	5709.000 H	105.1244
# 2	0.3421	7.4129	5722.000 H	105.3641
/ean	0.3616	7.3785	5715.500 H	105.2442
3D	0.0277	0.0487	9.192	0.1694
:RSD	7.6479	0.6599	0.161	0.1610

3ACKGROUND CORRECTED INTENSITIES
[dentity 1 : 265492 Identity 2 : Type : SAMPLE
/eight : 1.0000 Volume : 1.00 Printed : 6:17:00 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	56.0	4632.0	5618.0	5618.0
# 2	62.0	4634.0	5595.0	5595.0
/ean	59.0	4633.0	5606.5	5606.5
3D	4.2	1.4	16.3	16.3
:RSD	7.2	0.0	0.3	0.3

\PPARENT CONCENTRATIONS
[dentity 1 : 265492 Identity 2 : Type : SAMPLE
/eight : 1.0000 Volume : 1.00 Printed : 6:17:02 PM August 15, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	0.3094	7.5605	5618.000 H	103.4470
# 2	0.3695	7.5951	5595.000 H	103.0230
/ean	0.3394	7.5778	5606.500 H	103.2350
3D	0.0425	0.0245	16.263	0.2998
:RSD	12.5168	0.3235	0.290	0.2904

3ACKGROUND CORRECTED INTENSITIES
[dentity 1 : 265493 Identity 2 : Type : SAMPLE
/eight : 1.0000 Volume : 1.00 Printed : 6:19:38 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	69.5	4596.5	5638.0	5638.0
# 2	58.5	4592.5	5602.0	5602.0
/ean	64.0	4594.5	5620.0	5620.0

%RSD	12.2	0.1	0.5	0.5

APPARENT CONCENTRATIONS
Identity 1 : 265493 Identity 2 : Type : SAMPLE
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Weight : 1.0000 Volume : 1.00 Printed : 6:19:38 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.4367	7.4752	5638.000 H	103.8157
# 2	0.3350	7.5170	5602.000 H	103.1521
Mean	0.3859	7.4961	5620.000 H	103.4839
SD	0.0719	0.0296	25.456	0.4692
%RSD	18.6358	0.3949	0.453	0.4534

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265494 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 6:22:16 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	51.5	4683.5	5711.5	5711.5
# 2	63.5	4653.5	5709.5	5709.5
Mean	57.5	4668.5	5710.5	5710.5
SD	8.5	21.2	1.4	1.4
%RSD	14.8	0.5	0.0	0.0

APPARENT CONCENTRATIONS
Identity 1 : 265494 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 6:22:16 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.2581	7.5190	5711.500 H	105.1705
# 2	0.3717	7.4731	5709.500 H	105.1336
Mean	0.3149	7.4960	5710.500 H	105.1521
SD	0.0803	0.0325	1.414	0.0261
%RSD	25.5108	0.4335	0.025	0.0248

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265495 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 6:24:54 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	58.5	6631.5	5641.0	5641.0
# 2	57.5	6649.5	5682.0	5682.0
Mean	58.0	6640.5	5661.5	5661.5
SD	0.7	12.7	29.0	29.0
%RSD	1.2	0.2	0.5	0.5

APPARENT CONCENTRATIONS
Identity 1 : 265495 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 6:24:54 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.3311	10.8090	5641.000 H	103.8710
# 2	0.3176	10.7598	5682.000 H	104.6267
Mean	0.3243	10.7844	5661.500 H	104.2488

ACKGROUND CORRECTED INTENSITIES
dentity 1 : CLP_CCV_SC Identity 2 : Type : CV
eight : 1.0000 Volume : 1.00 Printed : 6:28:16 PM August 15, 2005
VOLUTION by Micro-Active Australia Pty Ltd 6:35:28 PM August 15, 2005

010100

	K_766	Na589	Sc	Sc361
# 1	1980.0	17433.5	5421.5	5421.5
# 2	1989.0	17393.5	5386.5	5386.5
ean	1984.5	17413.5	5404.0	5404.0
D	6.4	28.3	24.7	24.7
RSD	0.3	0.2	0.5	0.5

PPARENT CONCENTRATIONS
dentity 1 : CLP_CCV_SC Identity 2 : Type : CV
eight : 1.0000 Volume : 1.00 Printed : 6:28:16 PM August 15, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	19.4807	29.6844	5421.500	99.8249
# 2	19.6989	29.8090	5386.500	99.1797
ean	19.5898	29.7467	5404.000	99.5023
D	0.1543	0.0881	24.749	0.4562
RSD	0.7877	0.2962	0.458	0.4585

hecking calibration verification ...
dentity 1 : CLP_CCV_SC Identity 2 :

eport name	Low limit	Value	High limit
_766	18.000	19.590	22.000
a589	27.000	29.747	33.000

ACKGROUND CORRECTED INTENSITIES
dentity 1 : Calibration blank Identity 2 : Type : CB
eight : 1.0000 Volume : 1.00 Printed : 6:32:10 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	12.5	31.5	5451.0	5451.0
# 2	5.5	40.5	5421.0	5421.0
ean	9.0	36.0	5436.0	5436.0
D	4.9	6.4	21.2	21.2
RSD	55.0	17.7	0.4	0.4

PPARENT CONCENTRATIONS
dentity 1 : Calibration blank Identity 2 : Type : CB
eight : 1.0000 Volume : 1.00 Printed : 6:32:10 PM August 15, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1 L	-0.1048 L	-0.0147	5451.000 H	100.3687
# 2 L	-0.1738	0.0010	5421.000	99.8157
ean L	-0.1393 L	-0.0068	5436.000 H	100.0922
D	0.0488	0.0111	21.213	0.3910
RSD	35.0278	161.6371	0.390	0.3907

hecking calibration blank ...
dentity 1 : Calibration blank Identity 2 :

eport name	CRDL	Value	
_766	0.100	-0.139	Contaminated
a589	0.050	-0.007	

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265496 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 6:35:02 PM August 15, 2005

VOLUTION by Micro-Active Australia Pty Ltd 6:40:30 PM August 15, 2005

010101

	K_766	Na589	Sc	Sc361
# 1	56.5	5944.5	5794.5	5794.5
# 2	39.5	5962.5	5765.5	5765.5
ean	48.0	5953.5	5780.0	5780.0
D	12.0	12.7	20.5	20.5
RSD	25.0	0.2	0.4	0.4

PPARENT CONCENTRATIONS
dentity 1 : 265496 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 6:35:02 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.2977	9.4239	5794.500 H	106.7005
# 2	0.1412	9.5005	5765.500 H	106.1659
ean	0.2194	9.4622	5780.000 H	106.4332
D	0.1106	0.0542	20.506	0.3780
RSD	50.4260	0.5727	0.355	0.3551

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265497 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 6:37:40 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	29.5	5883.5	5673.0	5673.0
# 2	30.5	5901.5	5667.0	5667.0
ean	30.0	5892.5	5670.0	5670.0
D	0.7	12.7	4.2	4.2
RSD	2.4	0.2	0.1	0.1

PPARENT CONCENTRATIONS
dentity 1 : 265497 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 6:37:40 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.0521	9.5277	5673.000 H	104.4608
# 2	0.0619	9.5672	5667.000 H	104.3502
ean	0.0570	9.5475	5670.000 H	104.4055
D	0.0069	0.0280	4.243	0.0782
RSD	12.1834	0.2929	0.075	0.0749

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265498 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 6:40:20 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	45.5	5868.0	5673.0	5673.0
# 2	49.5	5917.0	5665.0	5665.0
ean	47.5	5892.5	5669.0	5669.0
D	2.8	34.6	5.7	5.7
RSD	6.0	0.6	0.1	0.1

PPARENT CONCENTRATIONS

eight : 1.0000 Volume : 1.00 Printed : 6:40:20 PM August 15, 2005

010102

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm

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# 1	0.2043	9.5024	5673.000 H	104.4608
# 2	0.2430	9.5959	5665.000 H	104.3134
ean	0.2236	9.5492	5669.000 H	104.3871
D	0.0274	0.0661	5.657	0.1043
RSD	12.2409	0.6927	0.100	0.0999

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265499 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 6:43:00 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	28.0	5961.5	5632.5	5632.5
# 2	45.0	5887.5	5583.5	5583.5
ean	36.5	5924.5	5608.0	5608.0
D	12.0	52.3	34.6	34.6
RSD	32.9	0.9	0.6	0.6

PPARENT CONCENTRATIONS
dentity 1 : 265499 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 6:43:00 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.0397	9.7248	5632.500 H	103.7143
# 2	0.2064	9.6881	5583.500 H	102.8111
ean	0.1231	9.7065	5608.000 H	103.2627
D	0.1179	0.0259	34.648	0.6387
RSD	95.7642	0.2672	0.618	0.6185

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265500 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 6:45:38 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	38.5	5927.0	5679.0	5679.0
# 2	40.5	5986.0	5691.0	5691.0
ean	39.5	5956.5	5685.0	5685.0
D	1.4	41.7	8.5	8.5
RSD	3.6	0.7	0.1	0.1

PPARENT CONCENTRATIONS
dentity 1 : 265500 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 6:45:38 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.1373	9.5884	5679.000 H	104.5714
# 2	0.1555	9.6640	5691.000 H	104.7926
ean	0.1464	9.6262	5685.000 H	104.6820
D	0.0129	0.0534	8.485	0.1564
RSD	8.7871	0.5550	0.149	0.1494

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265501 Identity 2 : Type : SAMPLE

010103

	K_766	Na589	Sc	Sc361
# 1	41.0	6382.5	5770.5	5770.5
# 2	49.0	6322.5	5718.5	5718.5

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lean	45.0	6352.5	5744.5	5744.5
:D	5.7	42.4	36.8	36.8
.RSD	12.6	0.7	0.6	0.6

.PPARENT CONCENTRATIONS
dentity 1 : 265501 Identity 2 : Type : SAMPLE
'eight : 1.0000 Volume : 1.00 Printed : 6:48:16 PM August 15, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.1549	10.1657	5770.500 H	106.2581
# 2	0.2339	10.1616	5718.500 H	105.2995
lean	0.1944	10.1636	5744.500 H	105.7788
:D	0.0559	0.0028	36.770	0.6778
.RSD	28.7318	0.0280	0.640	0.6408

:ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265502 Identity 2 : Type : SAMPLE
'eight : 1.0000 Volume : 1.00 Printed : 6:50:54 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	31.5	5754.0	5728.5	5728.5
# 2	21.5	5768.0	5730.5	5730.5
ean	26.5	5761.0	5729.5	5729.5
:D	7.1	9.9	1.4	1.4
.RSD	26.7	0.2	0.0	0.0

.PPARENT CONCENTRATIONS
dentity 1 : 265502 Identity 2 : Type : SAMPLE
'eight : 1.0000 Volume : 1.00 Printed : 6:50:54 PM August 15, 2005

		K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1		0.0682	9.2255	5728.500 H	105.4839
# 2	L	-0.0261	9.2449	5730.500 H	105.5207
lean		0.0211	9.2352	5729.500 H	105.5023
:D		0.0667	0.0137	1.414	0.0261
.RSD		316.4250	0.1482	0.025	0.0247

ACKGROUND CORRECTED INTENSITIES
dentity 1 : CRI Identity 2 : Type : CV
eight : 1.0000 Volume : 1.00 Printed : 6:54:16 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	19.5	20.5	5393.5	5393.5
# 2	19.5	32.5	5372.5	5372.5
ean	19.5	26.5	5383.0	5383.0
D	0.0	8.5	14.8	14.8
RSD	0.0	32.0	0.3	0.3

PPARENT CONCENTRATIONS
dentity 1 : CRI Identity 2 : Type : CV
eight : 1.0000 Volume : 1.00 Printed : 6:54:16 PM August 15, 2005

010104

		ppm	ppm		ppm
# 1	L	-0.0334 L	-0.0330	5393.500	99.3088
# 2	L	-0.0327 L	-0.0122	5372.500	98.9217

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ean	L	-0.0331 L	-0.0226	5383.000	99.1152
D		0.0005	0.0147	14.849	0.2737
RSD		1.6317	65.1590	0.276	0.2762

hecking calibration verification ...
dentity 1 : CRI Identity 2 :

eport name	Low limit	Value	High limit	
_766	0.900	-0.033	1.100	Failed
a589	0.900	-0.023	1.100	Failed

ACKGROUND CORRECTED INTENSITIES
dentity 1 : ICSA Identity 2 : Type : INTRF
eight : 1.0000 Volume : 1.00 Printed : 6:57:08 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	14.5	32.5	5133.0	5133.0
# 2	3.5	38.5	5105.0	5105.0
ean	9.0	35.5	5119.0	5119.0
D	7.8	4.2	19.8	19.8
RSD	86.4	12.0	0.4	0.4

PPARENT CONCENTRATIONS
dentity 1 : ICSA Identity 2 : Type : INTRF
eight : 1.0000 Volume : 1.00 Printed : 6:57:10 PM August 15, 2005

		K_766	Na589	Sc	Sc361
		ppm	ppm		ppm
# 1	L	-0.0761 L	-0.0096	5133.000	94.5069
# 2	L	-0.1915	0.0016	5105.000	93.9908
ean	L	-0.1338 L	-0.0040	5119.000	94.2488
D		0.0816	0.0079	19.799	0.3650
RSD		61.0022	199.6698	0.387	0.3872

ACKGROUND CORRECTED INTENSITIES
dentity 1 : ICSAB Identity 2 : Type : ICSAB
eight : 1.0000 Volume : 1.00 Printed : 7:00:02 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	15.5	45.0	5119.5	5119.5
# 2	14.5	46.0	5065.5	5065.5
ean	15.0	45.5	5092.5	5092.5
D	0.7	0.7	38.2	38.2
RSD	4.7	1.6	0.7	0.7

PPARENT CONCENTRATIONS
dentity 1 : ICSAB Identity 2 : Type : ICSAB
eight : 1.0000 Volume : 1.00 Printed : 7:00:02 PM August 15, 2005

		K_766	Na589	Sc	Sc361
		ppm	ppm		ppm
# 1	L	-0.0652	0.0132	5119.500	94.2581
# 2	L	-0.0741	0.0159	5065.500	93.2627
ean	L	-0.0696	0.0145	5092.500	93.7604
D		0.0063	0.0019	38.184	0.7038
RSD		[illegible]	[illegible]	[illegible]	[illegible]

010105

ıecking interference check standard ...
dentity 1 : ICSAB Identity 2 :

eport name	Low limit	Value	High limit	
_766	0.000	-0.070	0.000	Failed
a589	0.000	0.015	0.000	Failed

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ACKGROUND CORRECTED INTENSITIES
dentity 1 : CLP_CCV_SC Identity 2 : Type : CV
eight : 1.0000 Volume : 1.00 Printed : 7:03:54 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	1994.0	17507.0	5439.5	5439.5
# 2	1986.0	17371.0	5388.5	5388.5
ean	1990.0	17439.0	5414.0	5414.0
D	5.7	96.2	36.1	36.1
RSD	0.3	0.6	0.7	0.7

PPARENT CONCENTRATIONS
dentity 1 : CLP_CCV_SC Identity 2 : Type : CV
eight : 1.0000 Volume : 1.00 Printed : 7:03:54 PM August 15, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	19.5544	29.7110	5439.500 H	100.1567
# 2	19.6615	29.7593	5388.500	99.2166
ean	19.6079	29.7352	5414.000	99.6866
D	0.0757	0.0342	36.062	0.6647
RSD	0.3863	0.1149	0.666	0.6668

hecking calibration verification ...
dentity 1 : CLP_CCV_SC Identity 2 :

eport name	Low limit	Value	High limit
_766	18.000	19.608	22.000
a589	27.000	29.735	33.000

ACKGROUND CORRECTED INTENSITIES
dentity 1 : Calibration blank Identity 2 : Type : CB
eight : 1.0000 Volume : 1.00 Printed : 7:07:46 PM August 15, 2005

	K_766	Na589	Sc	Sc361
# 1	21.5	33.0	5491.0	5491.0
# 2	13.5	15.0	5468.0	5468.0
ean	17.5	24.0	5479.5	5479.5
D	5.7	12.7	16.3	16.3
RSD	32.3	53.0	0.3	0.3

PPARENT CONCENTRATIONS
dentity 1 : Calibration blank Identity 2 : Type : CB
eight : 1.0000 Volume : 1.00 Printed : 7:07:46 PM August 15, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1 L	-0.0172 L	-0.0125	5491.000 H	101.1060
# 2 L	-0.0953 L	-0.0428	5468.000 H	100.6820
ean L	-0.0563 L	-0.0277	5479.500 H	100.8940
D	0.0552	0.0214	16.263	0.2998
RSD	98.0962	77.2884	0.297	0.2971

dentity 1 : Calibration blank Identity 2 :

eport name	CRDL	Value
_766	0.100	-0.056
a589	0.050	-0.028

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010106

c361	0.000	100.894

☐ 200.7 TAP No. 01-0406-028 Rev2/Mar02

☑ 6010B TAP No. 01-0406-130 Rev3/Mar05

☐ Other_____

QC STD. ID's	
CCV	05HD1
CRI	
ICSA	
ICSAB	05HD1

ICP CAL.STD. ID's	
Std0	05HD1
Std1	05HD1
Std2	
Std3	
Std4	
Std5	
Std6	

010107

K ~~[illegible]~~ JR 8/19/05

PROJ. NO.	PROJECT	TO#	DATE	MATRIX	LOGBK PG
06002.01.242	DIV. 20	050722-11	8-16-05	Water	61-108

INSTRUMENT: Spectro FILENAME: 050816

File converted to wsl? ☑ NA

VOLUTION by Micro-Active Australia Pty Ltd 4:15:06 PM August 16, 2005 **010108**

eep last result visible enabled ...
tarting run ...
reating high priority queue entries ...
ACKGROUND CORRECTED INTENSITIES
dentity 1 : BLK_SC Identity 2 : Type : STD
eight : 1.0000 Volume : 1.00 Printed : 4:09:10 PM August 16, 2005

	K_766	Na589	Sc361
# 1	33.5	17.0	5115.5
# 2	16.5	8.0	5124.5
lean	25.0	12.5	5120.0
SD	12.0	6.4	6.4
RSD	48.1	50.9	0.1

NTENSITIES
dentity 1 : BLK_SC Identity 2 : Type : STD
eight : 1.0000 Volume : 1.00 Printed : 4:09:10 PM August 16, 2005

	K_766	Na589	Sc361
# 1	0.0	0.0	5115.5
# 2	0.0	0.0	5124.5
lean	0.0	0.0	5120.0
SD	0.0	0.0	6.4
RSD	48.2	51.0	0.1

BACKGROUND CORRECTED INTENSITIES
Identity 1 : CLP_STD1_SC Identity 2 : Type : STD
Weight : 1.0000 Volume : 1.00 Printed : 4:12:02 PM August 16, 2005

	K_766	Na589
# 1	5145.5	30158.5
# 2	5159.5	30164.5
Mean	5152.5	30161.5
SD	9.9	4.2
%RSD	0.2	0.0

INTENSITIES
Identity 1 : CLP_STD1_SC Identity 2 : Type : STD
Weight : 1.0000 Volume : 1.00 Printed : 4:12:02 PM August 16, 2005

	K_766	Na589
# 1	1.0	5.8
# 2	1.0	5.8
Mean	1.0	5.8
SD	0.0	0.0
%RSD	0.3	0.1

8/19/05

BACKGROUND CORRECTED INTENSITIES
Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 4:14:54 PM August 16, 2005

	K_766	Na589	Sc	Sc361
# 1	2043.5	17730.0	5092.0	5092.0
# 2	2040.5	17761.0	5104.0	5104.0

8-16-05

:D	2.1	21.9	8.5	8.5
:RSD	0.1	0.1	0.2	0.2

.PPARENT CONCENTRATIONS
:VOLUTION by Micro-Active Australia Pty Ltd 4:15:06 PM August 16, 2005

010109

dentity 1 : CLP_CCV_SC Identity 2 : Type : CV
'eight : 1.0000 Volume : 1.00 Printed : 4:14:54 PM August 16, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	19.9694	29.8076	5092.000	99.4525
# 2	19.8923	29.7895	5104.000	99.6871
lean	19.9308	29.7985	5098.000	99.5698
:D	0.0545	0.0128	8.485	0.1659
:RSD	0.2737	0.0429	0.166	0.1666

:VOLUTION by Micro-Active Australia Pty Ltd 4:22:36 PM August 16, 2005 **010110**

:hecking calibration verification ...
[dentity 1 : CLP_CCV_SC Identity 2 :

Report name	Low limit	Value	High limit
(_766	18.000	19.931	22.000
Na589	27.000	29.799	33.000

BACKGROUND CORRECTED INTENSITIES
[dentity 1 : Calibration blank Identity 2 : Type : CB
Weight : 1.0000 Volume : 1.00 Printed : 4:19:00 PM August 16, 2005

	K_766	Na589	Sc	Sc361
# 1	12.5	47.5	5165.5	5165.5
# 2	18.5	26.5	5138.5	5138.5
Mean	15.5	37.0	5152.0	5152.0
SD	4.2	14.8	19.1	19.1
%RSD	27.4	40.1	0.4	0.4

APPARENT CONCENTRATIONS
[dentity 1 : Calibration blank Identity 2 : Type : CB
Weight : 1.0000 Volume : 1.00 Printed : 4:19:00 PM August 16, 2005

		K_766 ppm	Na589 ppm	Sc		Sc361 ppm
# 1	L	-0.1241	0.0579	5165.500	H	100.8897
# 2	L	-0.0646	0.0233	5138.500	H	100.3618
Mean	L	-0.0943	0.0406	5152.000	H	100.6257
SD		0.0420	0.0245	19.092		0.3733
%RSD		44.5686	60.3093	0.371		0.3710

:hecking calibration blank ...
[dentity 1 : Calibration blank Identity 2 :

Report name	CRDL	Value
(_766	0.100	-0.094
Na589	0.050	0.041
Sc361	0.000	100.626

BACKGROUND CORRECTED INTENSITIES
[dentity 1 : CRI Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 4:22:06 PM August 16, 2005

	K_766	Na589	Sc	Sc361
# 1	17.5	12.0	5121.5	5121.5
# 2	12.5	22.0	5092.5	5092.5
Mean	15.0	17.0	5107.0	5107.0
SD	3.5	7.1	20.5	20.5
%RSD	23.6	41.6	0.4	0.4

APPARENT CONCENTRATIONS
[dentity 1 : CRI Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 4:22:06 PM August 16, 2005

		K_766 ppm	Na589 ppm	Sc		Sc361 ppm
# 1	L	-0.0738	L -0.0008	5121.500	H	100.0293
# 2	L	-0.1223	0.0161	5092.500		99.4623

D	0.0343	0.0120	20.506	0.4010
RSD	34.9508	157.0452	0.402	0.4020

VOLUTION by Micro-Active Australia Pty Ltd 4:32:06 PM August 16, 2005 **010111**

hecking calibration verification ...
dentity 1 : CRI Identity 2 :

eport name	Low limit	Value	High limit	
_766	0.900	-0.098	1.100	Failed
a589	0.900	0.008	1.100	Failed

ACKGROUND CORRECTED INTENSITIES
dentity 1 : ICSA Identity 2 : Type : INTRF
eight : 1.0000 Volume : 1.00 Printed : 4:25:00 PM August 16, 2005

	K_766	Na589	Sc	Sc361
# 1	17.5	41.5	4895.5	4895.5
# 2	18.5	38.5	4867.5	4867.5
ean	18.0	40.0	4881.5	4881.5
D	0.7	2.1	19.8	19.8
RSD	3.9	5.3	0.4	0.4

PPARENT CONCENTRATIONS
dentity 1 : ICSA Identity 2 : Type : INTRF
eight : 1.0000 Volume : 1.00 Printed : 4:25:00 PM August 16, 2005

		K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	L	-0.0659	0.0517	4895.500	95.6101
# 2	L	-0.0545	0.0468	4867.500	95.0626
ean	L	-0.0602	0.0493	4881.500	95.3363
D		0.0081	0.0034	19.799	0.3872
RSD		13.3723	6.9773	0.406	0.4061

ACKGROUND CORRECTED INTENSITIES
dentity 1 : ICSAB Identity 2 : Type : ICSAB
eight : 1.0000 Volume : 1.00 Printed : 4:27:52 PM August 16, 2005

	K_766	Na589	Sc	Sc361
# 1	10.0	28.0	4875.5	4875.5
# 2	16.0	30.0	4865.5	4865.5
ean	13.0	29.0	4870.5	4870.5
D	4.2	1.4	7.1	7.1
RSD	32.6	4.9	0.1	0.1

PPARENT CONCENTRATIONS
dentity 1 : ICSAB Identity 2 : Type : ICSAB
eight : 1.0000 Volume : 1.00 Printed : 4:27:52 PM August 16, 2005

		K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	L	-0.1426	0.0283	4875.500	95.2190
# 2	L	-0.0803	0.0319	4865.500	95.0235
ean	L	-0.1115	0.0301	4870.500	95.1212
D		0.0441	0.0026	7.071	0.1383
RSD		39.5367	8.5114	0.145	0.1454

hecking interference check standard ...
dentity 1 : ICSAB Identity 2 :

la589	0.000	0.030	0.000	Failed

)ACKGROUND CORRECTED INTENSITIES
:dentity 1 : CLP_CCV_SC Identity 2 : Type : CV
leight : 1.0000 Volume : 1.00 Printed : 4:31:46 PM August 16, 2005
:VOLUTION by Micro-Active Australia Pty Ltd 4:38:40 PM August 16, 2005

010112

	K_766	Na589	Sc	Sc361
# 1	2019.0	17603.0	5157.5	5157.5
# 2	2027.0	17756.0	5159.5	5159.5
lean	2023.0	17679.5	5158.5	5158.5
SD	5.7	108.2	1.4	1.4
:RSD	0.3	0.6	0.0	0.0

\PPARENT CONCENTRATIONS
:dentity 1 : CLP_CCV_SC Identity 2 : Type : CV
leight : 1.0000 Volume : 1.00 Printed : 4:31:46 PM August 16, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	19.4734	29.2178	5157.500 H	100.7333
# 2	19.5439	29.4605	5159.500 H	100.7724
lean	19.5086	29.3392	5158.500 H	100.7528
SD	0.0498	0.1716	1.414	0.0277
:RSD	0.2554	0.5849	0.027	0.0274

:hecking calibration verification ...
:dentity 1 : CLP_CCV_SC Identity 2 :

leport name	Low limit	Value	High limit
:_766	18.000	19.509	22.000
la589	27.000	29.339	33.000

)ACKGROUND CORRECTED INTENSITIES
:dentity 1 : Calibration blank Identity 2 : Type : CB
leight : 1.0000 Volume : 1.00 Printed : 4:35:38 PM August 16, 2005

	K_766	Na589	Sc	Sc361
# 1	12.0	48.5	5194.5	5194.5
# 2	15.0	48.5	5193.5	5193.5
lean	13.5	48.5	5194.0	5194.0
SD	2.1	0.0	0.7	0.7
:RSD	15.7	0.0	0.0	0.0

\PPARENT CONCENTRATIONS
:dentity 1 : Calibration blank Identity 2 : Type : CB
leight : 1.0000 Volume : 1.00 Printed : 4:35:38 PM August 16, 2005

		K_766	Na589	Sc	Sc361
		ppm	ppm		ppm
# 1	L	-0.1296	0.0591	5194.500 H	101.4568
# 2	L	-0.1005	0.0591	5193.500 H	101.4372
lean	L	-0.1150	0.0591	5194.000 H	101.4470
SD		0.0206	0.0000	0.707	0.0138
:RSD		17.9001	0.0184	0.014	0.0136

:hecking calibration blank ...
:dentity 1 : Calibration blank Identity 2 :

leport name	CRDL	Value	
:_766	0.100	-0.115	Contaminated
la589	0.050	0.059	Contaminated

ACKGROUND CORRECTED INTENSITIES
dentity 1 : pbw-H16H1 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 4:38:30 PM August 16, 2005

VOLUTION by Micro-Active Australia Pty Ltd 4:44:06 PM August 16, 2005

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	K_766	Na589	Sc	Sc361
# 1	15.0	22.0	5163.5	5163.5
# 2	19.0	46.0	5130.5	5130.5
ean	17.0	34.0	5147.0	5147.0
D	2.8	17.0	23.3	23.3
RSD	16.6	49.9	0.5	0.5

PPARENT CONCENTRATIONS
dentity 1 : pbw-H16H1 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 4:38:30 PM August 16, 2005

		K_766 ppm	Na589 ppm	Sc		Sc361 ppm
# 1	L	-0.0996	0.0156	5163.500	H	100.8506
# 2	L	-0.0594	0.0559	5130.500	H	100.2053
ean	L	-0.0795	0.0357	5147.000	H	100.5280
D		0.0284	0.0285	23.335		0.4563
RSD		35.7593	79.7511	0.453		0.4539

ACKGROUND CORRECTED INTENSITIES
dentity 1 : lcsw-H16H1 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 4:40:14 PM August 16, 2005

	K_766	Na589	Sc	Sc361
# 1	1917.5	11309.5	5217.0	5217.0
# 2	1914.5	11360.5	5242.0	5242.0
ean	1916.0	11335.0	5229.5	5229.5
D	2.1	36.1	17.7	17.7
RSD	0.1	0.3	0.3	0.3

PPARENT CONCENTRATIONS
dentity 1 : lcsw-H16H1 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 4:40:14 PM August 16, 2005

	K_766 ppm	Na589 ppm	Sc		Sc361 ppm
# 1	18.2685	18.5500	5217.000	H	101.8968
# 2	18.1513	18.5448	5242.000	H	102.3856
lean	18.2099	18.5474	5229.500	H	102.1412
SD	0.0828	0.0037	17.678		0.3457
RSD	0.4548	0.0199	0.338		0.3384

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265477 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:43:36 PM August 16, 2005

	K_766	Na589	Sc	Sc361
# 1	65.5	6616.5	5252.0	5252.0
# 2	52.5	6588.5	5276.0	5276.0
lean	59.0	6602.5	5264.0	5264.0
SD	9.2	19.8	17.0	17.0
RSD	15.6	0.3	0.3	0.3

APPARENT CONCENTRATIONS

eight : 1.0000 Volume : 1.00 Printed : 4:43:36 PM August 16, 2005

010114

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm

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# 1	0.3823	10.7714	5252.000 H	102.5811
# 2	0.2553	10.6768	5276.000 H	103.0504
ean	0.3188	10.7241	5264.000 H	102.8158
)	0.0898	0.0669	16.971	0.3318
RSD	28.1660	0.6235	0.322	0.3228

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265477d Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 4:45:18 PM August 16, 2005

	K_766	Na589	Sc	Sc361
# 1	51.0	6620.5	5268.0	5268.0
# 2	54.0	6652.5	5253.0	5253.0
ean	52.5	6636.5	5260.5	5260.5
)	2.1	22.6	10.6	10.6
RSD	4.0	0.3	0.2	0.2

PPARENT CONCENTRATIONS
dentity 1 : 265477d Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 4:45:20 PM August 16, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.2417	10.7451	5268.000 H	102.8940
# 2	0.2719	10.8281	5253.000 H	102.6007
ean	0.2568	10.7866	5260.500 H	102.7474
D	0.0213	0.0586	10.607	0.2074
RSD	8.3053	0.5436	0.202	0.2019

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265490 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 4:48:44 PM August 16, 2005

	K_766	Na589	Sc	Sc361
# 1	66.5	4632.0	5311.0	5311.0
# 2	68.5	4664.0	5272.0	5272.0
ean	67.5	4648.0	5291.5	5291.5
)	1.4	22.6	27.6	27.6
RSD	2.1	0.5	0.5	0.5

PPARENT CONCENTRATIONS
dentity 1 : 265490 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 4:48:44 PM August 16, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.3848	7.4505	5311.000 H	103.7348
# 2	0.4085	7.5578	5272.000 H	102.9722
ean	0.3967	7.5041	5291.500 H	103.3535
)	0.0168	0.0759	27.577	0.5392
RSD	4.2384	1.0108	0.521	0.5218

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265490d Identity 2 : Type : SAMPLE

010115

	K_766	Na589	Sc	Sc361
# 1	65.0	4567.0	5266.0	5266.0
# 2	50.0	4589.0	5259.0	5259.0

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Mean	57.5	4578.0	5262.5	5262.5
SD	10.6	15.6	4.9	4.9
%RSD	18.4	0.3	0.1	0.1

APPARENT CONCENTRATIONS
Identity 1 : 265490d Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:50:26 PM August 16, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	0.3758	7.4086	5266.000 H	102.8549
# 2	0.2330	7.4543	5259.000 H	102.7180
Mean	0.3044	7.4315	5262.500 H	102.7865
SD	0.1010	0.0323	4.950	0.0968
%RSD	33.1848	0.4351	0.094	0.0942

BACKGROUND CORRECTED INTENSITIES
Identity 1 : CRI Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 4:53:48 PM August 16, 2005

	K_766	Na589	Sc	Sc361
# 1	35.0	29.0	5205.0	5205.0
# 2	28.0	36.0	5198.0	5198.0
Mean	31.5	32.5	5201.5	5201.5
SD	4.9	4.9	4.9	4.9
%RSD	15.7	15.2	0.1	0.1

APPARENT CONCENTRATIONS
Identity 1 : CRI Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 4:53:48 PM August 16, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	0.0928	0.0268	5205.000 H	101.6621
# 2	0.0254	0.0384	5198.000 H	101.5252
Mean	0.0591	0.0326	5201.500 H	101.5937
SD	0.0476	0.0082	4.950	0.0968
%RSD	80.6559	25.1506	0.095	0.0953

Checking calibration verification ...
Identity 1 : CRI Identity 2 :

Report name	Low limit	Value	High limit	
K_766	0.900	0.059	1.100	Failed
Na589	0.900	0.033	1.100	Failed

BACKGROUND CORRECTED INTENSITIES
Identity 1 : ICSA Identity 2 : Type : INTRF
Weight : 1.0000 Volume : 1.00 Printed : 4:56:42 PM August 16, 2005

	K_766	Na589	Sc	Sc361
# 1	10.5	27.0	4948.0	4948.0
# 2	8.5	48.0	4948.0	4948.0
Mean	9.5	37.5	4948.0	4948.0
SD	[illegible]	[illegible]	[illegible]	[illegible]

PPARENT CONCENTRATIONS
dentity 1 : ICSA Identity 2 : Type : INTRF
eight : 1.0000 Volume : 1.00 Printed : 4:56:42 PM August 16, 2005
VOLUTION by Micro-Active Australia Pty Ltd 5:03:42 PM August 16, 2005

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		K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	L	-0.1391	0.0258	4948.000	96.6367
# 2	L	-0.1594	0.0622	4948.000	96.6367
ean	L	-0.1492	0.0440	4948.000	96.6367
D		0.0144	0.0257	0.000	0.0000
RSD		9.6466	58.4158	0.000	0.0000

ACKGROUND CORRECTED INTENSITIES
dentity 1 : ICSAB Identity 2 : Type : ICSAB
eight : 1.0000 Volume : 1.00 Printed : 4:59:34 PM August 16, 2005

	K_766	Na589	Sc	Sc361
# 1	15.5	40.0	4991.5	4991.5
# 2	5.5	38.0	4901.5	4901.5
ean	10.5	39.0	4946.5	4946.5
D	7.1	1.4	63.6	63.6
RSD	67.3	3.6	1.3	1.3

PPARENT CONCENTRATIONS
dentity 1 : ICSAB Identity 2 : Type : ICSAB
eight : 1.0000 Volume : 1.00 Printed : 4:59:34 PM August 16, 2005

		K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	L	-0.0895	0.0477	4991.500	97.4873
# 2	L	-0.1894	0.0455	4901.500	95.7274
ean	L	-0.1395	0.0466	4946.500	96.6074
D		0.0706	0.0016	63.640	1.2444
RSD		50.6412	3.3901	1.287	1.2881

hecking interference check standard ...
dentity 1 : ICSAB Identity 2 :

eport name	Low limit	Value	High limit	
_766	0.000	-0.139	0.000	Failed
a589	0.000	0.047	0.000	Failed

ACKGROUND CORRECTED INTENSITIES
dentity 1 : CLP_CCV_SC Identity 2 : Type : CV
eight : 1.0000 Volume : 1.00 Printed : 5:03:28 PM August 16, 2005

	K_766	Na589	Sc	Sc361
# 1	2000.0	17492.5	5256.5	5256.5
# 2	1996.0	17380.5	5208.5	5208.5
ean	1998.0	17436.5	5232.5	5232.5
D	2.8	79.2	33.9	33.9
RSD	0.1	0.5	0.6	0.6

PPARENT CONCENTRATIONS
dentity 1 : CLP_CCV_SC Identity 2 : Type : CV
eight : 1.0000 Volume : 1.00 Printed : 5:03:28 PM August 16, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm

# 2	19.0579	28.5656	5208.500 H	101.7305
ean	18.9889	28.5263	5232.500 H	102.1998
D	0.0975	0.0555	33.941	0.6637
RSD	0.5137	0.1946	0.649	0.6494

010117

VOLUTION by Micro-Active Australia Pty Ltd 5:14:06 PM August 16, 2005

hecking calibration verification ...
dentity 1 : CLP_CCV_SC Identity 2 :

eport name	Low limit	Value	High limit
_766	18.000	18.989	22.000
a589	27.000	28.526	33.000

ACKGROUND CORRECTED INTENSITIES
dentity 1 : Calibration blank Identity 2 : Type : CB
eight : 1.0000 Volume : 1.00 Printed : 5:07:24 PM August 16, 2005

	K_766	Na589	Sc	Sc361
# 1	21.5	35.5	5278.0	5278.0
# 2	20.5	30.5	5260.0	5260.0
ean	21.0	33.0	5269.0	5269.0
D	0.7	3.5	12.7	12.7
RSD	3.4	10.7	0.2	0.2

PPARENT CONCENTRATIONS
dentity 1 : Calibration blank Identity 2 : Type : CB
eight : 1.0000 Volume : 1.00 Printed : 5:07:24 PM August 16, 2005

		K_766	Na589	Sc	Sc361
		ppm	ppm		ppm
# 1	L	-0.0408	0.0367	5278.000 H	103.0896
# 2	L	-0.0496	0.0288	5260.000 H	102.7376
ean	L	-0.0452	0.0327	5269.000 H	102.9136
D		0.0063	0.0056	12.728	0.2489
RSD		13.8819	17.1658	0.242	0.2418

hecking calibration blank ...
dentity 1 : Calibration blank Identity 2 :

eport name	CRDL	Value
_766	0.100	-0.045
a589	0.050	0.033
c361	0.000	102.914

Div. 20
TO#050722-11
Project No. 06002.01.242
Prep. Pages 61-104/105

DL 8-19-05

Sample ID	Element	Result	Qual (Q)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	mg/L	sigwt	Dilution	Calc RL	ug/ml	Date	Time
pbw-H17H1	Na589	2.50	U		mg/L	2.5				0.125	0.141229064	0.141	1	2.5	0.007061453	08/17/05	3:21 PM
lcsw-H17H1	Na589	381			mg/L	2.5		95.3%	400	0.125	381.48255	381	1	2.5	19.0741275	08/17/05	3:22 PM
265477	Na589	✓ 108			mg/L	2.5				0.125	108.2746206	108	1	2.5	5.413731031	08/17/05	3:26 PM
265478	Na589	96.1			mg/L	2.5				0.125	96.05910575	96.1	1	2.5	4.802955288	08/17/05	3:28 PM
265478d	Na589	93.3			mg/L	2.5	3.0%			0.125	93.34635102	93.3	1	2.5	4.667317551	08/17/05	3:30 PM
265478s	Na589	477			mg/L	2.5		95.2%	400	0.125	477.4504827	477	1	2.5	23.87252414	08/17/05	3:32 PM
265479	Na589	94.5			mg/L	2.5				0.125	94.51470135	94.5	1	2.5	4.725735067	08/17/05	3:34 PM
265480	Na589	129			mg/L	2.5				0.125	129.2446853	129	1	2.5	6.462234263	08/17/05	3:37 PM
265481	Na589	9.99			mg/L	2.5				0.125	9.990824744	9.99	1	2.5	0.499541237	08/17/05	3:40 PM
265482	Na589	9.38			mg/L	2.5				0.125	9.384816082	9.38	1	2.5	0.469240804	08/17/05	3:42 PM
265483	Na589	74.9			mg/L	2.5				0.125	74.87789514	74.9	1	2.5	3.743894757	08/17/05	3:52 PM
265484	Na589	74.6			mg/L	2.5				0.125	74.56632746	74.6	1	2.5	3.728316373	08/17/05	3:54 PM
265485	Na589	77.2			mg/L	2.5				0.125	77.15668884	77.2	1	2.5	3.857834442	08/17/05	3:57 PM
265486	Na589	77.1			mg/L	2.5				0.125	77.06465092	77.1	1	2.5	3.853232546	08/17/05	4:00 PM
265487	Na589	76.7			mg/L	2.5				0.125	76.72739578	76.7	1	2.5	3.836369789	08/17/05	4:02 PM
265488	Na589	97.9			mg/L	2.5				0.125	97.85257417	97.9	1	2.5	4.892628709	08/17/05	4:05 PM
265489	Na589	76.7			mg/L	2.5				0.125	76.73580858	76.7	1	2.5	3.836790429	08/17/05	4:08 PM
pbw-H17H2	Na589	2.50	U		mg/L	2.5				0.125	-0.116012989	-0.116	1	2.5	-0.005800649	08/17/05	4:17 PM
lcsw-H17H2	Na589	383			mg/L	2.5		95.8%	400	0.125	383.1866752	383	1	2.5	19.15933376	08/17/05	4:19 PM
265490	Na589	77.1			mg/L	2.5				0.125	77.14434714	77.1	1	2.5	3.857217357	08/17/05	4:22 PM
265491	Na589	77.9			mg/L	2.5				0.125	77.86866221	77.9	1	2.5	3.89343311	08/17/05	4:25 PM
265491d	Na589	76.6			mg/L	2.5	1.7%			0.125	76.60561041	76.6	1	2.5	3.83028052	08/17/05	4:27 PM
265491s	Na589	456			mg/L	2.5		94.5%	400	0.125	456.3535492	456	1	2.5	22.81767746	08/17/05	4:29 PM
265492	Na589	78.0			mg/L	2.5				0.125	78.02497644	78	1	2.5	3.901248822	08/17/05	4:31 PM
265493	Na589	76.1			mg/L	2.5				0.125	76.10995905	76.1	1	2.5	3.805497952	08/17/05	4:34 PM
265494	Na589	78.5			mg/L	2.5				0.125	78.47795222	78.5	1	2.5	3.923897611	08/17/05	4:36 PM
265495	Na589	112			mg/L	2.5				0.125	112.4385313	112	1	2.5	5.621926565	08/17/05	4:39 PM
265496	Na589	98.7			mg/L	2.5				0.125	98.72724824	98.7	1	2.5	4.936362412	08/17/05	4:49 PM
265497	Na589	99.4			mg/L	2.5				0.125	99.37068854	99.4	1	2.5	4.968534427	08/17/05	4:51 PM
265498	Na589	101			mg/L	2.5				0.125	100.7955348	101	1	2.5	5.039776741	08/17/05	4:54 PM
265499	Na589	99.6			mg/L	2.5				0.125	99.59198682	99.6	1	2.5	4.979599341	08/17/05	4:57 PM
265500	Na589	98.6			mg/L	2.5				0.125	98.64942916	98.6	1	2.5	4.932471458	08/17/05	4:59 PM
265501	Na589	95.8			mg/L	2.5				0.125	95.75292636	95.8	1	2.5	4.787646318	08/17/05	5:02 PM
265502	Na589	94.6			mg/L	2.5				0.125	94.64412577	94.6	1	2.5	4.732206289	08/17/05	5:05 PM

DIV20_050722_11Specrr

LRawyer 8/19/05

265477

$$\frac{5.414\ ug/ml \times 10ml}{0.5ml} = 108\ \frac{mg}{L}$$

010118

☐ 200.7 TAP No. 01-0406-028 Rev2/Mar02

☑ 6010B TAP No. 01-0406-130 Rev3/Mar05

☐ Other_____

QC STD. ID's	
CCV	05H01
CRI	
ICSA	
ICSAB	05H01

ICP CAL.STD. ID's	
Std0	05H01
Std1	05H01
Std2	
Std3	
Std4	
Std5	
Std6	~~05H01~~

010119

Na
JR
8/19/05

PROJ. NO.	PROJECT	TO#	DATE	MATRIX	LOGBK PG
06002.01.242	D.V. 20	050722-11	8-17-05	Water	61-104
06002.01.242	D.V. 20	050722-11	8-17-05	Water	61-105

INSTRUMENT: Spectro FILENAME: 050817A

010120

EVOLUTION by Micro-Active Australia Pty Ltd 2:58:02 PM August 17, 2005

Keep last result visible enabled ...
Starting run ...
Creating high priority queue entries ...
BACKGROUND CORRECTED INTENSITIES
Identity 1 : BLK_SC Identity 2 : Type : STD
Weight : 1.0000 Volume : 1.00 Printed : 2:52:04 PM August 17, 2005

	K_766	Na589	Sc361
# 1	25.5	22.0	5279.0
# 2	42.5	40.0	5222.0
Mean	34.0	31.0	5250.5
SD	12.0	12.7	40.3
%RSD	35.4	41.1	0.8

INTENSITIES
Identity 1 : BLK_SC Identity 2 : Type : STD
Weight : 1.0000 Volume : 1.00 Printed : 2:52:04 PM August 17, 2005

	K_766	Na589	Sc361
# 1	0.0	0.0	5279.0
# 2	0.0	0.0	5222.0
Mean	0.0	0.0	5250.5
SD	0.0	0.0	40.3
%RSD	36.1	41.8	0.8

BACKGROUND CORRECTED INTENSITIES
Identity 1 : CLP_STD1_SC Identity 2 : Type : STD
Weight : 1.0000 Volume : 1.00 Printed : 2:54:54 PM August 17, 2005

	K_766	Na589
# 1	4889.0	28279.0
# 2	4841.0	28130.0
Mean	4865.0	28204.5
SD	33.9	105.4
%RSD	0.7	0.4

INTENSITIES
Identity 1 : CLP_STD1_SC Identity 2 : Type : STD
Weight : 1.0000 Volume : 1.00 Printed : 2:54:54 PM August 17, 2005

	K_766	Na589
# 1	0.9	5.4
# 2	0.9	5.4
Mean	0.9	5.4
SD	0.0	0.0
%RSD	0.2	0.1

8/19/05

BACKGROUND CORRECTED INTENSITIES
Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 2:57:52 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	1962.5	16973.0	5276.0	5276.0
# 2	1943.5	16794.0	5244.0	5244.0

8-18-05

D	13.4	126.6	22.6	22.6
RSD	0.7	0.7	0.4	0.4

PPARENT CONCENTRATIONS
VOLUTION by Micro-Active Australia Pty Ltd 2:58:02 PM August 17, 2005

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dentity 1 : CLP_CCV_SC Identity 2 : Type : CV
eight : 1.0000 Volume : 1.00 Printed : 2:57:52 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	19.7948	29.8218	5276.000 H	100.4862
# 2	19.7215	29.6871	5244.000	99.8761
ean	19.7582	29.7545	5260.000 H	100.1811
D	0.0518	0.0952	22.627	0.4315
RSD	0.2623	0.3201	0.430	0.4307

hecking calibration verification ...
dentity 1 : CLP_CCV_SC Identity 2 :

eport name	Low limit	Value	High limit
_766	18.000	19.758	22.000
a589	27.000	29.754	33.000

EVOLUTION by Micro-Active Australia Pty Ltd 3:07:58 PM August 17, 2005 **010122**

BACKGROUND CORRECTED INTENSITIES
Identity 1 : Calibration blank Identity 2 : Type : CB
Weight : 1.0000 Volume : 1.00 Printed : 3:01:44 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	23.5	28.5	5259.5	5259.5
# 2	11.5	14.5	5226.5	5226.5
Mean	17.5	21.5	5243.0	5243.0
SD	8.5	9.9	23.3	23.3
%RSD	48.5	46.0	0.4	0.4

APPARENT CONCENTRATIONS
Identity 1 : Calibration blank Identity 2 : Type : CB
Weight : 1.0000 Volume : 1.00 Printed : 3:01:44 PM August 17, 2005

		K_766 ppm		Na589 ppm	Sc		Sc361 ppm
# 1	L	-0.1087	L	-0.0045	5259.500	H	100.1716
# 2	L	-0.2315	L	-0.0291	5226.500		99.5424
Mean	L	-0.1701	L	-0.0168	5243.000		99.8570
SD		0.0868		0.0174	23.335		0.4449
%RSD		51.0468		103.4436	0.445		0.4456

Checking calibration blank ...
Identity 1 : Calibration blank Identity 2 :

Report name	CRDL	Value	
K_766	0.100	-0.170	Contaminated
Na589	0.050	-0.017	
Sc361	0.000	99.857	

BACKGROUND CORRECTED INTENSITIES
Identity 1 : CRI Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 3:04:36 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	18.5	28.0	5285.5	5285.5
# 2	15.5	40.0	5225.5	5225.5
Mean	17.0	34.0	5255.5	5255.5
SD	2.1	8.5	42.4	42.4
%RSD	12.5	25.0	0.8	0.8

APPARENT CONCENTRATIONS
Identity 1 : CRI Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 3:04:36 PM August 17, 2005

		K_766 ppm		Na589 ppm	Sc		Sc361 ppm
# 1	L	-0.1611	L	-0.0056	5285.500	H	100.6674
# 2	L	-0.1901		0.0163	5225.500		99.5233
Mean	L	-0.1756		0.0053	5255.500	H	100.0953
SD		0.0204		0.0155	42.426		0.8090
%RSD		11.6438		291.4342	0.807		0.8082

Checking calibration verification ...

Report name	Low limit	Value	High limit	
K_766	0.900	-0.176	1.100	Failed
Na589	0.900	0.005	1.100	Failed

BACKGROUND CORRECTED INTENSITIES
EVOLUTION by Micro-Active Australia Pty Ltd 3:14:28 PM August 17, 2005

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Identity 1 : ICSA Identity 2 : Type : INTRF
Weight : 1.0000 Volume : 1.00 Printed : 3:07:30 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	13.5	62.0	5020.0	5020.0
# 2	15.5	60.0	4965.0	4965.0
Mean	14.5	61.0	4992.5	4992.5
SD	1.4	1.4	38.9	38.9
%RSD	9.8	2.3	0.8	0.8

APPARENT CONCENTRATIONS
Identity 1 : ICSA Identity 2 : Type : INTRF
Weight : 1.0000 Volume : 1.00 Printed : 3:07:30 PM August 17, 2005

		K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	L	-0.2051	0.0599	5020.000	95.6049
# 2	L	-0.1816	0.0574	4965.000	94.5562
Mean	L	-0.1934	0.0586	4992.500	95.0806
SD		0.0166	0.0017	38.891	0.7416
%RSD		8.5686	2.9793	0.779	0.7799

BACKGROUND CORRECTED INTENSITIES
Identity 1 : ICSAB Identity 2 : Type : ICSAB
Weight : 1.0000 Volume : 1.00 Printed : 3:10:22 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	13.5	40.5	5014.0	5014.0
# 2	17.5	42.5	4992.0	4992.0
Mean	15.5	41.5	5003.0	5003.0
SD	2.8	1.4	15.6	15.6
%RSD	18.2	3.4	0.3	0.3

APPARENT CONCENTRATIONS
Identity 1 : ICSAB Identity 2 : Type : ICSAB
Weight : 1.0000 Volume : 1.00 Printed : 3:10:22 PM August 17, 2005

		K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	L	-0.2049	0.0202	5014.000	95.4905
# 2	L	-0.1609	0.0242	4992.000	95.0710
Mean	L	-0.1829	0.0222	5003.000	95.2808
SD		0.0311	0.0029	15.556	0.2966
%RSD		17.0288	12.8995	0.311	0.3113

Checking interference check standard ...
Identity 1 : ICSAB Identity 2 :

Report name	Low limit	Value	High limit	
K_766	0.000	-0.183	0.000	Failed
Na589	0.000	0.022	0.000	Failed

BACKGROUND CORRECTED INTENSITIES
Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 3:14:14 PM August 17, 2005

# 1	1961.0	17000.5	5298.5	5298.5
# 2	1958.0	17001.5	5291.5	5291.5
lean	1959.5	17001.0	5295.0	5295.0

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;D	2.1	0.7	4.9	4.9
;RSD	0.1	0.0	0.1	0.1

\PPARENT CONCENTRATIONS
:dentity 1 : CLP_CCV_SC Identity 2 : Type : CV
/eight : 1.0000 Volume : 1.00 Printed : 3:14:14 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	19.6939	29.7432	5298.500 H	100.9152
# 2	19.6897	29.7843	5291.500 H	100.7818
lean	19.6918	29.7638	5295.000 H	100.8485
3D	0.0030	0.0291	4.950	0.0944
:RSD	0.0150	0.0978	0.093	0.0936

:hecking calibration verification ...
[dentity 1 : CLP_CCV_SC Identity 2 :

Report name	Low limit	Value	High limit
(_766	18.000	19.692	22.000
Na589	27.000	29.764	33.000

3ACKGROUND CORRECTED INTENSITIES
[dentity 1 : Calibration blank Identity 2 : Type : CB
Veight : 1.0000 Volume : 1.00 Printed : 3:18:08 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	20.0	23.5	5290.0	5290.0
# 2	20.0	30.5	5243.0	5243.0
lean	20.0	27.0	5266.5	5266.5
3D	0.0	4.9	33.2	33.2
(RSD	0.0	18.3	0.6	0.6

\PPARENT CONCENTRATIONS
[dentity 1 : Calibration blank Identity 2 : Type : CB
Veight : 1.0000 Volume : 1.00 Printed : 3:18:08 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1 L	-0.1460 L	-0.0136	5290.000 H	100.7532
# 2 L	-0.1441 L	-0.0008	5243.000	99.8570
lean L	-0.1450 L	-0.0072	5266.500 H	100.3051
3D	0.0013	0.0090	33.234	0.6337
(RSD	0.8949	125.5478	0.631	0.6318

:hecking calibration blank ...
Identity 1 : Calibration blank Identity 2 :

Report name	CRDL	Value	
K_766	0.100	-0.145	Contaminated
Na589	0.050	-0.007	
3c361	0.000	100.305	

3ACKGROUND CORRECTED INTENSITIES
Identity 1 : pbw-H17H1 Identity 2 : Type : SAMPLE
Veight : 1.0000 Volume : 1.00 Printed : 3:21:00 PM August 17, 2005

	K_766	Na589	Sc	Sc361

# 2	11.0	42.5	5311.5	5311.5
ean	12.5	35.5	5330.5	5330.5
D	2.1	9.9	26.9	26.9

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RSD	17.0	27.9	0.5	0.5

PPARENT CONCENTRATIONS
dentity 1 : pbw-H17H1 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 3:21:00 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1 L	-0.2090 L	-0.0054	5349.500 H	101.8877
# 2 L	-0.2386	0.0195	5311.500 H	101.1631
ean L	-0.2238	0.0071	5330.500 H	101.5254
D	0.0209	0.0176	26.870	0.5123
RSD	9.3462	248.6654	0.504	0.5046

ACKGROUND CORRECTED INTENSITIES
dentity 1 : lcsw-H17H1 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 3:22:44 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	1892.5	11053.5	5367.0	5367.0
# 2	1883.5	11080.5	5379.0	5379.0
ean	1888.0	11067.0	5373.0	5373.0
D	6.4	19.1	8.5	8.5
RSD	0.3	0.2	0.2	0.2

PPARENT CONCENTRATIONS
dentity 1 : lcsw-H17H1 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 3:22:44 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	18.7468	19.0722	5367.000 H	102.2214
# 2	18.6136	19.0761	5379.000 H	102.4502
ean	18.6802	19.0741	5373.000 H	102.3358
D	0.0942	0.0028	8.485	0.1618
RSD	0.5043	0.0146	0.158	0.1581

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265477 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 3:26:06 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	36.0	3180.5	5374.0	5374.0
# 2	46.0	3132.5	5347.0	5347.0
ean	41.0	3156.5	5360.5	5360.5
D	7.1	33.9	19.1	19.1
RSD	17.2	1.1	0.4	0.4

PPARENT CONCENTRATIONS
dentity 1 : 265477 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 3:26:06 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	[illegible]	[illegible]	[illegible]	[illegible]

lean	0.0637	5.4137	5360.500 H	102.0974
SD	0.0729	0.0393	19.092	0.3640
RSD	114.5480	0.7264	0.356	0.3566

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BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265478 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 3:28:46 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	33.0	2799.5	5391.5	5391.5
# 2	20.0	2835.5	5381.5	5381.5
lean	26.5	2817.5	5386.5	5386.5
SD	9.2	25.5	7.1	7.1
RSD	34.7	0.9	0.1	0.1

APPARENT CONCENTRATIONS
Identity 1 : 265478 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 3:28:46 PM August 17, 2005

		K_766	Na589	Sc	Sc361
		ppm	ppm		ppm
# 1	L	-0.0192	4.7674	5391.500 H	102.6885
# 2	L	-0.1494	4.8385	5381.500 H	102.4979
lean	L	-0.0843	4.8030	5386.500 H	102.5932
SD		0.0921	0.0503	7.071	0.1348
RSD		109.1922	1.0466	0.131	0.1314

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265478d Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 3:30:30 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	24.0	2767.0	5464.0	5464.0
# 2	29.0	2789.0	5463.0	5463.0
Mean	26.5	2778.0	5463.5	5463.5
SD	3.5	15.6	0.7	0.7
%RSD	13.3	0.6	0.0	0.0

APPARENT CONCENTRATIONS
Identity 1 : 265478d Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 3:30:30 PM August 17, 2005

		K_766	Na589	Sc	Sc361
		ppm	ppm		ppm
# 1	L	-0.1128	4.6482	5464.000 H	104.0709
# 2	L	-0.0632	4.6864	5463.000 H	104.0519
Mean	L	-0.0880	4.6673	5463.500 H	104.0614
SD		0.0351	0.0271	0.707	0.0135
%RSD		39.8574	0.5797	0.013	0.0130

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265478s Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 3:32:12 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	1928.0	13913.5	5407.0	5407.0
# 2	1907.0	13870.5	5377.0	5377.0

D	14.8	30.4	21.2	21.2
RSD	0.8	0.2	0.4	0.4

PPARENT CONCENTRATIONS
VOLUTION by Micro-Active Australia Pty Ltd 3:40:28 PM August 17, 2005

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dentity 1 : 265478s Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 3:32:12 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	18.9612	23.8430	5407.000 H	102.9841
# 2	18.8574	23.9021	5377.000 H	102.4121
ean	18.9093	23.8725	5392.000 H	102.6981
D	0.0734	0.0418	21.213	0.4045
RSD	0.3881	0.1750	0.393	0.3939

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265479 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 3:34:50 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	25.0	2819.0	5448.0	5448.0
# 2	25.0	2778.0	5425.0	5425.0
ean	25.0	2798.5	5436.5	5436.5
D	0.0	29.0	16.3	16.3
RSD	0.0	1.0	0.3	0.3

PPARENT CONCENTRATIONS
dentity 1 : 265479 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 3:34:50 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1 L	-0.1022	4.7506	5448.000 H	103.7658
# 2 L	-0.1011	4.7008	5425.000 H	103.3273
ean L	-0.1017	4.7257	5436.500 H	103.5466
D	0.0007	0.0352	16.263	0.3101
RSD	0.7329	0.7454	0.299	0.2995

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265480 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 3:37:28 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	33.5	3816.0	5462.0	5462.0
# 2	35.5	3811.0	5407.0	5407.0
ean	34.5	3813.5	5434.5	5434.5
D	1.4	3.5	38.9	38.9
RSD	4.1	0.1	0.7	0.7

PPARENT CONCENTRATIONS
dentity 1 : 265480 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 3:37:28 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1 L	-0.0185	6.4335	5462.000 H	104.0328
# 2	0.0049	6.4909	5407.000 H	102.9841
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

%RSD	242.3047	0.6282	0.716	0.7164

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265481 Identity 2 : Type : SAMPLE
EVOLUTION by Micro-Active Australia Pty Ltd 3:45:58 PM August 17, 2005

Weight : 1.0000 Volume : 1.00 Printed : 3:40:06 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	57.5	323.0	5442.5	5442.5
# 2	67.5	327.0	5446.5	5446.5
Mean	62.5	325.0	5444.5	5444.5
SD	7.1	2.8	2.8	2.8
%RSD	11.3	0.9	0.1	0.1

APPARENT CONCENTRATIONS
Identity 1 : 265481 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 3:40:06 PM August 17, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	0.2215	0.4963	5442.500 H	103.6610
# 2	0.3205	0.5027	5446.500 H	103.7372
Mean	0.2710	0.4995	5444.500 H	103.6991
SD	0.0700	0.0045	2.828	0.0539
%RSD	25.8374	0.9082	0.052	0.0520

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265482 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 3:42:44 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	63.5	299.0	5376.0	5376.0
# 2	63.5	309.0	5398.0	5398.0
Mean	63.5	304.0	5387.0	5387.0
SD	0.0	7.1	15.6	15.6
%RSD	0.0	2.3	0.3	0.3

APPARENT CONCENTRATIONS
Identity 1 : 265482 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 3:42:44 PM August 17, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	0.2890	0.4617	5376.000 H	102.3930
# 2	0.2864	0.4768	5398.000 H	102.8125
Mean	0.2877	0.4692	5387.000 H	102.6027
SD	0.0018	0.0107	15.556	0.2966
%RSD	0.6408	2.2754	0.289	0.2891

BACKGROUND CORRECTED INTENSITIES
Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 3:45:36 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	1945.0	16878.5	5262.0	5262.0
# 2	1935.0	16743.5	5202.0	5202.0
Mean	1940.0	16811.0	5232.0	5232.0
SD	7.1	95.5	42.4	42.4
%RSD	0.4	0.6	0.8	0.8

PPARENT CONCENTRATIONS
dentity 1 : CLP_CCV_SC Identity 2 : Type : CV
eight : 1.0000 Volume : 1.00 Printed : 3:45:36 PM August 17, 2005

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	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	19.6683	29.7345	5262.000 H	100.2193
# 2	19.7951	29.8371	5202.000	99.0752
ean	19.7317	29.7858	5232.000	99.6472
D	0.0897	0.0725	42.426	0.8090
RSD	0.4544	0.2435	0.811	0.8118

hecking calibration verification ...
dentity 1 : CLP_CCV_SC Identity 2 :

eport name	Low limit	Value	High limit
_766	18.000	19.732	22.000
a589	27.000	29.786	33.000

ACKGROUND CORRECTED INTENSITIES
dentity 1 : Calibration blank Identity 2 : Type : CB
eight : 1.0000 Volume : 1.00 Printed : 3:49:28 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	31.0	47.0	5263.0	5263.0
# 2	21.0	44.0	5231.0	5231.0
ean	26.0	45.5	5247.0	5247.0
D	7.1	2.1	22.6	22.6
RSD	27.2	4.7	0.4	0.4

PPARENT CONCENTRATIONS
dentity 1 : Calibration blank Identity 2 : Type : CB
eight : 1.0000 Volume : 1.00 Printed : 3:49:28 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1 L	-0.0317	0.0281	5263.000 H	100.2383
# 2 L	-0.1333	0.0233	5231.000	99.6282
ean L	-0.0825	0.0257	5247.000	99.9333
D	0.0718	0.0034	22.627	0.4315
RSD	87.0710	13.2616	0.431	0.4317

hecking calibration blank ...
dentity 1 : Calibration blank Identity 2 :

eport name	CRDL	Value
_766	0.100	-0.082
a589	0.050	0.026
c361	0.000	99.933

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265483 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 3:52:22 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	47.0	2230.0	5429.0	5429.0
# 2	31.0	2206.0	5416.0	5416.0
ean	39.0	2218.0	5422.5	5422.5
D	11.3	17.0	9.2	9.2
RSD	29.0	0.8	0.2	0.2

dentity 1 : 265483 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 3:52:22 PM August 17, 2005

	K_766	Na589	Sc	Sc361
VOLUTION by Micro-Active Australia Pty Ltd				4:00:28 PM August 17, 2005
	ppm	ppm		ppm
# 1	0.1182	3.7599	5429.000 H	103.4036
# 2 L	-0.0407	3.7279	5416.000 H	103.1557
ean	0.0387	3.7439	5422.500 H	103.2796
D	0.1123	0.0226	9.192	0.1753
RSD	290.1361	0.6043	0.170	0.1697

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265484 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 3:54:58 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	29.5	2257.5	5503.0	5503.0
# 2	28.5	2210.5	5465.0	5465.0
ean	29.0	2234.0	5484.0	5484.0
D	0.7	33.2	26.9	26.9
RSD	2.4	1.5	0.5	0.5

PPARENT CONCENTRATIONS
dentity 1 : 265484 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 3:54:58 PM August 17, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1 L	-0.0604	3.7550	5503.000 H	104.8146
# 2 L	-0.0683	3.7016	5465.000 H	104.0900
ean L	-0.0643	3.7283	5484.000 H	104.4523
D	0.0056	0.0377	26.870	0.5123
RSD	8.6747	1.0124	0.490	0.4905

ACKGROUND CORRECTED INTENSITIES
dentity 1 : 265485 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 3:57:40 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	50.0	2323.5	5484.0	5484.0
# 2	41.0	2278.5	5439.0	5439.0
ean	45.5	2301.0	5461.5	5461.5
D	6.4	31.8	31.8	31.8
RSD	14.0	1.4	0.6	0.6

PPARENT CONCENTRATIONS
dentity 1 : 265485 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 3:57:40 PM August 17, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	0.1431	3.8800	5484.000 H	104.4523
# 2	0.0575	3.8357	5439.000 H	103.5942
ean	0.1003	3.8578	5461.500 H	104.0233
D	0.0605	0.0313	31.820	0.6067
RSD	60.2910	0.8117	0.583	0.5833

ACKGROUND CORRECTED INTENSITIES

Weight : 1.0000 Volume : 1.00 Printed : 4:00:18 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	59.5	2277.5	5388.0	5388.0

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# 2	54.5	2234.5	5334.0	5334.0
Mean	57.0	2256.0	5361.0	5361.0
SD	3.5	30.4	38.2	38.2
%RSD	6.2	1.3	0.7	0.7

APPARENT CONCENTRATIONS
Identity 1 : 265486 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:00:18 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.2474	3.8708	5388.000 H	102.6218
# 2	0.2027	3.8357	5334.000 H	101.5921
Mean	0.2250	3.8532	5361.000 H	102.1070
SD	0.0316	0.0248	38.184	0.7281
%RSD	14.0510	0.6446	0.712	0.7130

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265487 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:02:56 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	33.0	2269.0	5420.0	5420.0
# 2	37.0	2254.0	5375.0	5375.0
Mean	35.0	2261.5	5397.5	5397.5
SD	2.8	10.6	31.8	31.8
%RSD	8.1	0.5	0.6	0.6

APPARENT CONCENTRATIONS
Identity 1 : 265487 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:02:56 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1 L	-0.0210	3.8331	5420.000 H	103.2320
# 2	0.0221	3.8397	5375.000 H	102.3739
Mean	0.0006	3.8364	5397.500 H	102.8029
SD	0.0305	0.0047	31.820	0.6067
%RSD	5320.8567	0.1222	0.590	0.5902

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265488 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:05:34 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	24.5	2885.0	5414.5	5414.5
# 2	28.5	2853.0	5356.5	5356.5
Mean	26.5	2869.0	5385.5	5385.5
SD	2.8	22.6	41.0	41.0
%RSD	10.7	0.8	0.8	0.8

APPARENT CONCENTRATIONS
Identity 1 : 265488 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:05:34 PM August 17, 2005

		K_766 ppm	Na589 ppm	Sc		Sc361 ppm
# 1	L	-0.1056	4.8936	5414.500	H	103.1271
# 2	L	-0.0626	4.8917	5356.500	H	102.0212

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lean	L	-0.0841	4.8926	5385.500	H	102.5741
SD		0.0305	0.0013	41.012		0.7820
:RSD		36.2363	0.0275	0.762		0.7624

ACKGROUND CORRECTED INTENSITIES
:dentity 1 : 265489 Identity 2 : Type : SAMPLE
leight : 1.0000 Volume : 1.00 Printed : 4:08:12 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	45.5	2292.5	5396.0	5396.0
# 2	46.5	2209.5	5347.0	5347.0
lean	46.0	2251.0	5371.5	5371.5
SD	0.7	58.7	34.6	34.6
:RSD	1.5	2.6	0.6	0.6

PPARENT CONCENTRATIONS
:dentity 1 : 265489 Identity 2 : Type : SAMPLE
leight : 1.0000 Volume : 1.00 Printed : 4:08:12 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc		Sc361 ppm
# 1	0.1060	3.8908	5396.000	H	102.7743
# 2	0.1203	3.7828	5347.000	H	101.8400
lean	0.1131	3.8368	5371.500	H	102.3072
SD	0.0101	0.0764	34.648		0.6607
:RSD	8.9472	1.9905	0.645		0.6458

ACKGROUND CORRECTED INTENSITIES
:dentity 1 : CLP_CCV_SC Identity 2 : Type : CV
leight : 1.0000 Volume : 1.00 Printed : 4:11:04 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	1983.5	16981.0	5277.5	5277.5
# 2	1958.5	16859.0	5217.5	5217.5
ean	1971.0	16920.0	5247.5	5247.5
D	17.7	86.3	42.4	42.4
RSD	0.9	0.5	0.8	0.8

PPARENT CONCENTRATIONS
dentity 1 : CLP_CCV_SC Identity 2 : Type : CV
eight : 1.0000 Volume : 1.00 Printed : 4:11:04 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc		Sc361 ppm
# 1	20.0046	29.8274	5277.500	H	100.5148
# 2	19.9792	29.9539	5217.500		99.3708
ean	19.9919	29.8907	5247.500		99.9428
D	0.0180	0.0894	42.426		0.8090
RSD	0.0899	0.2992	0.809		0.8094

hecking calibration verification ...
dentity 1 : CLP_CCV_SC Identity 2 :
ement name Low limit Value High limit

a589 27.000 29.891 33.000

ACKGROUND CORRECTED INTENSITIES
dentity 1 : Calibration blank Identity 2 : Type : CB
eight : 1.0000 Volume : 1.00 Printed : 4:14:56 PM August 17, 2005
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	K_766	Na589	Sc	Sc361
# 1	21.0	50.5	5267.5	5267.5
# 2	18.0	54.5	5214.5	5214.5
ean	19.5	52.5	5241.0	5241.0
D	2.1	2.8	37.5	37.5
RSD	10.9	5.4	0.7	0.7

PPARENT CONCENTRATIONS
dentity 1 : Calibration blank Identity 2 : Type : CB
eight : 1.0000 Volume : 1.00 Printed : 4:14:56 PM August 17, 2005

		K_766 ppm	Na589 ppm	Sc		Sc361 ppm
# 1	L	-0.1348	0.0342	5267.500	H	100.3241
# 2	L	-0.1638	0.0422	5214.500		99.3136
ean	L	-0.1493	0.0382	5241.000		99.8189
D		0.0205	0.0057	37.477		0.7146
RSD		13.7200	14.8553	0.715		0.7159

hecking calibration blank ...
dentity 1 : Calibration blank Identity 2 :

eport name	CRDL	Value	
_766	0.100	-0.149	Contaminated
a589	0.050	0.038	
c361	0.000	99.819	

ACKGROUND CORRECTED INTENSITIES
dentity 1 : pbw-H17H2 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 4:17:48 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	12.5	21.5	5400.0	5400.0
# 2	2.5	35.5	5397.0	5397.0
ean	7.5	28.5	5398.5	5398.5
D	7.1	9.9	2.1	2.1
RSD	94.3	34.7	0.0	0.0

PPARENT CONCENTRATIONS
dentity 1 : pbw-H17H2 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 4:17:48 PM August 17, 2005

		K_766 ppm	Na589 ppm	Sc		Sc361 ppm
# 1	L	-0.2253	L -0.0179	5400.000	H	102.8506
# 2	L	-0.3256	0.0063	5397.000	H	102.7934
ean	L	-0.2755	L -0.0058	5398.500	H	102.8220
D		0.0709	0.0170	2.121		0.0404
RSD		25.7399	293.9224	0.039		0.0393

ACKGROUND CORRECTED INTENSITIES
dentity 1 : lcsw-H17H2 Identity 2 : Type : SAMPLE
eight : 1.0000 Volume : 1.00 Printed : 4:19:32 PM August 17, 2005

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# 2	1921.5	11188.5	5411.0	5411.0
lean	1931.0	11227.0	5426.5	5426.5
SD	13.4	54.4	21.9	21.9

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RSD	0.7	0.5	0.4	0.4

APPARENT CONCENTRATIONS
Identity 1 : lcsw-H17H2 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:19:32 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	18.9613	19.1703	5442.000 H	103.6514
# 2	18.8818	19.1483	5411.000 H	103.0603
lean	18.9216	19.1593	5426.500 H	103.3559
SD	0.0562	0.0156	21.920	0.4180
RSD	0.2972	0.0813	0.404	0.4044

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265490 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:22:54 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	51.5	2282.0	5391.0	5391.0
# 2	46.5	2256.0	5382.0	5382.0
lean	49.0	2269.0	5386.5	5386.5
SD	3.5	18.4	6.4	6.4
RSD	7.2	0.8	0.1	0.1

APPARENT CONCENTRATIONS
Identity 1 : 265490 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:22:54 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.1667	3.8764	5391.000 H	102.6790
# 2	0.1172	3.8381	5382.000 H	102.5074
lean	0.1419	3.8572	5386.500 H	102.5932
SD	0.0350	0.0271	6.364	0.1213
RSD	24.6340	0.7020	0.118	0.1183

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265491 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:25:32 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	30.0	2272.5	5338.5	5338.5
# 2	39.0	2270.5	5347.5	5347.5
lean	34.5	2271.5	5343.0	5343.0
SD	6.4	1.4	6.4	6.4
RSD	18.4	0.1	0.1	0.1

APPARENT CONCENTRATIONS
Identity 1 : 265491 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:25:32 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	-0.0464	3.8985	5338.500 H	101.6779

Mean L	-0.0010	3.8934	5343.000 H	101.7638
SD	0.0641	0.0072	6.364	0.1213
%RSD	6153.2820	0.1839	0.119	0.1192

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BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265491d Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:27:18 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	37.0	2278.5	5462.5	5462.5
# 2	41.0	2293.5	5466.5	5466.5
Mean	39.0	2286.0	5464.5	5464.5
SD	2.8	10.6	2.8	2.8
%RSD	7.3	0.5	0.1	0.1

APPARENT CONCENTRATIONS
Identity 1 : 265491d Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:27:18 PM August 17, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	0.0161	3.8190	5462.500 H	104.0423
# 2	0.0555	3.8416	5466.500 H	104.1186
Mean	0.0358	3.8303	5464.500 H	104.0805
SD	0.0278	0.0160	2.828	0.0539
%RSD	77.7153	0.4181	0.052	0.0518

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265491s Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:29:02 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	1914.0	13298.5	5393.0	5393.0
# 2	1930.0	13366.5	5434.0	5434.0
Mean	1922.0	13332.5	5413.5	5413.5
SD	11.3	48.1	29.0	29.0
%RSD	0.6	0.4	0.5	0.5

APPARENT CONCENTRATIONS
Identity 1 : 265491s Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:29:02 PM August 17, 2005

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	18.8707	22.8460	5393.000 H	102.7171
# 2	18.8851	22.7894	5434.000 H	103.4989
Mean	18.8779	22.8177	5413.500 H	103.1080
SD	0.0102	0.0400	28.991	0.5528
%RSD	0.0541	0.1753	0.536	0.5361

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265492 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:31:38 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	48.5	2263.5	5327.0	5327.0
# 2	28.5	2297.5	5380.0	5380.0

SD	14.1	24.0	37.5	37.5
%RSD	36.7	1.1	0.7	0.7

APPARENT CONCENTRATIONS
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Identity 1 : 265492 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:31:38 PM August 17, 2005

		K_766 ppm	Na589 ppm	Sc		Sc361 ppm
# 1		0.1424	3.8913	5327.000	H	101.4587
# 2	L	-0.0638	3.9112	5380.000	H	102.4693
Mean		0.0393	3.9012	5353.500	H	101.9640
SD		0.1458	0.0140	37.477		0.7146
%RSD		371.1124	0.3592	0.700		0.7008

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265493 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:34:16 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	22.5	2284.0	5491.0	5491.0
# 2	37.5	2263.0	5448.0	5448.0
Mean	30.0	2273.5	5469.5	5469.5
SD	10.6	14.8	30.4	30.4
%RSD	35.4	0.7	0.6	0.6

APPARENT CONCENTRATIONS
Identity 1 : 265493 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:34:16 PM August 17, 2005

		K_766 ppm	Na589 ppm	Sc		Sc361 ppm
# 1	L	-0.1288	3.8082	5491.000	H	104.5858
# 2		0.0221	3.8028	5448.000	H	103.7658
Mean	L	-0.0534	3.8055	5469.500	H	104.1758
SD		0.1067	0.0038	30.406		0.5798
%RSD		199.9468	0.0986	0.556		0.5565

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265494 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:36:54 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	52.0	2296.0	5321.0	5321.0
# 2	46.0	2253.0	5297.0	5297.0
Mean	49.0	2274.5	5309.0	5309.0
SD	4.2	30.4	17.0	17.0
%RSD	8.7	1.3	0.3	0.3

APPARENT CONCENTRATIONS
Identity 1 : 265494 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:36:54 PM August 17, 2005

		K_766 ppm	Na589 ppm	Sc		Sc361 ppm
# 1		0.1786	3.9525	5321.000	H	101.3443
# 2		0.1196	3.8953	5297.000	H	100.8866
Mean		0.1491	3.9239	5309.000	H	101.1155

%RSD	27.9585	1.0314	0.320	0.3200

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265495 Identity 2 : Type : SAMPLE
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Weight : 1.0000 Volume : 1.00 Printed : 4:39:32 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	30.0	3233.5	5280.0	5280.0
# 2	26.0	3230.5	5295.0	5295.0
Mean	28.0	3232.0	5287.5	5287.5
SD	2.8	2.1	10.6	10.6
%RSD	10.1	0.1	0.2	0.2

APPARENT CONCENTRATIONS
Identity 1 : 265495 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:39:32 PM August 17, 2005

		K_766 ppm	Na589 ppm	Sc		Sc361 ppm
# 1	L	-0.0430	5.6326	5280.000	H	100.5625
# 2	L	-0.0848	5.6112	5295.000	H	100.8485
Mean	L	-0.0639	5.6219	5287.500	H	100.7055
SD		0.0295	0.0151	10.607		0.2022
%RSD		46.2520	0.2688	0.201		0.2008

BACKGROUND CORRECTED INTENSITIES
Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 4:42:24 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	1950.0	17007.0	5251.5	5251.5
# 2	1944.0	16869.0	5189.5	5189.5
Mean	1947.0	16938.0	5220.5	5220.5
SD	4.2	97.6	43.8	43.8
%RSD	0.2	0.6	0.8	0.8

APPARENT CONCENTRATIONS
Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 4:42:24 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc		Sc361 ppm
# 1	19.7599	30.0213	5251.500	H	100.0191
# 2	19.9375	30.1337	5189.500		98.8369
Mean	19.8487	30.0775	5220.500		99.4280
SD	0.1256	0.0795	43.841		0.8359
%RSD	0.6329	0.2642	0.840		0.8407

Checking calibration verification ...
Identity 1 : CLP_CCV_SC Identity 2 :

Report name	Low limit	Value	High limit
K_766	18.000	19.849	22.000
Na589	27.000	30.078	33.000

BACKGROUND CORRECTED INTENSITIES
Identity 1 : Calibration blank Identity 2 : Type : CB
Weight : 1.0000 Volume : 1.00 Printed : 4:46:16 PM August 17, 2005

# 2	10.5	50.5	5201.5	5201.5
Mean	12.0	48.0	5215.0	5215.0
SD	2.1	3.5	19.1	19.1

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%RSD	17.7	7.4	0.4	0.4

APPARENT CONCENTRATIONS
Identity 1 : Calibration blank Identity 2 : Type : CB
Weight : 1.0000 Volume : 1.00 Printed : 4:46:16 PM August 17, 2005

		K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	L	-0.2109	0.0260	5228.500	99.5805
# 2	L	-0.2414	0.0353	5201.500	99.0657
Mean	L	-0.2261	0.0307	5215.000	99.3231
SD		0.0216	0.0066	19.092	0.3640
%RSD		9.5408	21.5567	0.366	0.3665

Checking calibration blank ...
Identity 1 : Calibration blank Identity 2 :

Report name	CRDL	Value	
K_766	0.100	-0.226	Contaminated
Na589	0.050	0.031	
Sc361	0.000	99.323	

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265496 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:49:10 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	36.0	2935.0	5408.0	5408.0
# 2	36.0	2863.0	5380.0	5380.0
Mean	36.0	2899.0	5394.0	5394.0
SD	0.0	50.9	19.8	19.8
%RSD	0.0	1.8	0.4	0.4

APPARENT CONCENTRATIONS
Identity 1 : 265496 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:49:10 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.0098	4.9854	5408.000 H	103.0031
# 2	0.0117	4.8873	5380.000 H	102.4693
Mean	0.0108	4.9364	5394.000 H	102.7362
SD	0.0013	0.0693	19.799	0.3775
%RSD	12.3381	1.4046	0.367	0.3675

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265497 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:51:46 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	26.0	2890.5	5350.0	5350.0
# 2	27.0	2895.5	5347.0	5347.0
Mean	26.5	2893.0	5348.5	5348.5
SD	0.7	3.5	2.1	2.1
%RSD	2.7	0.1	0.0	0.0

Identity 1 : 265497 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:51:46 PM August 17, 2005

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		K_766	Na589	Sc		Sc361
EVOLUTION by Micro-Active Australia Pty Ltd						4:59:58 PM August 17, 2005
		ppm	ppm			ppm
# 1	L	-0.0875	4.9628	5350.000	H	101.8972
# 2	L	-0.0772	4.9743	5347.000	H	101.8400
Mean	L	-0.0824	4.9685	5348.500	H	101.8686
SD		0.0073	0.0081	2.121		0.0404
%RSD		8.8219	0.1637	0.040		0.0397

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265498 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:54:24 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	14.0	2894.0	5295.5	5295.5
# 2	22.0	2906.0	5277.5	5277.5
Mean	18.0	2900.0	5286.5	5286.5
SD	5.7	8.5	12.7	12.7
%RSD	31.4	0.3	0.2	0.2

APPARENT CONCENTRATIONS
Identity 1 : 265498 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:54:26 PM August 17, 2005

		K_766	Na589	Sc		Sc361
		ppm	ppm			ppm
# 1	L	-0.2075	5.0206	5295.500	H	100.8580
# 2	L	-0.1249	5.0590	5277.500	H	100.5148
Mean	L	-0.1662	5.0398	5286.500	H	100.6864
SD		0.0584	0.0272	12.728		0.2427
%RSD		35.1295	0.5392	0.241		0.2410

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265499 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:57:04 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	26.0	2903.5	5345.5	5345.5
# 2	40.0	2852.5	5272.5	5272.5
Mean	33.0	2878.0	5309.0	5309.0
SD	9.9	36.1	51.6	51.6
%RSD	30.0	1.3	1.0	1.0

APPARENT CONCENTRATIONS
Identity 1 : 265499 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:57:04 PM August 17, 2005

		K_766	Na589	Sc		Sc361
		ppm	ppm			ppm
# 1	L	-0.0873	4.9896	5345.500	H	101.8114
# 2		0.0602	4.9696	5272.500	H	100.4195
Mean	L	-0.0136	4.9796	5309.000	H	101.1155
SD		0.1043	0.0141	51.619		0.9842
%RSD		768.9849	0.2839	0.972		0.9734

BACKGROUND CORRECTED INTENSITIES

Weight : 1.0000 Volume : 1.00 Printed : 4:59:46 PM August 17, 2005

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	K_766	Na589	Sc	Sc361
# 1	30.5	2890.0	5390.0	5390.0

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# 2	30.5	2863.0	5323.0	5323.0
Mean	30.5	2876.5	5356.5	5356.5
SD	0.0	19.1	47.4	47.4
%RSD	0.0	0.7	0.9	0.9

APPARENT CONCENTRATIONS
Identity 1 : 265500 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:59:46 PM August 17, 2005

		K_766 ppm	Na589 ppm	Sc		Sc361 ppm
# 1	L	-0.0442	4.9247	5390.000	H	102.6599
# 2	L	-0.0404	4.9403	5323.000	H	101.3824
Mean	L	-0.0423	4.9325	5356.500	H	102.0212
SD		0.0027	0.0110	47.376		0.9033
%RSD		6.4458	0.2232	0.884		0.8855

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265501 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:02:24 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	30.0	2897.5	5485.0	5485.0
# 2	33.0	2822.5	5485.0	5485.0
Mean	31.5	2860.0	5485.0	5485.0
SD	2.1	53.0	0.0	0.0
%RSD	6.7	1.9	0.0	0.0

APPARENT CONCENTRATIONS
Identity 1 : 265501 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:02:24 PM August 17, 2005

		K_766 ppm	Na589 ppm	Sc		Sc361 ppm
# 1	L	-0.0545	4.8511	5485.000	H	104.4714
# 2	L	-0.0249	4.7242	5485.000	H	104.4714
Mean	L	-0.0397	4.7876	5485.000	H	104.4714
SD		0.0209	0.0898	0.000		0.0000
%RSD		52.7886	1.8755	0.000		0.0000

BACKGROUND CORRECTED INTENSITIES
Identity 1 : 265502 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:05:02 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	28.0	2823.0	5457.5	5457.5
# 2	28.0	2797.0	5445.5	5445.5
Mean	28.0	2810.0	5451.5	5451.5
SD	0.0	18.4	8.5	8.5
%RSD	0.0	0.7	0.2	0.2

APPARENT CONCENTRATIONS
Identity 1 : 265502 Identity 2 : Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:05:02 PM August 17, 2005

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	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1 L	-0.0728	4.7491	5457.500 H	103.9470
# 2 L	-0.0722	4.7153	5445.500 H	103.7182

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Mean L	-0.0725	4.7322	5451.500 H	103.8326
SD	0.0004	0.0239	3.485	0.1618
%RSD	0.5969	0.5044	0.156	0.1558

BACKGROUND CORRECTED INTENSITIES
Identity 1 : Calibration blank Identity 2 : Type : CB
Weight : 1.0000 Volume : 1.00 Printed : 5:07:54 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	20.5	16.0	5288.5	5288.5
# 2	7.5	24.0	5232.5	5232.5
Mean	14.0	20.0	5260.5	5260.5
SD	9.2	5.7	39.6	39.6
%RSD	65.7	28.3	0.8	0.8

APPARENT CONCENTRATIONS
Identity 1 : Calibration blank Identity 2 : Type : CB
Weight : 1.0000 Volume : 1.00 Printed : 5:07:54 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1 L	-0.1408 L	-0.0267	5288.500 H	100.7246
# 2 L	-0.2731 L	-0.0122	5232.500	99.6568
Mean L	-0.2069 L	-0.0195	5260.500 H	100.1907
SD	0.0936	0.0103	39.598	0.7550
%RSD	45.2126	52.6182	0.753	0.7536

Checking calibration blank ...
Identity 1 : Calibration blank Identity 2 :

Report name	CRDL	Value	
K_766	0.100	-0.207	Contaminated
Na589	0.050	-0.019	
Sc361	0.000	100.191	

BACKGROUND CORRECTED INTENSITIES
Identity 1 : CRI Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 5:10:46 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	27.5	37.5	5214.0	5214.0
# 2	21.5	37.5	5204.0	5204.0
Mean	24.5	37.5	5209.0	5209.0
SD	4.2	0.0	7.1	7.1
%RSD	17.3	0.0	0.1	0.1

APPARENT CONCENTRATIONS
Identity 1 : CRI Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 5:10:46 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1 L	-0.0651	0.0120	5214.000	99.3040
# 2 L	-0.1270	0.0121	5204.000	99.1134

%RSD	45.5851	0.7547	0.136	0.1359

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Checking calibration verification ...
EVOLUTION by Micro-Active Australia Pty Ltd 5:20:38 PM August 17, 2005

Identity 1 : CRI Identity 2 :

Report name	Low limit	Value	High limit	
K_766	0.900	-0.096	1.100	Failed
Na589	0.900	0.012	1.100	Failed

BACKGROUND CORRECTED INTENSITIES
Identity 1 : ICSA Identity 2 : Type : INTRF
Weight : 1.0000 Volume : 1.00 Printed : 5:13:38 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	20.0	44.5	4992.0	4992.0
# 2	15.0	48.5	4943.0	4943.0
Mean	17.5	46.5	4967.5	4967.5
SD	3.5	2.8	34.6	34.6
%RSD	20.2	6.1	0.7	0.7

APPARENT CONCENTRATIONS
Identity 1 : ICSA Identity 2 : Type : INTRF
Weight : 1.0000 Volume : 1.00 Printed : 5:13:38 PM August 17, 2005

		K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	L	-0.1337	0.0280	4992.000	95.0710
# 2	L	-0.1864	0.0363	4943.000	94.1367
Mean	L	-0.1600	0.0321	4967.500	94.6039
SD		0.0372	0.0059	34.648	0.6607
%RSD		23.2542	18.3498	0.697	0.6983

BACKGROUND CORRECTED INTENSITIES
Identity 1 : ICSAB Identity 2 : Type : ICSAB
Weight : 1.0000 Volume : 1.00 Printed : 5:16:30 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	6.5	19.5	4998.0	4998.0
# 2	8.5	32.5	4970.0	4970.0
Mean	7.5	26.0	4984.0	4984.0
SD	1.4	9.2	19.8	19.8
%RSD	18.9	35.4	0.4	0.4

APPARENT CONCENTRATIONS
Identity 1 : ICSAB Identity 2 : Type : ICSAB
Weight : 1.0000 Volume : 1.00 Printed : 5:16:32 PM August 17, 2005

		K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	L	-0.2803 L	-0.0186	4998.000	95.1854
# 2	L	-0.2581	0.0059	4970.000	94.6515
Mean	L	-0.2692 L	-0.0064	4984.000	94.9185
SD		0.0157	0.0173	19.799	0.3775
%RSD		5.8294	272.7572	0.397	0.3977

Checking interference check standard ...
Identity 1 : ICSAB Identity 2 :

Report name	Low limit	Value	High limit	
K_766	0.000	-0.269	0.000	Failed

BACKGROUND CORRECTED INTENSITIES
Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 5:20:26 PM August 17, 2005

EVOLUTION by Micro-Active Australia Pty Ltd 5:31:00 PM August 17, 2005

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	K_766	Na589	Sc	Sc361
# 1	1959.0	17156.5	5270.5	5270.5
# 2	1939.0	16795.5	5150.5	5150.5
Mean	1949.0	16976.0	5210.5	5210.5
SD	14.1	255.3	84.9	84.9
%RSD	0.7	1.5	1.6	1.6

APPARENT CONCENTRATIONS
Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 5:20:26 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	19.7799	30.1764	5270.500 H	100.3814
# 2	20.0386	30.2298	5150.500	98.0932
Mean	19.9092	30.2031	5210.500	99.2373
SD	0.1829	0.0378	84.853	1.6179
%RSD	0.9188	0.1251	1.628	1.6304

Checking calibration verification ...
Identity 1 : CLP_CCV_SC Identity 2 :

Report name	Low limit	Value	High limit
K_766	18.000	19.909	22.000
Na589	27.000	30.203	33.000

BACKGROUND CORRECTED INTENSITIES
Identity 1 : Calibration blank Identity 2 : Type : CB
Weight : 1.0000 Volume : 1.00 Printed : 5:24:20 PM August 17, 2005

	K_766	Na589	Sc	Sc361
# 1	12.0	25.0	5255.5	5255.5
# 2	18.0	37.0	5197.5	5197.5
Mean	15.0	31.0	5226.5	5226.5
SD	4.2	8.5	41.0	41.0
%RSD	28.3	27.4	0.8	0.8

APPARENT CONCENTRATIONS
Identity 1 : Calibration blank Identity 2 : Type : CB
Weight : 1.0000 Volume : 1.00 Printed : 5:24:20 PM August 17, 2005

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1 L	-0.2270 L	-0.0107	5255.500 H	100.0953
# 2 L	-0.1631	0.0113	5197.500	98.9894
Mean L	-0.1951	0.0003	5226.500	99.5424
SD	0.0452	0.0155	41.012	0.7820
%RSD	23.1602	4961.0110	0.785	0.7856

Checking calibration blank ...
Identity 1 : Calibration blank Identity 2 :

Report name	CRDL	Value	
K_766	0.100	-0.195	Contaminated
Na589	0.050	0.000	
Sc361	0.000	99.542	

Div. 20
TO#050722-11
Project No. 06002.01.242
Prep. Pages 61-104/105

8-19-05

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	mg/L	sigwt	Dilution	Calc RL	ug/ml	Date	Time
pbw-H17H1	Al3082	0.500	U		mg/L	0.5				0.025	-0.1504	-0.15	1	0.5	-0.00752	08/17/05	15:16
pbw-H17H1	Ca3179	0.500	U		mg/L	0.5				0.025	0.1182	0.118	1	0.5	0.00591	08/17/05	15:16
pbw-H17H1	Mg2790	0.500	U		mg/L	0.5				0.025	0.0012	0.0012	1	0.5	0.00006	08/17/05	15:16
pbw-H17H1	Mn2576	0.0500	U		mg/L	0.05				0.003	0.0008	0.0008	1	0.05	0.00004	08/17/05	15:16
pbw-H17H1	Si2881	0.500	U		mg/L	0.5				0.025	-0.01	-0.01	1	0.5	-0.0005	08/17/05	15:16
pbw-H17H1	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0004	0.0004	1	0.05	0.00002	08/17/05	15:16
lcsw-H17H1	Al3082	38.5			mg/L	0.5		96.3%	40	0.025	38.4896	38.5	1	0.5	1.92448	08/17/05	15:21
lcsw-H17H1	Ca3179	395			mg/L	0.5		98.8%	400	0.025	395.0218	395	1	0.5	19.75109	08/17/05	15:21
lcsw-H17H1	Mg2790	392			mg/L	0.5		98.0%	400	0.025	391.5696	392	1	0.5	19.57848	08/17/05	15:21
lcsw-H17H1	Mn2576	9.78			mg/L	0.05		97.8%	10	0.003	9.7832	9.78	1	0.05	0.48916	08/17/05	15:21
lcsw-H17H1	Si2881	79.4			mg/L	0.5		99.3%	80	0.025	79.4458	79.4	1	0.5	3.97229	08/17/05	15:21
lcsw-H17H1	Sr4215	78.0			mg/L	0.05		97.5%	80	0.003	77.9928	78	1	0.05	3.89964	08/17/05	15:21
265477	Al3082	50.4			mg/L	0.5				0.025	50.3682	50.4	1	0.5	2.51841	08/17/05	15:26
265477	Ca3179	1.98			mg/L	0.5				0.025	1.9778	1.98	1	0.5	0.09889	08/17/05	15:26
265477	Mg2790	20.2			mg/L	0.5				0.025	20.2454	20.2	1	0.5	1.01227	08/17/05	15:26
265477	Mn2576	0.139			mg/L	0.05				0.003	0.1394	0.139	1	0.05	0.00697	08/17/05	15:26
265477	Si2881	178			mg/L	0.5				0.025	178.1176	178	1	0.5	8.90588	08/17/05	15:26
265477	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0186	0.0186	1	0.05	0.00093	08/17/05	15:26
265478	Al3082	27.3			mg/L	0.5				0.025	27.3262	27.3	1	0.5	1.36631	08/17/05	15:31
265478	Ca3179	1.02			mg/L	0.5				0.025	1.0164	1.02	1	0.5	0.05082	08/17/05	15:31
265478	Mg2790	11.0			mg/L	0.5				0.025	10.9728	11	1	0.5	0.54864	08/17/05	15:31
265478	Mn2576	0.0646			mg/L	0.05				0.003	0.0646	0.0646	1	0.05	0.00323	08/17/05	15:31
265478	Si2881	101			mg/L	0.5				0.025	101.2856	101	1	0.5	5.06428	08/17/05	15:31
265478	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0052	0.0052	1	0.05	0.00026	08/17/05	15:31
265478d	Al3082	27.9			mg/L	0.5	2.2%			0.025	27.861	27.9	1	0.5	1.39305	08/17/05	15:35
265478d	Ca3179	1.11			mg/L	0.5	8.5%			0.025	1.1058	1.11	1	0.5	0.05529	08/17/05	15:35
265478d	Mg2790	11.1			mg/L	0.5	0.9%			0.025	11.1476	11.1	1	0.5	0.55738	08/17/05	15:35
265478d	Mn2576	0.0652			mg/L	0.05	0.9%			0.003	0.0652	0.0652	1	0.05	0.00326	08/17/05	15:35
265478d	Si2881	103			mg/L	0.5	2.0%			0.025	102.5142	103	1	0.5	5.12571	08/17/05	15:35
265478d	Sr4215	0.0500	U		mg/L	0.05	0.0%			0.003	0.006	0.006	1	0.05	0.0003	08/17/05	15:35
265478s	Al3082	66.1			mg/L	0.5		97.0%	40	0.025	66.0816	66.1	1	0.5	3.30408	08/17/05	15:40
265478s	Ca3179	391			mg/L	0.5		97.5%	400	0.025	390.5336	391	1	0.5	19.52668	08/17/05	15:40
265478s	Mg2790	398			mg/L	0.5		96.8%	400	0.025	398.227	398	1	0.5	19.91135	08/17/05	15:40
265478s	Mn2576	9.70			mg/L	0.05		96.4%	10	0.003	9.6958	9.7	1	0.05	0.48479	08/17/05	15:40
265478s	Si2881	181			mg/L	0.5		100.0%	80	0.025	181.0578	181	1	0.5	9.05289	08/17/05	15:40
265478s	Sr4215	77.3			mg/L	0.05		96.6%	80	0.003	77.3222	77.3	1	0.05	3.86611	08/17/05	15:40
265479	Al3082	✓ 26.4			mg/L	0.5				0.025	26.4344	26.4	1	0.5	1.32172	08/17/05	15:45

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8/19/05

265479 for Al

$$\frac{1.32172\ ug/ml \times 10ml}{0.5ml} = 26.4\ mg/L$$

010142

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TO#050722-11
Project No. 06002.01.242
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Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	mg/L	sigwt	Dilution	Calc RL	ug/ml	Date	Time
265479	Ca3179	0.896			mg/L	0.5				0.025	0.8964	0.896	1	0.5	0.04482	08/17/05	15:45
265479	Mg2790	10.6			mg/L	0.5				0.025	10.5792	10.6	1	0.5	0.52896	08/17/05	15:45
265479	Mn2576	0.0644			mg/L	0.05				0.003	0.0644	0.0644	1	0.05	0.00322	08/17/05	15:45
265479	Si2881	98.1			mg/L	0.5				0.025	98.0934	98.1	1	0.5	4.90467	08/17/05	15:45
265479	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0082	0.0082	1	0.05	0.00041	08/17/05	15:45
265480	Al3082	26.0			mg/L	0.5				0.025	25.9928	26	1	0.5	1.29964	08/17/05	15:50
265480	Ca3179	1.12			mg/L	0.5				0.025	1.1154	1.12	1	0.5	0.05577	08/17/05	15:50
265480	Mg2790	10.4			mg/L	0.5				0.025	10.422	10.4	1	0.5	0.5211	08/17/05	15:50
265480	Mn2576	0.0658			mg/L	0.05				0.003	0.0658	0.0658	1	0.05	0.00329	08/17/05	15:50
265480	Si2881	96.6			mg/L	0.5				0.025	96.6264	96.6	1	0.5	4.83132	08/17/05	15:50
265480	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0088	0.0088	1	0.05	0.00044	08/17/05	15:50
265481	Al3082	0.500	U		mg/L	0.5				0.025	-0.1482	-0.148	1	0.5	-0.00741	08/17/05	15:54
265481	Ca3179	9.99			mg/L	0.5				0.025	9.9852	9.99	1	0.5	0.49926	08/17/05	15:54
265481	Mg2790	9.59			mg/L	0.5				0.025	9.5858	9.59	1	0.5	0.47929	08/17/05	15:54
265481	Mn2576	0.0500	U		mg/L	0.05				0.003	-0.0012	-0.0012	1	0.05	-0.00006	08/17/05	15:54
265481	Si2881	0.500	U		mg/L	0.5				0.025	-0.005	-0.005	1	0.5	-0.00025	08/17/05	15:54
265481	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0004	0.0004	1	0.05	0.00002	08/17/05	15:54
265482	Al3082	0.500	U		mg/L	0.5				0.025	-0.2036	-0.204	1	0.5	-0.01018	08/17/05	15:59
265482	Ca3179	9.93			mg/L	0.5				0.025	9.9266	9.93	1	0.5	0.49633	08/17/05	15:59
265482	Mg2790	9.63			mg/L	0.5				0.025	9.6338	9.63	1	0.5	0.48169	08/17/05	15:59
265482	Mn2576	0.0500	U		mg/L	0.05				0.003	-0.0002	-0.0002	1	0.05	-0.00001	08/17/05	15:59
265482	Si2881	0.500	U		mg/L	0.5				0.025	0.021	0.021	1	0.5	0.00105	08/17/05	15:59
265482	Sr4215	0.0500	U		mg/L	0.05				0.003	0.001	0.001	1	0.05	0.00005	08/17/05	15:59
265483	Al3082	0.500	U		mg/L	0.5				0.025	-0.1842	-0.184	1	0.5	-0.00921	08/17/05	16:19
265483	Ca3179	8.25			mg/L	0.5				0.025	8.2472	8.25	1	0.5	0.41236	08/17/05	16:19
265483	Mg2790	1.05			mg/L	0.5				0.025	1.0548	1.05	1	0.5	0.05274	08/17/05	16:19
265483	Mn2576	0.0500	U		mg/L	0.05				0.003	0.0094	0.0094	1	0.05	0.00047	08/17/05	16:19
265483	Si2881	13.3			mg/L	0.5				0.025	13.3272	13.3	1	0.5	0.66636	08/17/05	16:19
265483	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0222	0.0222	1	0.05	0.00111	08/17/05	16:19
265484	Al3082	0.500	U		mg/L	0.5				0.025	-0.4188	-0.419	1	0.5	-0.02094	08/17/05	16:24
265484	Ca3179	8.05			mg/L	0.5				0.025	8.0532	8.05	1	0.5	0.40266	08/17/05	16:24
265484	Mg2790	0.811			mg/L	0.5				0.025	0.8112	0.811	1	0.5	0.04056	08/17/05	16:24
265484	Mn2576	0.0500	U		mg/L	0.05				0.003	0.006	0.006	1	0.05	0.0003	08/17/05	16:24
265484	Si2881	13.0			mg/L	0.5				0.025	13.0378	13	1	0.5	0.65189	08/17/05	16:24
265484	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0204	0.0204	1	0.05	0.00102	08/17/05	16:24
265485	Al3082	0.500	U		mg/L	0.5				0.025	-0.32	-0.32	1	0.5	-0.016	08/17/05	16:29
265485	Ca3179	8.14			mg/L	0.5				0.025	8.1444	8.14	1	0.5	0.40722	08/17/05	16:29

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Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	mg/L	sigwt	Dilution	Calc RL	ug/ml	Date	Time
265485	Mg2790	0.973			mg/L	0.5				0.025	0.9732	0.973	1	0.5	0.04866	08/17/05	16:29
265485	Mn2576	0.0500	U		mg/L	0.05				0.003	0.0062	0.0062	1	0.05	0.00031	08/17/05	16:29
265485	Si2881	13.2			mg/L	0.5				0.025	13.184	13.2	1	0.5	0.6592	08/17/05	16:29
265485	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0226	0.0226	1	0.05	0.00113	08/17/05	16:29
265486	Al3082	0.500	U		mg/L	0.5				0.025	-0.2252	-0.225	1	0.5	-0.01126	08/17/05	16:33
265486	Ca3179	7.90			mg/L	0.5				0.025	7.8956	7.9	1	0.5	0.39478	08/17/05	16:33
265486	Mg2790	0.947			mg/L	0.5				0.025	0.9468	0.947	1	0.5	0.04734	08/17/05	16:33
265486	Mn2576	0.0500	U		mg/L	0.05				0.003	0.0036	0.0036	1	0.05	0.00018	08/17/05	16:33
265486	Si2881	13.3			mg/L	0.5				0.025	13.2538	13.3	1	0.5	0.66269	08/17/05	16:33
265486	Sr4215	0.0500	U		mg/L	0.05				0.003	0.021	0.021	1	0.05	0.00105	08/17/05	16:33
265487	Al3082	0.500	U		mg/L	0.5				0.025	-0.2734	-0.273	1	0.5	-0.01367	08/17/05	16:38
265487	Ca3179	7.98			mg/L	0.5				0.025	7.9836	7.98	1	0.5	0.39918	08/17/05	16:38
265487	Mg2790	0.979			mg/L	0.5				0.025	0.9792	0.979	1	0.5	0.04896	08/17/05	16:38
265487	Mn2576	0.0500	U		mg/L	0.05				0.003	0.0048	0.0048	1	0.05	0.00024	08/17/05	16:38
265487	Si2881	13.2			mg/L	0.5				0.025	13.1526	13.2	1	0.5	0.65763	08/17/05	16:38
265487	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0218	0.0218	1	0.05	0.00109	08/17/05	16:38
265488	Al3082	21.8			mg/L	0.5				0.025	21.8492	21.8	1	0.5	1.09246	08/17/05	16:43
265488	Ca3179	0.967			mg/L	0.5				0.025	0.9668	0.967	1	0.5	0.04834	08/17/05	16:43
265488	Mg2790	8.71			mg/L	0.5				0.025	8.7098	8.71	1	0.5	0.43549	08/17/05	16:43
265488	Mn2576	0.0594			mg/L	0.05				0.003	0.0594	0.0594	1	0.05	0.00297	08/17/05	16:43
265488	Si2881	84.5			mg/L	0.5				0.025	84.4548	84.5	1	0.5	4.22274	08/17/05	16:43
265488	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0044	0.0044	1	0.05	0.00022	08/17/05	16:43
265489	Al3082	0.500	U		mg/L	0.5				0.025	-0.1712	-0.171	1	0.5	-0.00856	08/17/05	16:48
265489	Ca3179	7.90			mg/L	0.5				0.025	7.8974	7.9	1	0.5	0.39487	08/17/05	16:48
265489	Mg2790	1.05			mg/L	0.5				0.025	1.0516	1.05	1	0.5	0.05258	08/17/05	16:48
265489	Mn2576	0.0500	U		mg/L	0.05				0.003	0.0018	0.0018	1	0.05	0.00009	08/17/05	16:48
265489	Si2881	13.2			mg/L	0.5				0.025	13.1702	13.2	1	0.5	0.65851	08/17/05	16:48
265489	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0218	0.0218	1	0.05	0.00109	08/17/05	16:48
pbw-H17H2	Al3082	0.500	U		mg/L	0.5				0.025	-0.4448	-0.445	1	0.5	-0.02224	08/17/05	17:08
pbw-H17H2	Ca3179	0.500	U		mg/L	0.5				0.025	0.0452	0.0452	1	0.5	0.00226	08/17/05	17:08
pbw-H17H2	Mg2790	0.500	U		mg/L	0.5				0.025	-0.118	-0.118	1	0.5	-0.0059	08/17/05	17:08
pbw-H17H2	Mn2576	0.0500	U		mg/L	0.05				0.003	-0.0028	-0.0028	1	0.05	-0.00014	08/17/05	17:08
pbw-H17H2	Si2881	0.500	U		mg/L	0.5				0.025	-0.0992	-0.0992	1	0.5	-0.00496	08/17/05	17:08
pbw-H17H2	Sr4215	0.0500	U		mg/L	0.05				0.003	0	0	1	0.05	0	08/17/05	17:08
lcsw-H17H2	Al3082	38.9			mg/L	0.5		97.3%	40	0.025	38.9364	38.9	1	0.5	1.94682	08/17/05	17:12
lcsw-H17H2	Ca3179	399			mg/L	0.5		99.8%	400	0.025	399.0386	399	1	0.5	19.95193	08/17/05	17:12
lcsw-H17H2	Mg2790	393			mg/L	0.5		98.3%	400	0.025	393.2344	393	1	0.5	19.66172	08/17/05	17:12

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Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	mg/L	sigwt	Dilution	Calc RL	ug/ml	Date	Time
Icsw-H17H2	Mn2576	9.75			mg/L	0.05		97.5%	10	0.003	9.7474	9.75	1	0.05	0.48737	08/17/05	17:12
Icsw-H17H2	Si2881	80.3			mg/L	0.5		100.4%	80	0.025	80.2696	80.3	1	0.5	4.01348	08/17/05	17:12
Icsw-H17H2	Sr4215	79.0			mg/L	0.05		98.8%	80	0.003	79.0054	79	1	0.05	3.95027	08/17/05	17:12
265490	Al3082	0.500	U		mg/L	0.5				0.025	0.0424	0.0424	1	0.5	0.00212	08/17/05	17:17
265490	Ca3179	8.24			mg/L	0.5				0.025	8.2442	8.24	1	0.5	0.41221	08/17/05	17:17
265490	Mg2790	1.03			mg/L	0.5				0.025	1.0264	1.03	1	0.5	0.05132	08/17/05	17:17
265490	Mn2576	0.0500	U		mg/L	0.05				0.003	0.0034	0.0034	1	0.05	0.00017	08/17/05	17:17
265490	Si2881	13.2			mg/L	0.5				0.025	13.2104	13.2	1	0.5	0.66052	08/17/05	17:17
265490	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0264	0.0264	1	0.05	0.00132	08/17/05	17:17
265491	Al3082	0.500	U		mg/L	0.5				0.025	-0.3414	-0.341	1	0.5	-0.01707	08/17/05	17:22
265491	Ca3179	7.76			mg/L	0.5				0.025	7.7572	7.76	1	0.5	0.38786	08/17/05	17:22
265491	Mg2790	0.907			mg/L	0.5				0.025	0.9074	0.907	1	0.5	0.04537	08/17/05	17:22
265491	Mn2576	0.0500	U		mg/L	0.05				0.003	0.0028	0.0028	1	0.05	0.00014	08/17/05	17:22
265491	Si2881	13.2			mg/L	0.5				0.025	13.192	13.2	1	0.5	0.6596	08/17/05	17:22
265491	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0212	0.0212	1	0.05	0.00106	08/17/05	17:22
265491d	Al3082	0.500	U		mg/L	0.5	0.0%			0.025	-0.299	-0.299	1	0.5	-0.01495	08/17/05	17:27
265491d	Ca3179	7.67			mg/L	0.5	1.2%			0.025	7.6698	7.67	1	0.5	0.38349	08/17/05	17:27
265491d	Mg2790	0.994			mg/L	0.5	9.2%			0.025	0.994	0.994	1	0.5	0.0497	08/17/05	17:27
265491d	Mn2576	0.0500	U		mg/L	0.05	0.0%			0.003	0.0028	0.0028	1	0.05	0.00014	08/17/05	17:27
265491d	Si2881	13.2			mg/L	0.5	0.0%			0.025	13.2154	13.2	1	0.5	0.66077	08/17/05	17:27
265491d	Sr4215	0.0500	U		mg/L	0.05	0.0%			0.003	0.0214	0.0214	1	0.05	0.00107	08/17/05	17:27
265491s	Al3082	38.8			mg/L	0.5		97.0%	40	0.025	38.7596	38.8	1	0.5	1.93798	08/17/05	17:31
265491s	Ca3179	404			mg/L	0.5		99.1%	400	0.025	404.3454	404	1	0.5	20.21727	08/17/05	17:31
265491s	Mg2790	392			mg/L	0.5		97.8%	400	0.025	392.0252	392	1	0.5	19.60126	08/17/05	17:31
265491s	Mn2576	9.69			mg/L	0.05		96.9%	10	0.003	9.689	9.69	1	0.05	0.48445	08/17/05	17:31
265491s	Si2881	92.4			mg/L	0.5		99.0%	80	0.025	92.4428	92.4	1	0.5	4.62214	08/17/05	17:31
265491s	Sr4215	78.2			mg/L	0.05		97.8%	80	0.003	78.179	78.2	1	0.05	3.90895	08/17/05	17:31
265492	Al3082	0.500	U		mg/L	0.5				0.025	-0.279	-0.279	1	0.5	-0.01395	08/17/05	17:36
265492	Ca3179	7.69			mg/L	0.5				0.025	7.6884	7.69	1	0.5	0.38442	08/17/05	17:36
265492	Mg2790	0.880			mg/L	0.5				0.025	0.8802	0.88	1	0.5	0.04401	08/17/05	17:36
265492	Mn2576	0.0500	U		mg/L	0.05				0.003	0	0	1	0.05	0	08/17/05	17:36
265492	Si2881	13.1			mg/L	0.5				0.025	13.0608	13.1	1	0.5	0.65304	08/17/05	17:36
265492	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0236	0.0236	1	0.05	0.00118	08/17/05	17:36
265493	Al3082	0.500	U		mg/L	0.5				0.025	-0.377	-0.377	1	0.5	-0.01885	08/17/05	17:41
265493	Ca3179	7.39			mg/L	0.5				0.025	7.3868	7.39	1	0.5	0.36934	08/17/05	17:41
265493	Mg2790	0.897			mg/L	0.5				0.025	0.8974	0.897	1	0.5	0.04487	08/17/05	17:41
265493	Mn2576	0.0500	U		mg/L	0.05				0.003	-0.0004	-0.0004	1	0.05	-0.00002	08/17/05	17:41

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Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	mg/L	sigwt	Dilution	Calc RL	ug/ml	Date	Time
265493	Si2881	13.1			mg/L	0.5				0.025	13.0896	13.1	1	0.5	0.65448	08/17/05	17:41
265493	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0188	0.0188	1	0.05	0.00094	08/17/05	17:41
265494	Al3082	0.500	U		mg/L	0.5				0.025	-0.2898	-0.29	1	0.5	-0.01449	08/17/05	17:46
265494	Ca3179	6.97			mg/L	0.5				0.025	6.9674	6.97	1	0.5	0.34837	08/17/05	17:46
265494	Mg2790	0.945			mg/L	0.5				0.025	0.9452	0.945	1	0.5	0.04726	08/17/05	17:46
265494	Mn2576	0.0500	U		mg/L	0.05				0.003	0.0002	0.0002	1	0.05	0.00001	08/17/05	17:46
265494	Si2881	13.2			mg/L	0.5				0.025	13.2096	13.2	1	0.5	0.66048	08/17/05	17:46
265494	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0188	0.0188	1	0.05	0.00094	08/17/05	17:46
265495	Al3082	0.500	U		mg/L	0.5				0.025	-0.2732	-0.273	1	0.5	-0.01366	08/17/05	17:50
265495	Ca3179	2.55			mg/L	0.5				0.025	2.5538	2.55	1	0.5	0.12769	08/17/05	17:50
265495	Mg2790	0.500	U		mg/L	0.5				0.025	0.4176	0.418	1	0.5	0.02088	08/17/05	17:50
265495	Mn2576	0.0500	U		mg/L	0.05				0.003	0.0004	0.0004	1	0.05	0.00002	08/17/05	17:50
265495	Si2881	13.8			mg/L	0.5				0.025	13.8384	13.8	1	0.5	0.69192	08/17/05	17:50
265495	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0106	0.0106	1	0.05	0.00053	08/17/05	17:50
265496	Ca3179	1.01			mg/L	0.5				0.025	1.0128	1.01	1	0.5	0.05064	08/17/05	18:10
265496	Mn2576	0.0548			mg/L	0.05				0.003	0.0548	0.0548	1	0.05	0.00274	08/17/05	18:10
265496	Sr4215	0.0500	U		mg/L	0.05				0.003	0.005	0.005	1	0.05	0.00025	08/17/05	18:10
265497	Ca3179	0.994			mg/L	0.5				0.025	0.994	0.994	1	0.5	0.0497	08/17/05	18:15
265497	Mn2576	0.0608			mg/L	0.05				0.003	0.0608	0.0608	1	0.05	0.00304	08/17/05	18:15
265497	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0054	0.0054	1	0.05	0.00027	08/17/05	18:15
265498	Ca3179	0.991			mg/L	0.5				0.025	0.991	0.991	1	0.5	0.04955	08/17/05	18:20
265498	Mn2576	0.0522			mg/L	0.05				0.003	0.0522	0.0522	1	0.05	0.00261	08/17/05	18:20
265498	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0054	0.0054	1	0.05	0.00027	08/17/05	18:20
265499	Ca3179	1.03			mg/L	0.5				0.025	1.0336	1.03	1	0.5	0.05168	08/17/05	18:25
265499	Mn2576	0.0554			mg/L	0.05				0.003	0.0554	0.0554	1	0.05	0.00277	08/17/05	18:25
265499	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0058	0.0058	1	0.05	0.00029	08/17/05	18:25
265500	Ca3179	1.07			mg/L	0.5				0.025	1.074	1.07	1	0.5	0.0537	08/17/05	18:29
265500	Mn2576	0.0534			mg/L	0.05				0.003	0.0534	0.0534	1	0.05	0.00267	08/17/05	18:29
265500	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0056	0.0056	1	0.05	0.00028	08/17/05	18:29
265501	Ca3179	1.02			mg/L	0.5				0.025	1.0188	1.02	1	0.5	0.05094	08/17/05	18:34
265501	Mn2576	0.0524			mg/L	0.05				0.003	0.0524	0.0524	1	0.05	0.00262	08/17/05	18:34
265501	Sr4215	0.0500	U		mg/L	0.05				0.003	0.006	0.006	1	0.05	0.0003	08/17/05	18:34
265502	Ca3179	0.977			mg/L	0.5				0.025	0.9774	0.977	1	0.5	0.04887	08/17/05	18:39
265502	Mn2576	0.0504			mg/L	0.05				0.003	0.0504	0.0504	1	0.05	0.00252	08/17/05	18:39
265502	Sr4215	0.0500	U		mg/L	0.05				0.003	0.0046	0.0046	1	0.05	0.00023	08/17/05	18:39

010147

QC STD. ID's	
CCV	05H01
CRI	
ICSA	
ICSAB	05H01

ICP CAL.STD. ID's	
Std0	05H01
Std1	
Std2	
Std3	
Std4	
Std5	
Std6	05H01

☐ 200.7 TAP No. 01-0406-028 Rev2/Mar02

☑ 6010B TAP No. 01-0406-130 Rev3/Mar05

☐ Other _____

Al Ca Mg Mn Si Sr

PROJ. NO.	PROJECT	TO#	DATE	MATRIX	LOGBK PG
06002.01.242	DIV. 20	050722-11	8-17-05	water	61-104
06002.01.242	DIV. 20	050722-11	8-17-05	water	61-105

INSTRUMENT: JCAP2 FILENAME: B050817A

File converted to wsl? ☐ N/A

Standardization Rpt. 08/17/05 01:30:57 PM

010148

Method: DAILY2 Standard: blk
Run Time: 08/17/05 13:26:22

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Avge	-.0000	.0004	-.0000	.0000	-.0000	-.0002	-.0000
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	87.28	2.357	43.13	2.940	26.13	2.487	141.4
#1	-.0000	.0004	-.0000	.0000	-.0000	-.0002	.0000
#2	-.0000	.0004	-.0000	.0000	-.0000	-.0002	-.0000

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Avge	.0000	-.0000	-.0000	.0000	.0002	.0000	.0002
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	36.76	212.7	67.67	296.1	13.18	73.31	22.13
#1	.0000	.0000	-.0000	-.0000	.0002	.0000	.0002
#2	.0000	-.0000	-.0000	.0000	.0003	.0000	.0002

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Avge	-.0000	.0000	.0000	.0000	-.0000	-.0001	-.0110
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0002
%RSD	.4278	8.585	335.2	10.45	141.4	29.73	1.601
#1	-.0000	.0000	.0000	.0000	-.0000	-.0001	-.0109
#2	-.0000	.0000	-.0000	.0000	.0000	-.0001	-.0111

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Avge	.0000	.0000	.0001	.0000	.0001	.0000	-.0011
SDev	.0000	.0000	.0000	.0000	.0001	.0000	.0000
%RSD	167.8	25.16	26.00	312.8	121.8	47.52	.5403
#1	.0000	.0000	.0002	-.0000	.0001	.0000	-.0011
#2	-.0000	.0000	.0001	.0000	.0000	.0000	-.0011

Elem	Sc3613	1960/1	1960/2	Si2881	Sn1899	Sr4215	Th2837
Avge	112.7	-.0001	.0002	.0014	.0000	-.0000	.0001
SDev	.5	.0000	.0001	.0000	.0000	.0000	.0000
%RSD	.4309	20.07	44.19	1.802	94.52	236.5	41.93
#1	112.4	-.0001	.0002	.0014	.0000	.0000	.0000
#2	113.1	-.0001	.0001	.0015	.0000	-.0000	.0001

Elem	Ti3349	Tl1908	U_4090	V_2924	W_2079	Y_3710	Zn2062
Avge	-.0001	-.0003	-.0003	-.0000	.0002	.0000	-.0000
SDev	.0000	.0001	.0002	.0000	.0001	.0000	.0000
%RSD	46.50	26.92	51.60	2.746	34.43	26.10	24.54
#1	-.0001	-.0002	-.0002	-.0000	.0002	.0000	-.0000
#2	-.0001	-.0003	-.0005	-.0000	.0003	.0000	-.0000

Elem	Zr3496
Avge	.0001
SDev	.0001
%RSD	97.00
#1	.0000
#2	.0002

8-17-05

8/19/05

010149

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1127016	10000	--	--	--	--	--
SDev	4821.761	.0000000	--	--	--	--	--
%RSD	.4278341	.0000000	--	--	--	--	--
#1	1123607	10000	--	--	--	--	--
#2	1130426	10000	--	--	--	--	--

010150

Method: DAILY2 Standard: clp_std4
Run Time: 08/17/05 13:31:09

Elem	Ag3280	As1890	2203/1	2203/2	Sb2068	1960/1	1960/2
Avge	.0809	.1099	.3159	.2727	.1569	.1934	.2127
SDev	.0001	.0003	.0005	.0002	.0006	.0005	.0008
%RSD	.0904	.3002	.1521	.0569	.4026	.2723	.3895
#1	.0808	.1096	.3163	.2726	.1565	.1931	.2121
#2	.0809	.1101	.3156	.2728	.1574	.1938	.2133

Elem	Tl1908
Avge	.2046
SDev	.0004
%RSD	.2008
#1	.2043
#2	.2049

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1157194	10000	--	--	--	--	--
SDev	11536.45	.0000000	--	--	--	--	--
%RSD	.9969333	.0000000	--	--	--	--	--
#1	1149036	10000	--	--	--	--	--
#2	1165351	10000	--	--	--	--	--

Method: DAILY2 Standard: clp_std1
Run Time: 08/17/05 13:35:33

010151

Elem	Al3082	Ca3179	Fe2714	K_7664	Li6707	Mg2790	Na3302
Avge	.1026	.2375	.0900	.1912	3.161	.0955	.0081
SDev	.0002	.0003	.0001	.0003	.010	.0001	.0001
%RSD	.2029	.1436	.1372	.1550	.3032	.1312	.6006
#1	.1027	.2377	.0901	.1914	3.167	.0956	.0081
#2	.1024	.2372	.0899	.1910	3.154	.0954	.0081

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1120032	10000	--	--	--	--	--
SDev	5416.438	.0000000	--	--	--	--	--
%RSD	.4835967	.0000000	--	--	--	--	--
#1	1116202	10000	--	--	--	--	--
#2	1123862	10000	--	--	--	--	--

010152

Method: DAILY2 Standard: clp_std5
Run Time: 08/17/05 13:39:13

Elem	B_2496	Bi2230	Mo2020	P_1782	Si2881	Sn1899	Sr4215
Avge	.1629	.0282	.2722	.0245	.1573	.1528	2.529
SDev	.0012	.0001	.0002	.0001	.0006	.0002	.006
%RSD	.7269	.2751	.0791	.4259	.3871	.1441	.2250
#1	.1620	.0282	.2720	.0246	.1568	.1530	2.525
#2	.1637	.0283	.2723	.0244	.1577	.1527	2.533

Elem	Ti3349
Avge	2.948
SDev	.007
%RSD	.2354
#1	2.943
#2	2.953

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1121045	10000	--	--	--	--	--
SDev	35887.08	.0000000	--	--	--	--	--
%RSD	3.201217	.0000000	--	--	--	--	--
#1	1095669	10000	--	--	--	--	--
#2	1146421	10000	--	--	--	--	--

010153

Method: DAILY2 Standard: clp_std2
Run Time: 08/17/05 13:42:53

Elem	Ba4934	Be3130	Cr2677	Cu3247	Ni2316
Avge	.9738	1.400	.4391	.3144	.3399
SDev	.0007	.001	.0000	.0001	.0001
%RSD	.0745	.0751	.0042	.0370	.0299
#1	.9732	1.399	.4391	.3143	.3398
#2	.9743	1.400	.4391	.3145	.3400

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1147586	10000	--	--	--	--	--
SDev	2226.679	.0000000	--	--	--	--	--
%RSD	.1940317	.0000000	--	--	--	--	--
#1	1146011	10000	--	--	--	--	--
#2	1149160	10000	--	--	--	--	--

Method: DAILY2 Standard: clp_std3
Run Time: 08/17/05 13:46:13

010154

Elem	Cd2265	Co2286	Mn2576	V_2924	Zn2062
Avge	.9789	.2107	.9806	.2033	.2694
SDev	.0014	.0001	.0006	.0001	.0004
%RSD	.1409	.0333	.0561	.0717	.1568
#1	.9780	.2106	.9810	.2032	.2691
#2	.9799	.2107	.9802	.2034	.2697

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1160084	10000	--	--	--	--	--
SDev	3718.675	.0000000	--	--	--	--	--
%RSD	.3205520	.0000000	--	--	--	--	--
#1	1162714	10000	--	--	--	--	--
#2	1157455	10000	--	--	--	--	--

Standardization Rpt. 08/17/05 01:53:43 PM page 1

010155

Method: DAILY2 Standard: clp_std6
Run Time: 08/17/05 13:49:53

Elem	La3988	Na5889	Pd3404	S_1820	Th2837	U_4090	W_2079
Avge	.4786	.0453	.2017	.0281	.1007	.0623	.1836
SDev	.0001	.0005	.0001	.0000	.0001	.0001	.0002
%RSD	.0163	1.144	.0608	.0754	.0556	.2040	.1112
#1	.4786	.0457	.2018	.0280	.1006	.0624	.1835
#2	.4787	.0449	.2017	.0281	.1007	.0622	.1838

Elem	Y_3710	Zr3496
Avge	.7478	1.976
SDev	.0005	.001
%RSD	.0685	.0468
#1	.7482	1.975
#2	.7474	1.977

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1137352	10000	--	--	--	--	--
SDev	8442.147	.0000000	--	--	--	--	--
%RSD	.7422637	.0000000	--	--	--	--	--
#1	1143321	10000	--	--	--	--	--
#2	1131382	10000	--	--	--	--	--

Standardization Report 08/17/05 01:53:44 PM page 1

010156

Method: DAILY2 Slope = Conc(SIR)/IR

Element	Wavelen	High std	Low std	Slope	Y-intercept	Date Standardized
Ag3280	328.068	clp_std4	blk	24.7251	.000460	08/17/05 01:49:53
Al3082	308.215	clp_std1	blk	489.490	-.206966	08/17/05 01:49:53
As1890	189.042	clp_std4	blk	90.9994	.003146	08/17/05 01:49:53
B_2496	249.678	clp_std5	blk	61.4191	-.002289	08/17/05 01:49:53
Ba4934	493.409	clp_std2	blk	10.2693	.000201	08/17/05 01:49:53
Be3130	313.042	clp_std2	blk	3.57178	.000653	08/17/05 01:49:53
Bi2230	223.061	clp_std5	blk	175.634	.001942	08/17/05 01:49:53
Ca3179	317.933	clp_std1	blk	210.598	-.003273	08/17/05 01:49:53
Cd2265	226.502	clp_std3	blk	10.2122	.000018	08/17/05 01:49:53
Co2286	228.616	clp_std3	blk	47.4648	.000886	08/17/05 01:49:53
Cr2677	267.716	clp_std2	blk	22.7741	-.000241	08/17/05 01:49:53
Cu3247	324.753	clp_std2	blk	31.8290	-.007778	08/17/05 01:49:53
Fe2714	271.441	clp_std1	blk	555.862	-.015314	08/17/05 01:49:53
K_7664	766.491	clp_std1	blk	261.837	-.052996	08/17/05 01:49:53
La3988	398.853	clp_std6	blk	20.9115	.000427	08/17/05 01:49:53
Li6707	670.784	clp_std1	blk	3.16404	-.000146	08/17/05 01:49:53
Mg2790	279.078	clp_std1	blk	261.730	-.001520	08/17/05 01:49:53
Mn2576	257.610	clp_std3	blk	10.1990	-.000118	08/17/05 01:49:53
Mo2020	202.030	clp_std5	blk	36.7436	.000474	08/17/05 01:49:53
Na3302	330.232	clp_std1	blk	6092.53	.659100	08/17/05 01:49:53
Na5889	588.991	clp_std6	blk	17.8589	.196097	08/17/05 01:49:53
Ni2316	231.604	clp_std2	blk	29.4225	-.000419	08/17/05 01:49:53
P_1782	178.287	clp_std5	blk	409.132	-.014529	08/17/05 01:49:53
2203/1	220.351	clp_std4	blk	31.6659	-.004428	08/17/05 01:49:53
2203/2	220.352	clp_std4	blk	36.6726	-.000485	08/17/05 01:49:53
Pd3404	340.458	clp_std6	blk	50.9072	-.002921	08/17/05 01:49:53
S_1820	182.040	clp_std6	blk	356.284	-.007595	08/17/05 01:49:53
Sb2068	206.838	clp_std4	blk	63.2771	.070632	08/17/05 01:49:53
Sc3613	361.384	blk	dark	.887254	.000000	08/17/05 01:49:53
1960/1	196.021	clp_std4	blk	51.6675	.006765	08/17/05 01:49:53
1960/2	196.022	clp_std4	blk	47.0506	-.007083	08/17/05 01:49:53
Si2881	288.158	clp_std5	blk	63.9351	-.091756	08/17/05 01:49:53
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	65.4814	-.001048	08/17/05 01:49:53
Sr4215	421.552	clp_std5	blk	3.95464	.000005	08/17/05 01:49:53
Th2837	283.730	clp_std6	blk	103.740	-.006300	08/17/05 01:49:53
Ti3349	334.941	clp_std5	blk	3.39225	.000277	08/17/05 01:49:53
Tl1908	190.864	clp_std4	blk	48.8031	.014109	08/17/05 01:49:53
U_4090	409.014	clp_std6	blk	159.547	.053877	08/17/05 01:49:53
V_2924	292.402	clp_std3	blk	49.1906	.001331	08/17/05 01:49:53
W_2079	207.914	clp_std6	blk	27.2552	-.006573	08/17/05 01:49:53
Y_3710	371.030	clp_std6	blk	13.3703	-.000190	08/17/05 01:49:53
Zn2062	206.200	clp_std3	blk	37.1194	.000280	08/17/05 01:49:53
Zr3496	349.621	clp_std6	blk	5.53226	-.000784	08/17/05 01:49:53

Analysis Report QC Standard 08/17/05 02:00:20 PM page 1

Method: DAILY2 Sample Name: icv/ccv Operator: 010157
Run Time: 08/17/05 13:55:46
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9871	9.916	5.174	4.827	10.08	.9893	5.040
SDev	.0015	.003	.017	.007	.01	.0020	.023
%RSD	.1559	.0322	.3199	.1484	.1352	.1985	.4529
#1	.9882	9.914	5.186	4.822	10.09	.9907	5.056
#2	.9860	9.918	5.162	4.832	10.07	.9879	5.024
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	20.00	1.017	5.066	1.984	2.024	10.16	18.60
SDev	.07	.005	.015	.003	.001	.05	.01
%RSD	.3350	.4628	.2975	.1610	.0612	.4769	.0608
#1	20.05	1.020	5.077	1.987	2.023	10.20	18.59
#2	19.95	1.014	5.055	1.982	2.025	10.13	18.60
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	4.961	4.872	20.06	1.008	5.058	28.31	Q40.03
SDev	.002	.000	.04	.002	.006	.33	.01
%RSD	.0465	.0023	.2127	.1870	.1213	1.154	.0195
#1	4.963	4.872	20.09	1.010	5.054	28.54	Q40.03
#2	4.959	4.872	20.03	1.007	5.063	28.08	Q40.02
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	4.994	5.118	5.001	5.014	1.000	.9946	1.010
SDev	.019	.001	.003	.039	.001	.0004	.001
%RSD	.3817	.0097	.0649	.7843	.0520	.0384	.0716
#1	5.008	5.117	5.004	5.041	1.001	.9943	1.009
#2	4.981	5.118	4.999	4.986	1.000	.9949	1.010
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

010158

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.15	5.263	5.266	5.011	5.009	5.265	4.941
SDev	.60	.010	.022	.008	.027	.012	.018
%RSD	.6092	.1932	.4246	.1499	.5449	.2187	.3568
#1	98.72	5.256	5.282	5.016	5.029	5.273	4.954
#2	99.57	5.270	5.250	5.005	4.990	5.257	4.929
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	5.019	.9905	4.785	5.215	.9972	4.970	Q1.103
SDev	.014	.0032	.000	.021	.0002	.008	.004
%RSD	.2704	.3232	.0100	.3965	.0210	.1607	.3331
#1	5.029	.9928	4.786	5.229	.9971	4.976	Q1.101
#2	5.010	.9882	4.785	5.200	.9974	4.964	Q1.106
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Fail
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	5.052	1.030	4.909
SDev	.009	.001	.012
%RSD	.1744	.1444	.2349
#1	5.059	1.031	4.901
#2	5.046	1.029	4.917
Errors	QC Pass	QC Pass	QC Pass
Value	5.000	1.000	5.000
Range	10.00	10.00	10.00

010159

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1117358	10000	--	--	--	--	--
SDev	6878.028	.0000000	--	--	--	--	--
%RSD	.6155620	.0000000	--	--	--	--	--
#1	1112494	10000	--	--	--	--	--
#2	1122221	10000	--	--	--	--	--

Analysis Report Blank Sample 08/17/05 02:06:58 PM

Method: DAILY2 Sample Name: icb/ccb Operator: 010160
Run Time: 08/17/05 14:02:24
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	-.0012	-.0028	.0061	.0002	.0001	.0043
SDev	.0008	.0014	.0016	.0011	.0001	.0000	.0011
%RSD	219.8	122.7	58.15	17.85	87.68	45.47	25.10
#1	-.0002	-.0022	-.0017	.0068	.0003	.0001	.0050
#2	.0009	-.0002	-.0040	.0053	.0001	.0001	.0035
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	.0010	.0001	.0005	-.0005	.0006	.0062	.0072
SDev	.0002	.0002	.0001	.0001	.0000	.0202	.0156
%RSD	21.79	140.3	16.04	14.86	7.269	325.8	217.4
#1	.0012	.0000	.0005	-.0005	.0006	-.0081	-.0039
#2	.0008	.0003	.0006	-.0006	.0005	.0204	.0182
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0500	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0500	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	.0001	.0024	-.0000	.0016	.0118	.0099
SDev	.0008	.0000	.0073	.0001	.0005	.0905	.0038
%RSD	85.12	3.885	303.1	257.3	32.55	767.5	37.92
#1	.0004	.0001	-.0027	.0000	.0020	L-.0522	.0073
#2	.0014	.0001	.0075	-.0001	.0012	H.0758	.0126
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	-.0003	.0027	.0015	-.0011	.0016	.0027	.0002
SDev	.0003	.0056	.0014	.0021	.0024	.0018	.0014
%RSD	108.0	210.9	91.84	195.0	157.3	66.34	719.4
#1	-.0005	.0066	.0005	-.0025	-.0002	.0040	.0012
#2	-.0001	-.0013	.0026	.0004	.0033	.0014	-.0008
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

010161

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.3	.0011	.0003	-.0010	-.0002	.0006	-.0020
SDev	.2	.0006	.0002	.0023	.0018	.0003	.0012
%RSD	.1975	59.15	55.49	237.2	1032.	57.03	58.64
#1	101.2	.0015	.0004	-.0026	-.0015	.0008	-.0028
#2	101.5	.0006	.0002	.0007	.0011	.0003	-.0012
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	-.0022	.0002	.0028	.0189	.0002	.0007
SDev	.0000	.0014	.0001	.0001	.0224	.0001	.0027
%RSD	11.99	62.49	65.03	4.403	118.3	28.44	390.2
#1	.0001	-.0012	.0002	.0027	.0031	.0002	-.0012
#2	.0001	-.0031	.0001	.0029	.0348	.0003	.0026
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	.0002	-.0001
SDev	.0001	.0001	.0003
%RSD	1748.	69.14	373.8
#1	.0000	.0001	.0001
#2	-.0000	.0002	-.0003
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010162

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1141932	10000	--	--	--	--	--
SDev	2311.532	.0000000	--	--	--	--	--
%RSD	.2024228	.0000000	--	--	--	--	--
#1	1140298	10000	--	--	--	--	--
#2	1143567	10000	--	--	--	--	--

Analysis Report QC Standard 08/17/05 02:11:42 PM page 1

Method: DAILY2 Sample Name: cri Operator: 010163
Run Time: 08/17/05 14:07:09
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0197	.0992	.0186	.1018	.0206	.0099	-.0031
SDev	.0003	.0022	.0009	.0004	.0000	.0000	.0007
%RSD	1.498	2.242	4.845	.3909	.1331	.0396	23.53
#1	.0195	.0976	.0180	.1015	.0206	.0099	-.0026
#2	.0199	.1008	.0193	.1021	.0206	.0099	-.0037
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	.0022	.0104	.0990	.0190	.0496	.1059	.0096
SDev	.0012	.0001	.0006	.0005	.0003	.0105	.0094
%RSD	55.70	.6025	.6123	2.616	.6684	9.928	98.30
#1	.0031	.0104	.0994	.0194	.0499	.1133	.0162
#2	.0013	.0103	.0986	.0187	.0494	.0985	.0029
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	.0004	.0730	-.0045	.0301	.0201	.0863	.0044
SDev	.0006	.0002	.0019	.0001	.0001	.1479	.0004
%RSD	173.2	.2172	43.00	.1498	.3136	171.4	8.262
#1	-.0001	.0732	-.0031	.0301	.0201	.1908	.0046
#2	.0008	.0729	-.0058	.0300	.0202	-.0183	.0041
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	.0801	.1057	.0052	.0056	.0004	.0038	.1193
SDev	.0010	.0004	.0005	.0038	.0030	.0055	.0046
%RSD	1.232	.3571	10.19	67.64	756.6	146.4	3.864
#1	.0808	.1060	.0049	.0082	.0025	.0077	.1161
#2	.0794	.1055	.0056	.0029	-.0017	-.0001	.1226
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

010164

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.18	.0051	.0089	.1014	.0055	.0077	.1004
SDev	.73	.0037	.0006	.0043	.0023	.0009	.0008
%RSD	.7370	72.79	6.378	4.277	42.61	11.21	.7895
#1	98.66	.0025	.0093	.0983	.0071	.0070	.1010
#2	99.69	.0077	.0085	.1045	.0038	.0083	.0999
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	.0209	-.0034	.0189	.0177	.1929	.0983	-.0003
SDev	.0000	.0028	.0002	.0008	.0090	.0000	.0001
%RSD	.0351	82.72	1.184	4.658	4.646	.0207	30.99
#1	.0209	-.0014	.0190	.0182	.1866	.0983	-.0003
#2	.0209	-.0054	.0187	.0171	.1993	.0983	-.0004
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	-.0002	.0426	.0899
SDev	.0000	.0004	.0001
%RSD	11.34	.9169	.1693
#1	-.0001	.0424	.0900
#2	-.0002	.0429	.0898
Errors	NOCHECK	QC Pass	QC Pass
Value		.0400	.1000
Range		50.00	50.00

010165

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1117754	10000	--	--	--	--	--
SDev	8261.129	.0000000	--	--	--	--	--
%RSD	.7390826	.0000000	--	--	--	--	--
#1	1111913	10000	--	--	--	--	--
#2	1123596	10000	--	--	--	--	--

Analysis Report QC Standard 08/17/05 02:16:29 PM page 1

Method: DAILY2 Sample Name: icsa Operator: 010166
Run Time: 08/17/05 14:11:54
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0014	508.6	.0026	-.0141	.0025	-.0000	.0121
SDev	.0000	.5	.0011	.0007	.0000	.0000	.0007
%RSD	1.118	.1007	41.36	4.992	1.606	108.3	5.860
#1	-.0014	508.9	.0018	-.0136	.0025	-.0001	.0126
#2	-.0014	508.2	.0033	-.0145	.0025	-.0000	.0116
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	473.3	.0005	.0007	-.0006	.0022	192.9	.0102
SDev	1.5	.0002	.0000	.0006	.0001	.4	.0030
%RSD	.3106	51.28	.0889	100.7	5.023	.2214	29.45
#1	474.3	.0003	.0007	-.0010	.0023	193.2	.0123
#2	472.3	.0006	.0007	-.0002	.0022	192.6	.0081
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	.0054	.0004	549.3	-.0039	-.0019	.2871	-.0300
SDev	.0006	.0000	1.0	.0000	.0002	.0863	.0027
%RSD	10.90	2.836	.1836	.0254	11.92	30.08	8.885
#1	.0059	.0003	550.0	-.0039	-.0020	.3481	-.0319
#2	.0050	.0004	548.6	-.0039	-.0017	.2260	-.0281
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	.0011	-.0063	.0458	-.0353	.0170	.0006	-.0033
SDev	.0011	.0057	.0034	.0033	.0004	.0016	.0041
%RSD	98.64	90.58	7.327	9.483	2.146	279.2	125.9
#1	.0019	-.0104	.0434	-.0329	.0167	.0017	-.0062
#2	.0003	-.0023	.0482	-.0376	.0172	-.0005	-.0004
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value							
Range							

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

010167

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	89.00	.0095	-.0197	-.0082	-.0082	-.0100	-.0071
SDev	.58	.0132	.0019	.0013	.0011	.0031	.0007
%RSD	.6515	138.6	9.524	16.34	13.49	31.53	10.14
#1	88.59	.0002	-.0184	-.0073	-.0075	-.0122	-.0076
#2	89.41	.0188	-.0210	-.0092	-.0090	-.0077	-.0066
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	.0164	.0015	-.0006	.0185	-.0641	.0015	-.0041
SDev	.0000	.0023	.0001	.0012	.0075	.0008	.0008
%RSD	.1139	148.8	21.74	6.599	11.74	52.63	20.74
#1	.0164	-.0001	-.0005	.0176	-.0694	.0021	-.0047
#2	.0163	.0031	-.0007	.0193	-.0588	.0010	-.0035
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value							
Range							

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0005	.0076	-.0007
SDev	.0001	.0001	.0000
%RSD	18.64	.6902	5.912
#1	-.0005	.0077	-.0007
#2	-.0004	.0076	-.0006
Errors	NOCHECK	NOCHECK	NOCHECK
Value			
Range			

010168

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1003010	10000	--	--	--	--	--
SDev	6603.670	.0000000	--	--	--	--	--
%RSD	.6583856	.0000000	--	--	--	--	--
#1	998340	10000	--	--	--	--	--
#2	1007679	10000	--	--	--	--	--

Analysis Report QC Standard 08/17/05 02:21:14 PM page 1

Method: DAILY2 Sample Name: icsab Operator: 010169
Run Time: 08/17/05 14:16:41
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.099	508.8	1.061	1.030	.5313	.4935	.0049
SDev	.001	1.5	.003	.006	.0005	.0009	.0062
%RSD	.1279	.2907	.3193	.5903	.1017	.1794	126.4
#1	1.098	507.7	1.058	1.025	.5316	.4941	.0093
#2	1.100	509.8	1.063	1.034	.5309	.4929	.0005
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	470.7	.9763	.4895	.4864	.5478	191.9	.0011
SDev	.2	.0005	.0006	.0005	.0026	.0	.0030
%RSD	.0339	.0554	.1151	.1094	.4754	.0038	260.7
#1	470.8	.9766	.4899	.4868	.5460	191.9	-.0010
#2	470.6	.9759	.4891	.4861	.5496	191.9	.0032
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	.0046	1.186	547.7	.4927	1.026	.3654	-.0232
SDev	.0005	.004	.3	.0004	.004	.0758	.0004
%RSD	10.38	.3561	.0553	.0724	.3752	20.74	1.589
#1	.0050	1.183	548.0	.4929	1.023	.4190	-.0234
#2	.0043	1.189	547.5	.4924	1.029	.3118	-.0229
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	.9493	1.068	1.035	.9681	.0185	.0112	1.068
SDev	.0015	.004	.018	.0053	.0007	.0017	.006
%RSD	.1618	.4064	1.783	.5478	3.760	15.11	.5481
#1	.9482	1.071	1.048	.9718	.0180	.0100	1.064
#2	.9504	1.065	1.021	.9643	.0190	.0124	1.072
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

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	90.71	1.043	1.041	1.030	.9902	1.042	1.008
SDev	.20	.013	.003	.002	.0097	.002	.001
%RSD	.2233	1.254	.3162	.1551	.9780	.2083	.1331
#1	90.56	1.053	1.038	1.029	.9971	1.043	1.009
#2	90.85	1.034	1.043	1.031	.9834	1.040	1.007
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	1.042	.0056	.9542	1.016	.9174	.5050	-.0007
SDev	.001	.0027	.0004	.002	.0012	.0009	.0001
%RSD	.0898	47.58	.0384	.1827	.1337	.1750	9.921
#1	1.042	.0075	.9545	1.015	.9165	.5057	-.0008
#2	1.043	.0037	.9540	1.017	.9182	.5044	-.0007
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	-.0008	.9936	.9097
SDev	.0001	.0012	.0017
%RSD	14.48	.1189	.1841
#1	-.0007	.9944	.9085
#2	-.0009	.9927	.9109
Errors	NOCHECK	QC Pass	QC Pass
Value		1.000	1.000
Range		20.00	20.00

010171

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1022267	10000	--	--	--	--	--
SDev	2268.398	.0000000	--	--	--	--	--
%RSD	.2218988	.0000000	--	--	--	--	--
#1	1020663	10000	--	--	--	--	--
#2	1023871	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: icv/ccv Operator: 010172
Run Time: 08/17/05 14:25:06
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9862	9.908	5.159	4.820	10.05	.9931	5.024
SDev	.0027	.055	.005	.010	.00	.0008	.001
%RSD	.2773	.5543	.0960	.2116	.0312	.0804	.0197
#1	.9881	9.947	5.155	4.813	10.05	.9925	5.025
#2	.9842	9.869	5.162	4.827	10.05	.9937	5.024
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	20.12	1.016	5.071	1.991	2.021	10.17	18.57
SDev	.04	.001	.008	.000	.004	.01	.06
%RSD	.1970	.0946	.1635	.0248	.2001	.0937	.3306
#1	20.09	1.016	5.065	1.991	2.023	10.16	18.61
#2	20.14	1.017	5.077	1.990	2.018	10.18	18.53
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	4.963	4.863	20.15	1.009	5.053	28.47	Q39.83
SDev	.000	.013	.02	.001	.015	.29	.25
%RSD	.0068	.2647	.0747	.0915	.2898	1.010	.6302
#1	4.963	4.872	20.16	1.009	5.043	28.67	Q40.01
#2	4.963	4.853	20.14	1.010	5.064	28.27	Q39.66
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	5.010	5.127	5.034	5.018	1.005	.9934	1.004
SDev	.018	.013	.039	.049	.004	.0130	.002
%RSD	.3499	.2605	.7706	.9816	.4040	1.306	.2362
#1	5.023	5.137	5.007	5.052	1.008	1.003	1.006
#2	4.998	5.118	5.062	4.983	1.002	.9843	1.002
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

010173

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.79	5.282	5.252	5.021	5.023	5.262	4.951
SDev	.43	.056	.049	.013	.020	.014	.000
%RSD	.4370	1.059	.9290	.2686	.3963	.2639	.0006
#1	98.09	5.242	5.286	5.030	5.037	5.272	4.951
#2	97.49	5.322	5.217	5.011	5.009	5.252	4.951
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	5.032	.9891	4.782	5.203	1.006	4.973	1.095
SDev	.004	.0023	.000	.005	.025	.002	.007
%RSD	.0738	.2362	.0032	.0944	2.485	.0321	.6471
#1	5.035	.9907	4.782	5.206	1.023	4.974	1.090
#2	5.030	.9874	4.781	5.199	.9881	4.972	1.100
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	5.054	1.033	4.926
SDev	.002	.003	.003
%RSD	.0329	.3004	.0589
#1	5.055	1.030	4.924
#2	5.053	1.035	4.928
Errors	QC Pass	QC Pass	QC Pass
Value	5.000	1.000	5.000
Range	10.00	10.00	10.00

010174

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1102046	10000	--	--	--	--	--
SDev	4838.024	.0000000	--	--	--	--	--
%RSD	.4390039	.0000000	--	--	--	--	--
#1	1105467	10000	--	--	--	--	--
#2	1098625	10000	--	--	--	--	--

Analysis Report Blank Sample 08/17/05 02:36:21 PM page 1

Method: DAILY2 Sample Name: icb/ccb Operator: 010175
Run Time: 08/17/05 14:31:47
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	.0021	-.0025	.0064	.0003	.0001	.0001
SDev	.0005	.0004	.0016	.0017	.0001	.0000	.0006
%RSD	62.33	21.63	65.50	26.26	41.40	6.302	391.5
#1	.0011	.0024	-.0013	.0075	.0004	.0001	-.0003
#2	.0004	.0017	-.0036	.0052	.0002	.0001	.0006
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	.0003	.0007	.0004	.0011	.0155	.0147
SDev	.0001	.0000	.0003	.0001	.0002	.0179	.0008
%RSD	9.885	7.105	40.14	23.78	18.52	115.8	5.650
#1	.0014	.0002	.0005	.0004	.0012	.0028	.0153
#2	.0016	.0003	.0009	.0005	.0009	.0281	.0141
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0500	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0500	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0014	.0001	.0044	.0000	.0022	H.0553	.0051
SDev	.0008	.0000	.0006	.0000	.0011	.0411	.0084
%RSD	57.72	45.83	13.48	43.41	51.09	74.41	163.4
#1	.0019	.0001	.0048	.0001	.0030	.0262	-.0008
#2	.0008	.0001	.0040	.0000	.0014	H.0844	.0110
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	.0008	.0017	-.0009	.0002	.0023	.0034	-.0007
SDev	.0005	.0112	.0018	.0004	.0011	.0004	.0017
%RSD	65.65	665.9	204.5	151.8	50.58	13.15	234.7
#1	.0004	.0096	.0004	-.0000	.0015	.0031	.0005
#2	.0011	-.0062	-.0021	.0005	.0031	.0037	-.0019
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

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.22	-.0017	.0005	.0017	-.0001	-.0002	-.0018
SDev	2.19	.0016	.0009	.0038	.0003	.0001	.0036
%RSD	2.207	97.45	171.9	221.8	296.9	25.97	204.3
#1	97.68	-.0029	.0012	.0044	.0001	-.0002	.0008
#2	100.8	-.0005	-.0001	-.0010	-.0004	-.0002	-.0043
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	-.0002	.0001	.0000	.0171	.0002	.0000
SDev	.0001	.0003	.0000	.0027	.0131	.0001	.0004
%RSD	59.82	112.0	19.54	55100.	76.85	68.30	777.0
#1	.0002	-.0001	.0002	.0019	.0263	.0001	.0003
#2	.0001	-.0004	.0001	-.0019	.0078	.0002	-.0002
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	.0003	.0004
SDev	.0001	.0000	.0003
%RSD	97.31	7.306	67.29
#1	.0002	.0003	.0006
#2	.0000	.0003	.0002
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010177

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1118209	10000	--	--	--	--	--
SDev	24653.98	.0000000	--	--	--	--	--
%RSD	2.204774	.0000000	--	--	--	--	--
#1	1100776	10000	--	--	--	--	--
#2	1135642	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265106r Operator: 010178
Run Time: 08/17/05 14:39:06
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	243.7	.0977	.0632	4.711	.0182	.0163
SDev	.0004	.3	.0028	.0007	.001	.0000	.0022
%RSD	548.8	.1082	2.876	1.121	.0173	.0601	13.69
#1	-.0002	243.9	.0957	.0637	4.712	.0182	.0147
#2	.0004	243.5	.0997	.0627	4.711	.0182	.0178

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	428.9	.0185	.1760	.5759	.8519	425.3	65.88
SDev	.2	.0001	.0008	.0009	.0013	.6	.11
%RSD	.0439	.3758	.4812	.1639	.1528	.1347	.1704
#1	429.0	.0186	.1766	.5752	.8528	424.9	65.96
#2	428.7	.0185	.1754	.5766	.8509	425.7	65.80

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4591	.2644	230.0	7.328	.0056	3.616	4.433
SDev	.0014	.0008	.2	.001	.0000	.007	.019
%RSD	.3064	.2833	.0670	.0100	.6344	.2071	.4394
#1	.4600	.2649	229.9	7.327	.0056	3.622	4.447
#2	.4581	.2639	230.1	7.328	.0056	3.611	4.419

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.6880	26.30	.3554	.3145	.0276	3.220	.0120
SDev	.0018	.05	.0015	.0044	.0004	.007	.0001
%RSD	.2621	.1732	.4320	1.400	1.432	.2281	.8884
#1	.6892	26.27	.3543	.3114	.0273	3.215	.0119
#2	.6867	26.34	.3565	.3176	.0279	3.225	.0121

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	89.85	.0085	-.0057	39.54	.3282	-.0009	.0301
SDev	.20	.0032	.0032	.05	.0034	.0010	.0014
%RSD	.2201	38.12	55.97	.1210	1.051	111.4	4.739
#1	89.71	.0108	-.0079	39.57	.3257	-.0017	.0312
#2	89.99	.0062	-.0034	39.50	.3306	-.0002	.0291

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.175	.1239	7.427	.0034	-.2908	.5281	.0024
SDev	.001	.0056	.013	.0058	.0213	.0004	.0015
%RSD	.0695	4.489	.1725	169.3	7.325	.0714	63.65
#1	1.175	.1199	7.418	-.0007	-.2757	.5284	.0013
#2	1.174	.1278	7.436	.0076	-.3058	.5278	.0034

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Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.2768	2.745	.4072
SDev	.0001	.001	.0011
%RSD	.0436	.0236	.2730
#1	.2767	2.745	.4064
#2	.2769	2.745	.4080

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1012568	10000	--	--	--	--	--
SDev	2291.733	.0000000	--	--	--	--	--
%RSD	.2263289	.0000000	--	--	--	--	--
#1	1010947	10000	--	--	--	--	--
#2	1014188	10000	--	--	--	--	--

Analysis Report 08/17/05 02:52:07 PM

010180

Method: DAILY2 Sample Name: cri Operator:
Run Time: 08/17/05 14:47:33
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0193	.0998	.0187	.0994	.0206	.0099	.0006
SDev	.0001	.0007	.0015	.0005	.0000	.0000	.0001
%RSD	.7921	.6805	7.909	.4850	.0417	.1278	16.67
#1	.0192	.1003	.0176	.0997	.0206	.0099	.0006
#2	.0194	.0993	.0197	.0991	.0206	.0099	.0007
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	.0037	.0100	.0988	.0193	.0501	.1091	.0024
SDev	.0011	.0002	.0003	.0001	.0000	.0207	.0090
%RSD	30.80	2.190	.2732	.4876	.0374	18.99	373.0
#1	.0029	.0099	.0986	.0193	.0501	.0944	-.0040
#2	.0046	.0102	.0990	.0192	.0501	.1237	.0088
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	-.0002	.0727	-.0041	.0301	.0194	-.1711	.0070
SDev	.0002	.0001	.0001	.0000	.0004	.1233	.0056
%RSD	125.4	.0678	3.569	.0449	1.972	72.08	80.34
#1	-.0004	.0727	-.0042	.0301	.0197	-.2583	.0030
#2	-.0000	.0727	-.0040	.0301	.0192	-.0839	.0110
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	.0792	.1046	.0028	.0066	-.0006	-.0019	.1203
SDev	.0007	.0005	.0026	.0018	.0038	.0042	.0007
%RSD	.8567	.4792	90.03	26.99	655.8	221.5	.5868
#1	.0797	.1050	.0046	.0054	-.0033	.0011	.1208
#2	.0787	.1043	.0010	.0079	.0021	-.0049	.1198
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

010181

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.6	.0084	.0098	.1047	.0054	.0094	.1014
SDev	.2	.0031	.0016	.0010	.0003	.0000	.0023
%RSD	.2108	36.82	16.10	.9559	6.431	.2301	2.246
#1	100.4	.0062	.0109	.1054	.0051	.0094	.0998
#2	100.7	.0106	.0087	.1040	.0056	.0093	.1030
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	.0209	-.0031	.0190	.0211	.1705	.0985	.0001
SDev	.0000	.0009	.0000	.0026	.0037	.0002	.0004
%RSD	.0787	28.51	.2038	12.23	2.189	.1791	376.1
#1	.0209	-.0025	.0190	.0229	.1731	.0987	.0004
#2	.0209	-.0038	.0190	.0192	.1679	.0984	-.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	.0907
SDev	.0000	.0001	.0002
%RSD	24.35	.3799	.2087
#1	-.0001	.0403	.0905
#2	-.0001	.0401	.0908
Errors	NOCHECK	LC Pass	NOCHECK
High		.0600	
Low		.0200	

010182

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1133468	10000	--	--	--	--	--
SDev	2366.686	.0000000	--	--	--	--	--
%RSD	.2088004	.0000000	--	--	--	--	--
#1	1131795	10000	--	--	--	--	--
#2	1135142	10000	--	--	--	--	--

Analysis Report 08/17/05 02:56:52 PM

Method: DAILY2 Sample Name: icsa Operator: **010183**
Run Time: 08/17/05 14:52:19
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0016	509.9	.0025	-.0157	.0024	.0000	.0090
SDev	.0001	.4	.0016	.0007	.0002	.0000	.0032
%RSD	4.039	.0812	61.75	4.638	6.510	557.8	35.39
#1	-.0016	510.2	.0014	-.0152	.0023	.0000	.0068
#2	-.0017	509.6	.0036	-.0162	.0025	-.0000	.0113
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	472.7	.0007	.0005	-.0012	.0015	192.2	-.0047
SDev	1.7	.0001	.0005	.0015	.0004	.6	.0140
%RSD	.3587	12.90	98.66	116.6	29.46	.3132	297.5
#1	471.5	.0007	.0002	-.0023	.0012	191.7	-.0146
#2	473.9	.0008	.0009	-.0002	.0018	192.6	.0052
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	.0053	.0003	548.1	-.0038	-.0020	.0486	-.0292
SDev	.0001	.0000	1.5	.0001	.0008	.0928	.0044
%RSD	2.791	.7681	.2769	1.421	42.82	190.8	14.93
#1	.0052	.0003	547.1	-.0038	-.0014	.1142	-.0261
#2	.0055	.0003	549.2	-.0038	-.0026	-.0170	-.0323
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	-.0176	.0374	-.0309	.0151	.0165	.0067
SDev	.0004	.0139	.0034	.0049	.0020	.0036	.0199
%RSD	108.7	79.03	9.191	15.89	13.31	22.09	295.6
#1	.0001	-.0275	.0349	-.0274	.0137	.0190	.0208
#2	.0006	-.0078	.0398	-.0344	.0165	.0139	-.0073
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

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

010184

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	89.21	-.0009	-.0062	-.0061	-.0081	-.0044	-.0027
SDev	1.39	.0049	.0045	.0024	.0021	.0046	.0026
%RSD	1.560	568.1	71.77	39.80	26.14	104.2	95.44
#1	90.19	-.0043	-.0094	-.0078	-.0066	-.0077	-.0009
#2	88.22	.0026	-.0031	-.0044	-.0096	-.0012	-.0045
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	.0164	-.0061	-.0006	.0134	-.0667	.0000	-.0007
SDev	.0000	.0030	.0002	.0004	.0062	.0003	.0032
%RSD	.0987	48.71	24.42	3.129	9.287	879.8	492.1
#1	.0164	-.0082	-.0008	.0131	-.0711	-.0002	.0016
#2	.0164	-.0040	-.0005	.0137	-.0624	.0003	-.0029
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0006	.0076	-.0016
SDev	.0001	.0003	.0008
%RSD	24.02	3.843	49.83
#1	-.0007	.0078	-.0021
#2	-.0005	.0073	-.0010
Errors	NOCHECK	NOCHECK	NOCHECK
High			
Low			

010185

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1005412	10000	--	--	--	--	--
SDev	15658.88	.0000000	--	--	--	--	--
%RSD	1.557460	.0000000	--	--	--	--	--
#1	1016484	10000	--	--	--	--	--
#2	994339	10000	--	--	--	--	--

Analysis Report 08/17/05 03:01:40 PM page 1

Method: DAILY2 Sample Name: icsab Operator: 010186
Run Time: 08/17/05 14:57:04
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.100	510.2	1.052	1.027	.5297	.4931	.0063
SDev	.000	.7	.000	.004	.0006	.0002	.0039
%RSD	.0289	.1406	.0249	.3577	.1125	.0318	62.52
#1	1.100	509.7	1.052	1.024	.5293	.4932	.0035
#2	1.099	510.7	1.053	1.029	.5301	.4929	.0091
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	472.0	.9728	.4876	.4858	.5481	191.6	.0012
SDev	.9	.0021	.0000	.0011	.0002	.1	.0125
%RSD	.1913	.2105	.0031	.2188	.0380	.0701	1041.
#1	472.7	.9743	.4876	.4865	.5480	191.7	.0101
#2	471.4	.9714	.4876	.4850	.5483	191.5	-.0077
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	.0051	1.186	547.9	.4916	1.024	.5253	-.0247
SDev	.0002	.001	.3	.0009	.001	.1196	.0005
%RSD	3.407	.1085	.0564	.1818	.0695	22.77	2.194
#1	.0050	1.185	547.6	.4923	1.024	.6098	-.0243
#2	.0052	1.187	548.1	.4910	1.023	.4407	-.0251
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	.9440	1.048	1.041	.9669	.0191	.0092	1.067
SDev	.0020	.011	.009	.0014	.0002	.0010	.001
%RSD	.2117	1.036	.8581	.1404	1.212	10.75	.0994
#1	.9454	1.056	1.047	.9679	.0190	.0085	1.066
#2	.9426	1.041	1.035	.9659	.0193	.0099	1.068
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

010187

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	89.54	1.045	1.042	1.032	.9917	1.043	1.006
SDev	.10	.002	.002	.001	.0039	.002	.001
%RSD	.1169	.1724	.1859	.0910	.3916	.1814	.1259
#1	89.47	1.046	1.044	1.032	.9944	1.045	1.005
#2	89.61	1.044	1.041	1.033	.9889	1.042	1.007
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	1.042	.0037	.9545	1.006	.9205	.5042	.0033
SDev	.001	.0014	.0006	.009	.0016	.0004	.0034
%RSD	.0572	37.92	.0636	.8708	.1772	.0759	103.3
#1	1.042	.0047	.9549	.9994	.9193	.5045	.0057
#2	1.043	.0027	.9540	1.012	.9216	.5039	.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	-.0008	.9912	.9188
SDev	.0001	.0028	.0012
%RSD	9.617	.2799	.1289
#1	-.0008	.9932	.9179
#2	-.0007	.9893	.9196
Errors	NOCHECK	LC Pass	NOCHECK
High		1.200	
Low		.8000	

010188

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1009076	10000	--	--	--	--	--
SDev	1209.153	.0000000	--	--	--	--	--
%RSD	.1198277	.0000000	--	--	--	--	--
#1	1008221	10000	--	--	--	--	--
#2	1009931	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccv2 Operator: 010189
Run Time: 08/17/05 15:05:32
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9860	9.925	5.132	4.790	9.989	.9936	4.979
SDev	.0034	.078	.015	.003	.006	.0017	.018
%RSD	.3446	.7906	.2970	.0694	.0576	.1696	.3562
#1	.9884	9.980	5.143	4.788	9.993	.9924	4.991
#2	.9836	9.869	5.121	4.793	9.985	.9948	4.966
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	20.19	1.008	5.047	1.991	2.021	10.09	18.53
SDev	.05	.002	.010	.000	.013	.03	.14
%RSD	.2269	.1639	.2051	.0000	.6205	.2794	.7807
#1	20.16	1.007	5.040	1.991	2.030	10.07	18.63
#2	20.23	1.009	5.055	1.991	2.012	10.11	18.43
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	4.957	4.852	20.17	1.007	5.037	28.51	H39.80
SDev	.015	.038	.04	.001	.006	.57	.48
%RSD	.2978	.7833	.2004	.0806	.1270	1.983	1.194
#1	4.968	4.879	20.20	1.006	5.033	28.91	H40.14
#2	4.947	4.825	20.14	1.008	5.042	28.11	H39.47
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	4.938	5.112	4.997	4.975	1.006	.9785	1.004
SDev	.016	.016	.016	.026	.005	.0101	.004
%RSD	.3222	.3121	.3209	.5275	.5414	1.032	.3615
#1	4.926	5.123	4.986	4.956	1.010	.9857	1.007
#2	4.949	5.101	5.009	4.993	1.003	.9714	1.002
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

010190

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	96.53	5.216	5.188	5.011	4.982	5.197	4.929
SDev	1.74	.004	.029	.035	.023	.021	.005
%RSD	1.803	.0855	.5592	.7034	.4584	.4007	.0990
#1	97.76	5.212	5.167	5.036	4.966	5.182	4.925
#2	95.30	5.219	5.208	4.986	4.998	5.212	4.932
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	5.030	.9913	4.771	5.168	.9962	4.970	1.093
SDev	.007	.0022	.001	.002	.0118	.004	.000
%RSD	.1485	.2209	.0134	.0350	1.182	.0878	.0198
#1	5.035	.9929	4.772	5.169	.9879	4.973	1.093
#2	5.024	.9898	4.771	5.167	1.005	4.966	1.093
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	5.052	1.029	4.950
SDev	.011	.002	.008
%RSD	.2244	.2145	.1634
#1	5.060	1.027	4.956
#2	5.044	1.030	4.944
Errors	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500
Low	4.500	.9000	4.500

010191

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1087915	10000	--	--	--	--	--
SDev	19513.32	.0000000	--	--	--	--	--
%RSD	1.793644	.0000000	--	--	--	--	--
#1	1101713	10000	--	--	--	--	--
#2	1074117	10000	--	--	--	--	--

Analysis Report 08/17/05 03:16:42 PM

010192

Method: DAILY2 Sample Name: ccb2 Operator:
Run Time: 08/17/05 15:12:07
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	-.0052	-.0021	.0046	.0003	.0001	.0015
SDev	.0005	.0012	.0002	.0002	.0003	.0000	.0007
%RSD	131.0	23.11	9.266	4.552	99.05	26.00	46.01
#1	.0008	-.0061	-.0023	.0044	.0005	.0002	.0020
#2	.0000	-.0044	-.0020	.0047	.0001	.0001	.0010
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	.0043	.0001	.0004	-.0007	.0004	-.0013	.0084
SDev	.0010	.0001	.0001	.0001	.0000	.0007	.0077
%RSD	22.41	55.66	40.70	11.58	3.528	55.32	91.77
#1	.0036	.0002	.0003	-.0007	.0004	-.0008	.0029
#2	.0049	.0001	.0005	-.0006	.0003	-.0018	.0138
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0500	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0500	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	.0001	.0027	-.0000	.0017	H.0746	.0060
SDev	.0007	.0001	.0024	.0000	.0005	.0200	.0035
%RSD	77.39	113.3	87.75	95.19	29.59	26.80	57.77
#1	.0013	.0002	.0044	-.0001	.0020	H.0887	.0085
#2	.0004	.0000	.0010	-.0000	.0013	H.0604	.0036
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	.0061	.0001	-.0013	.0021	.0094	-.0021
SDev	.0006	.0027	.0028	.0004	.0001	.0086	.0017
%RSD	157.8	44.76	3418.	30.51	5.971	91.10	83.71
#1	.0000	.0042	.0021	-.0010	.0020	.0034	-.0033
#2	-.0008	.0080	-.0019	-.0015	.0022	H.0155	-.0009
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

010193

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.4	-.0018	-.0009	.0004	-.0008	-.0012	.0002
SDev	.8	.0029	.0009	.0032	.0012	.0015	.0032
%RSD	.7937	160.7	97.21	914.7	149.0	130.1	1509.
#1	100.9	.0002	-.0003	.0026	.0000	-.0001	.0025
#2	99.80	-.0038	-.0015	-.0019	-.0017	-.0022	-.0020
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	.0002	-.0065	.0000	.0039	.0178	-.0002	.0010
SDev	.0002	.0026	.0001	.0005	.0080	.0006	.0020
%RSD	84.70	40.16	427.3	12.18	44.81	306.3	195.6
#1	.0003	-.0046	.0001	.0043	.0234	-.0006	.0024
#2	.0001	-.0083	-.0000	.0036	.0122	.0002	-.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	.0000	.0002	-.0004
SDev	.0002	.0003	.0001
%RSD	995.7	111.5	31.53
#1	.0001	.0004	-.0004
#2	-.0001	.0000	-.0003
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010194

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1131000	10000	--	--	--	--	--
SDev	9060.159	.0000000	--	--	--	--	--
%RSD	.8010747	.0000000	--	--	--	--	--
#1	1137407	10000	--	--	--	--	--
#2	1124594	10000	--	--	--	--	--

Method: DAILY2 Sample Name: pbw-H17H1 Operator:
Run Time: 08/17/05 15:16:54
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	-.0003	-.0075	.0003	.0030	.0001	.0001	-.0006
SDev	.0004	.0043	.0027	.0015	.0001	.0000	.0054
%RSD	121.5	57.31	862.7	52.11	195.8	5.897	844.5
#1	-.0000	-.0106	.0022	.0040	.0002	.0001	-.0045
#2	-.0005	-.0045	-.0016	.0019	-.0000	.0001	.0032
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	.0059	.0001	-.0004	-.0001	.0007	.0098	.0183
SDev	.0006	.0002	.0001	.0004	.0006	.0040	.0004
%RSD	9.970	267.1	30.65	325.4	84.30	41.13	2.149
#1	.0063	.0002	-.0003	.0001	.0011	.0070	.0186
#2	.0055	-.0001	-.0005	-.0004	.0003	.0127	.0180
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0500	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0500	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0000	.0001	.0000	-.0002	H.0708	.0053
SDev	.0004	.0000	.0019	.0001	.0008	.0257	.0070
%RSD	129.6	5.855	2999.	298.3	329.6	36.26	132.8
#1	.0006	.0000	-.0013	.0001	.0003	H.0527	.0003
#2	.0000	.0000	.0014	-.0000	-.0008	H.0890	.0103
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	.0047	.0007	-.0009	.0031	-.0084	-.0029
SDev	.0001	.0077	.0041	.0008	.0003	.0002	.0046
%RSD	139.4	163.4	584.9	88.14	10.48	2.566	156.8
#1	-.0002	-.0007	.0036	-.0015	.0033	-.0083	.0003
#2	-.0000	H.0102	-.0022	-.0004	.0028	-.0086	-.0062
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

010196

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.57	-.0033	-.0025	-.0005	-.0004	-.0028	-.0005
SDev	1.70	.0021	.0016	.0028	.0008	.0018	.0025
%RSD	1.721	63.66	62.94	549.4	211.7	63.42	484.9
#1	97.37	-.0018	-.0014	-.0025	.0002	-.0015	.0013
#2	99.77	-.0048	-.0037	.0015	-.0010	-.0040	-.0023
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	.0000	-.0038	.0003	.0008	.0051	-.0002	-.0012
SDev	.0000	.0016	.0002	.0013	.0061	.0010	.0030
%RSD	91.83	43.40	72.23	164.4	119.3	513.5	243.9
#1	.0000	-.0026	.0004	.0018	.0094	.0005	-.0033
#2	.0000	-.0049	.0001	-.0001	.0008	-.0009	.0009
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	.0002	-.0001
SDev	.0001	.0001	.0005
%RSD	214.5	67.07	355.4
#1	.0000	.0001	.0002
#2	-.0001	.0003	-.0005
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010197

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1110909	10000	--	--	--	--	--
SDev	19117.34	.0000000	--	--	--	--	--
%RSD	1.720873	.0000000	--	--	--	--	--
#1	1097391	10000	--	--	--	--	--
#2	1124427	10000	--	--	--	--	--

Method: DAILY2 Sample Name: lcsw-H17H1 Operator:
Run Time: 08/17/05 15:21:39
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	.0488	1.924	1.988	.0014	1.956	.0494	-.0021
SDev	.0003	.011	.009	.0012	.002	.0001	.0001
%RSD	.5046	.5869	.4429	84.95	.1180	.1411	5.261
#1	.0490	1.916	1.982	.0023	1.954	.0495	-.0021
#2	.0486	1.932	1.994	.0006	1.957	.0494	-.0022

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.75	.0493	.4841	.1962	.2460	1.107	16.26
SDev	.00	.0001	.0004	.0013	.0004	.011	.09
%RSD	.0227	.1640	.0769	.6433	.1576	1.005	.5561
#1	19.75	.0492	.4843	.1971	.2457	1.115	16.20
#2	19.75	.0493	.4838	.1953	.2463	1.099	16.32

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0000	19.58	.4892	-.0013	17.41	24.13
SDev	.0004	.0000	.01	.0006	.0000	.03	.16
%RSD	141.0	378.2	.0371	.1224	1.423	.1666	.6502
#1	.0005	.0000	19.57	.4896	-.0012	17.39	24.02
#2	.0000	-.0000	19.58	.4887	-.0013	17.43	24.24

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4806	.0090	.4893	.4882	-.0004	-.0061	.4758
SDev	.0037	.0045	.0003	.0033	.0011	.0045	.0002
%RSD	.7612	50.62	.0551	.6803	257.8	74.10	.0506
#1	.4832	.0122	.4895	.4905	.0004	-.0093	.4756
#2	.4780	.0058	.4891	.4858	-.0012	-.0029	.4759

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.43	2.051	2.031	3.972	.4886	2.038	.0001
SDev	.47	.019	.002	.004	.0023	.005	.0021
%RSD	.4724	.9479	.1156	.0970	.4710	.2411	1668.
#1	98.11	2.037	2.033	3.970	.4902	2.034	-.0013
#2	98.76	2.064	2.030	3.975	.4869	2.041	.0016

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	3.900	-.0242	.0003	2.003	-.0628	.4854	-.0026
SDev	.004	.0046	.0001	.003	.0111	.0012	.0008
%RSD	.0961	18.81	38.32	.1592	17.70	.2381	28.75
#1	3.902	-.0210	.0004	2.005	-.0550	.4862	-.0021
#2	3.897	-.0274	.0002	2.000	-.0707	.4846	-.0032

010199

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0004	.4931	-.0007
SDev	.0002	.0012	.0008
%RSD	52.76	.2424	113.0
#1	-.0003	.4940	-.0001
#2	-.0006	.4923	-.0013

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1109354	10000	--	--	--	--	--
SDev	5245.318	.0000000	--	--	--	--	--
%RSD	.4728264	.0000000	--	--	--	--	--
#1	1105645	10000	--	--	--	--	--
#2	1113063	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265477 Operator: 010200
Run Time: 08/17/05 15:26:24
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	2.518	-.0021	.0311	.1392	.0002	.0009
SDev	.0002	.124	.0016	.0006	.0003	.0000	.0035
%RSD	82.69	4.927	79.47	1.808	.2495	3.562	394.4
#1	.0001	2.606	-.0032	.0307	.1394	.0002	-.0016
#2	.0003	2.431	-.0009	.0315	.1389	.0002	.0033

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0989	.0001	-.0001	-.0000	.0007	.3328	.1309
SDev	.0005	.0002	.0000	.0001	.0002	.0089	.0024
%RSD	.5451	230.3	28.71	851.1	31.53	2.663	1.832
#1	.0985	-.0000	-.0001	.0000	.0009	.3391	.1326
#2	.0993	.0002	-.0001	-.0000	.0006	.3266	.1292

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	.0056	1.012	.0070	-.0018	4.472	5.791
SDev	.0004	.0003	.047	.0002	.0006	.032	.031
%RSD	27.08	5.129	4.652	3.018	35.56	.7242	.5353
#1	.0012	.0058	1.046	.0071	-.0013	4.449	5.813
#2	.0018	.0054	.9790	.0068	-.0022	4.495	5.769

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	.0041	.0013	.0005	-.0003	.5088	-.0008
SDev	.0009	.0106	.0040	.0009	.0011	.0087	.0033
%RSD	179.4	257.9	316.8	173.0	322.1	1.718	403.0
#1	.0011	.0116	-.0016	.0012	-.0011	.5149	.0015
#2	-.0001	-.0034	.0041	-.0001	.0004	.5026	-.0031

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.99	-.0016	-.0024	8.906	.0008	-.0021	-.0023
SDev	.06	.0009	.0008	.420	.0007	.0002	.0003
%RSD	.0562	55.43	32.92	4.720	91.06	10.96	12.82
#1	99.03	-.0010	-.0029	9.203	.0003	-.0023	-.0021
#2	98.95	-.0022	-.0018	8.609	.0013	-.0019	-.0025

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	-.0031	.0368	-.0010	.0138	-.0005	-.0001
SDev	.0001	.0005	.0017	.0024	.0105	.0002	.0008
%RSD	8.855	15.14	4.632	245.3	76.07	48.61	911.1
#1	.0010	-.0034	.0381	-.0026	.0064	-.0007	.0005
#2	.0009	-.0027	.0356	.0007	.0212	-.0003	-.0007

010201

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0317	.0076
SDev	.0001	.0004	.0001
%RSD	3843.	1.204	1.399
#1	.0000	.0320	.0077
#2	-.0000	.0314	.0075

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1115660	10000	--	--	--	--	--
SDev	556.4930	.0000000	--	--	--	--	--
%RSD	.0498801	.0000000	--	--	--	--	--
#1	1116054	10000	--	--	--	--	--
#2	1115267	10000	--	--	--	--	--

Analysis Report 08/17/05 03:35:44 PM

010202

Method: DAILY2 Sample Name: 265478 Operator:
Run Time: 08/17/05 15:31:10
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	1.366	-.0026	.0077	.0517	.0002	-.0028
SDev	.0002	.070	.0025	.0006	.0001	.0000	.0052
%RSD	158.8	5.091	96.72	8.496	.1708	8.040	184.6
#1	-.0003	1.416	-.0008	.0072	.0518	.0002	-.0065
#2	.0000	1.317	-.0043	.0081	.0517	.0002	.0009

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0508	-.0001	-.0003	-.0002	.0006	.1738	.0602
SDev	.0021	.0000	.0003	.0004	.0007	.0057	.0136
%RSD	4.045	2.233	99.93	212.0	111.3	3.275	22.65
#1	.0494	-.0001	-.0006	-.0005	.0001	.1697	.0505
#2	.0523	-.0001	-.0001	.0001	.0011	.1778	.0698

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0029	.5486	.0032	-.0005	3.705	4.982
SDev	.0009	.0001	.0187	.0000	.0006	.040	.042
%RSD	304.8	3.166	3.413	.9521	136.8	1.087	.8435
#1	-.0003	.0030	.5619	.0033	-.0009	3.676	5.012
#2	.0009	.0028	.5354	.0032	-.0000	3.733	4.952

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0007	-.0027	-.0020	-.0011	-.0008	.4615	-.0014
SDev	.0006	.0014	.0006	.0008	.0050	.0082	.0001
%RSD	81.74	49.77	29.57	73.33	612.7	1.776	6.471
#1	-.0011	-.0018	-.0024	-.0005	-.0043	.4557	-.0014
#2	-.0003	-.0037	-.0016	-.0017	.0027	.4673	-.0013

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.6	-.0043	-.0000	5.064	-.0014	-.0014	-.0002
SDev	1.5	.0003	.0009	.219	.0003	.0005	.0024
%RSD	1.502	7.272	9517.	4.316	24.74	33.32	1137.
#1	101.7	-.0045	.0006	5.219	-.0012	-.0011	.0015
#2	99.52	-.0041	-.0006	4.910	-.0017	-.0018	-.0019

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	-.0048	.0187	.0005	-.0228	-.0002	-.0016
SDev	.0000	.0015	.0007	.0022	.0313	.0008	.0009
%RSD	14.41	32.42	3.805	488.2	137.5	329.5	56.08
#1	.0002	-.0037	.0192	.0020	-.0449	-.0008	-.0022
#2	.0003	-.0059	.0182	-.0011	-.0006	.0003	-.0009

010203

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0180	.0037
SDev	.0001	.0001	.0003
%RSD	101.7	.8467	8.749
#1	-.0001	.0178	.0035
#2	-.0000	.0181	.0039

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1133542	10000	--	--	--	--	--
SDev	17080.16	.0000000	--	--	--	--	--
%RSD	1.506797	.0000000	--	--	--	--	--
#1	1145619	10000	--	--	--	--	--
#2	1121464	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265478d Operator: **010204**
Run Time: 08/17/05 15:35:56
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	1.393	-.0009	.0068	.0520	.0002	.0015
SDev	.0008	.086	.0014	.0003	.0001	.0000	.0040
%RSD	149.8	6.149	145.8	5.236	.2773	9.648	256.9
#1	-.0000	1.454	-.0019	.0070	.0521	.0002	-.0013
#2	.0011	1.332	.0000	.0065	.0519	.0002	.0043

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0553	.0001	.0005	-.0004	.0008	.1737	.0733
SDev	.0015	.0000	.0004	.0003	.0001	.0020	.0198
%RSD	2.738	39.15	88.92	89.66	6.212	1.172	26.97
#1	.0542	.0000	.0002	-.0001	.0009	.1723	.0593
#2	.0564	.0001	.0008	-.0006	.0008	.1752	.0872

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	.0030	.5574	.0033	-.0004	3.943	5.043
SDev	.0007	.0001	.0272	.0000	.0005	.113	.041
%RSD	73.99	2.302	4.888	.6229	131.2	2.873	.8047
#1	.0005	.0030	.5766	.0033	-.0000	3.863	5.071
#2	.0015	.0029	.5381	.0032	-.0008	4.023	5.014

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	-.0040	-.0014	.0010	.0014	.4769	-.0020
SDev	.0007	.0024	.0001	.0018	.0040	.0041	.0032
%RSD	229.6	60.42	9.942	177.1	285.4	.8532	160.3
#1	.0002	-.0057	-.0015	-.0003	-.0014	.4741	.0003
#2	-.0007	-.0023	-.0013	.0023	.0043	.4798	-.0043

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.6	-.0014	.0010	5.126	.0002	.0002	-.0013
SDev	1.2	.0038	.0004	.265	.0013	.0010	.0008
%RSD	1.150	277.0	35.52	5.161	519.3	446.0	58.01
#1	101.4	.0013	.0008	5.313	-.0007	.0010	-.0019
#2	99.75	-.0041	.0013	4.939	.0011	-.0005	-.0008

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	-.0064	.0190	.0006	.0286	.0000	-.0000
SDev	.0000	.0001	.0010	.0005	.0174	.0002	.0011
%RSD	5.857	.8192	5.523	80.39	60.91	555.8	2914.
#1	.0003	-.0065	.0197	.0009	.0163	.0002	.0008
#2	.0003	-.0064	.0183	.0002	.0409	-.0001	-.0008

010205

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0148	.0039
SDev	.0000	.0002	.0002
%RSD	41.24	1.515	4.868
#1	-.0001	.0149	.0040
#2	-.0001	.0146	.0037

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1133335	10000	--	--	--	--	--
SDev	13111.17	.0000000	--	--	--	--	--
%RSD	1.156867	.0000000	--	--	--	--	--
#1	1142606	10000	--	--	--	--	--
#2	1124064	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265478s Operator: 010206
Run Time: 08/17/05 15:40:41
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0486	3.304	1.967	.0076	1.975	.0488	.0026
SDev	.0003	.067	.001	.0004	.001	.0001	.0019
%RSD	.5062	2.021	.0554	5.787	.0665	.1034	76.50
#1	.0484	3.351	1.966	.0073	1.974	.0488	.0012
#2	.0488	3.257	1.968	.0079	1.975	.0488	.0039

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.53	.0488	.4774	.1920	.2431	1.238	16.52
SDev	.02	.0004	.0000	.0005	.0001	.000	.01
%RSD	.0984	.9188	.0009	.2467	.0186	.0375	.0815
#1	19.54	.0492	.4774	.1923	.2432	1.239	16.51
#2	19.51	.0485	.4774	.1917	.2431	1.238	16.53

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	.0036	19.91	.4848	-.0010	21.67	29.90
SDev	.0008	.0001	.04	.0007	.0003	.13	.04
%RSD	182.3	4.180	.2255	.1434	34.28	.5819	.1272
#1	-.0001	.0037	19.94	.4853	-.0012	21.76	29.93
#2	.0010	.0035	19.88	.4843	-.0008	21.58	29.88

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4734	.0006	.4842	.4788	-.0011	.4648	.4745
SDev	.0039	.0052	.0000	.0051	.0018	.0022	.0030
%RSD	.8311	910.7	.0091	1.072	164.5	.4819	.6314
#1	.4762	-.0031	.4842	.4825	-.0024	.4632	.4724
#2	.4706	.0043	.4842	.4752	.0002	.4664	.4766

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.5	2.038	1.996	9.053	.4806	2.010	.0014
SDev	.5	.010	.001	.213	.0034	.002	.0011
%RSD	.5062	.4671	.0680	2.349	.7087	.1129	83.81
#1	101.2	2.045	1.995	9.203	.4830	2.012	.0022
#2	101.9	2.031	1.997	8.903	.4782	2.009	.0006

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	3.866	-.0246	.0191	1.972	-.0496	.4779	-.0019
SDev	.003	.0017	.0009	.003	.0000	.0006	.0002
%RSD	.0827	6.832	4.937	.1525	.0785	.1339	10.66
#1	3.868	-.0234	.0197	1.969	-.0496	.4783	-.0017
#2	3.864	-.0258	.0184	1.974	-.0497	.4774	-.0020

010207

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0003	.5009	.0037
SDev	.0000	.0001	.0003
%RSD	7.145	.0121	8.608
#1	-.0003	.5009	.0039
#2	-.0004	.5010	.0035

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1144078	10000	--	--	--	--	--
SDev	5786.255	.0000000	--	--	--	--	--
%RSD	.5057572	.0000000	--	--	--	--	--
#1	1139986	10000	--	--	--	--	--
#2	1148169	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265479 Operator: **010208**
Run Time: 08/17/05 15:45:26
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	1.322	-.0014	.0056	.0493	.0002	.0002
SDev	.0002	.076	.0013	.0005	.0003	.0000	.0045
%RSD	75.78	5.777	96.63	9.452	.5113	3.961	2412.
#1	-.0004	1.376	-.0023	.0060	.0495	.0002	.0034
#2	-.0001	1.268	-.0004	.0053	.0491	.0002	-.0030

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0448	-.0001	-.0000	-.0006	.0003	.1650	.0619
SDev	.0018	.0000	.0004	.0004	.0003	.0288	.0042
%RSD	3.987	17.57	868.2	65.47	86.47	17.45	6.814
#1	.0461	-.0001	-.0004	-.0003	.0005	.1853	.0649
#2	.0436	-.0001	.0003	-.0008	.0001	.1446	.0589

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0028	.5290	.0032	-.0009	3.893	5.047
SDev	.0005	.0002	.0311	.0001	.0002	.096	.016
%RSD	564.2	6.930	5.872	4.231	16.35	2.476	.3211
#1	.0004	.0029	.5509	.0033	-.0011	3.825	5.036
#2	-.0003	.0027	.5070	.0031	-.0008	3.961	5.059

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	.0011	.0011	-.0016	.0003	.4779	-.0035
SDev	.0003	.0134	.0018	.0001	.0008	.0040	.0019
%RSD	64.74	1251.	158.8	5.768	297.7	.8406	54.54
#1	-.0002	-.0084	.0024	-.0017	.0008	.4808	-.0022
#2	-.0007	.0105	-.0001	-.0015	-.0003	.4751	-.0048

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.94	-.0008	-.0005	4.905	-.0007	-.0006	.0002
SDev	1.37	.0005	.0017	.241	.0005	.0013	.0011
%RSD	1.374	59.10	349.4	4.923	79.15	220.3	730.5
#1	98.97	-.0005	.0007	5.075	-.0003	.0003	-.0006
#2	100.9	-.0012	-.0017	4.734	-.0011	-.0015	.0010

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	-.0038	.0179	-.0009	-.0164	-.0002	-.0016
SDev	.0001	.0018	.0011	.0025	.0030	.0002	.0011
%RSD	33.77	47.49	6.339	290.3	18.11	127.1	69.72
#1	.0005	-.0025	.0187	.0009	-.0185	-.0000	-.0008
#2	.0003	-.0050	.0171	-.0026	-.0143	-.0003	-.0024

010209

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0120	.0031
SDev	.0001	.0001	.0006
%RSD	47.86	1.146	20.23
#1	-.0001	.0121	.0035
#2	-.0002	.0119	.0026

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1126321	10000	--	--	--	--	--
SDev	15550.69	.0000000	--	--	--	--	--
%RSD	1.380663	.0000000	--	--	--	--	--
#1	1115325	10000	--	--	--	--	--
#2	1137317	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265480 Operator: **010210**
Run Time: 08/17/05 15:50:13
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	1.300	-.0017	.0103	.0513	.0002	.0011
SDev	.0004	.103	.0005	.0004	.0002	.0000	.0027
%RSD	191.7	7.933	29.71	3.472	.4200	3.206	244.7
#1	.0005	1.373	-.0021	.0106	.0514	.0002	-.0008
#2	-.0001	1.227	-.0014	.0100	.0511	.0002	.0031

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0558	.0001	.0005	.0001	.0008	.1756	.0772
SDev	.0007	.0000	.0003	.0001	.0000	.0218	.0008
%RSD	1.279	25.87	54.48	164.5	2.853	12.39	1.008
#1	.0563	.0001	.0003	-.0000	.0008	.1910	.0777
#2	.0553	.0001	.0007	.0002	.0009	.1602	.0766

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	.0029	.5211	.0033	-.0006	5.320	6.956
SDev	.0007	.0003	.0380	.0001	.0007	.060	.023
%RSD	67.32	9.258	7.300	4.089	117.3	1.137	.3321
#1	.0015	.0031	.5480	.0034	-.0001	5.363	6.940
#2	.0005	.0027	.4942	.0032	-.0010	5.277	6.972

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	-.0040	.0015	.0009	.0018	.4757	-.0047
SDev	.0004	.0003	.0019	.0018	.0018	.0120	.0044
%RSD	84.57	6.353	120.9	187.0	102.6	2.522	94.21
#1	.0007	-.0042	.0028	-.0003	.0031	.4672	-.0078
#2	.0002	-.0038	.0002	.0022	.0005	.4842	-.0016

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.7	-.0013	-.0003	4.831	.0012	-.0006	.0007
SDev	.1	.0075	.0002	.320	.0006	.0027	.0011
%RSD	.0980	592.5	68.87	6.621	48.64	422.5	171.4
#1	100.6	-.0066	-.0005	5.058	.0008	-.0025	-.0001
#2	100.7	.0041	-.0002	4.605	.0016	.0012	.0015

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	-.0029	.0178	-.0005	.0053	.0002	-.0017
SDev	.0000	.0020	.0014	.0005	.0054	.0003	.0004
%RSD	2.284	67.43	7.848	96.81	102.8	189.4	21.78
#1	.0005	-.0043	.0188	-.0008	.0091	-.0001	-.0020
#2	.0004	-.0015	.0168	-.0002	.0014	.0004	-.0014

010211

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0103	.0037
SDev	.0000	.0003	.0001
%RSD	80.88	2.762	3.610
#1	-.0000	.0105	.0037
#2	-.0000	.0101	.0038

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1134409	10000	--	--	--	--	--
SDev	1088.945	.0000000	--	--	--	--	--
%RSD	.0959922	.0000000	--	--	--	--	--
#1	1133639	10000	--	--	--	--	--
#2	1135179	10000	--	--	--	--	--

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010212

Method: DAILY2 Sample Name: 265481 Operator:
Run Time: 08/17/05 15:54:58
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	-.0074	-.0028	-.0003	-.0000	.0001	.0023
SDev	.0005	.0023	.0006	.0007	.0001	.0000	.0060
%RSD	1955.	30.50	21.98	223.8	2623.	10.35	260.2
#1	-.0003	-.0090	-.0032	-.0008	-.0001	.0001	-.0019
#2	.0004	-.0058	-.0023	.0002	.0000	.0001	.0065

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4993	-.0000	-.0000	-.0011	.0004	.4889	.2943
SDev	.0015	.0000	.0002	.0003	.0006	.0040	.0047
%RSD	.2930	2.439	889.2	30.34	169.8	.8150	1.595
#1	.4982	-.0000	-.0002	-.0013	-.0001	.4917	.2910
#2	.5003	-.0000	.0001	-.0008	.0008	.4861	.2976

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	-.0000	.4793	-.0001	-.0001	.4056	.4869
SDev	.0006	.0000	.0033	.0001	.0010	.1141	.0031
%RSD	111.1	195.2	.6946	149.8	746.9	28.13	.6448
#1	.0001	-.0000	.4769	-.0001	-.0008	.3249	.4891
#2	.0010	.0000	.4817	.0000	.0006	.4862	.4847

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	.0044	-.0006	-.0010	.0012	-.0070	-.0028
SDev	.0000	.0029	.0003	.0010	.0011	.0031	.0035
%RSD	5.874	66.82	48.23	99.65	87.13	44.12	124.2
#1	-.0003	.0065	-.0004	-.0003	.0005	-.0048	-.0052
#2	-.0004	.0023	-.0008	-.0017	.0020	-.0092	-.0003

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.5	-.0003	.0025	-.0003	-.0009	.0016	-.0004
SDev	.5	.0036	.0026	.0010	.0008	.0029	.0006
%RSD	.5140	1195.	102.6	372.6	88.45	182.6	177.7
#1	101.9	.0022	.0044	-.0009	-.0003	.0037	.0001
#2	101.2	-.0028	.0007	.0004	-.0014	-.0005	-.0008

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	-.0049	.0002	.0013	-.0022	-.0009	-.0025
SDev	.0000	.0006	.0000	.0011	.0247	.0008	.0003
%RSD	94.74	12.81	5.997	81.45	1097.	88.19	12.83
#1	.0000	-.0044	.0002	.0021	-.0197	-.0015	-.0028
#2	.0000	-.0053	.0002	.0006	.0152	-.0003	-.0023

010213

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0000	-.0007
SDev	.0001	.0001	.0004
%RSD	82.95	194.3	58.78
#1	-.0002	-.0000	-.0010
#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	1144431	10000	--	--	--	--	--
SDev	5871.815	.0000000	--	--	--	--	--
%RSD	.5130772	.0000000	--	--	--	--	--
#1	1148583	10000	--	--	--	--	--
#2	1140279	10000	--	--	--	--	--

Method: DAILY2 Sample Name: 265482 Operator:
Run Time: 08/17/05 15:59:44
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	.0005	-.0102	-.0007	-.0008	.0001	.0002	.0016
SDev	.0007	.0037	.0006	.0002	.0000	.0000	.0023
%RSD	145.3	36.33	81.00	26.09	9.982	1.198	149.3
#1	-.0000	-.0128	-.0011	-.0006	.0001	.0002	-.0001
#2	.0010	-.0076	-.0003	-.0009	.0001	.0002	.0032

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4963	.0002	.0003	-.0001	.0006	.4912	.3019
SDev	.0028	.0001	.0003	.0003	.0001	.0201	.0232
%RSD	.5657	68.09	107.4	523.1	19.42	4.083	7.694
#1	.4944	.0001	.0005	.0002	.0006	.4770	.2855
#2	.4983	.0003	.0001	-.0003	.0007	.5054	.3183

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	-.0000	.4817	-.0000	-.0004	.4983	.4721
SDev	.0006	.0001	.0073	.0000	.0007	.3479	.0065
%RSD	49.83	21990.	1.511	131.4	183.7	69.82	1.379
#1	.0007	-.0001	.4765	-.0000	.0001	.2523	.4767
#2	.0015	.0001	.4868	-.0000	-.0009	.7442	.4675

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	-.0028	.0022	-.0022	.0032	-.0016	-.0023
SDev	.0016	.0057	.0058	.0004	.0050	.0017	.0010
%RSD	148.5	206.7	260.4	15.88	155.0	105.6	42.59
#1	.0022	.0013	-.0019	-.0020	-.0003	-.0004	-.0016
#2	-.0001	-.0068	.0064	-.0025	.0067	-.0028	-.0029

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.73	-.0034	-.0013	.0011	-.0007	-.0020	-.0012
SDev	1.94	.0053	.0008	.0024	.0017	.0023	.0003
%RSD	1.943	154.6	65.39	229.1	231.2	117.4	27.73
#1	101.1	-.0072	-.0018	-.0007	-.0019	-.0036	-.0010
#2	98.36	.0003	-.0007	.0028	.0005	-.0003	-.0015

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	-.0035	.0003	.0020	.0214	-.0002	.0015
SDev	.0000	.0011	.0001	.0003	.0338	.0005	.0008
%RSD	61.74	32.18	35.19	15.21	157.8	302.4	53.40
#1	.0000	-.0027	.0004	.0023	-.0025	-.0005	.0009
#2	.0001	-.0043	.0002	.0018	.0453	.0002	.0020

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0003	.0000
SDev	.0000	.0001	.0006
%RSD	57.67	45.28	8406.
#1	-.0001	.0003	-.0004
#2	-.0000	.0002	.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1123954	10000	--	--	--	--	--
SDev	21916.78	.0000000	--	--	--	--	--
%RSD	1.949970	.0000000	--	--	--	--	--
#1	1139452	10000	--	--	--	--	--
#2	1108457	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccv3 Operator: 010216
Run Time: 08/17/05 16:08:11
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9853	9.934	5.094	4.788	9.949	.9931	4.983
SDev	.0028	.058	.000	.024	.020	.0019	.022
%RSD	.2868	.5866	.0066	.5058	.1981	.1896	.4334
#1	.9833	9.893	5.094	4.771	9.935	.9944	4.968
#2	.9873	9.975	5.094	4.806	9.963	.9918	4.998
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	20.26	1.000	5.027	1.984	2.025	10.05	18.46
SDev	.02	.002	.004	.005	.011	.01	.14
%RSD	.0928	.2360	.0825	.2512	.5276	.1207	.7366
#1	20.27	1.002	5.030	1.988	2.018	10.06	18.36
#2	20.25	.9987	5.024	1.981	2.033	10.04	18.55
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	4.961	4.819	20.09	1.004	5.024	28.35	H39.33
SDev	.011	.023	.04	.002	.002	.28	.25
%RSD	.2122	.4810	.2074	.1790	.0442	1.003	.6338
#1	4.954	4.803	20.12	1.006	5.023	28.15	H39.15
#2	4.968	4.835	20.06	1.003	5.026	28.55	H39.50
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	4.895	5.092	5.042	4.935	1.010	.9806	.9971
SDev	.011	.022	.008	.005	.002	.0024	.0025
%RSD	.2286	.4359	.1572	.0941	.1793	.2462	.2522
#1	4.903	5.076	5.048	4.938	1.008	.9789	.9989
#2	4.887	5.108	5.036	4.932	1.011	.9823	.9953
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

010217

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	95.87	5.300	5.168	5.010	4.971	5.212	4.907
SDev	1.70	.021	.004	.018	.006	.010	.006
%RSD	1.770	.3960	.0799	.3659	.1155	.1870	.1235
#1	94.67	5.285	5.165	4.997	4.975	5.205	4.903
#2	97.07	5.315	5.170	5.023	4.967	5.218	4.912
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	5.043	.9832	4.768	5.143	.9902	4.965	1.089
SDev	.014	.0027	.004	.012	.0246	.003	.003
%RSD	.2730	.2701	.0819	.2385	2.488	.0655	.2849
#1	5.034	.9851	4.765	5.134	1.008	4.967	1.087
#2	5.053	.9814	4.770	5.152	.9728	4.962	1.091
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	5.055	1.022	4.994
SDev	.005	.006	.014
%RSD	.1059	.5702	.2777
#1	5.051	1.026	4.984
#2	5.059	1.018	5.004
Errors	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500
Low	4.500	.9000	4.500

010218

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1080412	10000	--	--	--	--	--
SDev	19031.78	.0000000	--	--	--	--	--
%RSD	1.761531	.0000000	--	--	--	--	--
#1	1066954	10000	--	--	--	--	--
#2	1093869	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccb3 Operator: 010219
Run Time: 08/17/05 16:14:46
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	-.0088	.0005	.0036	.0009	.0002	-.0024
SDev	.0011	.0080	.0040	.0014	.0014	.0001	.0022
%RSD	250.3	91.32	750.8	40.06	144.6	59.48	92.65
#1	.0013	-.0031	-.0023	.0046	.0019	.0003	-.0008
#2	-.0003	-.0144	.0034	.0026	-.0000	.0001	-.0039
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	.0031	.0001	.0007	-.0010	.0002	.0122	.0104
SDev	.0043	.0004	.0013	.0003	.0007	.0215	.0155
%RSD	140.2	407.6	196.5	30.92	456.2	176.8	149.1
#1	.0061	.0004	.0016	-.0008	.0007	.0273	.0214
#2	.0000	-.0002	-.0003	-.0012	-.0004	-.0030	-.0006
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0500	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0500	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	.0004	.0029	-.0001	.0012	-.0282	.0089
SDev	.0021	.0006	.0104	.0001	.0009	.4746	.0158
%RSD	206.0	143.9	355.9	110.0	80.30	1684.	178.1
#1	.0025	.0008	.0103	-.0000	.0018	H.3074	.0201
#2	-.0005	-.0000	-.0044	-.0002	.0005	L-.3638	-.0023
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	.0003	-.0003	-.0007	-.0018	.0021	.0032	-.0057
SDev	.0021	.0045	.0003	.0010	.0070	.0076	.0003
%RSD	841.6	1508.	42.17	51.80	331.1	236.7	6.103
#1	.0018	.0029	-.0005	-.0025	H.0071	.0085	-.0060
#2	-.0013	-.0035	-.0009	-.0012	-.0028	-.0021	-.0055
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

010220

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.37	-.0044	-.0021	.0014	-.0015	-.0028	-.0004
SDev	.78	.0030	.0029	.0044	.0005	.0029	.0019
%RSD	.7859	69.16	138.4	306.9	36.87	103.1	500.5
#1	99.93	-.0022	-.0000	.0045	-.0018	-.0008	.0010
#2	98.82	-.0065	-.0041	-.0017	-.0011	-.0049	-.0017
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	.0005	-.0074	.0001	.0037	.0124	-.0007	.0032
SDev	.0007	.0026	.0005	.0033	.0638	.0008	.0019
%RSD	139.7	35.51	427.8	87.74	512.9	112.5	60.08
#1	.0010	-.0093	.0005	.0061	.0575	-.0001	.0046
#2	.0000	-.0056	-.0002	.0014	-.0327	-.0012	.0018
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	-.0000	-.0004
SDev	.0007	.0004	.0011
%RSD	273.4	7180.	306.8
#1	.0007	.0003	.0004
#2	-.0002	-.0003	-.0011
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010221

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1119876	10000	--	--	--	--	--
SDev	8823.985	.0000000	--	--	--	--	--
%RSD	.7879434	.0000000	--	--	--	--	--
#1	1126115	10000	--	--	--	--	--
#2	1113636	10000	--	--	--	--	--

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010222

Method: DAILY2 Sample Name: 265483 Operator:
Run Time: 08/17/05 16:19:33
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	-.0092	-.0010	.0060	.0346	.0002	.0038
SDev	.0001	.0011	.0016	.0008	.0001	.0000	.0033
%RSD	24.26	11.97	157.5	12.88	.1380	5.296	86.91
#1	.0003	-.0084	.0001	.0065	.0346	.0002	.0061
#2	.0002	-.0100	-.0022	.0054	.0346	.0002	.0015

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4124	.0001	.0004	-.0004	.0008	.0048	.1803
SDev	.0014	.0002	.0000	.0001	.0003	.0018	.0110
%RSD	.3523	131.3	2.359	20.08	34.38	36.28	6.080
#1	.4113	.0000	.0004	-.0005	.0010	.0036	.1725
#2	.4134	.0002	.0004	-.0004	.0006	.0061	.1880

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	.0002	.0527	.0005	-.0002	3.050	3.905
SDev	.0001	.0000	.0005	.0001	.0003	.195	.010
%RSD	13.70	12.29	.9698	19.82	124.8	6.394	.2666
#1	.0011	.0001	.0531	.0005	-.0000	2.912	3.912
#2	.0009	.0002	.0524	.0004	-.0004	3.188	3.897

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	.0173	-.0008	-.0009	.0027	.4540	-.0045
SDev	.0005	.0094	.0074	.0003	.0025	.0094	.0059
%RSD	316.8	54.26	907.9	37.76	93.51	2.075	130.8
#1	.0005	.0239	.0044	-.0007	.0009	.4473	-.0086
#2	-.0002	.0106	-.0060	-.0012	.0045	.4606	-.0003

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.08	-.0018	-.0045	.6664	-.0009	-.0036	-.0006
SDev	1.48	.0009	.0021	.0005	.0027	.0017	.0002
%RSD	1.497	51.17	46.48	.0790	307.3	47.38	36.13
#1	100.1	-.0012	-.0030	.6660	.0010	-.0024	-.0004
#2	98.03	-.0025	-.0060	.6667	-.0028	-.0048	-.0007

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	-.0027	.0002	.0022	.0218	-.0007	.0025
SDev	.0000	.0025	.0001	.0003	.0014	.0001	.0022
%RSD	2.773	93.50	24.23	13.24	6.365	17.79	90.13
#1	.0011	-.0045	.0003	.0020	.0228	-.0007	.0009
#2	.0011	-.0009	.0002	.0024	.0208	-.0006	.0040

010223

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0048	-.0003
SDev	.0000	.0002	.0003
%RSD	25.07	3.344	110.8
#1	-.0001	.0047	-.0001
#2	-.0002	.0049	-.0005

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1116578	10000	--	--	--	--	--
SDev	16749.24	.0000000	--	--	--	--	--
%RSD	1.500050	.0000000	--	--	--	--	--
#1	1128422	10000	--	--	--	--	--
#2	1104735	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265484 Operator: **010224**
Run Time: 08/17/05 16:24:19
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0006	-.0209	-.0037	.0055	.0326	.0002	.0010
SDev	.0019	.0039	.0016	.0003	.0000	.0000	.0100
%RSD	301.9	18.83	42.32	6.092	.1140	6.324	1004.
#1	-.0020	-.0237	-.0048	.0058	.0326	.0002	-.0061
#2	.0007	-.0182	-.0026	.0053	.0326	.0002	.0081

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4027	-.0000	-.0009	-.0002	.0006	-.0085	.1384
SDev	.0010	.0005	.0002	.0000	.0003	.0420	.0339
%RSD	.2537	1424.	17.48	22.63	42.45	492.2	24.51
#1	.4019	-.0004	-.0010	-.0002	.0008	-.0382	.1144
#2	.4034	.0003	-.0008	-.0002	.0004	.0212	.1624

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0008	.0001	.0406	.0003	-.0002	2.867	3.913
SDev	.0013	.0001	.0073	.0001	.0010	.415	.024
%RSD	172.5	141.6	18.04	27.04	448.0	14.49	.6175
#1	-.0017	-.0000	.0354	.0004	.0005	2.573	3.930
#2	.0002	.0001	.0457	.0003	-.0010	3.160	3.896

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	.0050	-.0041	.0008	-.0023	.4624	-.0017
SDev	.0009	.0052	.0066	.0044	.0065	.0002	.0019
%RSD	281.4	103.4	161.1	527.1	287.4	.0354	114.6
#1	.0003	.0087	-.0088	.0039	-.0069	.4625	-.0003
#2	-.0009	.0014	.0006	-.0023	.0023	.4623	-.0030

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.3	-.0049	.0016	.6519	-.0008	-.0005	-.0011
SDev	.4	.0046	.0003	.0009	.0007	.0017	.0010
%RSD	.4112	93.94	18.24	.1403	87.79	326.0	95.08
#1	100.1	-.0081	.0014	.6513	-.0003	-.0017	-.0018
#2	100.6	-.0016	.0018	.6525	-.0013	.0007	-.0004

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	-.0030	.0002	-.0011	-.0332	-.0002	-.0018
SDev	.0001	.0026	.0000	.0014	.0286	.0002	.0002
%RSD	5.529	87.58	4.326	129.0	86.20	91.06	9.486
#1	.0010	-.0011	.0002	-.0021	-.0534	-.0003	-.0019
#2	.0011	-.0048	.0002	-.0001	-.0129	-.0001	-.0017

010225

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0046	-.0005
SDev	.0001	.0004	.0004
%RSD	60.77	9.293	87.97
#1	-.0000	.0043	-.0002
#2	-.0001	.0049	-.0008

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1130943	10000	--	--	--	--	--
SDev	4661.248	.0000000	--	--	--	--	--
%RSD	.4121559	.0000000	--	--	--	--	--
#1	1127647	10000	--	--	--	--	--
#2	1134239	10000	--	--	--	--	--

Analysis Report 08/17/05 04:33:39 PM

Method: DAILY2 Sample Name: 265485 Operator: **010226**
Run Time: 08/17/05 16:29:05
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	-.0160	-.0025	.0055	.0337	.0002	.0018
SDev	.0003	.0017	.0018	.0002	.0001	.0000	.0043
%RSD	130.2	10.64	72.08	3.512	.3538	2.569	238.0
#1	-.0004	-.0148	-.0038	.0056	.0336	.0002	-.0012
#2	-.0000	-.0172	-.0012	.0053	.0338	.0002	.0049

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4072	.0000	-.0002	.0004	.0010	-.0043	.1563
SDev	.0012	.0001	.0012	.0002	.0001	.0006	.0117
%RSD	.2845	670.9	729.5	57.52	6.749	15.08	7.500
#1	.4064	-.0000	-.0010	.0005	.0009	-.0047	.1480
#2	.4080	.0001	.0007	.0002	.0010	-.0038	.1646

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0001	.0487	.0003	-.0002	3.061	3.937
SDev	.0006	.0000	.0037	.0000	.0001	.007	.018
%RSD	1344.	34.61	7.700	4.027	45.35	.2387	.4481
#1	-.0004	.0001	.0460	.0003	-.0003	3.055	3.950
#2	.0005	.0001	.0513	.0003	-.0001	3.066	3.925

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	.0124	-.0024	-.0007	-.0007	.4557	.0007
SDev	.0010	.0015	.0004	.0011	.0017	.0102	.0001
%RSD	520.3	12.55	17.47	151.8	243.1	2.232	22.83
#1	.0009	.0113	-.0027	-.0014	-.0019	.4629	.0006
#2	-.0005	.0135	-.0021	.0001	.0005	.4485	.0008

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.27	-.0025	.0011	.6592	-.0013	-.0001	-.0017
SDev	1.00	.0005	.0053	.0002	.0008	.0034	.0010
%RSD	1.008	19.54	508.6	.0319	67.00	3140.	56.13
#1	99.97	-.0028	.0048	.6594	-.0019	.0023	-.0010
#2	98.56	-.0021	-.0027	.6591	-.0007	-.0025	-.0024

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	-.0004	.0003	-.0001	-.0274	-.0000	-.0022
SDev	.0000	.0018	.0001	.0008	.0251	.0006	.0021
%RSD	1.837	404.7	16.96	820.0	91.71	2371.	94.46
#1	.0011	.0008	.0003	-.0007	-.0451	.0004	-.0037
#2	.0011	-.0017	.0002	.0005	-.0096	-.0004	-.0007

010227

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0043	-.0002
SDev	.0000	.0003	.0001
%RSD	24.56	6.400	62.53
#1	-.0000	.0041	-.0001
#2	-.0000	.0045	-.0003

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1118708	10000	--	--	--	--	--
SDev	11349.77	.0000000	--	--	--	--	--
%RSD	1.014542	.0000000	--	--	--	--	--
#1	1126734	10000	--	--	--	--	--
#2	1110683	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265486 Operator:
Run Time: 08/17/05 16:33:51
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	-.0002	-.0113	-.0041	.0037	.0328	.0002	-.0003
SDev	.0003	.0012	.0008	.0013	.0001	.0000	.0047
%RSD	131.6	10.85	19.60	33.53	.3409	12.57	1450.
#1	-.0004	-.0104	-.0046	.0046	.0328	.0001	.0030
#2	-.0000	-.0121	-.0035	.0028	.0327	.0002	-.0037

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.3948	-.0000	.0000	-.0008	.0006	-.0025	.1474
SDev	.0010	.0001	.0000	.0015	.0007	.0036	.0026
%RSD	.2652	193.2	28.92	184.1	107.5	144.3	1.742
#1	.3955	-.0001	.0000	.0002	.0011	.0001	.1492
#2	.3940	.0000	.0000	-.0018	.0002	-.0051	.1455

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0001	.0473	.0002	-.0007	3.157	4.003
SDev	.0004	.0000	.0004	.0002	.0010	.028	.001
%RSD	317.7	1.837	.9032	96.37	142.8	.9000	.0192
#1	-.0001	.0001	.0477	.0003	.0000	3.137	4.002
#2	.0004	.0001	.0470	.0001	-.0013	3.177	4.003

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	.0128	.0011	-.0007	-.0003	.4553	-.0029
SDev	.0003	.0021	.0033	.0022	.0001	.0102	.0047
%RSD	166.5	15.99	301.7	333.5	47.38	2.243	163.5
#1	.0000	.0143	.0035	.0009	-.0004	.4626	.0004
#2	-.0004	.0114	-.0013	-.0023	-.0002	.4481	-.0062

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.3	-.0036	-.0020	.6627	-.0001	-.0025	.0011
SDev	1.0	.0005	.0010	.0029	.0026	.0009	.0017
%RSD	.9539	12.76	53.21	.4408	3933.	33.86	157.3
#1	99.64	-.0033	-.0012	.6606	.0018	-.0019	.0023
#2	101.0	-.0040	-.0027	.6648	-.0019	-.0031	-.0001

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	-.0049	.0001	.0015	.0009	-.0007	-.0009
SDev	.0000	.0036	.0002	.0022	.0004	.0004	.0007
%RSD	.9483	73.09	132.6	146.0	45.34	62.40	69.50
#1	.0011	-.0024	.0003	.0031	.0012	-.0004	-.0005
#2	.0010	-.0074	.0000	-.0000	.0006	-.0010	-.0014

010229

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0046	-.0006
SDev	.0001	.0002	.0008
%RSD	115.0	3.643	130.6
#1	-.0000	.0045	-.0000
#2	-.0002	.0047	-.0012

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1130531	10000	--	--	--	--	--
SDev	10789.03	.0000000	--	--	--	--	--
%RSD	.9543334	.0000000	--	--	--	--	--
#1	1122902	10000	--	--	--	--	--
#2	1138160	10000	--	--	--	--	--

Analysis Report 08/17/05 04:43:10 PM

Method: DAILY2 Sample Name: 265487 Operator:
Run Time: 08/17/05 16:38:37
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	.0007	-.0137	.0001	.0045	.0350	.0002	.0010
SDev	.0004	.0006	.0007	.0004	.0001	.0000	.0000
%RSD	61.51	4.201	733.3	9.274	.2357	2.820	2.655
#1	.0004	-.0141	.0006	.0048	.0349	.0002	.0010
#2	.0011	-.0133	-.0004	.0042	.0351	.0002	.0010

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.3992	-.0001	.0002	.0004	.0010	.0090	.1540
SDev	.0015	.0003	.0003	.0005	.0001	.0083	.0231
%RSD	.3855	196.4	147.7	137.7	4.336	91.92	14.99
#1	.3981	-.0003	-.0000	.0007	.0010	.0032	.1377
#2	.4003	.0001	.0004	.0000	.0011	.0149	.1703

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	.0001	.0490	.0002	.0002	3.129	3.915
SDev	.0010	.0001	.0033	.0001	.0005	.049	.005
%RSD	87.40	48.60	6.655	32.71	219.4	1.581	.1250
#1	.0004	.0001	.0513	.0003	.0006	3.094	3.911
#2	.0018	.0002	.0467	.0002	-.0001	3.164	3.918

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0005	.0048	-.0021	.0005	.0020	.4477	-.0009
SDev	.0003	.0018	.0001	.0006	.0048	.0003	.0010
%RSD	64.27	36.96	3.051	116.7	243.6	.0693	116.9
#1	-.0003	.0036	-.0021	.0009	-.0014	.4475	-.0002
#2	-.0007	.0061	-.0022	.0001	.0053	.4480	-.0016

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.2	-.0045	.0008	.6576	-.0004	-.0009	-.0020
SDev	.1	.0019	.0015	.0013	.0004	.0004	.0006
%RSD	.0688	41.81	176.7	.1908	117.1	38.68	27.79
#1	100.3	-.0058	.0019	.6567	-.0001	-.0007	-.0024
#2	100.2	-.0031	-.0002	.6585	-.0006	-.0012	-.0016

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	-.0041	.0003	.0010	.0068	.0001	-.0019
SDev	.0000	.0016	.0000	.0013	.0292	.0006	.0002
%RSD	1.808	39.70	4.414	137.4	430.8	564.1	10.36
#1	.0011	-.0029	.0003	.0000	-.0139	.0005	-.0020
#2	.0011	-.0052	.0003	.0019	.0274	-.0003	-.0017

010231

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0041	.0001
SDev	.0001	.0002	.0001
%RSD	139.2	4.053	108.2
#1	-.0000	.0040	.0002
#2	-.0001	.0042	.0000

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1129744	10000	--	--	--	--	--
SDev	792.6667	.0000000	--	--	--	--	--
%RSD	.0701634	.0000000	--	--	--	--	--
#1	1130304	10000	--	--	--	--	--
#2	1129183	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265488 Operator: **010232**
Run Time: 08/17/05 16:43:22
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	1.092	-.0004	.0058	.0529	.0002	.0002
SDev	.0007	.039	.0016	.0013	.0001	.0000	.0029
%RSD	135.4	3.600	402.2	22.74	.1832	.6300	1441.
#1	-.0000	1.120	.0007	.0068	.0530	.0002	-.0018
#2	-.0010	1.065	-.0016	.0049	.0529	.0002	.0022

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0483	-.0001	-.0005	-.0003	.0005	.1172	.0590
SDev	.0020	.0001	.0000	.0009	.0006	.0089	.0287
%RSD	4.217	40.59	3.331	279.8	115.4	7.563	48.62
#1	.0498	-.0002	-.0005	.0003	.0009	.1235	.0793
#2	.0469	-.0001	-.0005	-.0009	.0001	.1109	.0387

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	.0023	.4355	.0030	-.0009	3.735	5.079
SDev	.0008	.0001	.0190	.0002	.0006	.106	.098
%RSD	196.9	4.543	4.372	7.431	69.15	2.846	1.931
#1	.0002	.0024	.4490	.0031	-.0004	3.810	5.010
#2	-.0010	.0022	.4220	.0028	-.0013	3.659	5.148

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0007	.0014	-.0019	.0008	-.0039	.4635	-.0018
SDev	.0006	.0066	.0011	.0012	.0059	.0037	.0064
%RSD	90.38	462.8	58.15	149.1	150.0	.7994	344.5
#1	-.0002	.0061	-.0011	.0016	.0002	.4662	.0027
#2	-.0011	-.0033	-.0027	-.0000	-.0081	.4609	-.0064

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.2	-.0018	-.0002	4.223	-.0001	-.0007	-.0010
SDev	3.1	.0006	.0018	.128	.0012	.0014	.0008
%RSD	3.069	35.71	913.2	3.042	1241.	195.7	76.05
#1	98.02	-.0013	.0011	4.314	.0007	.0003	-.0016
#2	102.4	-.0022	-.0014	4.132	-.0009	-.0017	-.0005

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	-.0042	.0152	-.0012	-.0237	-.0004	-.0018
SDev	.0000	.0056	.0011	.0003	.0159	.0013	.0029
%RSD	12.71	134.5	7.320	22.76	67.25	344.1	156.3
#1	.0002	-.0002	.0160	-.0010	-.0124	.0006	-.0039
#2	.0002	-.0082	.0144	-.0014	-.0349	-.0013	.0002

010233

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0002	.0172	.0027
SDev	.0003	.0002	.0013
%RSD	144.6	.9903	46.28
#1	.0000	.0173	.0036
#2	-.0004	.0171	.0018

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1129194	10000	--	--	--	--	--
SDev	34561.96	.0000000	--	--	--	--	--
%RSD	3.060764	.0000000	--	--	--	--	--
#1	1104755	10000	--	--	--	--	--
#2	1153633	10000	--	--	--	--	--

Method: DAILY2 Sample Name: 265489 Operator: 010234
Run Time: 08/17/05 16:48:08
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	-.0086	.0010	.0042	.0335	.0002	-.0015
SDev	.0008	.0055	.0017	.0007	.0000	.0000	.0099
%RSD	155.0	64.54	165.1	16.68	.0542	12.33	670.5
#1	-.0000	-.0125	-.0002	.0037	.0335	.0002	-.0084
#2	.0010	-.0047	.0022	.0047	.0335	.0002	.0055

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.3949	.0003	.0007	.0004	.0012	.0221	.1702
SDev	.0005	.0002	.0010	.0004	.0001	.0219	.0215
%RSD	.1338	70.93	147.3	98.06	12.25	99.13	12.66
#1	.3945	.0001	-.0000	.0007	.0013	.0066	.1550
#2	.3953	.0004	.0014	.0001	.0011	.0376	.1854

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0012	.0001	.0526	.0001	-.0006	3.192	3.898
SDev	.0017	.0000	.0078	.0001	.0001	.217	.000
%RSD	138.6	24.37	14.77	51.63	21.18	6.804	.0015
#1	.0000	.0001	.0471	.0001	-.0005	3.039	3.898
#2	.0024	.0001	.0581	.0001	-.0007	3.346	3.898

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	.0140	-.0020	.0008	.0039	.4584	-.0021
SDev	.0004	.0048	.0075	.0049	.0040	.0004	.0041
%RSD	170.5	34.19	369.8	630.0	101.5	.0980	197.3
#1	.0000	.0106	-.0074	.0042	.0011	.4587	.0008
#2	-.0005	.0174	.0033	-.0027	.0067	.4580	-.0050

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.82	-.0035	-.0037	.6585	-.0001	-.0036	-.0007
SDev	.39	.0045	.0043	.0063	.0008	.0014	.0003
%RSD	.4014	128.1	116.2	.9498	529.7	37.63	41.69
#1	98.10	-.0067	-.0007	.6541	.0004	-.0027	-.0009
#2	97.54	-.0003	-.0068	.6629	-.0007	-.0046	-.0005

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	-.0044	.0004	-.0000	.0280	.0001	.0001
SDev	.0001	.0027	.0000	.0015	.0667	.0003	.0013
%RSD	5.356	60.45	4.615	25820.	238.1	379.6	1104.
#1	.0011	-.0025	.0004	.0011	-.0192	.0003	-.0008
#2	.0011	-.0063	.0004	-.0011	.0752	-.0002	.0010

010235

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0044	.0002
SDev	.0001	.0001	.0002
%RSD	603.5	1.452	109.2
#1	.0001	.0043	.0000
#2	-.0000	.0044	.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1102409	10000	--	--	--	--	--
SDev	4398.204	.0000000	--	--	--	--	--
%RSD	.3989630	.0000000	--	--	--	--	--
#1	1105519	10000	--	--	--	--	--
#2	1099299	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccv4 Operator:
Run Time: 08/17/05 16:56:34
Comment:
Mode: CONC Corr. Factor: 1

010236

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9829	9.938	5.069	4.778	9.888	.9970	4.965
SDev	.0003	.007	.001	.015	.003	.0004	.008
%RSD	.0277	.0689	.0163	.3092	.0261	.0447	.1651
#1	.9827	9.934	5.069	4.768	9.890	.9966	4.959
#2	.9831	9.943	5.070	4.789	9.886	.9973	4.970
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	20.38	1.003	5.017	1.993	2.019	10.05	18.39
SDev	.02	.004	.001	.000	.002	.03	.01
%RSD	.0998	.3732	.0281	.0012	.1185	.3210	.0685
#1	20.37	1.001	5.016	1.993	2.020	10.02	18.40
#2	20.40	1.006	5.018	1.993	2.017	10.07	18.38
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	4.957	4.808	20.19	1.004	5.005	28.36	H39.16
SDev	.004	.004	.02	.000	.019	.08	.01
%RSD	.0805	.0858	.0953	.0297	.3786	.2996	.0226
#1	4.955	4.811	20.17	1.004	4.991	28.30	H39.17
#2	4.960	4.805	20.20	1.004	5.018	28.42	H39.15
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	4.880	5.162	4.987	4.954	1.012	.9696	.9980
SDev	.005	.016	.010	.002	.001	.0052	.0001
%RSD	.0960	.3192	.2039	.0415	.1193	.5383	.0077
#1	4.883	5.150	4.994	4.952	1.013	.9659	.9980
#2	4.877	5.174	4.980	4.955	1.011	.9733	.9979
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

010237

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	94.75	5.211	5.149	5.010	4.965	5.170	4.916
SDev	.39	.016	.007	.003	.002	.010	.011
%RSD	.4121	.3034	.1353	.0500	.0407	.1918	.2329
#1	95.02	5.222	5.154	5.011	4.966	5.177	4.908
#2	94.47	5.199	5.144	5.008	4.963	5.163	4.924
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	5.040	.9826	4.761	5.108	1.005	4.966	1.088
SDev	.005	.0031	.000	.009	.010	.001	.001
%RSD	.0927	.3192	.0102	.1813	.9948	.0126	.0808
#1	5.037	.9848	4.761	5.102	1.012	4.966	1.088
#2	5.043	.9804	4.761	5.115	.9981	4.966	1.089
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	5.053	1.026	5.009
SDev	.001	.001	.001
%RSD	.0182	.0742	.0142
#1	5.052	1.027	5.008
#2	5.054	1.026	5.009
Errors	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500
Low	4.500	.9000	4.500

010238

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1067750	10000	--	--	--	--	--
SDev	4400.326	.0000000	--	--	--	--	--
%RSD	.4121122	.0000000	--	--	--	--	--
#1	1070861	10000	--	--	--	--	--
#2	1064638	10000	--	--	--	--	--

Method: DAILY2 Sample Name: ccb4 Operator:
Run Time: 08/17/05 17:03:14
Comment:
Mode: CONC Corr. Factor: 1

010239

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	-.0112	.0006	.0043	.0002	.0002	.0017
SDev	.0005	.0031	.0001	.0003	.0000	.0000	.0031
%RSD	51.60	27.32	21.28	7.797	10.20	5.700	178.9
#1	.0006	-.0134	.0006	.0040	.0002	.0002	-.0005
#2	.0012	-.0091	.0005	.0045	.0002	.0002	.0039
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	.0067	.0004	.0003	-.0003	.0009	.0263	.0272
SDev	.0057	.0003	.0002	.0004	.0003	.0200	.0118
%RSD	85.74	82.49	74.21	139.9	31.25	76.16	43.40
#1	.0026	.0001	.0002	-.0006	.0007	.0121	.0189
#2	.0107	.0006	.0005	-.0000	.0012	.0405	.0355
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0500	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0500	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0017	.0001	.0051	.0000	.0012	H.1867	.0012
SDev	.0007	.0000	.0006	.0000	.0000	.0157	.0003
%RSD	43.09	1.790	11.75	408.2	2.383	8.388	23.84
#1	.0012	.0001	.0046	-.0000	.0012	H.1978	.0010
#2	.0022	.0001	.0055	.0000	.0012	H.1756	.0014
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	.0030	.0014	-.0004	.0046	.0022	-.0037
SDev	.0004	.0099	.0029	.0003	.0011	.0015	.0005
%RSD	103.4	331.1	208.7	75.00	25.13	67.50	12.14
#1	-.0001	H.0100	-.0007	-.0006	.0038	.0011	-.0041
#2	-.0006	-.0040	.0035	-.0002	H.0054	.0032	-.0034
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

010240

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.11	-.0042	-.0022	.0024	.0002	-.0029	-.0007
SDev	.78	.0047	.0026	.0008	.0012	.0002	.0021
%RSD	.8005	111.6	117.2	31.92	564.2	6.526	309.1
#1	97.66	-.0075	-.0004	.0018	-.0006	-.0027	.0008
#2	96.56	-.0009	-.0041	.0029	.0011	-.0030	-.0021
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	-.0023	-.0000	.0043	.0184	-.0004	.0027
SDev	.0000	.0042	.0001	.0027	.0200	.0008	.0008
%RSD	2.309	183.6	377.3	61.72	108.6	209.5	29.09
#1	.0001	-.0052	-.0001	.0062	.0043	-.0009	.0022
#2	.0001	.0007	.0001	.0024	.0326	.0002	.0033
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	.0006	-.0000
SDev	.0001	.0006	.0002
%RSD	310.9	87.08	687.1
#1	-.0001	.0002	-.0002
#2	.0000	.0010	.0001
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010241

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1094392	10000	--	--	--	--	--
SDev	8718.627	.0000000	--	--	--	--	--
%RSD	.7966639	.0000000	--	--	--	--	--
#1	1100557	10000	--	--	--	--	--
#2	1088227	10000	--	--	--	--	--

Method: DAILY2 Sample Name: pbw-H17H2 Operator:
Run Time: 08/17/05 17:08:01
Comment:
Mode: CONC Corr. Factor: 1

010242

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0005	-.0222	-.0012	.0012	-.0000	.0002	.0005
SDev	.0001	.0026	.0008	.0017	.0002	.0000	.0009
%RSD	24.35	11.62	65.43	137.9	406.8	1.182	159.9
#1	-.0004	-.0204	-.0006	.0024	.0001	.0002	.0012
#2	-.0005	-.0241	-.0017	.0000	-.0002	.0002	-.0001

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0023	.0001	-.0003	-.0009	.0002	-.0101	-.0085
SDev	.0011	.0001	.0005	.0008	.0009	.0150	.0108
%RSD	47.95	141.3	142.9	89.53	433.6	148.6	126.6
#1	.0030	.0000	.0000	-.0003	.0008	.0005	-.0009
#2	.0015	.0002	-.0007	-.0014	-.0004	-.0207	-.0161

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	-.0001	-.0059	-.0001	-.0001	-.2135	.0055
SDev	.0003	.0000	.0047	.0001	.0003	.1353	.0064
%RSD	102.2	.0180	80.38	50.42	561.5	63.39	116.7
#1	-.0001	-.0001	-.0093	-.0001	.0001	-.1178	.0010
#2	-.0004	-.0001	-.0025	-.0002	-.0003	-.3091	.0099

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0019	-.0007	-.0021	-.0016	-.0047	-.0019
SDev	.0003	.0017	.0029	.0021	.0018	.0072	.0039
%RSD	313.0	90.51	412.1	103.9	110.7	152.4	207.6
#1	.0004	.0007	-.0028	-.0005	-.0004	-.0098	.0009
#2	-.0001	.0031	.0014	-.0036	-.0029	.0004	-.0047

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.8	-.0041	-.0026	-.0050	-.0016	-.0031	-.0013
SDev	2.1	.0021	.0026	.0004	.0005	.0010	.0012
%RSD	2.036	51.45	100.6	7.916	28.51	33.86	95.43
#1	100.3	-.0056	-.0008	-.0047	-.0013	-.0024	-.0004
#2	103.3	-.0026	-.0045	-.0052	-.0019	-.0038	-.0021

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	-.0047	.0006	.0004	-.0214	-.0007	-.0002
SDev	.0000	.0008	.0002	.0016	.0236	.0005	.0011
%RSD	156.1	17.16	32.43	387.4	110.4	73.73	565.5
#1	.0000	-.0041	.0007	-.0007	-.0047	-.0003	-.0009
#2	-.0000	-.0053	.0005	.0015	-.0381	-.0010	.0006

010243

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0002	.0002	-.0007
SDev	.0001	.0001	.0008
%RSD	67.62	18.43	104.1
#1	-.0001	.0003	-.0002
#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	1147216	10000	--	--	--	--	--
SDev	23403.11	.0000000	--	--	--	--	--
%RSD	2.039993	.0000000	--	--	--	--	--
#1	1130667	10000	--	--	--	--	--
#2	1163764	10000	--	--	--	--	--

Method: DAILY2 Sample Name: lcsw-H17H2 Operator:
Run Time: 08/17/05 17:12:46
Comment:
Mode: CONC Corr. Factor: 1

010244

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0491	1.947	1.974	.0006	1.941	.0496	-.0036
SDev	.0003	.011	.003	.0018	.002	.0000	.0052
%RSD	.6582	.5492	.1737	285.0	.1203	.0893	147.2
#1	.0493	1.939	1.971	.0019	1.940	.0496	-.0073
#2	.0489	1.954	1.976	-.0006	1.943	.0496	.0001

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.95	.0490	.4815	.1961	.2473	1.128	16.43
SDev	.03	.0001	.0027	.0015	.0004	.019	.05
%RSD	.1531	.1120	.5533	.7473	.1457	1.726	.3290
#1	19.97	.0490	.4834	.1971	.2470	1.141	16.39
#2	19.93	.0490	.4796	.1951	.2475	1.114	16.47

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0000	19.66	.4874	-.0012	17.50	24.20
SDev	.0003	.0000	.05	.0005	.0009	.13	.05
%RSD	101.4	44.11	.2369	.1061	77.01	.7333	.1881
#1	.0006	.0000	19.69	.4877	-.0006	17.41	24.17
#2	.0001	.0000	19.63	.4870	-.0019	17.59	24.24

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4721	-.0020	.4873	.4878	-.0009	.0043	.4800
SDev	.0005	.0043	.0024	.0040	.0004	.0040	.0085
%RSD	.1081	214.2	.4921	.8260	46.55	94.23	1.767
#1	.4725	-.0051	.4890	.4849	-.0012	.0014	.4860
#2	.4718	.0010	.4856	.4906	-.0006	.0071	.4740

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.62	2.038	2.027	4.013	.4876	2.031	-.0002
SDev	.92	.024	.026	.006	.0019	.010	.0008
%RSD	.9435	1.155	1.287	.1470	.3865	.4695	348.0
#1	96.96	2.055	2.008	4.009	.4863	2.024	-.0008
#2	98.27	2.022	2.045	4.018	.4889	2.037	.0003

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	3.950	-.0232	.0003	1.985	-.0571	.4838	-.0020
SDev	.009	.0013	.0004	.001	.0056	.0010	.0002
%RSD	.2235	5.531	137.7	.0587	9.861	.2025	8.879
#1	3.944	-.0223	.0006	1.986	-.0611	.4845	-.0022
#2	3.957	-.0241	.0000	1.985	-.0532	.4831	-.0019

010245

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0004	.4901	-.0007
SDev	.0001	.0023	.0012
%RSD	25.27	.4637	165.4
#1	-.0003	.4917	.0001
#2	-.0004	.4885	-.0016

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1100088	10000	--	--	--	--	--
SDev	10300.42	.0000000	--	--	--	--	--
%RSD	.9363278	.0000000	--	--	--	--	--
#1	1092804	10000	--	--	--	--	--
#2	1107371	10000	--	--	--	--	--

Method: DAILY2 Sample Name: 265490 Operator: 010246
Run Time: 08/17/05 17:17:32
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	.0021	-.0013	.0048	.0323	.0002	.0030
SDev	.0004	.0005	.0008	.0001	.0000	.0000	.0008
%RSD	84.13	23.83	59.01	1.314	.0412	4.184	27.11
#1	.0008	.0018	-.0019	.0049	.0322	.0002	.0035
#2	.0002	.0025	-.0008	.0048	.0323	.0002	.0024

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4122	.0002	.0005	-.0004	.0009	.0127	.1639
SDev	.0015	.0001	.0003	.0000	.0004	.0073	.0009
%RSD	.3697	40.39	58.20	7.103	47.69	57.69	.5513
#1	.4133	.0002	.0006	-.0004	.0006	.0075	.1646
#2	.4111	.0003	.0003	-.0005	.0012	.0179	.1633

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	.0001	.0513	.0002	.0001	3.210	3.916
SDev	.0000	.0000	.0018	.0001	.0005	.045	.002
%RSD	3.709	6.415	3.425	70.87	359.8	1.405	.0523
#1	.0011	.0001	.0526	.0003	-.0002	3.241	3.917
#2	.0011	.0001	.0501	.0001	.0005	3.178	3.914

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	.0128	-.0017	-.0002	.0017	.4473	-.0025
SDev	.0002	.0013	.0029	.0002	.0007	.0081	.0009
%RSD	127.3	9.987	169.7	99.90	42.92	1.804	35.42
#1	-.0003	.0137	.0003	-.0003	.0012	.4416	-.0019
#2	-.0000	.0119	-.0038	-.0001	.0022	.4530	-.0032

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.22	-.0018	.0001	.6605	-.0007	-.0005	.0007
SDev	.87	.0004	.0005	.0018	.0009	.0005	.0017
%RSD	.8855	20.57	415.9	.2768	126.8	97.09	247.2
#1	97.60	-.0015	.0005	.6618	-.0001	-.0002	.0019
#2	98.83	-.0020	-.0003	.6592	-.0013	-.0008	-.0005

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0013	-.0053	.0006	.0014	.0279	-.0001	.0011
SDev	.0001	.0011	.0002	.0009	.0111	.0006	.0009
%RSD	11.57	19.81	35.37	64.68	39.74	829.8	83.33
#1	.0014	-.0061	.0007	.0008	.0357	.0003	.0017
#2	.0012	-.0046	.0004	.0021	.0201	-.0005	.0004

010247

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0039	-.0002
SDev	.0000	.0001	.0005
%RSD	28.34	2.244	285.5
#1	-.0001	.0038	.0002
#2	-.0001	.0039	-.0005

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1106847	10000	--	--	--	--	--
SDev	9732.618	.0000000	--	--	--	--	--
%RSD	.8793101	.0000000	--	--	--	--	--
#1	1099965	10000	--	--	--	--	--
#2	1113729	10000	--	--	--	--	--

Method: DAILY2 Sample Name: 265491 Operator:
Run Time: 08/17/05 17:22:20
Comment:
Mode: CONC Corr. Factor: 1

010248

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	-.0171	-.0026	.0050	.0361	.0002	.0003
SDev	.0001	.0004	.0007	.0005	.0000	.0000	.0007
%RSD	203.5	2.087	25.96	10.68	.0636	1.376	219.4
#1	.0002	-.0168	-.0031	.0054	.0361	.0002	.0008
#2	-.0000	-.0173	-.0021	.0047	.0361	.0002	-.0002

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.3879	.0001	-.0001	-.0001	.0013	.0014	.1450
SDev	.0004	.0001	.0008	.0004	.0003	.0022	.0146
%RSD	.1137	186.8	529.0	304.7	21.70	163.1	10.05
#1	.3876	-.0000	-.0007	.0001	.0015	-.0002	.1347
#2	.3882	.0001	.0004	-.0004	.0011	.0029	.1553

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0001	.0454	.0001	-.0008	3.186	3.976
SDev	.0004	.0000	.0003	.0000	.0008	.168	.006
%RSD	307.1	30.33	.5424	10.79	104.6	5.278	.1621
#1	.0004	.0001	.0452	.0002	-.0002	3.305	3.981
#2	-.0002	.0002	.0455	.0001	-.0013	3.067	3.972

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	.0024	-.0001	.0013	.0022	.4646	-.0017
SDev	.0007	.0045	.0005	.0019	.0011	.0011	.0012
%RSD	75.51	186.1	1024.	148.6	52.17	.2314	66.46
#1	.0004	-.0008	.0003	.0026	.0014	.4653	-.0009
#2	.0015	.0056	-.0004	-.0001	.0030	.4638	-.0026

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.50	-.0023	.0005	.6596	.0009	-.0005	-.0014
SDev	.20	.0006	.0020	.0041	.0014	.0011	.0006
%RSD	.2087	26.24	427.5	.6257	170.2	249.9	40.07
#1	97.65	-.0028	.0019	.6567	.0019	.0003	-.0010
#2	97.36	-.0019	-.0009	.6625	-.0002	-.0013	-.0018

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	-.0027	.0005	-.0003	-.0037	-.0001	-.0013
SDev	.0000	.0020	.0002	.0023	.0117	.0002	.0016
%RSD	1.011	72.81	36.89	766.9	317.2	125.5	120.9
#1	.0011	-.0013	.0006	-.0019	-.0119	-.0000	-.0002
#2	.0011	-.0041	.0004	.0013	.0046	-.0002	-.0025

010249

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0038	-.0000
SDev	.0001	.0006	.0001
%RSD	158.4	15.89	365.3
#1	.0000	.0034	-.0001
#2	-.0001	.0042	.0000

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1098862	10000	--	--	--	--	--
SDev	2320.017	.0000000	--	--	--	--	--
%RSD	.2111292	.0000000	--	--	--	--	--
#1	1100502	10000	--	--	--	--	--
#2	1097221	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265491d Operator: 010250
Run Time: 08/17/05 17:27:06
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	-.0150	-.0010	.0047	.0362	.0002	-.0021
SDev	.0003	.0008	.0038	.0004	.0000	.0000	.0043
%RSD	169.0	5.338	372.3	8.624	.1021	4.548	203.2
#1	-.0004	-.0155	-.0037	.0044	.0361	.0002	.0009
#2	.0000	-.0144	.0017	.0049	.0362	.0002	-.0052

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.3835	.0001	.0002	.0004	.0015	-.0031	.1443
SDev	.0009	.0001	.0006	.0003	.0003	.0003	.0032
%RSD	.2235	49.93	301.3	83.21	23.96	11.42	2.200
#1	.3829	.0001	-.0002	.0007	.0017	-.0028	.1466
#2	.3841	.0002	.0006	.0002	.0012	-.0033	.1421

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	.0001	.0497	.0001	.0003	3.058	3.954
SDev	.0005	.0000	.0008	.0001	.0001	.067	.016
%RSD	54.80	12.88	1.610	42.47	41.82	2.177	.4163
#1	.0005	.0001	.0491	.0002	.0004	3.011	3.942
#2	.0012	.0001	.0503	.0001	.0002	3.105	3.966

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	.0060	-.0014	-.0008	.0011	.4618	-.0026
SDev	.0010	.0024	.0040	.0018	.0004	.0065	.0060
%RSD	471.2	40.05	279.4	223.4	34.64	1.415	230.5
#1	.0009	.0043	-.0043	.0005	.0008	.4664	-.0069
#2	-.0005	.0077	.0014	-.0021	.0014	.4571	.0017

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.26	-.0052	-.0021	.6608	-.0010	-.0031	-.0005
SDev	1.07	.0007	.0015	.0037	.0001	.0008	.0005
%RSD	1.098	12.99	68.97	.5601	11.56	24.01	83.11
#1	96.50	-.0047	-.0032	.6582	-.0011	-.0037	-.0009
#2	98.01	-.0056	-.0011	.6634	-.0009	-.0026	-.0002

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	-.0007	.0006	.0007	.0047	.0006	-.0008
SDev	.0000	.0003	.0001	.0008	.0267	.0002	.0002
%RSD	3.128	52.19	18.72	102.3	570.4	37.48	24.90
#1	.0010	-.0004	.0007	.0013	-.0142	.0005	-.0007
#2	.0011	-.0009	.0005	.0002	.0235	.0008	-.0010

010251

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0035	.0003
SDev	.0001	.0003	.0001
%RSD	107.5	7.291	34.61
#1	.0001	.0033	.0004
#2	.0000	.0036	.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1096078	10000	--	--	--	--	--
SDev	12008.80	.0000000	--	--	--	--	--
%RSD	1.095616	.0000000	--	--	--	--	--
#1	1087586	10000	--	--	--	--	--
#2	1104569	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265491s Operator: 010252
Run Time: 08/17/05 17:31:52
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0490	1.938	1.969	.0036	1.961	.0494	-.0015
SDev	.0001	.005	.005	.0002	.005	.0001	.0032
%RSD	.1971	.2410	.2672	4.923	.2346	.1442	210.5
#1	.0490	1.941	1.973	.0035	1.964	.0493	-.0038
#2	.0489	1.935	1.965	.0037	1.957	.0494	.0007

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	20.22	.0485	.4790	.1944	.2462	1.105	16.85
SDev	.00	.0001	.0004	.0010	.0004	.016	.06
%RSD	.0172	.3182	.0771	.5070	.1795	1.410	.3410
#1	20.21	.0486	.4787	.1937	.2465	1.094	16.89
#2	20.22	.0484	.4792	.1950	.2458	1.116	16.81

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	.0002	19.60	.4845	-.0009	21.23	28.95
SDev	.0006	.0000	.05	.0010	.0008	.03	.14
%RSD	66.54	16.59	.2496	.2105	95.63	.1234	.4951
#1	.0005	.0002	19.57	.4837	-.0015	21.25	29.05
#2	.0013	.0002	19.64	.4852	-.0003	21.21	28.85

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4695	.0136	.4876	.4844	.0026	.4739	.4787
SDev	.0003	.0008	.0002	.0002	.0019	.0073	.0003
%RSD	.0646	5.826	.0355	.0329	73.41	1.538	.0531
#1	.4693	.0142	.4875	.4845	.0013	.4688	.4785
#2	.4697	.0131	.4877	.4843	.0040	.4791	.4789

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.15	2.041	2.018	4.622	.4854	2.026	-.0008
SDev	.88	.007	.003	.006	.0001	.000	.0005
%RSD	.8942	.3469	.1461	.1227	.0096	.0195	56.06
#1	98.77	2.036	2.020	4.626	.4855	2.026	-.0005
#2	97.53	2.046	2.016	4.618	.4854	2.026	-.0012

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	3.909	-.0257	.0005	1.983	-.0480	.4814	-.0029
SDev	.000	.0007	.0002	.010	.0080	.0018	.0026
%RSD	.0114	2.884	39.80	.5147	16.66	.3687	90.92
#1	3.909	-.0251	.0004	1.990	-.0536	.4802	-.0048
#2	3.909	-.0262	.0007	1.976	-.0423	.4827	-.0010

010253

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0004	.4912	-.0009
SDev	.0001	.0009	.0006
%RSD	21.46	.1920	64.53
#1	-.0005	.4905	-.0013
#2	-.0004	.4919	-.0005

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1106148	10000	--	--	--	--	--
SDev	9930.607	.0000000	--	--	--	--	--
%RSD	.8977648	.0000000	--	--	--	--	--
#1	1113170	10000	--	--	--	--	--
#2	1099126	10000	--	--	--	--	--

Method: DAILY2 Sample Name: 265492 Operator:
Run Time: 08/17/05 17:36:42
Comment:
Mode: CONC Corr. Factor: 1

010254

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	-.0140	.0020	.0041	.0366	.0002	.0002
SDev	.0009	.0063	.0007	.0009	.0001	.0000	.0041
%RSD	212.4	45.14	35.61	21.91	.2658	7.706	2329.
#1	-.0002	-.0184	.0024	.0035	.0367	.0002	-.0027
#2	.0010	-.0095	.0015	.0047	.0365	.0002	.0031

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.3844	.0001	-.0001	.0001	.0013	-.0013	.1659
SDev	.0006	.0001	.0006	.0005	.0001	.0267	.0059
%RSD	.1572	81.37	1172.	371.3	3.647	2000.	3.544
#1	.3840	.0001	-.0005	-.0002	.0013	-.0202	.1618
#2	.3849	.0000	.0004	.0005	.0014	.0175	.1701

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	.0001	.0440	.0000	-.0007	3.197	3.930
SDev	.0009	.0000	.0066	.0000	.0003	.026	.031
%RSD	161.6	21.05	15.04	347.1	39.61	.8159	.7786
#1	-.0001	.0001	.0393	.0000	-.0005	3.178	3.952
#2	.0012	.0002	.0487	-.0000	-.0009	3.215	3.909

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0035	-.0009	.0012	.0028	.4629	-.0006
SDev	.0001	.0048	.0019	.0010	.0009	.0089	.0019
%RSD	98.13	138.9	219.4	84.97	31.91	1.923	324.4
#1	.0001	.0069	.0005	.0005	.0022	.4692	.0007
#2	.0000	.0001	-.0022	.0020	.0034	.4566	-.0019

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.70	-.0013	-.0003	.6530	.0005	-.0006	.0009
SDev	1.05	.0030	.0013	.0017	.0001	.0002	.0015
%RSD	1.073	233.0	422.0	.2644	12.25	25.17	176.7
#1	98.45	-.0035	.0006	.6543	.0005	-.0007	-.0002
#2	96.96	.0008	-.0012	.6518	.0006	-.0005	.0019

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0012	-.0047	.0004	-.0004	.0054	-.0003	-.0045
SDev	.0001	.0018	.0001	.0014	.0318	.0006	.0006
%RSD	6.729	37.47	10.71	385.3	585.0	204.5	13.94
#1	.0012	-.0059	.0005	.0006	-.0170	.0001	-.0049
#2	.0011	-.0034	.0004	-.0014	.0279	-.0007	-.0040

010255

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0023	-.0005
SDev	.0001	.0001	.0003
%RSD	330.1	4.126	46.33
#1	-.0001	.0022	-.0007
#2	.0000	.0023	-.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1101068	10000	--	--	--	--	--
SDev	11820.70	.0000000	--	--	--	--	--
%RSD	1.073567	.0000000	--	--	--	--	--
#1	1109427	10000	--	--	--	--	--
#2	1092710	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265493 Operator:
Run Time: 08/17/05 17:41:27
Comment:
Mode: CONC Corr. Factor: 1

010256

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	-.0189	-.0005	.0037	.0318	.0002	.0013
SDev	.0008	.0009	.0005	.0003	.0001	.0000	.0020
%RSD	629.5	4.590	96.79	7.113	.1844	3.017	154.6
#1	.0006	-.0182	-.0002	.0039	.0317	.0002	.0027
#2	-.0004	-.0195	-.0008	.0035	.0318	.0002	-.0001

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.3693	-.0001	.0001	-.0004	.0010	-.0038	.1382
SDev	.0013	.0002	.0002	.0006	.0003	.0216	.0095
%RSD	.3604	113.6	399.5	170.5	27.11	568.3	6.911
#1	.3703	-.0000	.0002	.0001	.0008	.0115	.1449
#2	.3684	-.0003	-.0001	-.0008	.0012	-.0191	.1314

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0001	.0449	-.0000	-.0005	3.084	3.953
SDev	.0008	.0001	.0065	.0001	.0003	.150	.018
%RSD	280.0	58.30	14.40	300.0	63.69	4.847	.4517
#1	.0008	.0001	.0494	-.0001	-.0003	3.190	3.941
#2	-.0003	.0001	.0403	.0000	-.0007	2.979	3.966

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	-.0029	-.0011	-.0014	.0001	.4534	-.0045
SDev	.0003	.0021	.0004	.0008	.0026	.0132	.0010
%RSD	233.4	72.54	40.44	56.78	1893.	2.902	21.33
#1	.0004	-.0014	-.0014	-.0008	.0020	.4627	-.0052
#2	-.0001	-.0044	-.0008	-.0019	-.0017	.4441	-.0038

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.0	.0028	-.0016	.6545	-.0013	-.0001	-.0015
SDev	.5	.0036	.0021	.0005	.0004	.0026	.0012
%RSD	.5386	131.4	136.0	.0761	30.08	2358.	80.15
#1	99.66	.0002	-.0031	.6548	-.0010	-.0020	-.0006
#2	100.4	.0053	-.0001	.6541	-.0015	.0017	-.0023

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	-.0032	.0004	.0016	-.0038	-.0007	-.0014
SDev	.0000	.0007	.0001	.0020	.0134	.0009	.0012
%RSD	2.863	20.87	12.51	126.8	356.7	127.9	83.17
#1	.0010	-.0037	.0005	.0002	.0057	-.0001	-.0006
#2	.0009	-.0027	.0004	.0030	-.0132	-.0013	-.0022

010257

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0020	-.0004
SDev	.0001	.0001	.0002
%RSD	47.44	6.582	41.21
#1	-.0001	.0019	-.0003
#2	-.0001	.0021	-.0005

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1127486	10000	--	--	--	--	--
SDev	5955.960	.0000000	--	--	--	--	--
%RSD	.5282512	.0000000	--	--	--	--	--
#1	1123275	10000	--	--	--	--	--
#2	1131698	10000	--	--	--	--	--

Method: DAILY2 Sample Name: 265494 Operator:
Run Time: 08/17/05 17:46:13
Comment:
Mode: CONC Corr. Factor: 1

010258

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	-.0145	-.0001	.0040	.0369	.0002	-.0004
SDev	.0009	.0051	.0010	.0001	.0001	.0000	.0024
%RSD	123.6	35.38	1160.	2.692	.1825	4.559	649.0
#1	.0013	-.0109	-.0008	.0039	.0369	.0002	.0013
#2	.0001	-.0181	.0006	.0040	.0368	.0002	-.0020

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.3484	.0002	.0003	.0001	.0009	.0228	.1630
SDev	.0017	.0003	.0007	.0003	.0005	.0209	.0151
%RSD	.4914	129.0	230.0	188.2	59.29	91.45	9.254
#1	.3496	.0004	.0008	.0003	.0005	.0376	.1736
#2	.3472	.0000	-.0002	-.0000	.0013	.0081	.1523

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	.0002	.0473	.0000	.0000	3.247	3.940
SDev	.0010	.0000	.0064	.0001	.0005	.256	.005
%RSD	62.99	20.71	13.55	466.1	2056.	7.871	.1311
#1	.0022	.0002	.0518	-.0000	-.0003	3.428	3.944
#2	.0009	.0001	.0427	.0000	.0004	3.067	3.936

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	-.0033	.0024	-.0032	.0048	.4630	-.0013
SDev	.0002	.0014	.0024	.0016	.0026	.0035	.0019
%RSD	346.1	43.09	97.92	49.12	54.64	.7627	138.9
#1	.0001	-.0043	.0041	-.0043	.0066	.4655	-.0000
#2	-.0002	-.0023	.0007	-.0021	.0029	.4605	-.0027

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	95.24	-.0046	-.0027	.6605	-.0013	-.0033	.0002
SDev	.43	.0001	.0007	.0040	.0003	.0004	.0000
%RSD	.4508	2.066	25.30	.6027	19.87	12.74	14.51
#1	95.55	-.0045	-.0032	.6633	-.0015	-.0036	.0002
#2	94.94	-.0046	-.0022	.6577	-.0011	-.0030	.0002

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	-.0034	.0004	.0037	.0221	-.0002	.0001
SDev	.0000	.0008	.0001	.0016	.0348	.0002	.0021
%RSD	3.580	22.56	13.28	42.23	157.3	125.9	1446.
#1	.0010	-.0039	.0004	.0048	.0468	-.0000	.0016
#2	.0009	-.0028	.0004	.0026	-.0025	-.0003	-.0013

010259

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0010	-.0001
SDev	.0001	.0001	.0000
%RSD	37.91	5.427	81.31
#1	-.0002	.0009	-.0001
#2	-.0001	.0010	-.0000

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1073370	10000	--	--	--	--	--
SDev	4769.435	.0000000	--	--	--	--	--
%RSD	.4443423	.0000000	--	--	--	--	--
#1	1076742	10000	--	--	--	--	--
#2	1069997	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265495 Operator: **010260**
Run Time: 08/17/05 17:50:59
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	-.0137	-.0014	.0067	.0316	.0002	.0006
SDev	.0003	.0003	.0010	.0006	.0001	.0000	.0011
%RSD	1121.	2.228	74.30	9.535	.4058	2.862	175.4
#1	.0002	-.0134	-.0021	.0062	.0315	.0002	.0014
#2	-.0002	-.0139	-.0007	.0071	.0317	.0002	-.0002

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.1277	.0002	-.0001	-.0002	.0009	.0105	.1434
SDev	.0009	.0001	.0000	.0001	.0001	.0108	.0177
%RSD	.7246	27.05	7.190	85.65	12.37	102.2	12.36
#1	.1283	.0002	-.0001	-.0002	.0010	.0181	.1560
#2	.1270	.0003	-.0001	-.0001	.0008	.0029	.1309

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	.0001	.0209	.0000	-.0007	4.552	5.722
SDev	.0001	.0001	.0018	.0000	.0004	.141	.019
%RSD	10.36	35.77	8.529	187.5	50.18	3.100	.3250
#1	.0006	.0002	.0196	-.0000	-.0010	4.652	5.709
#2	.0007	.0001	.0221	.0001	-.0005	4.453	5.735

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	-.0010	.0001	.0004	.0019	.4547	-.0037
SDev	.0005	.0012	.0052	.0013	.0028	.0017	.0019
%RSD	258.4	123.7	10100.	363.9	148.9	.3694	49.64
#1	.0002	-.0018	-.0036	.0013	.0038	.4559	-.0024
#2	-.0005	-.0001	.0037	-.0006	-.0001	.4536	-.0051

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.74	-.0025	-.0003	.6919	.0003	-.0011	.0002
SDev	.79	.0014	.0006	.0004	.0008	.0000	.0001
%RSD	.8040	54.14	187.5	.0572	323.7	4.448	46.51
#1	97.18	-.0016	-.0008	.6922	-.0003	-.0010	.0003
#2	98.29	-.0035	.0001	.6916	.0009	-.0011	.0001

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	-.0032	.0005	.0005	.0022	-.0004	-.0032
SDev	.0000	.0002	.0000	.0005	.0003	.0001	.0013
%RSD	2.234	5.588	1.626	105.7	14.23	19.71	39.36
#1	.0005	-.0033	.0005	.0001	.0020	-.0003	-.0023
#2	.0005	-.0031	.0005	.0008	.0025	-.0004	-.0041

010261

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0006	-.0000
SDev	.0001	.0001	.0005
%RSD	78.93	15.17	11930.
#1	-.0001	.0005	.0004
#2	-.0000	.0007	-.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1101470	10000	--	--	--	--	--
SDev	8899.646	.0000000	--	--	--	--	--
%RSD	.8079790	.0000000	--	--	--	--	--
#1	1095177	10000	--	--	--	--	--
#2	1107763	10000	--	--	--	--	--

Method: DAILY2 Sample Name: ccv5 Operator:
Run Time: 08/17/05 17:59:26
Comment:
Mode: CONC Corr. Factor: 1

010262

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9836	9.938	5.022	4.764	9.840	.9952	4.939
SDev	.0002	.012	.002	.027	.002	.0001	.008
%RSD	.0219	.1233	.0404	.5752	.0225	.0093	.1530
#1	.9838	9.930	5.021	4.745	9.841	.9951	4.933
#2	.9835	9.947	5.024	4.783	9.838	.9952	4.944
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	20.42	.9931	4.992	1.983	2.023	10.02	18.48
SDev	.03	.0023	.008	.001	.006	.01	.01
%RSD	.1695	.2287	.1654	.0737	.3077	.0676	.0609
#1	20.45	.9915	4.998	1.982	2.018	10.03	18.47
#2	20.40	.9947	4.986	1.984	2.027	10.02	18.49
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	4.819	20.14	.9992	4.954	28.23	H38.96
SDev	.002	.004	.01	.0006	.001	.24	.03
%RSD	.0496	.0778	.0575	.0556	.0179	.8432	.0818
#1	4.966	4.821	20.14	.9996	4.953	28.40	H38.94
#2	4.969	4.816	20.13	.9988	4.954	28.06	H38.98
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	4.824	5.181	5.003	4.880	1.020	.9618	.9985
SDev	.001	.048	.077	.010	.001	.0221	.0062
%RSD	.0120	.9318	1.537	.2076	.0833	2.299	.6216
#1	4.823	5.215	5.058	4.887	1.019	.9461	.9941
#2	4.824	5.147	4.949	4.873	1.020	.9774	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

010263

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	93.50	5.239	5.060	5.000	4.921	5.120	4.888
SDev	1.66	.082	.003	.007	.032	.026	.001
%RSD	1.772	1.563	.0505	.1315	.6582	.5000	.0236
#1	92.33	5.297	5.059	4.995	4.944	5.138	4.887
#2	94.68	5.181	5.062	5.005	4.898	5.102	4.889
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	5.063	.9796	4.752	5.083	.9994	4.955	1.075
SDev	.003	.0005	.002	.018	.0017	.006	.000
%RSD	.0537	.0508	.0342	.3478	.1663	.1147	.0416
#1	5.061	.9793	4.751	5.070	1.001	4.950	1.076
#2	5.065	.9800	4.753	5.095	.9982	4.959	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	5.053	1.015	5.032
SDev	.005	.003	.010
%RSD	.1047	.3280	.1950
#1	5.050	1.018	5.025
#2	5.057	1.013	5.038
Errors	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500
Low	4.500	.9000	4.500

010264

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1053832	10000	--	--	--	--	--
SDev	18690.95	.0000000	--	--	--	--	--
%RSD	1.773619	.0000000	--	--	--	--	--
#1	1040615	10000	--	--	--	--	--
#2	1067048	10000	--	--	--	--	--

Method: DAILY2 Sample Name: ccb5 Operator:
Run Time: 08/17/05 18:06:02
Comment:
Mode: CONC Corr. Factor: 1

010265

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	-.0207	-.0014	.0036	.0002	.0002	.0036
SDev	.0008	.0041	.0000	.0004	.0000	.0000	.0017
%RSD	197.0	19.91	1.406	11.59	6.975	1.174	46.90
#1	-.0002	-.0178	-.0014	.0033	.0002	.0002	.0024
#2	.0009	-.0236	-.0014	.0039	.0002	.0002	.0048
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	.0012	.0002	.0001	-.0003	.0010	.0011	.0053
SDev	.0006	.0002	.0001	.0003	.0003	.0086	.0017
%RSD	47.93	120.5	186.2	123.9	25.69	760.9	32.14
#1	.0008	.0000	.0002	-.0000	.0012	-.0050	.0065
#2	.0016	.0004	-.0000	-.0005	.0008	.0072	.0041
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0500	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0500	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	.0001	.0013	-.0000	.0024	.0487	-.0021
SDev	.0006	.0000	.0076	.0000	.0002	.0596	.0007
%RSD	57.61	22.84	576.9	105.2	8.007	122.4	31.71
#1	.0007	.0001	-.0041	-.0000	.0026	.0066	-.0026
#2	.0016	.0001	.0067	-.0001	.0023	H.0908	-.0016
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	-.0001	.0015	.0003	.0005	.0007	.0011	-.0021
SDev	.0001	.0047	.0007	.0002	.0011	.0041	.0029
%RSD	85.20	318.9	217.5	33.00	150.5	356.9	137.0
#1	-.0000	-.0018	-.0002	.0006	.0015	-.0017	-.0001
#2	-.0002	.0048	.0008	.0004	-.0000	.0040	-.0042
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

010266

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.47	-.0003	.0001	.0004	.0005	-.0000	-.0009
SDev	.31	.0032	.0019	.0023	.0001	.0023	.0028
%RSD	.3151	1078.	2005.	571.5	26.02	7679.	315.9
#1	97.26	.0020	.0014	-.0012	.0004	.0016	-.0028
#2	97.69	-.0026	-.0012	.0020	.0005	-.0017	.0011
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	-.0051	.0000	.0003	.0295	-.0001	-.0003
SDev	.0000	.0004	.0000	.0020	.0160	.0004	.0001
%RSD	28.38	8.607	713.9	609.8	54.18	439.2	37.21
#1	.0001	-.0048	-.0000	.0017	.0182	.0002	-.0004
#2	.0001	-.0054	.0000	-.0011	.0408	-.0004	-.0002
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	-.0001
SDev	.0001	.0002	.0002
%RSD	351.8	451.4	179.2
#1	.0000	-.0001	-.0003
#2	-.0001	.0002	.0000
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010267

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1098468	10000	--	--	--	--	--
SDev	3430.175	.0000000	--	--	--	--	--
%RSD	.3122691	.0000000	--	--	--	--	--
#1	1096042	10000	--	--	--	--	--
#2	1100893	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265496 Operator: **010268**
Run Time: 08/17/05 18:10:48
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	.6513	.0001	.0083	.0474	.0003	.0017
SDev	.0014	.1624	.0002	.0003	.0001	.0000	.0037
%RSD	7469.	24.93	216.5	3.212	.2074	.5511	213.8
#1	-.0009	.7661	.0003	.0081	.0473	.0003	-.0009
#2	.0010	.5365	-.0001	.0084	.0474	.0003	.0043

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0506	.0001	-.0002	.0001	.0013	.0771	.1048
SDev	.0005	.0001	.0000	.0002	.0001	.0061	.0050
%RSD	1.019	234.6	3.112	338.0	4.846	7.956	4.751
#1	.0503	-.0000	-.0002	-.0001	.0013	.0814	.1083
#2	.0510	.0001	-.0003	.0002	.0012	.0727	.1013

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0013	.2691	.0027	-.0000	3.999	4.993
SDev	.0006	.0001	.0519	.0001	.0009	.034	.032
%RSD	466.6	7.506	19.28	3.180	8486.	.8564	.6478
#1	-.0003	.0014	.3058	.0028	-.0007	3.975	4.970
#2	.0006	.0013	.2324	.0027	.0006	4.024	5.016

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0006	-.0067	-.0018	.0016	.0008	.4520	.0017
SDev	.0006	.0191	.0025	.0010	.0036	.0051	.0046
%RSD	104.4	287.9	137.3	61.19	462.1	1.124	266.1
#1	-.0010	-.0202	-.0035	.0009	-.0017	.4484	-.0015
#2	-.0001	.0069	-.0001	.0023	.0033	.4556	.0050

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.70	-.0065	.0005	2.793	.0005	-.0019	-.0007
SDev	.48	.0018	.0033	.489	.0015	.0016	.0003
%RSD	.4926	27.34	678.3	17.51	307.2	85.49	36.91
#1	97.36	-.0053	-.0018	3.139	-.0006	-.0030	-.0005
#2	98.04	-.0078	.0028	2.448	.0015	-.0007	-.0009

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	-.0022	.0099	.0018	.0076	.0005	-.0002
SDev	.0000	.0024	.0021	.0029	.0185	.0008	.0031
%RSD	11.22	109.9	21.44	158.9	243.1	175.7	1852.
#1	.0002	-.0039	.0115	-.0002	-.0055	-.0001	-.0023
#2	.0003	-.0005	.0084	.0039	.0207	.0010	.0020

010269

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0157	.0028
SDev	.0001	.0001	.0002
%RSD	100.6	.6263	5.621
#1	.0000	.0158	.0027
#2	.0001	.0156	.0029

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1100986	10000	--	--	--	--	--
SDev	5408.660	.0000000	--	--	--	--	--
%RSD	.4912562	.0000000	--	--	--	--	--
#1	1097161	10000	--	--	--	--	--
#2	1104810	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265497 Operator: **010270**
Run Time: 08/17/05 18:15:34
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	1.112	-.0009	.0085	.0576	.0003	-.0019
SDev	.0000	.267	.0021	.0003	.0000	.0000	.0006
%RSD	6.642	24.00	243.7	3.096	.0310	2.629	33.88
#1	-.0006	1.301	.0006	.0083	.0576	.0003	-.0014
#2	-.0006	.9232	-.0023	.0087	.0576	.0003	-.0023

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0497	-.0000	-.0004	-.0002	.0013	.1342	.0755
SDev	.0011	.0004	.0005	.0004	.0008	.0208	.0030
%RSD	2.278	1545.	123.5	207.6	60.34	15.49	4.017
#1	.0489	-.0003	-.0008	-.0005	.0007	.1488	.0733
#2	.0505	.0002	-.0001	.0001	.0018	.1195	.0776

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0024	.4536	.0030	-.0008	3.863	5.063
SDev	.0006	.0004	.0992	.0001	.0001	.051	.052
%RSD	958.3	16.85	21.86	4.852	8.514	1.312	1.018
#1	-.0003	.0027	.5237	.0032	-.0008	3.827	5.099
#2	.0005	.0021	.3835	.0029	-.0009	3.899	5.027

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0006	.0012	-.0015	-.0004	-.0008	.4673	-.0035
SDev	.0013	.0003	.0001	.0008	.0016	.0006	.0033
%RSD	241.6	21.03	8.243	204.5	207.7	.1242	92.70
#1	-.0015	.0010	-.0014	.0002	-.0019	.4677	-.0059
#2	.0004	.0014	-.0016	-.0010	.0004	.4669	-.0012

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.39	-.0038	-.0010	4.308	-.0008	-.0019	-.0003
SDev	.13	.0015	.0011	.831	.0006	.0002	.0011
%RSD	.1315	39.77	113.3	19.30	75.38	11.80	326.5
#1	97.30	-.0027	-.0017	4.895	-.0004	-.0021	.0004
#2	97.48	-.0049	-.0002	3.720	-.0012	-.0017	-.0011

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	-.0045	.0157	-.0022	-.0259	-.0006	-.0018
SDev	.0000	.0029	.0034	.0023	.0093	.0001	.0020
%RSD	10.72	62.93	21.66	104.8	35.80	16.37	111.7
#1	.0003	-.0065	.0180	-.0038	-.0324	-.0007	-.0004
#2	.0003	-.0025	.0133	-.0006	-.0193	-.0005	-.0032

010271

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0179	.0032
SDev	.0000	.0000	.0004
%RSD	43.80	.2383	11.09
#1	-.0001	.0179	.0035
#2	-.0001	.0178	.0030

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1097555	10000	--	--	--	--	--
SDev	1482.096	.0000000	--	--	--	--	--
%RSD	.1350361	.0000000	--	--	--	--	--
#1	1096507	10000	--	--	--	--	--
#2	1098603	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265498 Operator: **010272**
Run Time: 08/17/05 18:20:20
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	.5913	-.0016	.0076	.0527	.0003	.0041
SDev	.0003	.2994	.0014	.0001	.0001	.0000	.0033
%RSD	208.6	50.65	83.32	1.907	.2237	10.10	81.39
#1	.0004	.8030	-.0007	.0075	.0527	.0003	.0065
#2	-.0001	.3795	-.0026	.0077	.0526	.0003	.0017

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0496	.0002	.0004	.0004	.0013	.0599	.0740
SDev	.0011	.0000	.0001	.0003	.0000	.0054	.0087
%RSD	2.161	16.79	25.80	68.62	2.945	8.988	11.73
#1	.0488	.0003	.0005	.0002	.0013	.0561	.0679
#2	.0503	.0002	.0003	.0007	.0013	.0638	.0801

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	.0012	.2469	.0026	-.0005	3.743	4.942
SDev	.0007	.0004	.1079	.0003	.0002	.151	.000
%RSD	77.42	33.25	43.69	12.19	33.39	4.025	.0046
#1	.0014	.0015	.3231	.0028	-.0004	3.636	4.942
#2	.0004	.0009	.1706	.0024	-.0006	3.849	4.942

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0020	-.0013	.0016	.0011	.4568	-.0025
SDev	.0002	.0022	.0002	.0003	.0014	.0019	.0010
%RSD	233.4	107.9	18.71	20.89	119.8	.4058	40.71
#1	-.0001	.0035	-.0015	.0018	.0002	.4581	-.0033
#2	.0002	.0005	-.0011	.0014	.0021	.4555	-.0018

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.59	-.0049	-.0008	2.605	.0006	-.0021	-.0013
SDev	.51	.0003	.0023	.934	.0001	.0014	.0003
%RSD	.5125	6.348	297.8	35.85	22.08	67.07	25.59
#1	98.23	-.0047	-.0024	3.266	.0007	-.0031	-.0011
#2	98.95	-.0051	.0009	1.945	.0005	-.0011	-.0015

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	-.0028	.0092	-.0019	.0106	.0002	-.0009
SDev	.0000	.0014	.0040	.0007	.0091	.0003	.0011
%RSD	.3437	48.88	43.82	35.59	85.73	109.9	124.2
#1	.0003	-.0018	.0120	-.0014	.0042	.0004	-.0017
#2	.0003	-.0038	.0063	-.0024	.0170	.0001	-.0001

010273

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0164	.0027
SDev	.0000	.0004	.0009
%RSD	25.97	2.350	31.94
#1	.0001	.0167	.0033
#2	.0001	.0161	.0021

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1111128	10000	--	--	--	--	--
SDev	5679.481	.0000000	--	--	--	--	--
%RSD	.5111456	.0000000	--	--	--	--	--
#1	1107112	10000	--	--	--	--	--
#2	1115144	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265499 Operator: **010274**
Run Time: 08/17/05 18:25:08
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	.7151	-.0023	.0080	.0558	.0003	-.0036
SDev	.0004	.0998	.0015	.0004	.0003	.0000	.0046
%RSD	129.1	13.95	64.56	5.370	.4662	.2696	127.3
#1	.0000	.7856	-.0012	.0084	.0560	.0003	-.0069
#2	.0006	.6446	-.0033	.0077	.0556	.0003	-.0004

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0517	.0001	-.0001	-.0006	.0013	.0859	.0916
SDev	.0019	.0002	.0007	.0013	.0001	.0312	.0272
%RSD	3.583	139.2	496.5	200.5	8.523	36.30	29.64
#1	.0504	.0000	-.0006	.0003	.0013	.0638	.0724
#2	.0530	.0003	.0003	-.0015	.0012	.1079	.1108

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	.0014	.2990	.0028	-.0006	4.131	4.988
SDev	.0005	.0002	.0246	.0002	.0001	.098	.044
%RSD	46.97	15.29	8.230	5.876	9.320	2.375	.8738
#1	.0007	.0013	.3164	.0029	-.0006	4.062	5.019
#2	.0014	.0016	.2816	.0027	-.0005	4.201	4.958

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0005	-.0003	-.0022	.0020	.0036	.4644	-.0067
SDev	.0009	.0049	.0007	.0037	.0060	.0017	.0008
%RSD	206.2	1940.	31.15	185.3	166.7	.3746	12.29
#1	.0002	.0032	-.0027	.0045	-.0006	.4656	-.0061
#2	-.0011	-.0037	-.0017	-.0006	.0078	.4631	-.0072

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.28	-.0068	.0018	3.001	.0006	-.0011	-.0006
SDev	.77	.0037	.0013	.296	.0022	.0021	.0015
%RSD	.7956	54.17	70.42	9.880	378.9	194.8	238.4
#1	97.83	-.0094	.0009	3.211	.0021	-.0025	-.0017
#2	96.73	-.0042	.0027	2.791	-.0010	.0004	.0004

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	-.0055	.0103	.0027	.0205	-.0007	-.0002
SDev	.0000	.0013	.0014	.0002	.0171	.0001	.0001
%RSD	11.07	23.27	13.17	7.756	83.41	16.12	63.00
#1	.0003	-.0064	.0113	.0029	.0084	-.0006	-.0001
#2	.0003	-.0046	.0094	.0026	.0326	-.0007	-.0003

010275

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0182	.0027
SDev	.0001	.0001	.0006
%RSD	53.53	.2660	20.03
#1	-.0001	.0182	.0031
#2	-.0002	.0181	.0024

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1096298	10000	--	--	--	--	--
SDev	8710.142	.0000000	--	--	--	--	--
%RSD	.7945049	.0000000	--	--	--	--	--
#1	1102457	10000	--	--	--	--	--
#2	1090139	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265500 Operator: 010276
Run Time: 08/17/05 18:29:54
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	.6871	-.0002	.0069	.0544	.0003	.0013
SDev	.0000	.0452	.0002	.0011	.0001	.0000	.0010
%RSD	5.857	6.577	71.13	15.24	.2071	10.12	79.96
#1	-.0003	.7190	-.0003	.0077	.0543	.0003	.0020
#2	-.0003	.6551	-.0001	.0062	.0544	.0003	.0006

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0537	.0000	-.0003	-.0003	.0015	.0730	.0722
SDev	.0004	.0001	.0001	.0012	.0008	.0024	.0019
%RSD	.6970	395.1	54.23	479.0	54.58	3.337	2.565
#1	.0540	.0001	-.0004	.0006	.0021	.0747	.0709
#2	.0534	-.0000	-.0002	-.0011	.0009	.0713	.0735

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	.0014	.2878	.0027	-.0004	4.052	5.000
SDev	.0006	.0001	.0215	.0001	.0013	.046	.053
%RSD	107.0	9.419	7.487	5.714	318.3	1.143	1.057
#1	.0010	.0013	.3031	.0028	.0005	4.019	4.963
#2	.0001	.0015	.2726	.0026	-.0013	4.085	5.037

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0006	-.0002	.0011	-.0001	.0007	.4559	-.0019
SDev	.0001	.0022	.0049	.0030	.0009	.0088	.0025
%RSD	13.36	1207.	439.1	4096.	123.9	1.925	131.7
#1	-.0006	-.0018	-.0023	.0020	.0001	.4497	-.0001
#2	-.0007	.0014	.0046	-.0022	.0014	.4621	-.0036

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	96.94	-.0010	-.0011	2.925	.0003	-.0010	-.0009
SDev	1.06	.0084	.0036	.129	.0004	.0004	.0012
%RSD	1.094	880.0	333.0	4.408	107.6	36.86	126.8
#1	96.19	-.0069	.0015	3.016	.0006	-.0013	-.0001
#2	97.69	.0050	-.0037	2.834	.0001	-.0008	-.0018

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	-.0036	.0103	.0016	.0028	-.0004	-.0003
SDev	.0000	.0026	.0009	.0021	.0221	.0007	.0005
%RSD	6.354	70.60	8.744	131.9	787.0	165.2	154.7
#1	.0003	-.0018	.0110	.0001	.0184	.0001	-.0007
#2	.0003	-.0054	.0097	.0030	-.0128	-.0009	.0000

010277

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0175	.0028
SDev	.0002	.0001	.0013
%RSD	194.8	.6638	47.97
#1	.0000	.0176	.0037
#2	-.0002	.0175	.0018

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1092534	10000	--	--	--	--	--
SDev	11934.55	.0000000	--	--	--	--	--
%RSD	1.092373	.0000000	--	--	--	--	--
#1	1084095	10000	--	--	--	--	--
#2	1100973	10000	--	--	--	--	--

Analysis Report 08/17/05 06:39:15 PM

Method: DAILY2 Sample Name: 265501 Operator:

010278

Run Time: 08/17/05 18:34:40
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	.5896	-.0003	.0062	.0525	.0003	.0070
SDev	.0006	.0106	.0012	.0007	.0001	.0000	.0018
%RSD	127.5	1.802	473.7	10.94	.1789	8.798	25.60
#1	.0008	.5971	-.0011	.0067	.0524	.0003	.0083
#2	.0000	.5821	.0006	.0058	.0525	.0003	.0057

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0509	.0002	.0002	.0000	.0014	.0650	.0771
SDev	.0010	.0000	.0002	.0001	.0002	.0013	.0044
%RSD	1.927	19.87	89.73	213.9	14.83	1.952	5.713
#1	.0516	.0002	.0004	-.0000	.0012	.0659	.0740
#2	.0503	.0002	.0001	.0001	.0015	.0641	.0802

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0008	.0012	.2521	.0026	-.0003	3.920	4.958
SDev	.0004	.0002	.0062	.0000	.0002	.150	.014
%RSD	46.75	17.07	2.449	.4318	57.88	3.837	.2821
#1	.0010	.0010	.2564	.0026	-.0002	4.027	4.948
#2	.0005	.0013	.2477	.0026	-.0004	3.814	4.968

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0007	-.0110	-.0013	.0001	.0029	.4596	-.0008
SDev	.0009	.0008	.0002	.0015	.0014	.0033	.0032
%RSD	124.5	7.482	16.02	2137.	47.74	.7107	423.6
#1	-.0014	-.0104	-.0012	-.0010	.0039	.4619	.0015
#2	-.0001	-.0116	-.0015	.0012	.0019	.4573	-.0030

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	96.16	-.0026	-.0014	2.595	-.0004	-.0018	-.0008
SDev	.91	.0020	.0004	.029	.0010	.0009	.0005
%RSD	.9473	76.98	27.12	1.124	246.2	51.22	55.21
#1	95.51	-.0040	-.0017	2.615	-.0011	-.0024	-.0005
#2	96.80	-.0012	-.0011	2.574	.0003	-.0011	-.0012

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	-.0048	.0090	-.0002	.0160	.0001	.0002
SDev	.0000	.0031	.0001	.0004	.0147	.0005	.0003
%RSD	2.509	64.57	1.334	167.7	91.98	473.7	164.8
#1	.0003	-.0026	.0091	.0000	.0264	-.0003	.0004
#2	.0003	-.0070	.0089	-.0005	.0056	.0005	-.0000

010279

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0154	.0028
SDev	.0000	.0002	.0001
%RSD	665.6	1.116	4.559
#1	-.0000	.0153	.0027
#2	.0000	.0155	.0029

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1083658	10000	--	--	--	--	--
SDev	10278.50	.0000000	--	--	--	--	--
%RSD	.9485008	.0000000	--	--	--	--	--
#1	1076390	10000	--	--	--	--	--
#2	1090926	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265502 Operator:
Run Time: 08/17/05 18:39:27
Comment:
Mode: CONC Corr. Factor: 1

010280

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	.7773	-.0010	.0048	.0471	.0003	-.0017
SDev	.0006	.2359	.0003	.0004	.0000	.0000	.0034
%RSD	203.8	30.35	35.18	8.721	.0086	1.210	204.2
#1	-.0007	.6105	-.0012	.0045	.0471	.0003	-.0041
#2	.0001	.9441	-.0007	.0051	.0471	.0003	.0007

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0489	.0001	-.0001	-.0011	.0006	.0754	.0570
SDev	.0002	.0002	.0004	.0007	.0005	.0469	.0103
%RSD	.3628	192.5	533.4	68.56	83.55	62.19	18.05
#1	.0487	-.0000	-.0004	-.0016	.0002	.0422	.0498
#2	.0490	.0002	.0002	-.0006	.0009	.1085	.0643

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0016	.3204	.0025	-.0012	3.697	4.971
SDev	.0003	.0007	.1003	.0003	.0014	.182	.000
%RSD	93.34	41.57	31.32	11.05	119.5	4.934	.0063
#1	.0001	.0011	.2495	.0023	-.0002	3.568	4.971
#2	.0006	.0021	.3914	.0027	-.0022	3.826	4.971

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	.0023	-.0009	-.0003	-.0020	.4525	-.0049
SDev	.0001	.0089	.0040	.0031	.0025	.0083	.0049
%RSD	31.30	396.4	436.3	998.8	125.6	1.826	100.9
#1	-.0005	-.0041	.0019	-.0025	-.0037	.4467	-.0084
#2	-.0003	.0086	-.0037	.0019	-.0002	.4583	-.0014

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.2	-.0024	-.0002	3.190	-.0005	-.0010	.0002
SDev	.0	.0029	.0031	.785	.0008	.0011	.0007
%RSD	.0313	119.3	1341.	24.61	154.5	114.7	330.0
#1	100.2	-.0004	-.0024	2.634	-.0010	-.0017	-.0003
#2	100.2	-.0045	.0019	3.745	.0000	-.0002	.0007

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	-.0059	.0110	-.0007	-.0065	-.0010	-.0023
SDev	.0000	.0011	.0032	.0003	.0009	.0007	.0004
%RSD	.0211	19.03	29.07	35.83	13.49	63.86	17.88
#1	.0002	-.0067	.0087	-.0009	-.0059	-.0015	-.0020
#2	.0002	-.0051	.0132	-.0005	-.0072	-.0006	-.0026

010281

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0002	.0139	.0022
SDev	.0000	.0004	.0007
%RSD	8.360	2.797	34.10
#1	-.0002	.0136	.0017
#2	-.0002	.0141	.0027

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1129197	10000	--	--	--	--	--
SDev	363.4529	.0000000	--	--	--	--	--
%RSD	.0321868	.0000000	--	--	--	--	--
#1	1128940	10000	--	--	--	--	--
#2	1129454	10000	--	--	--	--	--

Method: DAILY2 Sample Name: cri Operator:
Run Time: 08/17/05 18:47:53
Comment:
Mode: CONC Corr. Factor: 1

010282

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0205	.0828	.0191	.0968	.0201	.0101	.0000
SDev	.0008	.0037	.0003	.0027	.0001	.0000	.0081
%RSD	3.738	4.481	1.698	2.840	.2358	.0397	66160.
#1	.0199	.0801	.0194	.0987	.0201	.0101	-.0057
#2	.0210	.0854	.0189	.0948	.0201	.0101	.0058
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	.0035	.0102	.0979	.0198	.0512	.1076	.0151
SDev	.0023	.0003	.0006	.0007	.0004	.0192	.0175
%RSD	64.92	2.471	.6413	3.680	.8385	17.81	115.6
#1	.0019	.0100	.0974	.0203	.0515	.0941	.0028
#2	.0052	.0104	.0983	.0193	.0509	.1212	.0274
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	.0013	.0730	.0062	.0298	.0201	.1063	.0005
SDev	.0019	.0000	.0051	.0001	.0004	.0853	.0084
%RSD	148.9	.0497	82.11	.3322	2.061	80.23	1528.
#1	-.0001	.0731	.0026	.0298	.0198	.0460	-.0054
#2	.0027	.0730	.0098	.0297	.0204	.1667	.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	.0776	.1081	.0053	.0056	.0022	-.0041	.1154
SDev	.0010	.0007	.0003	.0014	.0022	.0014	.0007
%RSD	1.294	.6594	5.105	24.67	99.85	33.42	.6038
#1	.0783	.1086	.0051	.0065	.0006	-.0051	.1159
#2	.0769	.1076	.0055	.0046	.0037	-.0031	.1149
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

010283

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	95.64	.0080	.0080	.1108	.0055	.0080	.0991
SDev	.32	.0018	.0027	.0035	.0008	.0024	.0006
%RSD	.3390	21.82	33.19	3.126	14.99	29.35	.5727
#1	95.41	.0093	.0099	.1083	.0061	.0097	.0995
#2	95.87	.0068	.0061	.1132	.0049	.0063	.0987
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	.0212	-.0034	.0188	.0188	.2236	.0985	-.0029
SDev	.0001	.0056	.0001	.0006	.0556	.0006	.0008
%RSD	.3392	163.7	.7296	3.208	24.87	.6245	27.45
#1	.0212	.0005	.0189	.0192	.1843	.0989	-.0034
#2	.0213	-.0073	.0187	.0184	.2629	.0980	-.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	.0399	.0963
SDev	.0000	.0001	.0000
%RSD	23.55	.1548	.0307
#1	-.0001	.0399	.0963
#2	-.0001	.0398	.0963
Errors	NOCHECK	LC Pass	NOCHECK
High		.0600	
Low		.0200	

010284

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1077880	10000	--	--	--	--	--
SDev	3653.621	.0000000	--	--	--	--	--
%RSD	.3389634	.0000000	--	--	--	--	--
#1	1075297	10000	--	--	--	--	--
#2	1080464	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: icsa Operator: **010285**
Run Time: 08/17/05 18:52:39
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0010	516.5	.0026	-.0207	.0023	.0002	.0076
SDev	.0002	.4	.0018	.0004	.0001	.0000	.0066
%RSD	23.07	.0825	67.42	1.894	2.753	.5157	87.82
#1	-.0009	516.2	.0014	-.0210	.0023	.0002	.0123
#2	-.0012	516.8	.0038	-.0205	.0024	.0002	.0029
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	485.9	.0021	.0006	-.0011	.0033	193.9	.0051
SDev	1.5	.0000	.0001	.0009	.0001	.1	.0061
%RSD	.3073	1.974	12.56	81.73	4.374	.0702	118.5
#1	486.9	.0021	.0006	-.0017	.0032	194.0	.0094
#2	484.8	.0021	.0007	-.0004	.0034	193.8	.0008
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	.0052	.0002	551.1	-.0040	-.0013	.1683	-.0367
SDev	.0003	.0000	.7	.0000	.0007	.0667	.0013
%RSD	5.756	12.93	.1195	.0672	53.54	39.63	3.584
#1	.0050	.0003	550.6	-.0040	-.0008	.2155	-.0376
#2	.0054	.0002	551.6	-.0040	-.0018	.1212	-.0358
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	-.0187	.0387	-.0346	.0117	-.0019	.0028
SDev	.0010	.0034	.0065	.0042	.0029	.0023	.0077
%RSD	98.82	18.38	16.89	12.28	25.12	118.6	277.6
#1	.0018	-.0212	.0340	-.0316	.0138	-.0036	.0083
#2	.0003	-.0163	.0433	-.0376	.0096	-.0003	-.0027
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

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

010286

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	86.19	.0044	-.0100	-.0061	-.0101	-.0052	-.0051
SDev	.81	.0005	.0084	.0012	.0007	.0054	.0002
%RSD	.9360	12.27	84.06	19.76	6.442	104.5	3.266
#1	85.62	.0040	-.0041	-.0069	-.0097	-.0014	-.0052
#2	86.76	.0048	-.0159	-.0052	-.0106	-.0090	-.0050
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	.0166	-.0051	-.0007	.0097	-.0771	-.0005	.0032
SDev	.0000	.0076	.0001	.0015	.0237	.0004	.0005
%RSD	.2201	148.5	7.164	15.35	30.77	89.39	15.42
#1	.0165	-.0105	-.0007	.0108	-.0603	-.0002	.0036
#2	.0166	.0003	-.0008	.0087	-.0939	-.0008	.0029
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0008	.0079	-.0010
SDev	.0000	.0006	.0005
%RSD	.4072	8.253	49.90
#1	-.0008	.0074	-.0013
#2	-.0008	.0083	-.0006
Errors	NOCHECK	NOCHECK	NOCHECK
High			
Low			

010287

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	971326	10000	--	--	--	--	--
SDev	9070.059	.0000000	--	--	--	--	--
%RSD	.9337816	.0000000	--	--	--	--	--
#1	964912	10000	--	--	--	--	--
#2	977739	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: icsab Operator: **010288**
Run Time: 08/17/05 18:57:26
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.097	516.6	1.033	1.015	.5186	.4955	.0096
SDev	.001	.7	.002	.004	.0005	.0005	.0044
%RSD	.0932	.1291	.1875	.4342	.0944	.0941	45.90
#1	1.097	517.0	1.035	1.011	.5183	.4958	.0127
#2	1.098	516.1	1.032	1.018	.5190	.4952	.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	482.1	.9536	.4838	.4868	.5531	192.9	-.0012
SDev	.8	.0001	.0005	.0003	.0010	.3	.0051
%RSD	.1566	.0135	.0942	.0687	.1880	.1802	426.8
#1	482.7	.9537	.4834	.4865	.5523	193.2	-.0048
#2	481.6	.9535	.4841	.4870	.5538	192.7	.0024
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	.0048	1.181	551.2	.4880	1.007	.4287	-.0263
SDev	.0001	.002	1.0	.0004	.002	.0551	.0037
%RSD	1.481	.1949	.1798	.0730	.1579	12.86	14.16
#1	.0047	1.182	551.9	.4877	1.005	.3898	-.0290
#2	.0048	1.179	550.5	.4882	1.008	.4677	-.0237
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	.9089	1.071	1.028	.9454	.0176	.0031	1.061
SDev	.0055	.000	.001	.0030	.0014	.0024	.002
%RSD	.6095	.0192	.0779	.3175	7.853	74.81	.2340
#1	.9128	1.071	1.027	.9433	.0166	.0048	1.063
#2	.9050	1.071	1.028	.9475	.0186	.0015	1.060
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

010289

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	88.06	1.045	1.022	1.034	.9729	1.029	.9992
SDev	.46	.004	.007	.001	.0023	.003	.0006
%RSD	.5273	.3413	.6754	.0494	.2331	.3315	.0596
#1	87.74	1.047	1.017	1.034	.9713	1.027	.9988
#2	88.39	1.042	1.027	1.035	.9745	1.032	.9997
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	1.054	-.0019	.9487	.9926	.9311	.5042	-.0020
SDev	.001	.0038	.0001	.0086	.0246	.0002	.0004
%RSD	.0838	199.7	.0136	.8694	2.646	.0427	22.40
#1	1.054	.0008	.9487	.9865	.9137	.5044	-.0023
#2	1.053	-.0046	.9486	.9987	.9485	.5041	-.0017
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	-.0010	.9785	.9722
SDev	.0000	.0014	.0015
%RSD	4.171	.1427	.1538
#1	-.0010	.9795	.9732
#2	-.0011	.9776	.9711
Errors	NOCHECK	LC Pass	NOCHECK
High		1.200	
Low		.8000	

010290

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	992426	10000	--	--	--	--	--
SDev	5221.983	.0000000	--	--	--	--	--
%RSD	.5261834	.0000000	--	--	--	--	--
#1	988734	10000	--	--	--	--	--
#2	996119	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccv6 Operator: **010291**
Run Time: 08/17/05 19:05:52
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9820	9.961	5.048	4.778	9.788	.9977	4.955
SDev	.0000	.018	.005	.004	.011	.0019	.012
%RSD	.0020	.1765	.0945	.0884	.1098	.1947	.2444
#1	.9820	9.973	5.051	4.775	9.796	.9963	4.963
#2	.9820	9.948	5.045	4.781	9.780	.9990	4.946
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	20.56	.9946	5.021	1.990	2.025	10.03	18.42
SDev	.08	.0021	.006	.003	.007	.00	.07
%RSD	.3954	.2148	.1182	.1524	.3545	.0162	.3694
#1	20.51	.9930	5.017	1.988	2.030	10.03	18.47
#2	20.62	.9961	5.025	1.993	2.020	10.02	18.38
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	4.976	4.812	20.29	1.001	4.970	28.36	H38.74
SDev	.007	.015	.05	.001	.002	.05	.12
%RSD	.1355	.3023	.2308	.0929	.0411	.1636	.2990
#1	4.981	4.822	20.26	1.000	4.969	28.39	H38.82
#2	4.971	4.801	20.33	1.002	4.972	28.33	H38.66
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	4.809	5.295	4.989	4.886	1.023	.9656	.9975
SDev	.008	.000	.022	.003	.001	.0169	.0021
%RSD	.1657	.0015	.4356	.0639	.0792	1.755	.2081
#1	4.803	5.295	4.974	4.889	1.022	.9776	.9989
#2	4.814	5.295	5.004	4.884	1.023	.9536	.9960
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

010292

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.33	5.255	5.112	5.021	4.921	5.159	4.905
SDev	1.66	.017	.017	.007	.005	.005	.010
%RSD	1.701	.3231	.3228	.1335	.1049	.1035	.2134
#1	98.50	5.243	5.123	5.025	4.917	5.163	4.898
#2	96.16	5.267	5.100	5.016	4.924	5.156	4.913
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	.9846	4.751	5.082	1.009	4.978	1.076
SDev	.010	.0012	.002	.009	.010	.010	.003
%RSD	.1980	.1187	.0371	.1727	1.035	.1977	.2631
#1	5.076	.9854	4.752	5.076	1.016	4.971	1.074
#2	5.062	.9838	4.750	5.089	1.002	4.985	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	5.060	1.020	5.076
SDev	.002	.005	.000
%RSD	.0301	.5273	.0009
#1	5.061	1.016	5.076
#2	5.059	1.024	5.076
Errors	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500
Low	4.500	.9000	4.500

010293

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1096951	10000	--	--	--	--	--
SDev	18714.29	.0000000	--	--	--	--	--
%RSD	1.706028	.0000000	--	--	--	--	--
#1	1110184	10000	--	--	--	--	--
#2	1083718	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccb6 Operator: **010294**
Run Time: 08/17/05 19:12:33
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	-.0253	-.0008	.0034	.0001	.0003	.0018
SDev	.0003	.0007	.0025	.0009	.0001	.0000	.0013
%RSD	79.97	2.753	316.4	25.68	53.22	6.190	68.39
#1	-.0002	-.0248	.0010	.0040	.0001	.0003	.0027
#2	-.0006	-.0258	-.0026	.0028	.0001	.0003	.0009
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	.0012	.0001	-.0002	-.0006	.0011	-.0055	-.0036
SDev	.0000	.0002	.0000	.0007	.0003	.0059	.0001
%RSD	2.326	154.0	12.18	114.9	24.48	108.7	3.556
#1	.0012	.0002	-.0002	-.0011	.0009	-.0096	-.0035
#2	.0012	-.0000	-.0002	-.0001	.0013	-.0013	-.0037
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0500	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0500	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	-.0001	-.0027	-.0001	.0020	L-.1588	.0012
SDev	.0004	.0000	.0026	.0002	.0005	.0104	.0114
%RSD	107.1	74.37	98.84	127.5	25.81	6.560	922.0
#1	.0007	-.0000	-.0008	-.0002	.0024	L-.1514	.0093
#2	.0001	-.0001	-.0046	-.0000	.0016	L-.1662	-.0068
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	-.0005	-.0014	-.0005	.0007	-.0019	.0001	-.0030
SDev	.0005	.0009	.0034	.0050	.0008	.0029	.0033
%RSD	112.6	63.21	654.1	669.6	40.71	3587.	107.3
#1	-.0008	-.0020	.0019	-.0028	-.0013	-.0020	-.0007
#2	-.0001	-.0007	-.0029	.0042	-.0024	.0021	-.0053
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

010295

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.32	-.0084	-.0004	-.0007	.0003	-.0031	.0004
SDev	2.41	.0100	.0018	.0019	.0022	.0045	.0012
%RSD	2.423	118.9	443.4	260.9	656.0	147.3	307.6
#1	101.0	-.0013	.0009	.0006	-.0012	.0001	-.0005
#2	97.61	-.0155	-.0016	-.0020	.0019	L-.0063	.0013
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	-.0047	-.0002	.0004	-.0054	-.0005	-.0005
SDev	.0000	.0011	.0002	.0003	.0315	.0004	.0003
%RSD	45.24	22.62	98.42	80.65	584.6	87.37	51.85
#1	.0001	-.0054	-.0003	.0002	.0169	-.0007	-.0007
#2	.0000	-.0039	-.0000	.0007	-.0276	-.0002	-.0003
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	-.0002
SDev	.0001	.0003	.0001
%RSD	44.60	28520.	61.99
#1	-.0002	-.0002	-.0002
#2	-.0001	.0002	-.0001
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010296

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1119286	10000	--	--	--	--	--
SDev	27074.41	.0000000	--	--	--	--	--
%RSD	2.418899	.0000000	--	--	--	--	--
#1	1138431	10000	--	--	--	--	--
#2	1100142	10000	--	--	--	--	--

Div. 20
TO#050722-11
Project No. 06002.01.242
Prep. Pages 61-110

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	mg/L	sigwt	Dilution	Calc RL	ug/ml	Date	Time
265496	Al3082	29.2			mg/L	0.5				0.01	29.2445	29.2	1	0.5	0.58489	08/19/05	11:00
265496	Mg2790	11.6			mg/L	0.5				0.01	11.604	11.6	1	0.5	0.23208	08/19/05	11:00
265496	Si2881	109			mg/L	0.5				0.01	109.332	109	1	0.5	2.18664	08/19/05	11:00
265497	Al3082	29.0			mg/L	0.5				0.01	29.0415	29	1	0.5	0.58083	08/19/05	11:05
265497	Mg2790	12.0			mg/L	0.5				0.01	12.034	12	1	0.5	0.24068	08/19/05	11:05
265497	Si2881	107			mg/L	0.5				0.01	107.349	107	1	0.5	2.14698	08/19/05	11:05
265498	Al3082	28.5			mg/L	0.5				0.01	28.4815	28.5	1	0.5	0.56963	08/19/05	11:10
265498	Mg2790	11.7			mg/L	0.5				0.01	11.6615	11.7	1	0.5	0.23323	08/19/05	11:10
265498	Si2881	107			mg/L	0.5				0.01	107.2815	107	1	0.5	2.14563	08/19/05	11:10
265499	Al3082	29.7			mg/L	0.5				0.01	29.7195	29.7	1	0.5	0.59439	08/19/05	11:15
265499	Mg2790	12.1			mg/L	0.5				0.01	12.068	12.1	1	0.5	0.24136	08/19/05	11:15
265499	Si2881	110			mg/L	0.5				0.01	110.3125	110	1	0.5	2.20625	08/19/05	11:15
265500	Al3082	28.8			mg/L	0.5				0.01	28.8095	28.8	1	0.5	0.57619	08/19/05	11:19
265500	Mg2790	11.6			mg/L	0.5				0.01	11.6285	11.6	1	0.5	0.23257	08/19/05	11:19
265500	Si2881	108			mg/L	0.5				0.01	107.866	108	1	0.5	2.15732	08/19/05	11:19
265501	Al3082	28.8			mg/L	0.5				0.01	28.8035	28.8	1	0.5	0.57607	08/19/05	11:24
265501	Mg2790	11.7			mg/L	0.5				0.01	11.6735	11.7	1	0.5	0.23347	08/19/05	11:24
265501	Si2881	107			mg/L	0.5				0.01	107.1335	107	1	0.5	2.14267	08/19/05	11:24
265502	Al3082	27.4			mg/L	0.5				0.01	27.384	27.4	1	0.5	0.54768	08/19/05	11:29
265502	Mg2790	11.0			mg/L	0.5				0.01	11.0035	11	1	0.5	0.22007	08/19/05	11:29
265502	Si2881	102	✓		mg/L	0.5				0.01	102.2745	102	1	0.5	2.04549	08/19/05	11:29

265502 for Si

$$\frac{2.04549\ \mu g/ml \times 5ml}{0.1\ ml} = 102\ mg/L$$

010297

div20_050722(11)

☐ 200.7 TAP No. 01-0406-028 Rev2/Mar02

☑ 6010B TAP No. 01-0406-130 Rev3/Mar05

☐ Other_____

QC STD. ID's	
CCV	05H01
CRI	
ICSA	
ICSAB	05H01

ICP CAL.STD ID's	
Std0	05H01
Std1	
Std2	
Std3	
Std4	
Std5	
Std6	05H01

010298

Al, Mg, Si

PROJ. NO.	PROJECT	TO#	DATE	MATRIX	LOGBK PG
06002.01.242	D.V20	050722-11	8-19-05	water	61-110

INSTRUMENT: Icace 2 FILENAME: B050819

Method: DAILY2 Standard: blk
Run Time: 08/19/05 09:41:04

010299

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Avge	-.0000	.0005	-.0001	-.0000	-.0000	-.0002	-.0000
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	114.5	1.420	43.90	358.4	34.04	2.370	141.4
#1	-.0000	.0005	-.0000	.0000	-.0000	-.0002	.0000
#2	-.0000	.0005	-.0001	-.0000	-.0000	-.0002	-.0000

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Avge	.0000	.0000	-.0000	-.0000	.0002	.0000	.0002
SDev	.0000	.0000	.0000	.0001	.0000	.0000	.0000
%RSD	.9122	41.24	3.651	259.3	15.26	86.98	6.380
#1	.0000	.0000	-.0000	.0000	.0002	.0000	.0002
#2	.0000	.0000	-.0000	-.0001	.0002	.0000	.0002

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Avge	-.0000	.0000	.0000	-.0000	-.0000	-.0001	-.0122
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0002
%RSD	3456.	9.228	269.5	193.6	3.374	15.28	1.625
#1	-.0000	.0000	-.0000	.0000	-.0000	-.0002	-.0123
#2	.0000	.0000	.0000	-.0000	-.0000	-.0001	-.0120

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Avge	-.0000	.0000	.0001	.0000	.0000	.0000	-.0012
SDev	.0000	.0000	.0001	.0000	.0000	.0000	.0001
%RSD	105.7	28.81	35.21	61.85	51.31	71.39	5.824
#1	-.0000	.0000	.0001	.0001	.0000	.0000	-.0011
#2	-.0000	.0000	.0002	.0000	.0000	.0000	-.0012

Elem	Sc3613	1960/1	1960/2	Si2881	Sn1899	Sr4215	Th2837
Avge	111.5	-.0002	.0001	.0014	-.0000	.0000	.0000
SDev	1.0	.0000	.0000	.0000	.0000	.0000	.0001
%RSD	.9156	10.61	1.220	3.032	41.24	141.4	360.6
#1	110.8	-.0002	.0001	.0014	-.0000	.0000	.0000
#2	112.3	-.0002	.0001	.0014	-.0000	.0000	-.0000

Elem	Ti3349	Tl1908	U_4090	V_2924	W_2079	Y_3710	Zn2062
Avge	-.0002	-.0002	-.0003	-.0000	.0002	.0000	-.0000
SDev	.0001	.0000	.0002	.0000	.0000	.0000	.0000
%RSD	55.63	16.39	53.34	38.52	6.722	185.4	13.76
#1	-.0001	-.0003	-.0005	-.0000	.0002	.0000	-.0000
#2	-.0002	-.0002	-.0002	-.0001	.0002	-.0000	-.0000

Elem	Zr3496
Avge	-.0000
SDev	.0002
%RSD	1093.
#1	.0001
#2	-.0001

8-19-05

8/19/05

010300

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1115323	10000	--	--	--	--	--
SDev	10173.85	.0000000	--	--	--	--	--
%RSD	.9121889	.0000000	--	--	--	--	--
#1	1108129	10000	--	--	--	--	--
#2	1122517	10000	--	--	--	--	--

Method: DAILY2 Standard: clp_std4
Run Time: 08/19/05 09:45:49

010301

Elem	Ag3280	As1890	2203/1	2203/2	Sb2068	1960/1	1960/2
Avge	.0814	.1113	.3170	.2731	.1573	.1915	.2126
SDev	.0001	.0001	.0020	.0029	.0002	.0008	.0018
%RSD	.1769	.0652	.6230	1.057	.1537	.4342	.8262
#1	.0815	.1113	.3156	.2711	.1575	.1909	.2113
#2	.0813	.1112	.3184	.2752	.1571	.1921	.2138

Elem	Tl1908
Avge	.2058
SDev	.0001
%RSD	.0387
#1	.2057
#2	.2058

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1104989	10000	--	--	--	--	--
SDev	15499.78	.0000000	--	--	--	--	--
%RSD	1.402709	.0000000	--	--	--	--	--
#1	1115949	10000	--	--	--	--	--
#2	1094029	10000	--	--	--	--	--

Method: DAILY2 Standard: clp_std1
Run Time: 08/19/05 09:50:13

010302

Elem	Al3082	Ca3179	Fe2714	K_7664	Li6707	Mg2790	Na3302
Avge	.1017	.2386	.0898	.1894	3.161	.0959	.0080
SDev	.0004	.0004	.0001	.0006	.008	.0000	.0000
%RSD	.4212	.1643	.0529	.3405	.2566	.0141	.5596
#1	.1020	.2384	.0897	.1899	3.167	.0959	.0080
#2	.1014	.2389	.0898	.1889	3.155	.0959	.0080

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1077435	10000	--	--	--	--	--
SDev	1838.478	.0000000	--	--	--	--	--
%RSD	.1706347	.0000000	--	--	--	--	--
#1	1078735	10000	--	--	--	--	--
#2	1076135	10000	--	--	--	--	--

Method: DAILY2 Standard: clp_std5
Run Time: 08/19/05 09:53:53

010303

Elem	B_2496	Bi2230	Mo2020	P_1782	Si2881	Sn1899	Sr4215
Avge	.1646	.0286	.2744	.0257	.1571	.1543	2.517
SDev	.0004	.0001	.0009	.0001	.0004	.0000	.002
%RSD	.2492	.1896	.3402	.3800	.2393	.0245	.0920
#1	.1643	.0286	.2737	.0256	.1573	.1543	2.519
#2	.1649	.0285	.2751	.0258	.1568	.1544	2.515

Elem	Ti3349
Avge	2.953
SDev	.002
%RSD	.0679
#1	2.952
#2	2.955

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1087269	10000	--	--	--	--	--
SDev	3596.345	.0000000	--	--	--	--	--
%RSD	.3307686	.0000000	--	--	--	--	--
#1	1084726	10000	--	--	--	--	--
#2	1089812	10000	--	--	--	--	--

Method: DAILY2 Standard: clp_std2
Run Time: 08/19/05 09:57:36

010304

Elem	Ba4934	Be3130	Cr2677	Cu3247	Ni2316
Avge	.9809	1.395	.4429	.3126	.3514
SDev	.0013	.002	.0001	.0004	.0005
%RSD	.1308	.1629	.0151	.1348	.1322
#1	.9800	1.393	.4430	.3129	.3511
#2	.9818	1.396	.4429	.3123	.3517

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1077306	10000	--	--	--	--	--
SDev	940.4520	.0000000	--	--	--	--	--
%RSD	.0872967	.0000000	--	--	--	--	--
#1	1076641	10000	--	--	--	--	--
#2	1077971	10000	--	--	--	--	--

Method: DAILY2 Standard: clp_std3
Run Time: 08/19/05 10:00:54

010305

Elem	Cd2265	Co2286	Mn2576	V_2924	Zn2062
Avge	1.001	.2140	.9847	.2031	.2735
SDev	.001	.0000	.0006	.0002	.0004
%RSD	.0831	.0063	.0596	.1008	.1548
#1	1.002	.2141	.9851	.2033	.2738
#2	1.001	.2140	.9843	.2030	.2732

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1092568	10000	--	--	--	--	--
SDev	9038.239	.0000000	--	--	--	--	--
%RSD	.8272473	.0000000	--	--	--	--	--
#1	1086177	10000	--	--	--	--	--
#2	1098959	10000	--	--	--	--	--

Standardization Report 08/19/05 10:08:26 AM page 1

Method: DAILY2 Slope = Conc(SIR)/IR **010306**

Element	Wavelen	High std	Low std	Slope	Y-intercept	Date Standardized
Ag3280	328.068	clp_std4	blk	24.5672	.000576	08/19/05 10:04:35
Al3082	308.215	clp_std1	blk	493.932	-.228280	08/19/05 10:04:35
As1890	189.042	clp_std4	blk	89.8090	.004701	08/19/05 10:04:35
B_2496	249.678	clp_std5	blk	60.7440	.000322	08/19/05 10:04:35
Ba4934	493.409	clp_std2	blk	10.1944	.000351	08/19/05 10:04:35
Be3130	313.042	clp_std2	blk	3.58437	.000779	08/19/05 10:04:35
Bi2230	223.061	clp_std5	blk	173.512	.000850	08/19/05 10:04:35
Ca3179	317.933	clp_std1	blk	209.566	-.003382	08/19/05 10:04:35
Cd2265	226.502	clp_std3	blk	9.98475	-.000126	08/19/05 10:04:35
Co2286	228.616	clp_std3	blk	46.7144	.001298	08/19/05 10:04:35
Cr2677	267.716	clp_std2	blk	22.5765	.000660	08/19/05 10:04:35
Cu3247	324.753	clp_std2	blk	32.0137	-.006649	08/19/05 10:04:35
Fe2714	271.441	clp_std1	blk	557.301	-.005226	08/19/05 10:04:35
K_7664	766.491	clp_std1	blk	264.242	-.045949	08/19/05 10:04:35
La3988	398.853	clp_std6	blk	20.9582	.000011	08/19/05 10:04:35
Li6707	670.784	clp_std1	blk	3.16374	-.000096	08/19/05 10:04:35
Mg2790	279.078	clp_std1	blk	260.547	-.001038	08/19/05 10:04:35
Mn2576	257.610	clp_std3	blk	10.1560	.000050	08/19/05 10:04:35
Mo2020	202.030	clp_std5	blk	36.4435	.001078	08/19/05 10:04:35
Na3302	330.232	clp_std1	blk	6139.57	.840059	08/19/05 10:04:35
Na5889	588.991	clp_std6	blk	18.4633	.224980	08/19/05 10:04:35
Ni2316	231.604	clp_std2	blk	28.4562	.000406	08/19/05 10:04:35
P_1782	178.287	clp_std5	blk	389.466	-.014124	08/19/05 10:04:35
2203/1	220.351	clp_std4	blk	31.5632	-.004210	08/19/05 10:04:35
2203/2	220.352	clp_std4	blk	36.6182	-.001333	08/19/05 10:04:35
Pd3404	340.458	clp_std6	blk	52.4378	-.000446	08/19/05 10:04:35
S_1820	182.040	clp_std6	blk	349.442	-.003143	08/19/05 10:04:35
Sb2068	206.838	clp_std4	blk	63.1037	.073646	08/19/05 10:04:35
Sc3613	361.384	blk	dark	.896555	.000000	08/19/05 10:04:35
1960/1	196.021	clp_std4	blk	52.1730	.011256	08/19/05 10:04:35
1960/2	196.022	clp_std4	blk	47.0623	-.004198	08/19/05 10:04:35
Si2881	288.158	clp_std5	blk	63.9951	-.088465	08/19/05 10:04:35
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	64.8287	.001223	08/19/05 10:04:35
Sr4215	421.552	clp_std5	blk	3.97314	-.000004	08/19/05 10:04:35
Th2837	283.730	clp_std6	blk	104.191	-.001377	08/19/05 10:04:35
Ti3349	334.941	clp_std5	blk	3.38581	.000509	08/19/05 10:04:35
Tl1908	190.864	clp_std4	blk	48.5306	.012127	08/19/05 10:04:35
U_4090	409.014	clp_std6	blk	162.687	.054687	08/19/05 10:04:35
V_2924	292.402	clp_std3	blk	49.2222	.002137	08/19/05 10:04:35
W_2079	207.914	clp_std6	blk	25.7806	-.005064	08/19/05 10:04:35
Y_3710	371.030	clp_std6	blk	13.3706	-.000115	08/19/05 10:04:35
Zn2062	206.200	clp_std3	blk	36.5614	.000180	08/19/05 10:04:35
Zr3496	349.621	clp_std6	blk	5.65335	.000092	08/19/05 10:04:35

Standardization Rpt. 08/19/05 10:08:26 AM

010307

Method: DAILY2 Standard: clp_std6
Run Time: 08/19/05 10:04:35

Elem	La3988	Na5889	Pd3404	S_1820	Th2837	U_4090	W_2079
Avge	.4776	.0423	.1958	.0286	.1002	.0611	.1941
SDev	.0002	.0007	.0005	.0002	.0000	.0001	.0004
%RSD	.0391	1.641	.2390	.5908	.0183	.0885	.2238
#1	.4774	.0418	.1955	.0285	.1002	.0611	.1938
#2	.4777	.0428	.1961	.0287	.1002	.0610	.1944

Elem	Y_3710	Zr3496
Avge	.7478	1.933
SDev	.0027	.006
%RSD	.3556	.3236
#1	.7459	1.929
#2	.7497	1.938

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1090047	10000	--	--	--	--	--
SDev	21549.79	.0000000	--	--	--	--	--
%RSD	1.976959	.0000000	--	--	--	--	--
#1	1074809	10000	--	--	--	--	--
#2	1105285	10000	--	--	--	--	--

Analysis Report QC Standard 08/19/05 10:15:02 AM page 1

Method: DAILY2 Sample Name: icv/ccv Operator:
Run Time: 08/19/05 10:10:28
Comment:
Mode: CONC Corr. Factor: 1

010308

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9849	9.913	5.210	4.828	10.11	.9939	5.044
SDev	.0010	.027	.013	.003	.00	.0006	.003
%RSD	.1004	.2712	.2489	.0677	.0189	.0560	.0584
#1	.9856	9.932	5.220	4.826	10.11	.9942	5.046
#2	.9842	9.894	5.201	4.830	10.11	.9935	5.042
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	19.97	1.019	5.084	1.988	2.031	10.35	18.54
SDev	.02	.001	.004	.001	.004	.01	.03
%RSD	.0789	.1007	.0748	.0574	.1982	.0706	.1796
#1	19.95	1.018	5.087	1.989	2.033	10.35	18.57
#2	19.98	1.019	5.081	1.987	2.028	10.34	18.52
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	4.954	4.873	20.19	1.013	5.078	28.66	Q41.42
SDev	.008	.018	.04	.001	.003	.11	.31
%RSD	.1629	.3676	.1885	.0597	.0572	.3977	.7434
#1	4.960	4.886	20.22	1.013	5.076	28.58	Q41.64
#2	4.948	4.861	20.17	1.012	5.080	28.74	Q41.21
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	5.020	5.132	5.040	5.163	1.015	1.008	1.016
SDev	.005	.023	.002	.084	.005	.005	.004
%RSD	.0951	.4551	.0309	1.623	.4552	.5365	.3569
#1	5.017	5.148	5.041	5.104	1.012	1.005	1.019
#2	5.023	5.115	5.039	5.222	1.018	1.012	1.014
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

010309

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.43	5.281	5.459	5.023	5.122	5.400	4.947
SDev	.31	.003	.123	.015	.055	.081	.004
%RSD	.3166	.0533	2.260	.2961	1.081	1.506	.0852
#1	99.65	5.283	5.372	5.034	5.083	5.342	4.944
#2	99.20	5.279	5.547	5.013	5.161	5.457	4.950
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	4.984	1.004	4.798	5.266	1.026	4.988	1.051
SDev	.002	.006	.003	.001	.058	.006	.006
%RSD	.0416	.6158	.0581	.0122	5.618	.1139	.5727
#1	4.985	1.008	4.800	5.266	.9852	4.992	1.047
#2	4.982	.9996	4.796	5.267	1.067	4.984	1.055
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	5.053	1.030	4.910
SDev	.009	.000	.008
%RSD	.1875	.0174	.1693
#1	5.059	1.030	4.916
#2	5.046	1.030	4.904
Errors	QC Pass	QC Pass	QC Pass
Value	5.000	1.000	5.000
Range	10.00	10.00	10.00

010310

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1108832	10000	--	--	--	--	--
SDev	3481.087	.0000000	--	--	--	--	--
%RSD	.3139416	.0000000	--	--	--	--	--
#1	1111294	10000	--	--	--	--	--
#2	1106371	10000	--	--	--	--	--

Analysis Report Blank Sample 08/19/05 10:21:38 AM page 1

Method: DAILY2 Sample Name: icb/ccb Operator:
Run Time: 08/19/05 10:17:04
Comment:
Mode: CONC Corr. Factor: 1

010311

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0059	-.0012	.0074	.0002	.0000	.0011
SDev	.0011	.0106	.0013	.0008	.0001	.0000	.0040
%RSD	740.9	180.4	103.0	10.58	46.06	161.9	350.8
#1	.0009	.0134	-.0003	.0079	.0002	.0000	.0039
#2	-.0006	-.0016	-.0021	.0068	.0001	-.0000	-.0017
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	.0012	.0000	.0009	.0000	.0005	.0084	.0134
SDev	.0018	.0004	.0009	.0000	.0001	.0182	.0191
%RSD	148.5	5969.	102.7	123.8	13.06	217.1	142.0
#1	.0025	.0003	.0016	.0001	.0006	.0212	.0269
#2	-.0001	-.0003	.0003	.0000	.0005	-.0045	-.0001
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0500	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0500	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	.0001	.0015	.0001	.0021	H.1558	.0006
SDev	.0017	.0001	.0095	.0000	.0006	.1076	.0034
%RSD	369.4	78.62	623.9	40.60	28.84	69.03	600.2
#1	.0017	.0002	.0083	.0000	.0025	H.2319	.0030
#2	-.0008	.0000	-.0052	.0001	.0016	H.0798	-.0018
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	.0002	.0060	-.0040	.0005	.0047	.0046	.0032
SDev	.0011	.0087	.0022	.0021	.0043	.0033	.0019
%RSD	573.2	143.5	56.35	390.6	90.42	71.69	58.41
#1	.0010	H.0122	-.0056	.0020	H.0077	.0023	.0019
#2	-.0006	-.0001	-.0024	-.0009	.0017	.0069	.0046
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

010312

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.90	.0014	.0014	.0029	-.0010	.0014	.0028
SDev	1.05	.0022	.0000	.0034	.0006	.0008	.0020
%RSD	1.059	159.9	2.996	118.1	64.44	55.14	70.86
#1	98.16	.0029	.0014	.0054	-.0005	.0019	.0042
#2	99.64	-.0002	.0013	.0005	-.0014	.0008	.0014
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	.0010	.0002	.0022	.0128	.0007	.0037
SDev	.0001	.0011	.0001	.0047	.0617	.0002	.0033
%RSD	152.5	113.2	25.16	220.6	481.0	28.13	87.31
#1	.0002	.0002	.0002	.0055	.0565	.0009	.0060
#2	-.0000	.0017	.0002	-.0012	-.0308	.0006	.0014
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	.0001	.0002	.0005
%RSD	256.9	255.0	204.9
#1	.0001	.0002	.0006
#2	-.0000	-.0001	-.0001
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010313

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1103046	10000	--	--	--	--	--
SDev	11594.43	.0000000	--	--	--	--	--
%RSD	1.051129	.0000000	--	--	--	--	--
#1	1094847	10000	--	--	--	--	--
#2	1111244	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: cri Operator:

010314

Run Time: 08/19/05 10:21:49
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0198	.0977	.0225	.1046	.0208	.0098	-.0037
SDev	.0002	.0001	.0006	.0016	.0000	.0000	.0035
%RSD	1.095	.1137	2.448	1.519	.0915	.0808	92.63
#1	.0196	.0978	.0221	.1035	.0208	.0098	-.0062
#2	.0199	.0976	.0228	.1057	.0208	.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	.0014	.0100	.0997	.0204	.0505	.1115	.0142
SDev	.0002	.0001	.0006	.0001	.0002	.0004	.0062
%RSD	10.72	.8267	.5917	.2809	.4792	.3877	43.32
#1	.0016	.0099	.1002	.0205	.0503	.1118	.0099
#2	.0013	.0101	.0993	.0204	.0507	.1112	.0186
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	-.0002	.0732	-.0022	.0304	.0222	.1575	-.0041
SDev	.0002	.0000	.0091	.0000	.0006	.1035	.0074
%RSD	81.45	.0063	406.1	.0747	2.695	65.74	177.5
#1	-.0004	.0732	-.0086	.0304	.0217	.0843	-.0093
#2	-.0001	.0732	.0042	.0305	.0226	.2307	.0011
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	.0804	.0995	.0053	.0061	.0020	.0002	.1253
SDev	.0015	.0027	.0043	.0011	.0005	.0054	.0027
%RSD	1.835	2.672	82.21	17.73	24.35	2490.	2.144
#1	.0814	.0976	.0083	.0053	.0017	-.0036	.1234
#2	.0793	.1014	.0022	.0068	.0024	.0040	.1272
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

010315

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.72	.0100	.0139	.1057	.0058	.0126	.1033
SDev	1.39	.0052	.0011	.0021	.0007	.0010	.0031
%RSD	1.426	52.28	8.193	1.976	12.55	7.782	2.979
#1	96.73	.0136	.0131	.1042	.0063	.0133	.1012
#2	98.70	.0063	.0147	.1072	.0053	.0119	.1055
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	.0030	.0193	.0170	.1903	.1002	.0025
SDev	.0000	.0018	.0001	.0010	.0250	.0001	.0016
%RSD	.0773	57.69	.4630	6.164	13.13	.1267	61.71
#1	.0208	.0043	.0193	.0163	.1726	.1001	.0014
#2	.0208	.0018	.0192	.0178	.2079	.1003	.0036
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	.0406	.0885
SDev	.0000	.0002	.0006
%RSD	80.33	.4857	.7321
#1	.0000	.0407	.0881
#2	.0001	.0404	.0890
Errors	NOCHECK	QC Pass	QC Pass
Value		.0400	.1000
Range		50.00	50.00

010316

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1089838	10000	--	--	--	--	--
SDev	15538.67	.0000000	--	--	--	--	--
%RSD	1.425779	.0000000	--	--	--	--	--
#1	1078850	10000	--	--	--	--	--
#2	1100825	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: icsa Operator: **010317**
Run Time: 08/19/05 10:26:34
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0023	506.7	.0012	-.0095	.0026	-.0001	.0019
SDev	.0003	.6	.0054	.0005	.0001	.0000	.0029
%RSD	12.86	.1171	466.3	5.234	3.498	5.961	154.2
#1	-.0021	507.1	-.0027	-.0092	.0025	-.0001	.0039
#2	-.0025	506.3	.0050	-.0099	.0027	-.0001	-.0002
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	469.4	-.0014	.0008	-.0005	.0016	192.8	.0108
SDev	1.0	.0000	.0009	.0010	.0004	.0	.0178
%RSD	.2074	.1034	118.5	202.9	27.35	.0059	165.1
#1	470.1	-.0014	.0001	-.0012	.0013	192.8	.0234
#2	468.7	-.0014	.0014	.0002	.0019	192.8	-.0018
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	.0051	.0004	549.3	-.0037	-.0011	.4248	-.0233
SDev	.0002	.0000	.6	.0001	.0005	.2929	.0033
%RSD	3.447	7.057	.1116	1.548	45.11	68.95	14.07
#1	.0050	.0004	548.8	-.0037	-.0007	.6320	-.0210
#2	.0052	.0004	549.7	-.0037	-.0014	.2177	-.0256
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	.0006	-.0096	.0437	-.0402	.0219	.0133	.0095
SDev	.0006	.0116	.0075	.0023	.0056	.0016	.0169
%RSD	97.32	121.6	17.17	5.804	25.42	11.98	177.6
#1	.0002	-.0178	.0384	-.0386	.0258	.0145	.0215
#2	.0010	-.0013	.0490	-.0419	.0179	.0122	-.0024
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value							
Range							

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

010318

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	89.23	.0052	-.0076	-.0095	-.0123	-.0034	-.0046
SDev	.56	.0125	.0041	.0006	.0009	.0014	.0019
%RSD	.6313	241.6	54.18	6.595	7.692	41.66	41.22
#1	88.83	-.0037	-.0047	-.0099	-.0129	-.0043	-.0060
#2	89.63	.0140	-.0105	-.0090	-.0116	-.0024	-.0033
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	.0163	-.0013	-.0004	.0200	-.0446	.0028	.0035
SDev	.0000	.0013	.0001	.0029	.0028	.0003	.0015
%RSD	.1077	103.7	34.38	14.44	6.225	9.582	42.10
#1	.0163	-.0022	-.0005	.0180	-.0466	.0030	.0025
#2	.0163	-.0003	-.0003	.0221	-.0427	.0026	.0046
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value							
Range							

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0005	.0081	-.0007
SDev	.0001	.0001	.0007
%RSD	25.33	1.868	106.1
#1	-.0006	.0080	-.0012
#2	-.0004	.0082	-.0002
Errors	NOCHECK	NOCHECK	NOCHECK
Value			
Range			

010319

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	995137	10000	--	--	--	--	--
SDev	6344.162	.0000000	--	--	--	--	--
%RSD	.6375164	.0000000	--	--	--	--	--
#1	990651	10000	--	--	--	--	--
#2	999623	10000	--	--	--	--	--

Analysis Report QC Standard 08/19/05 10:35:54 AM page 1

Method: DAILY2 Sample Name: icsab Operator: **010320**
Run Time: 08/19/05 10:31:20
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.097	508.2	1.067	1.035	.5341	.4963	.0071
SDev	.001	1.9	.004	.004	.0001	.0009	.0003
%RSD	.1214	.3728	.3955	.3642	.0257	.1768	4.363
#1	1.098	506.8	1.070	1.032	.5340	.4969	.0069
#2	1.096	509.5	1.064	1.037	.5342	.4957	.0073
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	470.4	.9825	.4917	.4893	.5478	192.8	.0132
SDev	.4	.0023	.0027	.0016	.0010	.1	.0328
%RSD	.0907	.2359	.5456	.3322	.1925	.0397	248.1
#1	470.7	.9842	.4936	.4904	.5470	192.9	.0364
#2	470.1	.9809	.4898	.4881	.5485	192.8	-.0100
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	.0052	1.179	550.8	.4965	1.031	.4122	-.0252
SDev	.0013	.006	.6	.0008	.001	.4229	.0050
%RSD	24.72	.5454	.1066	.1683	.1384	102.6	19.86
#1	.0061	1.175	551.2	.4971	1.030	.7112	-.0217
#2	.0043	1.184	550.4	.4960	1.032	.1131	-.0287
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	.9631	1.045	1.054	.9912	.0249	.0104	1.070
SDev	.0003	.003	.008	.0183	.0069	.0027	.002
%RSD	.0264	.3067	.7405	1.847	27.67	25.56	.1981
#1	.9629	1.047	1.048	1.004	.0297	.0123	1.072
#2	.9633	1.043	1.059	.9783	.0200	.0085	1.069
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

010321

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	89.21	1.059	1.065	1.030	1.012	1.063	1.017
SDev	1.24	.039	.029	.002	.010	.007	.010
%RSD	1.393	3.671	2.768	.1783	.9466	.6288	1.024
#1	88.33	1.032	1.085	1.028	1.019	1.068	1.009
#2	90.09	1.087	1.044	1.031	1.005	1.058	1.024
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	1.034	.0094	.9594	1.035	.9377	.5090	.0005
SDev	.002	.0016	.0016	.015	.0711	.0015	.0087
%RSD	.2410	17.16	.1669	1.475	7.581	.2913	1904.
#1	1.032	.0082	.9606	1.024	.9880	.5100	-.0057
#2	1.036	.0105	.9583	1.046	.8875	.5079	.0066
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	-.0007	.9990	.8816
SDev	.0001	.0044	.0037
%RSD	12.99	.4428	.4167
#1	-.0008	1.002	.8791
#2	-.0007	.9959	.8842
Errors	NOCHECK	QC Pass	QC Pass
Value		1.000	1.000
Range		20.00	20.00

010322

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	994976	10000	--	--	--	--	--
SDev	13963.24	.0000000	--	--	--	--	--
%RSD	1.403374	.0000000	--	--	--	--	--
#1	985103	10000	--	--	--	--	--
#2	1004850	10000	--	--	--	--	--

Analysis Report QC Standard 08/19/05 10:44:24 AM page 1

Method: DAILY2 Sample Name: icv/ccv Operator: **010323**
Run Time: 08/19/05 10:39:49
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9824	9.777	5.197	4.808	10.11	.9955	5.011
SDev	.0006	.015	.011	.009	.00	.0000	.007
%RSD	.0657	.1495	.2199	.1810	.0385	.0037	.1394
#1	.9828	9.787	5.205	4.802	10.10	.9955	5.016
#2	.9819	9.767	5.189	4.814	10.11	.9955	5.006
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	19.87	1.021	5.091	1.990	2.021	10.31	18.33
SDev	.03	.000	.005	.001	.001	.03	.05
%RSD	.1260	.0248	.0986	.0471	.0349	.3121	.2595
#1	19.89	1.020	5.094	1.991	2.021	10.29	18.30
#2	19.86	1.021	5.087	1.989	2.022	10.33	18.37
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	4.951	4.832	20.18	1.016	5.090	28.15	Q41.01
SDev	.007	.005	.01	.000	.005	.18	.00
%RSD	.1330	.0952	.0567	.0131	.0927	.6261	.0042
#1	4.946	4.828	20.18	1.016	5.086	28.02	Q41.01
#2	4.956	4.835	20.17	1.016	5.093	28.27	Q41.01
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	5.031	5.125	5.030	5.104	1.004	1.003	1.004
SDev	.017	.001	.005	.058	.002	.007	.004
%RSD	.3456	.0106	.0961	1.134	.2088	.7441	.4356
#1	5.043	5.125	5.033	5.063	1.003	.9975	1.001
#2	5.019	5.126	5.026	5.145	1.006	1.008	1.007
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

010324

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.84	5.266	5.366	4.991	5.079	5.333	4.952
SDev	.13	.011	.088	.001	.037	.062	.001
%RSD	.1371	.2079	1.643	.0286	.7276	1.170	.0296
#1	97.94	5.259	5.304	4.992	5.053	5.289	4.950
#2	97.75	5.274	5.429	4.990	5.105	5.377	4.953
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	4.984	1.0000	4.802	5.258	.9932	4.986	1.045
SDev	.005	.00055	.003	.008	.0105	.001	.006
%RSD	.0912	.0553	.0544	.1602	1.056	.0120	.5834
#1	4.981	1.000	4.800	5.252	1.001	4.986	1.041
#2	4.987	.9996	4.804	5.264	.9858	4.986	1.049
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	5.050	1.034	4.904
SDev	.005	.001	.007
%RSD	.0910	.0895	.1376
#1	5.053	1.034	4.900
#2	5.047	1.033	4.909
Errors	QC Pass	QC Pass	QC Pass
Value	5.000	1.000	5.000
Range	10.00	10.00	10.00

010325

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1091258	10000	--	--	--	--	--
SDev	1452.397	.0000000	--	--	--	--	--
%RSD	.1330939	.0000000	--	--	--	--	--
#1	1092285	10000	--	--	--	--	--
#2	1090231	10000	--	--	--	--	--

Analysis Report Blank Sample 08/19/05 10:50:59 AM page 1

Method: DAILY2 Sample Name: icb/ccb Operator:
Run Time: 08/19/05 10:46:25 010326
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	.0004	.0006	.0077	.0002	.0000	-.0042
SDev	.0001	.0024	.0007	.0003	.0001	.0000	.0002
%RSD	244.5	680.0	123.6	4.548	83.27	3.955	4.960
#1	-.0000	.0021	.0001	.0080	.0003	.0000	-.0044
#2	.0001	-.0014	.0011	.0075	.0001	.0000	-.0041
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	-.0000	.0001	.0005	.0005	.0127	.0080
SDev	.0002	.0001	.0000	.0010	.0003	.0180	.0053
%RSD	24.52	513.6	2.172	207.1	51.43	141.6	66.29
#1	.0007	-.0001	.0001	.0012	.0007	-.0000	.0042
#2	.0005	.0001	.0001	-.0002	.0003	.0255	.0117
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0500	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0500	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.0001	.0003	.0001	.0022	H.0611	.0067
SDev	.0002	.0000	.0035	.0000	.0003	.0112	.0013
%RSD	238.4	7.328	1095.	21.87	15.88	18.31	19.65
#1	.0001	.0001	-.0021	.0002	.0019	H.0690	.0058
#2	-.0003	.0001	.0028	.0001	.0024	H.0532	.0076
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	.0007	.0079	-.0017	-.0007	.0030	.0045	.0038
SDev	.0001	.0002	.0003	.0007	.0002	.0077	.0029
%RSD	17.27	2.933	19.03	101.7	7.374	172.0	78.21
#1	.0008	.0077	-.0019	-.0002	.0031	.0099	.0017
#2	.0006	.0081	-.0014	-.0012	.0028	-.0010	.0059
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

010327

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.6	.0030	.0040	-.0001	-.0010	.0037	.0031
SDev	.1	.0017	.0025	.0011	.0004	.0011	.0016
%RSD	.0784	58.04	60.94	1069.	36.61	28.92	53.18
#1	100.5	.0018	.0058	.0007	-.0007	.0045	.0042
#2	100.7	.0042	.0023	-.0008	-.0013	.0029	.0019
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	.0020	.0002	.0017	.0006	.0007	.0001
SDev	.0000	.0022	.0001	.0009	.0061	.0003	.0007
%RSD	61.69	107.7	67.61	51.68	997.1	39.82	467.5
#1	.0001	.0036	.0003	.0011	.0049	.0009	-.0003
#2	.0000	.0005	.0001	.0023	-.0037	.0005	.0006
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	.0003
SDev	.0002	.0001	.0004
%RSD	228.9	52.72	153.4
#1	.0002	-.0002	.0006
#2	-.0000	-.0001	-.0000
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010328

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1122116	10000	--	--	--	--	--
SDev	879.6408	.0000000	--	--	--	--	--
%RSD	.0783912	.0000000	--	--	--	--	--
#1	1121494	10000	--	--	--	--	--
#2	1122738	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: pbw-H19H1 Operator:

010329

Run Time: 08/19/05 10:51:11
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	-.0025	.0008	.0055	.0001	.0000	-.0013
SDev	.0013	.0085	.0019	.0007	.0001	.0000	.0068
%RSD	5358.	347.3	219.3	12.37	83.81	652.7	519.2
#1	-.0009	-.0085	.0022	.0060	.0000	.0000	-.0062
#2	.0009	.0036	-.0005	.0050	.0002	-.0000	.0035
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	.0025	-.0002	.0002	.0011	.0009	.0059	.0033
SDev	.0037	.0004	.0011	.0006	.0002	.0501	.0408
%RSD	150.1	192.3	438.4	51.05	20.01	849.8	1233.
#1	-.0002	-.0005	-.0005	.0007	.0010	-.0295	-.0255
#2	.0051	.0001	.0010	.0015	.0008	.0413	.0322
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0500	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0500	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0006	.0000	-.0050	.0001	.0017	H.1502	.0116
SDev	.0021	.0001	.0098	.0000	.0015	.4403	.0065
%RSD	368.9	746.9	197.9	4.606	91.12	293.2	56.43
#1	-.0021	-.0001	-.0119	.0001	.0006	L-.1611	.0070
#2	.0009	.0001	.0020	.0001	.0028	H.4615	.0162
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	.0007	.0034	.0006	-.0015	.0010	.0036	.0031
SDev	.0002	.0022	.0021	.0012	.0112	.0042	.0004
%RSD	28.22	65.94	332.6	79.14	1134.	118.0	12.71
#1	.0006	.0018	-.0009	-.0007	L-.0069	.0066	.0029
#2	.0009	.0050	.0022	-.0023	H.0089	.0006	.0034
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

010330

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.9	-.0032	.0025	-.0019	-.0008	.0006	.0007
SDev	2.0	.0022	.0004	.0057	.0001	.0010	.0001
%RSD	2.002	69.25	17.90	304.9	10.19	176.9	17.54
#1	103.3	-.0048	.0022	-.0059	-.0007	-.0001	.0007
#2	100.4	-.0016	.0028	.0021	-.0008	.0013	.0006
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	-.0000	.0036	.0004	-.0032	-.0360	.0008	.0033
SDev	.0001	.0025	.0001	.0006	.0855	.0006	.0037
%RSD	290.5	69.81	24.66	17.65	237.6	84.89	111.7
#1	-.0001	.0054	.0004	-.0028	-.0964	.0003	.0007
#2	.0000	.0018	.0005	-.0036	.0245	.0012	.0059
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	-.0002	.0002
SDev	.0000	.0001	.0005
%RSD	40.34	53.32	231.8
#1	.0001	-.0003	-.0001
#2	.0001	-.0001	.0005
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010331

IntStd	1	2	3	4	5	6	
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1135982	10000	--	--	--	--	--
SDev	22770.96	.0000000	--	--	--	--	--
%RSD	2.004519	.0000000	--	--	--	--	--
#1	1152083	10000	--	--	--	--	--
#2	1119880	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: lcsw-H19H1 Operator:
Run Time: 08/19/05 10:55:57
Comment:
Mode: CONC Corr. Factor: 1

010332

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0491	1.899	2.020	.0047	1.982	.0492	-.0022
SDev	.0000	.000	.000	.0002	.002	.0000	.0025
%RSD	.0017	.0076	.0013	3.705	.0877	.0357	112.6
#1	.0491	1.899	2.020	.0048	1.980	.0492	-.0005
#2	.0491	1.899	2.020	.0045	1.983	.0492	-.0040

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.45	.0494	.4871	.1958	.2448	1.116	16.20
SDev	.00	.0004	.0012	.0007	.0004	.003	.03
%RSD	.0142	.8720	.2453	.3447	.1528	.2506	.2044
#1	19.45	.0497	.4880	.1963	.2451	1.118	16.17
#2	19.44	.0490	.4863	.1953	.2446	1.114	16.22

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.0001	19.59	.4918	.0001	17.53	25.11
SDev	.0003	.0000	.01	.0001	.0004	.06	.01
%RSD	262.5	4.520	.0303	.0097	431.5	.3288	.0477
#1	-.0004	.0001	19.60	.4919	.0004	17.49	25.10
#2	.0001	.0001	19.59	.4918	-.0002	17.57	25.12

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4873	.0088	.4930	.4967	.0049	-.0009	.4832
SDev	.0013	.0053	.0026	.0026	.0004	.0034	.0021
%RSD	.2691	60.55	.5170	.5180	8.209	385.0	.4433
#1	.4882	.0125	.4948	.4985	.0052	-.0033	.4847
#2	.4864	.0050	.4912	.4949	.0047	.0015	.4817

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.00	2.053	2.064	3.957	.4955	2.060	.0021
SDev	1.09	.034	.020	.003	.0026	.025	.0034
%RSD	1.108	1.670	.9930	.0791	.5181	1.218	162.9
#1	97.23	2.077	2.078	3.959	.4973	2.078	-.0003
#2	98.77	2.029	2.049	3.955	.4937	2.042	.0044

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	3.940	-.0172	.0004	2.046	-.0544	.4841	.0002
SDev	.004	.0003	.0002	.000	.0070	.0014	.0011
%RSD	.0932	1.676	43.14	.0076	12.83	.2787	537.3
#1	3.937	-.0174	.0005	2.046	-.0593	.4851	-.0006
#2	3.942	-.0170	.0003	2.046	-.0495	.4832	.0010

010333

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0002	.4936	.0001
SDev	.0001	.0019	.0000
%RSD	25.43	.3867	16.58
#1	-.0002	.4950	.0001
#2	-.0003	.4923	.0001

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1092978	10000	--	--	--	--	--
SDev	12083.75	.0000000	--	--	--	--	--
%RSD	1.105581	.0000000	--	--	--	--	--
#1	1084433	10000	--	--	--	--	--
#2	1101522	10000	--	--	--	--	--

Analysis Report 08/19/05 11:05:16 AM

Method: DAILY2 Sample Name: 265496 Operator: **010334**
Run Time: 08/19/05 11:00:42
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	.5849	.0011	.0065	.0203	.0000	.0013
SDev	.0008	.0067	.0005	.0014	.0002	.0000	.0012
%RSD	233.1	1.141	42.70	21.63	.9704	204.0	93.81
#1	.0002	.5896	.0008	.0075	.0204	-.0000	.0022
#2	-.0009	.5802	.0014	.0055	.0202	.0000	.0004

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0210	-.0003	.0002	.0001	.0004	.0787	.0421
SDev	.0008	.0003	.0006	.0006	.0006	.0115	.0042
%RSD	3.576	101.9	335.2	518.9	161.3	14.61	10.02
#1	.0215	-.0001	.0006	.0006	.0008	.0868	.0450
#2	.0205	-.0005	-.0002	-.0003	-.0001	.0706	.0391

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0010	.0012	.2321	.0015	-.0004	1.637	2.109
SDev	.0005	.0000	.0081	.0000	.0000	.213	.012
%RSD	52.34	2.449	3.488	2.293	7.935	13.03	.5591
#1	-.0006	.0013	.2378	.0016	-.0004	1.788	2.101
#2	-.0013	.0012	.2264	.0015	-.0004	1.487	2.117

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	.0057	.0013	-.0011	.0019	.2013	.0025
SDev	.0020	.0019	.0036	.0012	.0010	.0065	.0021
%RSD	1057.	32.87	271.1	112.8	51.23	3.208	85.95
#1	.0016	.0071	-.0012	-.0019	.0027	.2059	.0040
#2	-.0012	.0044	.0039	-.0002	.0012	.1968	.0010

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.23	.0003	.0017	2.187	-.0002	.0013	-.0007
SDev	.76	.0025	.0015	.031	.0020	.0002	.0008
%RSD	.7626	801.7	89.47	1.406	820.8	16.11	115.6
#1	98.70	-.0014	.0028	2.208	-.0017	.0014	-.0001
#2	99.77	.0021	.0006	2.165	.0012	.0011	-.0013

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	.0010	.0084	-.0007	-.0312	.0002	.0022
SDev	.0001	.0008	.0003	.0003	.0140	.0004	.0012
%RSD	24.97	80.89	3.240	43.11	44.91	174.6	55.80
#1	.0003	.0016	.0086	-.0005	-.0213	.0006	.0031
#2	.0002	.0004	.0082	-.0009	-.0411	-.0001	.0013

010335

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0069	.0016
SDev	.0000	.0001	.0006
%RSD	26.82	1.752	38.29
#1	-.0001	.0070	.0020
#2	-.0001	.0068	.0011

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1106712	10000	--	--	--	--	--
SDev	8393.357	.0000000	--	--	--	--	--
%RSD	.7584049	.0000000	--	--	--	--	--
#1	1100777	10000	--	--	--	--	--
#2	1112647	10000	--	--	--	--	--

Analysis Report 08/19/05 11:10:04 AM

Method: DAILY2 Sample Name: 265497 Operator:
Run Time: 08/19/05 11:05:28
Comment:
Mode: CONC Corr. Factor: 1

010336

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	.5808	-.0007	.0072	.0240	.0000	.0033
SDev	.0013	.0155	.0002	.0001	.0001	.0000	.0032
%RSD	128.2	2.667	22.63	1.039	.4993	393.6	98.48
#1	.0019	.5918	-.0006	.0072	.0239	-.0000	.0055
#2	.0001	.5699	-.0008	.0073	.0241	.0000	.0010

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0214	-.0000	.0013	.0014	.0014	.1018	.0611
SDev	.0024	.0001	.0013	.0001	.0004	.0301	.0308
%RSD	11.34	481.5	97.93	5.167	27.13	29.53	50.41
#1	.0231	.0000	.0022	.0014	.0011	.1230	.0829
#2	.0196	-.0001	.0004	.0015	.0017	.0805	.0393

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0012	.0013	.2407	.0016	.0005	1.814	2.044
SDev	.0018	.0001	.0142	.0000	.0008	.216	.010
%RSD	151.2	6.942	5.914	.9098	144.4	11.92	.4665
#1	.0024	.0014	.2508	.0016	-.0000	1.967	2.037
#2	-.0001	.0012	.2306	.0016	.0011	1.661	2.051

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	.0085	-.0019	-.0002	.0075	.1951	.0062
SDev	.0002	.0010	.0011	.0014	.0070	.0009	.0027
%RSD	19.22	11.95	57.77	626.2	93.21	.4416	43.82
#1	.0008	.0078	-.0011	-.0013	.0125	.1945	.0042
#2	.0011	.0092	-.0027	.0008	.0026	.1957	.0081

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.56	.0006	.0015	2.147	-.0008	.0012	.0014
SDev	1.14	.0001	.0007	.017	.0006	.0005	.0013
%RSD	1.168	26.60	45.97	.7798	75.26	42.62	96.58
#1	96.76	.0005	.0010	2.159	-.0012	.0008	.0023
#2	98.37	.0007	.0020	2.135	-.0004	.0015	.0004

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	.0013	.0084	-.0002	.0451	.0013	.0023
SDev	.0001	.0026	.0001	.0007	.0364	.0002	.0008
%RSD	43.86	196.0	1.409	466.0	80.60	12.64	35.90
#1	.0002	-.0005	.0084	-.0007	.0708	.0012	.0017
#2	.0001	.0032	.0085	.0004	.0194	.0014	.0029

010337

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0076	.0028
SDev	.0001	.0002	.0001
%RSD	102.8	2.712	3.599
#1	.0000	.0078	.0027
#2	.0002	.0075	.0028

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1088144	10000	--	--	--	--	--
SDev	12768.23	.0000000	--	--	--	--	--
%RSD	1.173396	.0000000	--	--	--	--	--
#1	1079115	10000	--	--	--	--	--
#2	1097172	10000	--	--	--	--	--

Analysis Report 08/19/05 11:14:49 AM

Method: DAILY2 Sample Name: 265498 Operator:
Run Time: 08/19/05 11:10:15
Comment:
Mode: CONC Corr. Factor: 1

010338

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.5696	-.0001	.0063	.0224	.0000	-.0016
SDev	.0002	.0149	.0029	.0004	.0001	.0000	.0048
%RSD	197.9	2.608	2447.	7.048	.2756	1675.	294.9
#1	-.0000	.5801	.0019	.0060	.0224	.0000	-.0050
#2	.0002	.5591	-.0022	.0067	.0225	-.0000	.0018

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0220	-.0000	.0001	.0011	.0010	.0870	.0526
SDev	.0014	.0001	.0004	.0004	.0001	.0081	.0187
%RSD	6.313	505.4	304.6	41.63	8.619	9.346	35.49
#1	.0230	.0001	.0004	.0007	.0011	.0928	.0658
#2	.0210	-.0001	-.0002	.0014	.0009	.0813	.0394

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	.0013	.2332	.0015	.0004	1.833	2.051
SDev	.0001	.0001	.0032	.0000	.0000	.282	.003
%RSD	41.82	5.914	1.357	1.697	6.669	15.40	.1548
#1	-.0001	.0013	.2355	.0015	.0004	2.032	2.053
#2	-.0003	.0012	.2310	.0015	.0005	1.633	2.048

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	-.0034	-.0000	-.0004	.0068	.1929	-.0011
SDev	.0007	.0030	.0003	.0007	.0040	.0004	.0020
%RSD	66.82	89.64	715.8	163.2	59.09	.1969	182.1
#1	.0006	-.0055	-.0003	.0001	.0096	.1926	-.0025
#2	.0016	-.0012	.0002	-.0009	.0040	.1931	.0003

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	96.80	-.0011	.0028	2.146	-.0003	.0015	.0023
SDev	.49	.0065	.0022	.034	.0003	.0036	.0009
%RSD	.5032	570.8	77.89	1.576	121.5	246.0	38.29
#1	96.45	-.0058	.0012	2.170	-.0000	-.0011	.0017
#2	97.14	.0035	.0043	2.122	-.0005	.0040	.0030

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0016	.0083	-.0015	-.0020	.0008	.0021
SDev	.0000	.0001	.0001	.0001	.0097	.0001	.0003
%RSD	4.752	5.282	.7120	4.340	497.3	8.345	16.20
#1	.0001	.0015	.0084	-.0016	.0049	.0008	.0018
#2	.0001	.0017	.0083	-.0015	-.0088	.0009	.0023

010339

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0069	.0019
SDev	.0001	.0001	.0001
%RSD	250.1	1.250	5.719
#1	-.0000	.0068	.0020
#2	.0001	.0070	.0018

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1079556	10000	--	--	--	--	--
SDev	5470.885	.0000000	--	--	--	--	--
%RSD	.5067716	.0000000	--	--	--	--	--
#1	1075688	10000	--	--	--	--	--
#2	1083425	10000	--	--	--	--	--

Analysis Report 08/19/05 11:19:34 AM page 1

Method: DAILY2 Sample Name: 265499 Operator:
Run Time: 08/19/05 11:15:01
Comment:
Mode: CONC Corr. Factor: 1

010340

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	.5944	.0026	.0063	.0235	-.0000	-.0001
SDev	.0003	.0159	.0034	.0004	.0000	.0000	.0027
%RSD	41.16	2.675	130.0	5.751	.0719	59.09	1908.
#1	.0010	.6056	.0051	.0066	.0235	-.0000	-.0020
#2	.0005	.5831	.0002	.0061	.0235	-.0000	.0018

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0223	-.0002	.0004	.0008	.0009	.0993	.0486
SDev	.0010	.0002	.0002	.0007	.0001	.0113	.0054
%RSD	4.617	126.9	44.42	89.23	15.19	11.41	11.21
#1	.0215	-.0000	.0003	.0013	.0010	.1073	.0448
#2	.0230	-.0003	.0005	.0003	.0008	.0913	.0525

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	.0013	.2414	.0016	-.0008	1.853	2.080
SDev	.0004	.0000	.0076	.0001	.0007	.030	.003
%RSD	91.80	2.826	3.134	4.652	91.04	1.618	.1598
#1	.0007	.0013	.2467	.0017	-.0003	1.832	2.082
#2	.0001	.0013	.2360	.0015	-.0013	1.874	2.077

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	.0080	.0008	-.0023	.0070	.2018	.0014
SDev	.0005	.0077	.0008	.0008	.0009	.0029	.0004
%RSD	81.89	96.72	99.73	35.98	13.59	1.416	27.79
#1	.0009	.0025	.0002	-.0029	.0063	.2038	.0016
#2	.0002	.0135	.0014	-.0017	.0077	.1998	.0011

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.30	.0021	-.0008	2.206	-.0012	.0002	.0016
SDev	.18	.0082	.0024	.041	.0008	.0043	.0003
%RSD	.1788	386.9	294.9	1.861	66.39	2396.	21.26
#1	98.17	.0079	.0009	2.235	-.0018	.0032	.0018
#2	98.42	-.0037	-.0025	2.177	-.0007	-.0029	.0013

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0033	.0085	-.0026	.0013	.0013	.0039
SDev	.0000	.0008	.0003	.0075	.0049	.0006	.0014
%RSD	6.409	26.23	3.362	282.6	390.2	48.09	36.12
#1	.0001	.0039	.0087	.0026	.0048	.0009	.0049
#2	.0001	.0026	.0083	-.0079	-.0022	.0018	.0029

010341

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0078	.0019
SDev	.0000	.0001	.0003
%RSD	49.71	1.082	16.65
#1	.0000	.0078	.0022
#2	.0001	.0077	.0017

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1096306	10000	--	--	--	--	--
SDev	1998.991	.0000000	--	--	--	--	--
%RSD	.1823388	.0000000	--	--	--	--	--
#1	1094892	10000	--	--	--	--	--
#2	1097719	10000	--	--	--	--	--

Analysis Report 08/19/05 11:24:21 AM

Method: DAILY2 Sample Name: 265500 Operator:
Run Time: 08/19/05 11:19:46
Comment:
Mode: CONC Corr. Factor: 1

010342

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.5762	.0017	.0054	.0232	-.0000	.0011
SDev	.0003	.0161	.0011	.0002	.0000	.0000	.0022
%RSD	582.6	2.800	67.56	2.939	.1941	204.6	197.9
#1	.0002	.5876	.0009	.0053	.0232	.0000	-.0004
#2	-.0003	.5648	.0024	.0055	.0232	-.0000	.0027

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0219	-.0002	.0003	.0007	.0006	.0777	.0389
SDev	.0004	.0000	.0003	.0009	.0001	.0069	.0037
%RSD	2.033	2.531	99.29	139.2	18.16	8.933	9.645
#1	.0223	-.0002	.0005	.0013	.0007	.0826	.0415
#2	.0216	-.0002	.0001	.0000	.0006	.0728	.0362

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	.0013	.2326	.0015	.0006	1.616	2.093
SDev	.0007	.0000	.0109	.0000	.0006	.086	.004
%RSD	367.3	1.827	4.700	2.628	97.04	5.328	.1995
#1	.0007	.0013	.2403	.0015	.0010	1.677	2.096
#2	-.0003	.0012	.2248	.0015	.0002	1.555	2.090

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	.0028	-.0025	.0001	.0023	.1997	.0049
SDev	.0013	.0003	.0006	.0024	.0027	.0024	.0033
%RSD	267.5	12.34	25.00	1669.	113.6	1.214	68.05
#1	.0013	.0031	-.0020	-.0015	.0042	.2015	.0072
#2	-.0004	.0026	-.0029	.0018	.0005	.1980	.0025

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.61	.0012	.0023	2.157	-.0007	.0020	.0016
SDev	.64	.0010	.0017	.046	.0014	.0015	.0008
%RSD	.6471	83.21	73.17	2.151	190.6	74.87	49.34
#1	99.16	.0019	.0036	2.190	-.0017	.0030	.0010
#2	100.1	.0005	.0011	2.125	.0002	.0009	.0021

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0026	.0083	-.0029	-.0032	.0007	.0007
SDev	.0000	.0009	.0002	.0024	.0140	.0005	.0010
%RSD	20.52	33.85	2.751	82.65	439.7	67.55	154.2
#1	.0001	.0020	.0085	-.0046	.0067	.0004	.0014
#2	.0001	.0032	.0082	-.0012	-.0131	.0010	-.0001

010343

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0076	.0018
SDev	.0000	.0003	.0003
%RSD	1.624	3.691	16.92
#1	-.0000	.0078	.0021
#2	-.0000	.0074	.0016

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1110945	10000	--	--	--	--	--
SDev	7236.531	.0000000	--	--	--	--	--
%RSD	.6513851	.0000000	--	--	--	--	--
#1	1105828	10000	--	--	--	--	--
#2	1116062	10000	--	--	--	--	--

Analysis Report 08/19/05 11:29:06 AM

Method: DAILY2 Sample Name: 265501 Operator:
Run Time: 08/19/05 11:24:33
Comment:
Mode: CONC Corr. Factor: 1

010344

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.5761	-.0000	.0052	.0220	-.0000	.0010
SDev	.0011	.0098	.0005	.0010	.0000	.0000	.0003
%RSD	5634.	1.709	4231.	19.17	.0705	234.3	28.51
#1	-.0008	.5830	-.0004	.0059	.0220	.0000	.0008
#2	.0008	.5691	.0003	.0045	.0220	-.0000	.0012

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0248	-.0002	.0001	.0010	.0011	.0794	.0424
SDev	.0018	.0002	.0011	.0005	.0002	.0152	.0307
%RSD	7.086	102.5	1911.	52.64	18.79	19.21	72.50
#1	.0236	-.0003	-.0007	.0014	.0012	.0686	.0207
#2	.0261	-.0000	.0008	.0006	.0009	.0901	.0641

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0005	.0012	.2335	.0016	.0001	1.662	2.040
SDev	.0014	.0001	.0022	.0000	.0001	.315	.006
%RSD	287.7	5.579	.9557	1.338	40.00	18.96	.3188
#1	-.0014	.0012	.2319	.0015	.0002	1.440	2.045
#2	.0005	.0013	.2350	.0016	.0001	1.885	2.035

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0010	-.0032	-.0008	-.0010	.0038	.1914	.0016
SDev	.0002	.0002	.0001	.0003	.0064	.0074	.0034
%RSD	18.29	5.521	17.27	30.62	171.4	3.852	211.4
#1	-.0012	-.0031	-.0007	-.0012	-.0008	.1967	.0040
#2	-.0009	-.0033	-.0009	-.0008	.0083	.1862	-.0008

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	96.84	.0047	.0019	2.143	-.0009	.0029	.0012
SDev	.89	.0082	.0002	.036	.0002	.0026	.0016
%RSD	.9171	173.5	11.96	1.688	17.48	89.79	130.8
#1	97.47	-.0011	.0021	2.168	-.0010	.0010	.0001
#2	96.21	.0105	.0018	2.117	-.0008	.0047	.0023

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0029	.0083	-.0018	-.0009	.0006	.0011
SDev	.0001	.0004	.0003	.0001	.0408	.0003	.0023
%RSD	44.11	14.28	3.382	6.103	4734.	51.67	211.6
#1	.0001	.0026	.0085	-.0019	-.0297	.0008	-.0005
#2	.0002	.0032	.0081	-.0017	.0280	.0004	.0027

010345

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0070	.0018
SDev	.0000	.0002	.0001
%RSD	61.62	2.938	5.872
#1	.0001	.0068	.0019
#2	.0000	.0071	.0018

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1080028	10000	--	--	--	--	--
SDev	9869.089	.0000000	--	--	--	--	--
%RSD	.9137813	.0000000	--	--	--	--	--
#1	1087006	10000	--	--	--	--	--
#2	1073049	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 265502 Operator: **010346**
Run Time: 08/19/05 11:29:18
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	.5477	.0004	.0055	.0199	.0000	-.0022
SDev	.0014	.0106	.0009	.0012	.0001	.0000	.0029
%RSD	253.4	1.937	240.4	21.61	.6217	138.0	135.1
#1	-.0004	.5552	.0010	.0063	.0200	.0000	-.0042
#2	.0016	.5402	-.0003	.0046	.0198	.0000	-.0001

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0194	-.0001	.0008	.0011	.0008	.0885	.0353
SDev	.0025	.0000	.0005	.0009	.0004	.0305	.0326
%RSD	13.04	63.26	65.92	82.32	48.63	34.44	92.45
#1	.0176	-.0001	.0004	.0017	.0011	.0669	.0122
#2	.0212	-.0000	.0012	.0004	.0005	.1100	.0583

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0012	.2201	.0015	.0000	1.631	2.009
SDev	.0016	.0001	.0000	.0001	.0001	.373	.006
%RSD	520.9	4.271	.0153	10.13	183.3	22.86	.2873
#1	-.0008	.0011	.2201	.0016	-.0000	1.368	2.013
#2	.0014	.0012	.2200	.0013	.0001	1.895	2.005

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	.0041	-.0022	.0008	.0046	.1998	.0053
SDev	.0000	.0010	.0043	.0027	.0080	.0064	.0014
%RSD	.6027	25.15	191.5	337.8	172.8	3.196	26.25
#1	.0007	.0034	-.0053	.0027	-.0010	.1953	.0063
#2	.0007	.0049	.0008	-.0011	.0102	.2043	.0043

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.12	-.0007	.0036	2.045	-.0002	.0022	.0019
SDev	.40	.0072	.0031	.054	.0004	.0003	.0001
%RSD	.3994	1041.	85.63	2.635	207.3	15.81	8.308
#1	99.40	-.0058	.0058	2.084	.0001	.0019	.0017
#2	98.84	.0044	.0014	2.007	-.0005	.0024	.0020

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0024	.0080	-.0007	.0045	.0007	-.0009
SDev	.0001	.0032	.0004	.0011	.0551	.0010	.0018
%RSD	77.47	136.5	4.882	145.2	1215.	140.3	201.4
#1	.0000	.0046	.0083	-.0015	-.0344	.0014	-.0022
#2	.0002	.0001	.0077	.0000	.0435	.0000	.0004

010347

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0058	.0019
SDev	.0002	.0002	.0002
%RSD	238.7	2.809	12.13
#1	.0002	.0056	.0021
#2	-.0001	.0059	.0018

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1105372	10000	--	--	--	--	--
SDev	4417.296	.0000000	--	--	--	--	--
%RSD	.3996209	.0000000	--	--	--	--	--
#1	1108495	10000	--	--	--	--	--
#2	1102248	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: CCV2 Operator: **010348**
Run Time: 08/19/05 11:37:43
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9787	9.802	5.205	4.785	10.09	.9941	4.991
SDev	.0014	.076	.006	.028	.01	.0024	.023
%RSD	.1438	.7753	.1079	.5870	.1448	.2467	.4636
#1	.9777	9.748	5.201	4.765	10.07	.9959	4.975
#2	.9797	9.856	5.209	4.805	10.10	.9924	5.007
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	19.84	1.018	5.079	1.989	2.015	10.34	18.31
SDev	.06	.003	.006	.002	.011	.04	.15
%RSD	.2776	.2939	.1184	.1133	.5520	.3593	.8261
#1	19.88	1.020	5.083	1.990	2.007	10.36	18.21
#2	19.81	1.016	5.075	1.987	2.023	10.31	18.42
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	4.936	4.816	20.10	1.014	5.082	28.27	H41.01
SDev	.001	.019	.02	.002	.007	.10	.24
%RSD	.0253	.3955	.1082	.1494	.1288	.3487	.5884
#1	4.937	4.803	20.12	1.015	5.078	28.20	H40.84
#2	4.935	4.830	20.09	1.013	5.087	28.34	H41.18
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	5.011	5.061	5.030	5.083	1.000	1.002	1.007
SDev	.024	.025	.056	.021	.003	.002	.005
%RSD	.4701	.4983	1.120	.4091	.3188	.1952	.4925
#1	5.028	5.079	5.070	5.097	.9978	1.003	1.004
#2	4.995	5.043	4.990	5.068	1.002	1.000	1.011
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

010349

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	96.52	5.265	5.331	4.993	5.065	5.309	4.954
SDev	1.46	.073	.001	.011	.033	.025	.012
%RSD	1.510	1.378	.0126	.2229	.6443	.4639	.2392
#1	95.49	5.316	5.332	4.985	5.088	5.327	4.963
#2	97.55	5.214	5.331	5.001	5.042	5.292	4.946
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	4.961	.9986	4.793	5.256	1.003	4.972	1.043
SDev	.004	.0019	.001	.007	.013	.003	.007
%RSD	.0904	.1910	.0191	.1319	1.331	.0562	.6683
#1	4.958	.9973	4.792	5.251	1.013	4.974	1.039
#2	4.964	1.0000	4.793	5.261	.9937	4.970	1.048
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	5.038	1.033	4.897
SDev	.003	.006	.004
%RSD	.0628	.5924	.0798
#1	5.040	1.037	4.894
#2	5.036	1.028	4.900
Errors	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500
Low	4.500	.9000	4.500

010350

IntStd	1	2	3	4	5	6	
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1076495	10000	--	--	--	--	--
SDev	16192.75	.0000000	--	--	--	--	--
%RSD	1.504210	.0000000	--	--	--	--	--
#1	1065045	10000	--	--	--	--	--
#2	1087945	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: CCB2 Operator: **010351**
Run Time: 08/19/05 11:44:21
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	.0015	.0006	.0073	.0002	-.0000	-.0011
SDev	.0002	.0030	.0010	.0008	.0000	.0000	.0030
%RSD	131.4	198.9	177.4	11.14	5.666	68.29	266.8
#1	-.0000	.0036	.0013	.0079	.0002	-.0000	-.0033
#2	-.0002	-.0006	-.0001	.0068	.0002	-.0000	.0010
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	.0011	-.0001	.0001	.0009	.0009	-.0004	.0003
SDev	.0010	.0000	.0002	.0002	.0000	.0216	.0318
%RSD	94.48	36.17	186.6	25.70	3.290	5421.	12190.
#1	.0018	-.0002	-.0000	.0011	.0009	.0149	.0227
#2	.0004	-.0001	.0003	.0007	.0009	-.0157	-.0222
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0500	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0500	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	.0001	-.0018	.0002	.0021	.0122	.0006
SDev	.0004	.0001	.0036	.0000	.0001	.1910	.0012
%RSD	159.9	148.0	205.0	19.01	5.153	1565.	208.9
#1	.0000	.0001	.0008	.0002	.0022	H.1472	.0014
#2	-.0005	-.0000	-.0043	.0002	.0021	L-.1228	-.0003
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	.0006	-.0014	-.0009	.0018	H.0102	.0034
SDev	.0008	.0055	.0032	.0005	.0071	.0038	.0019
%RSD	80.93	918.3	230.6	52.50	393.2	37.69	57.38
#1	.0004	.0045	-.0036	-.0012	H.0068	.0075	.0020
#2	.0016	-.0033	.0009	-.0006	-.0032	H.0129	.0048
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

010352

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.74	.0014	.0051	-.0024	-.0010	.0039	.0012
SDev	1.59	.0071	.0036	.0016	.0014	.0000	.0017
%RSD	1.612	515.0	70.14	67.64	131.8	.9318	145.4
#1	97.61	.0064	.0026	-.0012	-.0020	.0039	-.0000
#2	99.86	-.0036	.0077	-.0035	-.0001	.0039	.0024
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	.0000	.0040	.0004	.0015	-.0039	.0011	.0011
SDev	.0000	.0006	.0000	.0017	.0167	.0003	.0010
%RSD	161.6	14.32	4.182	119.2	428.7	28.42	98.04
#1	.0000	.0036	.0004	.0027	.0079	.0013	.0018
#2	-.0000	.0044	.0004	.0002	-.0157	.0009	.0003
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	.0008
SDev	.0001	.0000	.0001
%RSD	82.68	93.60	13.40
#1	.0002	.0001	.0009
#2	.0001	.0000	.0008
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010353

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1101170	10000	--	--	--	--	--
SDev	17779.49	.0000000	--	--	--	--	--
%RSD	1.614600	.0000000	--	--	--	--	--
#1	1088598	10000	--	--	--	--	--
#2	1113742	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: cri Operator: 010354
Run Time: 08/19/05 11:49:06
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0200	.1008	.0221	.1035	.0208	.0098	.0029
SDev	.0003	.0022	.0023	.0002	.0000	.0000	.0052
%RSD	1.394	2.212	10.46	.2288	.1027	.0308	183.9
#1	.0202	.0992	.0205	.1036	.0208	.0098	.0066
#2	.0198	.1024	.0238	.1033	.0209	.0098	-.0009
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	.0028	.0101	.0995	.0212	.0503	.1260	.0150
SDev	.0000	.0001	.0000	.0001	.0006	.0043	.0055
%RSD	.3617	.5240	.0276	.6034	1.154	3.378	36.58
#1	.0028	.0101	.0995	.0211	.0507	.1291	.0189
#2	.0028	.0102	.0995	.0213	.0499	.1230	.0111
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	.0731	-.0020	.0306	.0214	.0516	-.0012
SDev	.0004	.0000	.0026	.0000	.0002	.0719	.0077
%RSD	115.3	.0234	127.3	.0207	.7879	139.2	644.7
#1	-.0006	.0731	-.0002	.0306	.0216	.1025	-.0066
#2	-.0001	.0731	-.0039	.0306	.0213	.0008	.0043
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	.0807	.1006	.0054	.0067	.0046	-.0005	.1282
SDev	.0004	.0006	.0023	.0000	.0021	.0021	.0043
%RSD	.4579	.6469	43.45	.2776	45.94	406.4	3.331
#1	.0804	.1002	.0037	.0067	.0060	.0010	.1252
#2	.0810	.1011	.0070	.0067	.0031	-.0020	.1312
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

010355

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.24	.0110	.0146	.1054	.0063	.0134	.1035
SDev	1.61	.0034	.0004	.0025	.0008	.0014	.0017
%RSD	1.653	31.14	2.543	2.400	12.64	10.38	1.667
#1	96.11	.0086	.0143	.1072	.0057	.0124	.1047
#2	98.38	.0134	.0148	.1036	.0068	.0144	.1023
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	.0050	.0194	.0142	.1856	.0997	.0009
SDev	.0000	.0022	.0000	.0023	.0078	.0002	.0010
%RSD	.1424	44.14	.1222	16.01	4.189	.1920	109.2
#1	.0207	.0066	.0194	.0126	.1911	.0999	.0016
#2	.0207	.0035	.0194	.0158	.1801	.0996	.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	.0410	.0880
SDev	.0000	.0003	.0002
%RSD	38.34	.8253	.2170
#1	.0001	.0412	.0882
#2	.0001	.0408	.0879
Errors	NOCHECK	LC Pass	NOCHECK
High		.0600	
Low		.0200	

010356

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1084591	10000	--	--	--	--	--
SDev	17861.52	.0000000	--	--	--	--	--
%RSD	1.646844	.0000000	--	--	--	--	--
#1	1071961	10000	--	--	--	--	--
#2	1097221	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: icsa Operator: 010357
Run Time: 08/19/05 11:53:52
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0020	506.7	.0009	-.0096	.0026	-.0001	.0042
SDev	.0002	.3	.0011	.0000	.0001	.0000	.0053
%RSD	10.40	.0614	127.2	.2111	2.052	4.785	126.2
#1	-.0019	506.5	.0001	-.0096	.0027	-.0001	.0005
#2	-.0022	506.9	.0017	-.0096	.0026	-.0001	.0080
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	465.9	-.0014	.0011	.0004	.0028	193.0	-.0000
SDev	.4	.0006	.0000	.0004	.0001	.3	.0022
%RSD	.0880	45.87	3.070	95.87	2.407	.1546	6010.
#1	466.2	-.0019	.0011	.0001	.0028	193.3	.0015
#2	465.7	-.0009	.0011	.0007	.0029	192.8	-.0016
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	.0051	.0003	548.0	-.0037	-.0013	.3750	-.0259
SDev	.0002	.0000	.0	.0000	.0000	.0581	.0051
%RSD	4.572	2.185	.0072	.3619	2.887	15.50	19.53
#1	.0053	.0003	548.0	-.0037	-.0013	.3339	-.0295
#2	.0049	.0003	547.9	-.0037	-.0013	.4161	-.0223
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	.0022	-.0074	.0474	-.0369	.0201	.0069	-.0010
SDev	.0001	.0061	.0050	.0005	.0001	.0127	.0035
%RSD	2.395	82.00	10.55	1.423	.4960	184.3	358.7
#1	.0023	-.0117	.0509	-.0365	.0200	-.0021	.0015
#2	.0022	-.0031	.0438	-.0372	.0201	.0159	-.0034
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

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

010358

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	88.25	.0027	-.0083	-.0056	-.0088	-.0046	-.0006
SDev	.57	.0015	.0080	.0004	.0020	.0058	.0026
%RSD	.6417	55.50	95.64	7.515	22.94	124.9	442.3
#1	87.85	.0016	-.0139	-.0053	-.0074	-.0087	.0012
#2	88.65	.0037	-.0027	-.0059	-.0102	-.0005	-.0024
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	.0162	.0006	-.0005	.0247	-.0650	.0025	.0072
SDev	.0000	.0053	.0001	.0016	.0058	.0002	.0003
%RSD	.2019	947.7	22.12	6.422	8.910	6.370	3.830
#1	.0163	-.0032	-.0006	.0236	-.0691	.0024	.0070
#2	.0162	.0043	-.0004	.0258	-.0609	.0026	.0074
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0004	.0079	-.0004
SDev	.0000	.0001	.0003
%RSD	.6138	.6796	78.15
#1	-.0004	.0079	-.0002
#2	-.0004	.0078	-.0005
Errors	NOCHECK	NOCHECK	NOCHECK
High			
Low			

010359

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	984278	10000	--	--	--	--	--
SDev	6303.150	.0000000	--	--	--	--	--
%RSD	.6403831	.0000000	--	--	--	--	--
#1	979821	10000	--	--	--	--	--
#2	988735	10000	--	--	--	--	--

Analysis Report 08/19/05 12:03:15 PM

Method: DAILY2 Sample Name: icsab Operator: 010360
Run Time: 08/19/05 11:58:39
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.094	506.8	1.066	1.030	.5348	.4949	.0025
SDev	.000	.2	.005	.002	.0001	.0002	.0020
%RSD	.0138	.0306	.4846	.1969	.0284	.0410	80.32
#1	1.094	506.7	1.062	1.029	.5347	.4951	.0011
#2	1.094	506.9	1.069	1.032	.5349	.4948	.0039
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	465.5	.9798	.4907	.4882	.5476	192.5	.0089
SDev	.7	.0009	.0014	.0003	.0003	.3	.0038
%RSD	.1510	.0964	.2785	.0502	.0510	.1572	42.40
#1	466.0	.9805	.4897	.4880	.5474	192.8	.0062
#2	465.0	.9791	.4917	.4883	.5478	192.3	.0116
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	.0047	1.180	547.2	.4962	1.033	.4619	-.0238
SDev	.0008	.001	.2	.0000	.003	.2223	.0032
%RSD	16.94	.0682	.0419	.0065	.2509	48.12	13.56
#1	.0053	1.179	547.0	.4962	1.031	.6190	-.0261
#2	.0041	1.181	547.4	.4962	1.034	.3047	-.0215
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	.9560	1.054	1.050	.9890	.0230	.0061	1.062
SDev	.0006	.003	.008	.0034	.0005	.0068	.002
%RSD	.0610	.3210	.7873	.3456	2.216	111.1	.1545
#1	.9564	1.057	1.056	.9865	.0227	.0109	1.061
#2	.9556	1.052	1.044	.9914	.0234	.0013	1.063
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

010361

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	88.24	1.056	1.065	1.031	1.009	1.062	1.015
SDev	.33	.010	.002	.000	.000	.002	.002
%RSD	.3691	.9289	.1644	.0001	.0475	.1981	.1584
#1	88.01	1.063	1.064	1.031	1.010	1.063	1.014
#2	88.47	1.049	1.066	1.031	1.009	1.060	1.017
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	1.033	.0063	.9597	1.039	.9394	.5075	.0009
SDev	.002	.0018	.0002	.010	.0227	.0005	.0011
%RSD	.1890	29.19	.0232	.9803	2.414	.0949	132.8
#1	1.034	.0050	.9599	1.031	.9554	.5071	.0001
#2	1.031	.0076	.9596	1.046	.9233	.5078	.0017
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	-.0007	.9982	.8753
SDev	.0000	.0009	.0010
%RSD	2.308	.0944	.1167
#1	-.0007	.9989	.8760
#2	-.0007	.9975	.8745
Errors	NOCHECK	LC Pass	NOCHECK
High		1.200	
Low		.8000	

010362

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	984114	10000	--	--	--	--	--
SDev	3723.624	.0000000	--	--	--	--	--
%RSD	.3783733	.0000000	--	--	--	--	--
#1	981481	10000	--	--	--	--	--
#2	986747	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: CCV3 Operator:
Run Time: 08/19/05 12:07:06
Comment:
Mode: CONC Corr. Factor: 1

010363

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9785	9.783	5.212	4.797	10.12	.9928	5.012
SDev	.0013	.061	.021	.001	.01	.0014	.009
%RSD	.1361	.6221	.3991	.0196	.0555	.1451	.1840
#1	.9795	9.826	5.226	4.798	10.12	.9918	5.018
#2	.9776	9.740	5.197	4.797	10.11	.9938	5.005
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	19.69	1.017	5.072	1.987	2.022	10.30	18.41
SDev	.02	.003	.007	.006	.012	.01	.14
%RSD	.0848	.2925	.1474	.2941	.5835	.1156	.7809
#1	19.68	1.015	5.067	1.982	2.030	10.29	18.51
#2	19.70	1.019	5.077	1.991	2.013	10.31	18.31
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	4.947	4.834	20.05	1.014	5.093	28.08	H40.99
SDev	.006	.035	.01	.001	.008	.10	.36
%RSD	.1243	.7250	.0507	.0656	.1664	.3441	.8887
#1	4.951	4.858	20.06	1.014	5.087	28.15	H41.25
#2	4.942	4.809	20.04	1.015	5.099	28.01	H40.74
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	4.997	5.111	5.032	5.069	1.003	1.024	1.007
SDev	.007	.010	.024	.040	.001	.014	.002
%RSD	.1354	.1870	.4853	.7949	.0575	1.385	.2268
#1	4.992	5.104	5.049	5.040	1.004	1.034	1.008
#2	5.001	5.117	5.014	5.097	1.003	1.014	1.005
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	97.61	5.312	5.311	4.996	5.056	5.312	4.954
SDev	1.74	.058	.007	.022	.019	.014	.003
%RSD	1.780	1.088	.1411	.4413	.3703	.2687	.0614
#1	98.84	5.353	5.306	5.011	5.043	5.322	4.956
#2	96.39	5.271	5.317	4.980	5.070	5.302	4.952
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	4.972	.9986	4.802	5.262	.9931	4.973	1.044
SDev	.009	.0020	.001	.013	.0138	.003	.007
%RSD	.1799	.1973	.0109	.2519	1.394	.0695	.6769
#1	4.979	.9972	4.802	5.253	.9833	4.971	1.039
#2	4.966	.9999	4.801	5.272	1.003	4.975	1.049
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	5.044	1.030	4.915
SDev	.003	.004	.009
%RSD	.0572	.4095	.1830
#1	5.046	1.027	4.922
#2	5.042	1.033	4.909
Errors	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500
Low	4.500	.9000	4.500

010365

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1088650	10000	--	--	--	--	--
SDev	19377.56	.0000000	--	--	--	--	--
%RSD	1.779962	.0000000	--	--	--	--	--
#1	1102352	10000	--	--	--	--	--
#2	1074948	10000	--	--	--	--	--

Analysis Report 08/19/05 12:18:16 PM page 1

Method: DAILY2 Sample Name: CCB3 Operator:
Run Time: 08/19/05 12:13:42
Comment:
Mode: CONC Corr. Factor: 1

010366

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	.0034	.0003	.0066	.0001	.0000	.0001
SDev	.0001	.0053	.0023	.0011	.0001	.0000	.0029
%RSD	41.84	157.5	702.6	17.29	85.71	8.641	1981.
#1	-.0001	-.0004	.0020	.0074	.0002	.0000	-.0019
#2	-.0003	.0071	-.0013	.0058	.0000	.0000	.0022
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	.0055	-.0001	.0002	.0005	.0002	.0025	.0010
SDev	.0057	.0002	.0003	.0011	.0003	.0018	.0014
%RSD	104.6	130.7	161.4	229.6	130.6	70.23	134.8
#1	.0014	-.0000	-.0000	.0013	.0004	.0013	.0000
#2	.0095	-.0003	.0004	-.0003	.0000	.0038	.0020
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0500	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0500	-.1000

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.0001	.0034	.0001	.0023	H.0737	H.0957
SDev	.0005	.0000	.0033	.0001	.0005	.2792	.1208
%RSD	426.8	56.33	98.63	176.1	20.03	378.8	126.2
#1	-.0005	.0000	.0010	.0001	.0020	L-.1237	.0103
#2	.0002	.0001	.0057	-.0000	.0027	H.2711	H.1811
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC High	LC High
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	.0052	.0023	-.0009	.0026	.0038	-.0006
SDev	.0008	.0026	.0035	.0019	.0013	.0029	.0000
%RSD	1358.	49.46	151.1	211.8	47.98	75.76	4.092
#1	.0005	.0070	-.0002	.0004	.0017	.0059	-.0006
#2	-.0006	.0034	.0048	-.0022	.0035	.0018	-.0006
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

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Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.4	.0012	.0005	.0003	.0002	.0008	.0020
SDev	.6	.0025	.0022	.0002	.0001	.0006	.0002
%RSD	.6110	205.8	420.0	56.65	46.80	82.77	12.08
#1	101.0	-.0006	.0021	.0005	.0003	.0012	.0018
#2	101.8	.0030	-.0010	.0002	.0001	.0003	.0021
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	.0000	-.0008	.0001	-.0008	-.0017	.0006	.0005
SDev	.0000	.0047	.0003	.0011	.0130	.0010	.0014
%RSD	29.63	614.8	279.9	136.9	778.2	149.1	279.4
#1	.0001	.0026	.0003	-.0000	-.0109	.0013	.0015
#2	.0000	-.0041	-.0001	-.0016	.0076	-.0000	-.0005
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	.0002	.0000	.0009
%RSD	934.1	23.56	1278.
#1	.0001	.0001	.0007
#2	-.0002	.0001	-.0006
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

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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	1130844	10000	--	--	--	--	--
SDev	6880.856	.0000000	--	--	--	--	--
%RSD	.6084706	.0000000	--	--	--	--	--
#1	1125979	10000	--	--	--	--	--
#2	1135710	10000	--	--	--	--	--

010369

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050722-11
SRR: 27844
SDG: 265478
CASE: CNWRA
VTSR: July 22, 2005
PROJECT#: 06002.01.242

Certificates of Analysis

010370

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TRACEMETAL GRADE NITRIC ACID
CERTIFICATE OF ANALYSIS

B McKelvey

Dr. B. McKelvey
QA/QC Manager

CATALOG NUMBER: A509
LOT NUMBER: 1105010
RELEASE DATE: February, 2005
EXPIRY DATE: February, 2008

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 7/26/05
DATE EXPIRED: 7/26/2015
DATE OPENED: 8/3/05 DR
INORG: 5318-5333 PO: F55016

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	<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	<0.2
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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B. McKelvey

Dr. B. McKelvey
QA/QC Manager

CATALOG NUMBER: A509
LOT NUMBER: 1104120
RELEASE DATE: January, 2005
EXPIRY DATE: January, 2008

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 OPENED: 8-11-05
INORG: 5335-5340 PO: F55218

TRACEMETAL GRADE HYDROCHLORIC ACID
CERTIFICATE OF ANALYSIS

B McKelvey
Dr. B. McKelvey
QA/QC Manager

CATALOG NUMBER: A508
LOT NUMBER: 4105030
RELEASE DATE: April, 2005
EXPIRY DATE: April, 2008

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.

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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.

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DATE EXPIRED: 7/11/2015
DATE OPENED: 7/11/05
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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 Silicon in H_2O tr. HNO_3 tr. HF**

Catalog Number:	CGSI1-1, CGSI1-2, and CGSI1-5
Lot Number:	**X-SI02087**
Starting Material:	SiO_2
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
DATE EXPIRED: 3/1/2006 OK
DATE OPENED: 1/31/05
INORG: 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

164
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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4999

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

010376

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^{ss} with Na_2CO_3); Geological Samples (Fuse in Pt^{ss} 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^{ss} 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 ≤ 10 ppm conc.)
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'	$^{14}N_2$, $^{13}C^{15}O$

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)

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11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010377

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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010378

SPEXertificate™

Certificate of Reference Material

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.

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 6/30/05
DATE EXPIRED: 6/30/06
DATE OPENED: 6/30/05
INORG: 5288 PO: 155205

Date of Certification: _____ Certifying Officer: N. Kocherlakota

© 2004 SPEX CertiPrep, Inc.

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
732-549-7144 • 1-800-LAB-SPEX • Fax: 732-603-9647 • CRMSales@spexcsp.com • www.spexcsp.com

010380

SPECertificate™

Certificate of Reference Material

Catalog Number: SPIKE-1 **Lot No.:** 28-176AS
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

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 4/18/05
DATE EXPIRED: 4/30/09
DATE OPENED: 4/18/05
INORG: 5197 PO: 55168

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.

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Date of Certification: APR. -- 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:

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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 megolum, 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

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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@spexcerti.com • www.spexcerti.com

010382

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 Scandium in 5% (abs) HNO_3**

Catalog Number:	CGSC1-1, CGSC1-2, and CGSC1-5
Lot Number:	**X-SC02063**
Starting Material:	Sc_2O_3
Starting Material Purity (%):	99.996919
Starting Material Lot No	BSC-632-1-5736
Matrix:	5% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 5/19/05
DATE EXPIRED: 6/1/06
DATE OPENED: 5/19/05
INORG: 5245 PO: 55189

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1007 ± 2 µg/mL

Certified Density: 1.037 g/mL (measured at 22° C)

The Certified Value is the ICP value. The following equations are used in the calculations of the certified value and the uncertainty:

Certified Value $(\bar{x}) = \frac{\Sigma x_i}{n}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements

Uncertainty $(\pm) = 2[(\Sigma s_i)^2]^{1/2} / (n)^{1/2}$

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** **1007 ± 2 µg/mL**
ICP Assay NIST SRM 3148a Lot Number: 792111

Assay Method #2 **1006 ± 2 µg/mL**
EDTA NIST SRM 928 Lot Number: 392110

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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	< 0.00100	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	0.00010	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	0.01175
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	0.01149	M	Ho	< 0.00050	M	Nb	< 0.00050	O	Si	0.00200	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	0.00047	O	Fe	0.00037	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	0.00060
O	Cu	< 0.00140	M	Pb	< 0.00299	O	K	< 0.10000	M	Ta	< 0.00698	O	Zr	0.02298

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 - 44.95591; +3; 6; $Sc(H_2O)_6^{+z}$

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^0 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)
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, $^{29}Si^{16}O$, $^{90}Zr^{+z}$

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)

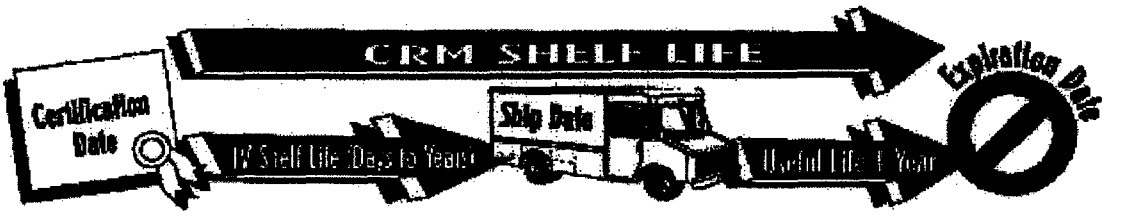
10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

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

010385



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 14, 2004

Expiration Date: EXPIRES 01/2006

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

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

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:

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** **10,005 ± 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

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 3/31/05
DATE EXPIRED: 9/1/06
DATE OPENED: 3/31/05
INORG: 5175 PO: 92106

1 of 4
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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	< 0.00100	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 Sample 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'	$^{13}O_2$, ^{12}CH, $^{29}Si^{16}O$, $^{90}Zr^{2+}$

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

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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: July 01, 2004

Expiration Date: EXPIRES 01-2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Nick Malda, QA Administrator	Nicholas T Malda
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010390

SPEXertificate™

Certificate of Reference Material

Catalog Number: PLB9-2X/2Y/2T **Lot No.** 10-119B

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: 1001 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)2B4O7-4H2O Lot# 08001E. 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: Titration with Sodium Hydroxide using Phenolphthalein as indicator. Sodium Hydroxide standardized against Potassium Biphthalate NIST SRM #84k

Instrumental Analysis by ICP spectrometer: 1001 mg/L

Uncertified Properties:

Density: 1.001 @ 22.3 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.06	Cu	<0.001	Pb	<0.001
As	<0.001	Fe	0.001	Re	<0.001
Ag	0.002	Ga	<0.001	Rb	<0.001
Ba	<0.001	In	<0.001	Sr	<0.001
Be	<0.001	K	<0.06	Sb	<0.001
Bi	0.03	Li	<0.001	Si	0.01
Cd	<0.001	Mn	<0.001	Ti	<0.001
Co	<0.001	Mo	<0.001	Tl	<0.001
Ca	0.001	Mg	<0.001	V	0.003
Cr	<0.001	Na	0.01	Zr	<0.001
		Ni	0.001	Zn	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: JAN 05 Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 01/17/05
DATE EXPIRED: 01/15/2006 W03
DATE OPENED: 01/19/05
INORG: 4966 PO: F55130

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Report of Certification

010391

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

010392

SPEXertificate™

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. Kochenakota

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DATE EXPIRED: 10/30/2005 vg
DATE OPENED: 11/03/04
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Report of Certification

010393

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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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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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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Certificate of Reference Material

Catalog Number: PLP9-2X/2Y/2T **Lot No.** 11-90P

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: 1000 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)H2(PO4) Lot# 049411. 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 Magnesia Mixture. Filter, ignite and weigh as Mg2P2O7.

Instrumental Analysis by ICP spectrometer: 1000 mg/L

Uncertified Properties:

Density: 1.000 @ 24.3 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	<0.009	Fe	0.02	Re	<0.001
Al	0.02	Ga	<0.001	Rb	<0.001
B	<0.002	In	<0.001	Si	0.01
Be	<0.001	K	<0.20	Sb	0.02
Ba	<0.001	Li	<0.001	Sr	<0.001
Bi	<0.001	Mo	0.002	Ti	0.006
Cr	<0.001	Mn	<0.001	Tl	0.003
Ca	0.025	Mg	0.002	V	<0.001
Cd	<0.001	Ni	<0.001	Zn	0.60
Co	<0.001	Na	0.009	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: _____ Certifying Officer: N. Kocherlakota

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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
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Material Source:

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Instructions for Use:

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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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Certificate of Reference Material

Catalog Number: PLSI9-2X/2Y/2T **Lot No.** 11-33SI

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: 1001.5 mg/L

Uncertainty Associated with Measurement: +/- 3.0 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: 1004 mg/L

Method: Precipitation using Ammonium Molybdate and 8-Hydroxy Quinoline. Filter, dry, and weigh as (C9H7ON)4[Si(Mo12O40)]

Instrumental Analysis by ICP spectrometer: 999 mg/L

Uncertified Properties:

Density: 1.001 @ 23.7 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
Ag	<0.001	Fe	0.02	Rb	<0.001
As	<0.06	Ga	<0.001	Re	<0.001
Ba	<0.001	In	<0.001	Sr	<0.001
Be	<0.001	K	0.14	Sb	<0.001
B	<0.004	Li	0.008	Ti	<0.001
Bi	<0.001	Mo	<0.001	Tl	<0.001
Cd	<0.001	Mg	<0.001	V	<0.001
Ca	0.016	Mn	<0.001	Zn	0.002
Cr	<0.001	Na	0.003	Zr	0.002
Co	<0.001	Ni	<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. Kocherakota

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Report of Certification

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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:

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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 OPENED: 3/08/05
INORG: 5040 PO: F55148

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Certificate of Reference Material

Catalog Number: PLTI9-2X/2Y/2T **Lot No.** 10-172TI

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 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 #3162a

The CRM is prepared gravimetrically using high purity (NH4)TiF6 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: 999 mg/L

Method: Precipitation using Ammonium Hydroxide. Filter, ignite and weigh as TiO2.

Instrumental Analysis by ICP spectrometer: 997 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
Al	0.004	Cu	0.04	Pb	<0.001
As	<0.001	Fe	0.002	Rb	<0.001
Ag	<0.001	Ga	<0.001	Re	<0.001
B	<0.004	In	<0.001	Si	3.0
Ba	<0.001	K	<0.10	Sr	<0.001
Be	<0.001	Li	<0.001	Sb	<0.001
Bi	<0.001	Mg	<0.003	Tl	<0.001
Ca	0.012	Mn	<0.001	V	<0.001
Cr	<0.07	Mo	<0.001	Zr	0.004
Cd	<0.001	Na	0.02	Zn	0.004
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: FEB '05 Certifying Officer: N. Kocherlakota

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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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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:

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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
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$U = ku_c$ 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:

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732-549-7144 • 1-800-LAB-SPEX • Fax: 732-603-9647 • CRMSales@spexcsp.com • www.spexcsp.com

010402

SPEXertificate ™

Certificate of Reference Material

Catalog Number: PLSR2-2X/2Y/2T **Lot No.** 10-130SR

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: 1000 mg/L

Uncertainty Associated with Measurement: +/- 3.0 mg/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: 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: 1.010 @ 23.5 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	0.006	Rb	<0.001
Ag	<0.001	Ga	<0.001	Re	<0.001
B	<0.001	In	<0.001	Si	0.012
Ba	0.02	K	0.20	Sr	<0.001
Be	<0.001	Li	<0.001	Sb	<0.001
Bi	<0.001	Mg	<0.001	Ti	<0.001
Ca	0.016	Mn	<0.001	Tl	<0.001
Cr	0.003	Mo	<0.001	V	0.003
Cd	<0.001	Na	0.004	Zr	
Co	<0.001	Ni	<0.001	Zn	<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.

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 5/24/05
DATE EXPIRED: 5/30/06
DATE OPENED: 5/24/05
INORG: 5246 PO: 133180

5246
1 of 2

Date of Certification: MAY - 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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010404

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 3/28/05
DATE EXPIRED: 3/28/2006 DK
DATE OPENED: 3/28/05
INORG: 5037 PO: F55146

SPEXertificate™

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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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
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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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DATE RECEIVED: 12/03/04
DATE EXPIRED: 11/30/2005 05
DATE OPENED: 12/03/04
INORG: 4912 PO: 55102

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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

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.

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010408

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/08/04
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

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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010410

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 12/03/04
DATE EXPIRED: 11/30/2005 NX
DATE OPENED: 12/02/04
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

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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.

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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010412

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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

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DATE RECEIVED: 01/17/05
DATE EXPIRED: 01/15/2006 [illegible]
DATE OPENED: 01/19/05
INORG: 4967 PO: F55130

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Report of Certification 010413

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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DATE EXPIRED: 7/31/2006
DATE OPENED: 7/7/05 DK
INORG: 5896 PO: E55203

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Certificate of Reference Material

Catalog Number: PLS9-2X/2Y/2T **Lot No.** 11-63S
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: 1001.5 mg/L
Uncertainty Associated with Measurement: +/- 3.0 mg/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: 1003 mg/L

Method: Precipitation using Barium Chloride. Filter, ignite and weigh as BaSO4.

Instrumental Analysis by ICP spectrometer: 1000 mg/L
Uncertified Properties:

Density: 1000 @ 23.2 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Ag	<0.001	Cu	<0.001	Pb	<0.001
Al	<0.001	Fe	0.01	Re	<0.001
As	<0.001	Ga	<0.001	Rb	<0.001
Be	<0.002	In	<0.001	Si	0.033
Ba	<0.001	K	0.009	Sb	<0.001
B	<0.001	Li	<0.001	Sr	<0.001
Bi	<0.001	Mg	0.004	Ti	<0.001
Cd	<0.001	Mn	<0.001	Tl	0.02
Co	<0.001	Mo	<0.001	V	<0.002
Ca	0.015	Na	0.01	Zn	0.03
Cr	<0.005	Ni	<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: JUL - 2005 Certifying Officer: N. Kocherlakota

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010415

SPEXertificate™

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

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DATE EXPIRED: 08/30/2005 VOS
DATE OPENED: 09/01/04
INORG: 4760 PO: F53435

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Report of Certification

010416

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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010417

SPEXertificate ™

Certificate of Reference Material

Catalog Number: PLU2-2X/2Y **Lot No.** 11-124U

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: 1000 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 Triuranium Octaoxide 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: 1001 mg/L

Method: Evaporate to dryness. Ignite and weigh as U3O8.

Instrumental Analysis by ICP spectrometer: 999 mg/L

Uncertified Properties:

Density: 1.009 @ 23.9 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.01	Cu	0.01	Pb	0.04
Ag	<0.005	Fe	0.20	Re	<0.001
As	0.05	Ga	<0.001	Rb	<0.001
Bi	<0.001	In	<0.001	Si	<0.01
Ba	0.005	K	0.03	Sb	0.004
Be	<0.001	Li	<0.001	Sr	0.003
B	<0.001	Mg	0.003	Tl	0.001
Ca	0.05	Mn	0.004	Ti	0.006
Cd	<0.001	Mo	0.006	V	0.005
Co	0.001	Ni	<0.001	Zr	<0.003
Cr	<0.002	Na	0.10	Zn	0.007

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 4/30/05
DATE EXPIRED: 4/30/09
DATE OPENED: 4/30/05
INORG: 5279 PO: 135205

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:_____ 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.

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010419

SPEXertificate ™

Certificate of Reference Material

Catalog Number: PLW9-2X/2Y **Lot No.** 11-83W

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# M0600W. 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: Fume with Sulfuric Acid to dryness. Ignite and weigh as WO3.

Instrumental Analysis by ICP spectrometer: 1003 mg/L

Uncertified Properties:

Density: 1.000 @ 19.6 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Ag	<0.005	Cu	<0.001	Pb	<0.001
Al	0.006	Fe	0.001	Rb	<0.001
As	0.003	Ga	<0.001	Re	0.006
B	<0.003	In	<0.001	Sr	<0.001
Be	<0.001	K	<0.10	Sb	<0.001
Bi	<0.001	Li	<0.001	Si	0.52
Ba	<0.001	Mo	<0.001	Tl	<0.001
Ca	0.005	Mn	<0.001	Ti	<0.001
Cr	<0.001	Mg	<0.001	V	<0.001
Cd	<0.001	Ni	<0.001	Zr	<0.001
Co	<0.001	Na	0.09	Zn	0.005

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.

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DATE RECEIVED: 7/26/05
DATE EXPIRED: 7/30/06
DATE OPENED: 7/28/05 (7)
INORG: SSM PO: 15213

Date of Certification: JUL - 2005 Certifying Officer: N. Kocherlakota

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Report of Certification 010420

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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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

010421

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 2/28/05
DATE EXPIRED: 2/28/2006 DK
DATE OPENED: 2/28/05
INORG: S039 PO: F55748

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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010422

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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010423

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 1/31/05
DATE EXPIRED: 1/31/2006
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. Kocherlakota

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Report of Certification

010424

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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010425

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 12/08/04
DATE EXPIRED: 11/30/2005
DATE OPENED: 12/08/04
INORG: 4908 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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Report of Certification

010426

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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010427

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 12/03/04
DATE EXPIRED: 11/30/2005 WX
DATE OPENED: 12/07/04
INORG: 4911 PO: E55100

SPEXertificate™

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 010428

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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732-549-7144 • 1-800-LAB-SPEX • Fax: 732-603-9647 • CRMSales@spexcsp.com • www.spexcsp.com

010429

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 12/09/04
DATE EXPIRED: 11/30/2005 WT
DATE OPENED: 12/09/04
INORG: 4910 PO: F55109

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

010430

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

010431

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 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 1 of 2
DATE RECEIVED: 09/01/04
DATE EXPIRED: 10/01/2005 VOS
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^0); γ- Al_2O_3 (Soluble in acids such as HCl); 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 ≤50ppm.)
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)**

INORGANIC LABS/RADCHEM LABS 8 2 of 2
DATE RECEIVED: 09/01/04
DATE EXPIRED: 10/01/2005 VOS
DATE OPENED: 09/01/04
INORG: 4762 PO: E53434

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010434

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 8 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

010435

inorganic ventures / iv labs

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phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
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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: 2/1/06 DR
DATE OPENED: 11/28/05
INORG: 4988 PO: F55133

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

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

010438

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 Maida, QA Administrator	Nicholas Maida
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul Gaines

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010439

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 **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:

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.)

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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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	< 0.00270	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

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2 of 4

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^{0} 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^+	$^{15}Ar^{14}N^1H$, $^{40}Ar^{16}O$, $^{38}Ar^{17}O^1H$, $^{38}Ar^{18}O$, $^{37}Cl^{18}O^1H$, $^{40}Ca^{16}O$

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)

010442

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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010443

inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
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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 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 VOS
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:

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n}$$

$$\text{Uncertainty } (\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$$

$(\bar{x})$ = 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** **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[a] 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[1]	^{38}ArH, $^{23}Na^{16}O$, $^{78}Se^{+2}$

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: 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 vas
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

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:

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** **10,039 ± 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

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 7/22/05
DATE EXPIRED: 8/1/06
DATE OPENED: 7/22/05
INORG: 5312 PO: F55213

Pg. 1 of 4
5312

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'	$^7Li^{16}O$, $^{48}Ti^{12}$, $^{48}Ca^{12}$

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 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)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010450

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
1/12006

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

010451

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) HNO3**

Catalog Number:	CGNA10-1, CGNA10-2, and CGNA10-5
Lot Number:	**X-QNA02148**
Starting Material:	Na2CO3
Starting Material Purity (%):	99.999819
Starting Material Lot No:	42063
Matrix:	1.4% (abs) HNO3

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 $(\bar{x}) = \frac{\sum x_i}{n}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements

Uncertainty $(\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$

$\sum s_i$ = 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 an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.

4.1 **Assay Method #1** **10,019 ± 33 µg/mL**
ICP Assay NIST SRM 3152a Lot Number: 990907

Assay Method #2 **10,006 ± 6 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 7/22/05
DATE EXPIRED: 8/1/06
DATE OPENED: 7/22/05
INORG: 5310 PO: F55213

1 of 4
5310

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)
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

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

010454

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 11, 2004

Expiration Date: EXPIRES 10 2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Nick Maida, QA Administrator

Certificate Approved By: Katalin Le, QC Manager

Certifying Officer: Paul Gaines, Chemist, Senior Technical Director

010455

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 Lithium in 0.07% (abs) HNO_3**

Catalog Number:	CGLI1-1, CGLI1-2. and CGLI1-5
Lot Number:	**X-LI02079**
Starting Material:	Li_2CO_3
Starting Material Purity (%):	99.997165
Starting Material Lot No	1123
Matrix:	0.07% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 5/19/05
DATE EXPIRED: 6/1/06
DATE OPENED: 5/19/05
INORG: 5244 PO: 55189

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 999 ± 3 µg/mL

Certified Density: 1.004 g/mL (measured at 22° C)

The Certified Value is the ICP value. The following equations are used in the calculations of the certified value and the uncertainty:

Certified Value $(\bar{x}) = \frac{\Sigma x_i}{n}$

Uncertainty $(\pm) = 2\left[\frac{\Sigma s_i}{(n)^{1/2}}\right]^{1/2}$

$(\bar{x})$ = 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** **999 ± 1 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

Assay Method #2 **999 ± 3 µg/mL**
ICP Assay NIST SRM 3129a Lot Number: 000505

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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	0.00120	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

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^0 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)
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)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010458

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 10, 2004

Expiration Date: EXPIRES 01 JAN 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

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 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° 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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5027

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010462

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 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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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:	**Y-BE01107**
Starting Material:	$Be(OOCCH_3)_2$
Starting Material Purity (%):	99.999897
Starting Material Lot No	01-10-01
Matrix:	2% (abs) HNO_3

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1008 ± 3 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 $(\bar{x}) = \frac{\sum x_i}{n}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements

Uncertainty $(\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$

$\sum s_i$ = 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.)

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** **1008 ± 3 µg/mL**
ICP Assay NIST SRM 3105a Lot Number: 892707

Assay Method #2 **1001 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 5/27/05
DATE EXPIRED: 6/1/06
DATE OPENED: 5/27/05
INORG: 5253 PO: 55195

1 of 4
5253

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; $Be^{+}(H_2O)_4^{+2}$
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) - Meta l(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)
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: February 21, 2005

Expiration Date: EXPIRES 01/2006

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 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 PS-1062
DATE RECEIVED: 12/02/04
DATE EXPIRED: 12/01/2005 WOS
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 (±) = $\frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$

($\bar{x}$) = 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** **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, Y
ICP-MS	52 amu	40 ppt	n/a	M^+	$^{34}S^{16}O$, $^{36}Ar^{16}O$ - The ^{40}Cr, ^{54}Cr, ^{50}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

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010470

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 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

010471

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 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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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	< 0.00090	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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2 of 4

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 - 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)

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 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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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 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: 3/28/05
DATE EXPIRED: 3/1/2006 DR
DATE OPENED: 3/28/05
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:

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** **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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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'	$^{40}Ca^{16}O^{1}H$, $^{44}Ca^{16}O$, $^{23}Na^{37}Cl$

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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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3of4

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

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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 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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2 of 4

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 compounds 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_3 then 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)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010482

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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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 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:

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n}$$

$$\text{Uncertainty } (\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$$

$(\bar{x})$ = 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** **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/.001µg/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'	$^{43}Ca^{16}O^{1}H$, $^{40}Ar^{18}O^{1}H$, $^{40}Ar^{19}Na$, $^{43}Ca^{16}O$, $^{24}Mg^{35}Cl$

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

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 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 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 **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: 11/23/05
DATE EXPIRED: 2/1/06 DR
DATE OPENED: 11/28/05
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:

Certified Value $(\bar{x}) = \frac{\Sigma x_i}{n}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements

Uncertainty $(\pm) = 2\left[\frac{\Sigma s_i}{(n)^{1/2}}\right]^{1/2}$

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** **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

010490

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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010491

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 Vanadium in 1.4% (abs) HNO_3**

Catalog Number:	CGV1-1, CGV1-2, and CGV1-5
Lot Number:	**X-QV01102**
Starting Material:	V2O5
Starting Material Purity (%):	99.986532
Starting Material Lot No	Stractor 46
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Pg 1 of 2
DATE RECEIVED: 12/9/2004
DATE EXPIRED: 01/01/2006
DATE OPENED: 12/9/04 KE
INORG: 4916 PO: F55102 VOS 10/1 SK

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; $H_3V_{10}O_{28}^{3-}$

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'	$^{34}S^{16}O^{1}H$, $^{35}Cl^{16}O$, $^{36}Ar^{15}C$, $^{36}Ar^{15}N$, $^{36}Ar^{14}N^{1}H$, $^{37}Cl^{14}N$, $^{35}S^{16}N$, $^{34}S^{16}O$, $^{35}S^{17}O$, $^{102}Ru^{+2}$, $^{102}Pd^{+2}$

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

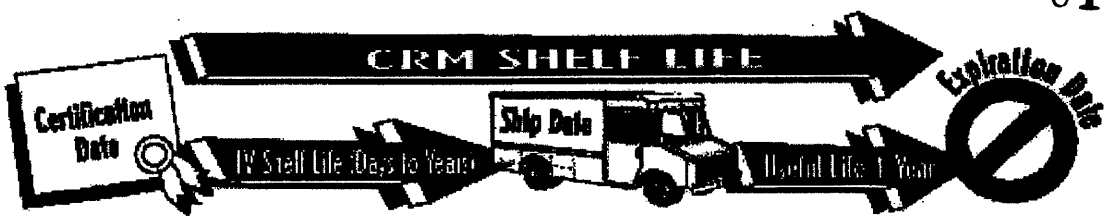
10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

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

010494



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

010495

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 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 19-1 of 2
DATE RECEIVED: 12/03/04
DATE EXPIRED: 01/01/2006 WCS
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 ($\bar{x}$) = $\frac{\Sigma x_i}{n}$

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 ± 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

010497

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; $Zn(OH)_4^{2-}$

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 ≤ 5 ppm conc.)
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^+	$^{48}Ti^{16}O$, $^{50}Cr^{16}O$, $^{50}V^{16}O$, $^{34}S^{16}O_2$, $^{32}S^{16}O^{16}O$, $^{32}S^{17}O_2$, $^{33}S^{16}O^{17}O$, $^{32}S^{34}S$, $^{33}S_2$

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 NPS
DATE OPENED: 12/07/04
INORG: 4915 PO: F55106

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010498

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
1/1/2006

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

010499

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 YES
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	M	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

010501

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: 11/27/05
DATE EXPIRED: 3/11/06 DR
DATE OPENED: 11/28/05
INORG: 4987 PO: F55133

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:

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n}$$

$$\text{Uncertainty } (\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$$

$(\bar{x})$ = 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** **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

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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⁺	$^{40}Ar^{35}Cl$, $^{59}Co^{16}O$, $^{40}Ar^{35}Ar^{1}H$, $^{38}Ar^{37}Cl$, $^{40}Ar^{35}K$, $^{150}Nd^{2+}$, $^{150}Sm^{2+}$

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)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010504

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 2006

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 R Gaines

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4987

010505

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 Lead in 0.35% (abs) HNO_3**

Catalog Number:	CGPB1-1, CGPB1-2, and CGPB1-5
Lot Number:	**X-PB02118**
Starting Material:	Pb(NO3)2
Starting Material Purity (%):	99.999974
Starting Material Lot No	22150
Matrix:	0.35% (abs) HNO_3

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1005 ± 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 $(\bar{x}) = \frac{\sum x_i}{n}$

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** **1005 ± 2 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

Assay Method #2 **1001 ± 4 µg/mL**
ICP Assay NIST SRM 3128 Lot Number: 991504

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 5/27/05
DATE EXPIRED: 6/1/06
DATE OPENED: 5/27/05
INORG: 5255 PO: 55195

1 of 4
5255

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 ≈ concs.)
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)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010508

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 17, 2004

Expiration Date: EXPIRES 01 JUN 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

010509

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 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: 3/1/2006
DATE OPENED: 2/28/05
INORG: 5042 PO: F55147

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 $(\bar{x}) = \frac{\Sigma x_i}{n}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements

Uncertainty $(\pm) = 2[(\Sigma s_i)^2]^{1/2} / (n)^{1/2}$

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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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

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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 - 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 fusate 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, Pd, O, Y, O_2
ICP-MS	121 amu	5 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)

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11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010512

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
MAR 1 2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	J. A. 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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4864

010513

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 Selenium in 1.4% (abs) HNO_3**

Catalog Number:	CGSE1-1, CGSE1-2, and CGSE1-5
Lot Number:	**X-SE01106**
Starting Material:	Se shot
Starting Material Purity (%):	99.997834
Starting Material Lot No	I20L45
Matrix:	1.4% (abs) HNO_3

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1006 ± 2 µg/mL 997 ± 2 µg/g

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 $(\bar{x}) = \frac{\sum x_1}{n}$

$(\bar{x})$ = mean
x_1 = individual results
n = number of measurements

Uncertainty $(\pm) = \frac{2[(\sum s_1)^2]^{1/2}}{(n)^{1/2}}$

$\sum s_1$ = 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 993 µg/g**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

Assay Method #2 **1006 ± 2 µg/mL 997 ± 2 µg/g (Avg 2 runs)**
ICP Assay NIST SRM 3149 Lot Number: 992106

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 7/22/05
DATE EXPIRED: 8/1/06
DATE OPENED: 7/22/05
INORG: 5313 PO: F55213

p. 1 of 4
5313

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_3or 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)
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)

010516

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 30, 2004

Expiration Date: EXPIRES 10 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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010517

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 Thallium in 0.5% (abs) HNO_3**

Catalog Number:	CGTL1-1, CGTL1-2, and CGTL1-5
Lot Number:	**X-TL01091**
Starting Material:	$TlNO_3$
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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4990

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^{+}	$^{187}Os^{16}O$

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)

3.004
4990

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010520

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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4990

010521

inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
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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:	H_3BO_3
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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INCL

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

010523

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)

5047
3 of 4

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010524

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

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
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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 $(\pm) = \frac{2[(\sum s)^2]^{1/2}}{(n)^{1/2}}$

$(\bar{x})$ = 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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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 $[MoOF_4]^{-2}$ 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 $[MoOF_4]^{-2}$ 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⁺	$^{40}Ar^{39}K^{16}O$, $^{79}Br^{16}O$, $^{190}Os^{+}$, $^{194}Pt^{+}$

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

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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: May 26, 2004

Expiration Date: EXPIRES 1 MAY 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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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

CUSTOM-GRADE SOLUTION 1000 μg/mL Phosphorus in H_2O

Catalog Number: CGP1-1, CGP1-2 and CGP1-5

Lot Number: **Y-P01127**

Starting Material:	Phosphoric Acid
Starting Material Purity:	99.999%
Starting Material Lot No:	J18804

CERTIFIED CONCENTRATION: 1000 ± 5 μg/mL

The Certified Value is the ICP 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: 1004 ± 2 μg/mL
Method: Acidimetric Titration vs NIST SRM 84k KHP.

Instrument Analysis: 1000 ± 5 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3139a Lot number 890607.

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	Te	<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): 0.999 g/mL

QA:KL Rev.020805CG

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 5/27/05
DATE EXPIRED: 6/1/06
DATE OPENED: 5/27/05
INORG: 5254 PO: 55195

Paul R. Haines
Quality Assurance Manager

1 of 2
5254

Expires: EXPIRES 01/2006

QUALITY STANDARD DOCUMENTATION

1. ISO 9001 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 17025-1999 - Chemical Testing - Accredited A2LA (Certificate Number 883.01)
3. ISO/IEC Guide 34-2000 - Reference Materials Production - Accredited A2LA (Certificate Number 883.02)
4. 10CFR50 Appendix B
5. 10CFR21

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 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
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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 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: 2/28/05
DATE EXPIRED: 3/1/2006 DR
DATE OPENED: 2/28/05
INORG: 5046 PO: F55148
DR 3/15/05

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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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

5046
2004

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; $Si(OH)_x(F)_y^{2-}$

Chemical Compatibility - Soluble in HCl, HF, H_3PO_4, H_2SO_4 and HNO_3 as the $Si(OH)_x(F)_y^{2-}$. 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 $Si(OH)_x(F)_y^{2-}$. 1-10,000 ppm single element solutions as the $Si(OH)_x(F)_y^{2-}$ 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 fusate); 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 fusate 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 ≤10ppm.)
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)

5046
3064

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010534

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 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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010535

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 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 $(\bar{x}) = \frac{\sum_i x_i}{n}$

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 WOS
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

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; $Ti(F)_6^{-2}$

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 $Ti(F)_6^{-2}$ for months in 1% HNO_3 / LDPE container. 1-10,000 ppm single element solutions as the $Ti(F)_6^{-2}$ 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⁺	[$^{16}S^{16}O$, $^{32}S^{16}N$, $^{14}N^{16}O^{16}O$, $^{14}N^{14}N$, $^{40}Ar^{8}C$, ^{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

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010538

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 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 R Gaines

P10539

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 Strontium in 0.1% (abs) HNO3

Catalog Number:	CGSR1-1, CGSR1-2, and CGSR1-5
Lot Number:	**Y-SR01128**
Starting Material:	SrCO3
Starting Material Purity (%):	99.999250
Starting Material Lot No:	22878
Matrix:	0.1% (abs) HNO3

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 5/19/05
DATE EXPIRED: 6/1/06
DATE OPENED: 5/19/05
INORG: 5243 PO: 55189

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1005 ± 2 µg/mL 1005 ± 2 µg/g

Certified Density: 1.000 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 $(\bar{x}) = \frac{\sum x_i}{n}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements

Uncertainty $(\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$

$\sum s_i$ = 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** **1005 ± 2 µg/mL** **1005 ± 2 µg/g**
EDTA NIST SRM 928 Lot Number: 392110

Assay Method #2 **1006 ± 4 µg/mL** **1006 ± 4 µg/g**
ICP Assay NIST SRM 3153a Lot Number: 990906

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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		0.00011	M	Dy	<	0.00595	O	Li		0.00013	M	Pr	<	0.00030	O	Te	<	0.10000
M	Sb	<	0.00050	M	Er	<	0.00496	M	Lu	<	0.00040	M	Re	<	0.00099	M	Tb	<	0.00030
O	As	<	0.00500	M	Eu	<	0.00297	O	Mg		0.00008	O	Rh	<	0.00600	M	Tl	<	0.00099
M	Ba		0.00197	M	Gd		0.00512	O	Mn		0.00003	i	Rb			M	Th	<	0.00099
O	Be	<	0.00009	M	Ga	<	0.00099	O	Hg	<	0.01500	O	Ru	<	0.00300	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	<	0.00060	M	Au	<	0.00297	M	Nd	<	0.00198	M	Sc	<	0.00991	M	Ti	<	0.04956
M	Cd	<	0.00297	M	Hf	<	0.00198	O	Ni	<	0.00300	O	Se	<	0.05000	M	W	<	0.00991
O	Ca		0.00447	M	Ho	<	0.00050	M	Nb	<	0.00050	O	Si	<	0.00340	M	U	<	0.00198
M	Ce	<	0.00496	O	In	<	0.00200	n	Os			M	Ag	<	0.00198	M	V	<	0.00198
M	Cs	<	0.00030	M	Ir	<	0.00496	O	Pd	<	0.00400	O	Na		0.00149	M	Yb		0.00059
O	Cr	<	0.00080	O	Fe		0.00044	O	P	<	0.00480	s	Sr			O	Y	<	0.00004
M	Co	<	0.00297	M	La	<	0.00050	M	Pt	<	0.00198	n	S			M	Zn	<	0.01982
O	Cu	<	0.00140	M	Pb		0.00016	O	K	<	0.00170	M	Ta	<	0.00694	M	Zr	<	0.00496

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 ± °4C. 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^0 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)
ICP-OES 407.771 nm	0.0004 / 0.00006 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)

010542

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, 2005

Expiration Date: EXPIRES 01 JAN 2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Nick Maida, QA Administrator

Certificate Approved By: Katalin Le, QC Manager

Certifying Officer: Paul Gaines, Chemist, Senior Technical Director

Nicholas Maida

Katalin Le

Paul R Gaines

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010543

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 Tin in H_2O tr HNO_3 tr HF**

Catalog Number:	CGSN1-1, CGSN1-2, and CGSN1-5
Lot Number:	**Y-QSN01140**
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: 994 ± 4 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 $(\bar{x}) = \frac{\Sigma x_i}{n}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements

Uncertainty $(\pm) = 2\left[\frac{\Sigma s_i^2}{(n)}\right]^{1/2}$

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** **994 ± 4 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
DATE RECEIVED: 3/31/05
DATE EXPIRED: 3/1/06
DATE OPENED: 3/31/05
INORG: 5124 PO: 5216

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	[illegible]
O	Cd	0.00009	M	Hf	< 0.00402	O	Ni	< 0.01000	M	Se	< 0.01607	M	W	[illegible]
O	Ca	< 0.00150	M	Ho	< 0.00100	M	Nb	< 0.00100	O	Si	< 0.00340	M	U	[illegible]
M	Ce	< 0.01004	M	In	< 0.02009	n	Os		M	Ag	< 0.00402	M	V	[illegible]
M	Cs	< 0.00060	M	Ir	< 0.01004	M	Pd	< 0.01004	O	Na	< 0.00010	M	Yb	[illegible]
M	Cr	< 0.01004	O	Fe	< 0.00110	O	P	< 0.00500	M	Sr	< 0.00100	M	Y	[illegible]
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

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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 - 118.710; +4; 4,5, 6, 7,8; $Sn(OH)_xF_y^{2-}$

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 $Sn(OH)_xF_y^{2-}$ for 1 year in 1% HNO_3 / LDPE container. 1-10,000 ppm single element solutions as the $Sn(OH)_xF_y^{2-}$ 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)
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, ^{124}Te, $^{104}Ru^{16}O$, $^{108}Pd^{16}O$
ICP-MS 120 amu	5 ppt	n/a	M^+	

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)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010546

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 01, 2005

Expiration Date: EXPIRES 01-2006

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 010547

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-BI01093**
Starting Material:	Bi needles
Starting Material Purity (%):	99.999090
Starting Material Lot No	G25L16
Matrix:	3.5% (abs) HNO_3

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1000 ± 2 µg/mL 976 ± 2 µg/g

Certified Density: 1.025 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 $(\bar{x}) = \frac{\sum x_1}{n}$

$(\bar{x})$ = mean
x_1 = individual results
n = number of measurements

Uncertainty $(\pm) = \frac{2[(\sum s_1)^2]^{1/2}}{(n)^{1/2}}$

$\sum s_1$ = 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 ± 2 µg/mL 976 ± 2 µg/g (Avg 2 runs)**
ICP Assay NIST SRM 3106 Lot Number: 991212

Assay Method #2 **1001 µg/mL 977 µg/g**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 7/22/05
DATE EXPIRED: 8/1/06 (D)
DATE OPENED: 7/22/05
INORG: 5309 PO: P55213

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5309

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 ;$Bi(O)(H_2O)_x^{1+}$
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)
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)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010550

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 18, 2004

Expiration Date: EXPIRES 1 12 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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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:	La_2O_3
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 KPJ
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 (±) = $\frac{2[(\Sigma s)^2]^{1/2}}{(n)^{1/2}}$

($\bar{x}$) = 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** **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

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 ≥10ppm 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 P3 of 2
DATE RECEIVED: 09/01/04
DATE EXPIRED: 10/01/2005 VOS
DATE OPENED: 09/01/04
INORG: 4763 PO: F53434

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

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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 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 DR
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:

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n}$$

$$\text{Uncertainty } (\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$$

$(\bar{x})$ = 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** **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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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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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

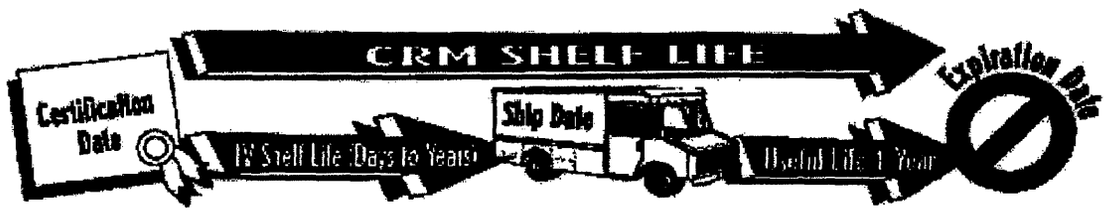
10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), 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

010559

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 Sulfur in H_2O**

Catalog Number:	CGS1-1, CGS1-2, and CGS1-5
Lot Number:	**X-S01069**
Starting Material:	H_2SO_4
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: 12/9/04
INORG: 49/7 PO: F55102 WS 12/14/04

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
$\sum S$ = 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=), 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⁺	$^{16}O_2$, $^{14}N^{18}O$, $^{15}N^{17}O$, $^{14}N^{17}O^1H$, $^{15}N^{16}O^1H$

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

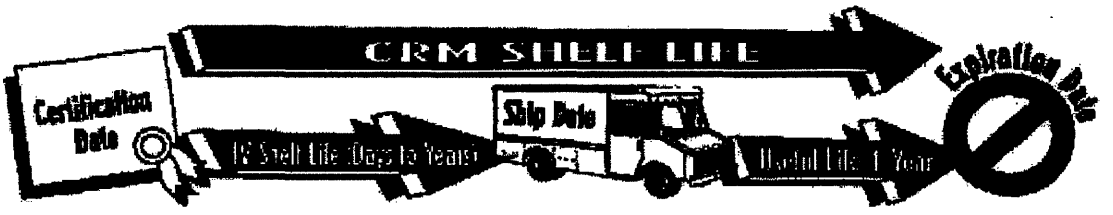
10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 12/9/2004
DATE EXPIRED: 01/01/2006 WS for KE
DATE OPENED: 12/9/04
INORG: 4917 PO: F55102

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010562



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 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

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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 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 v03
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

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; $Th(OH)^{+3}$ 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

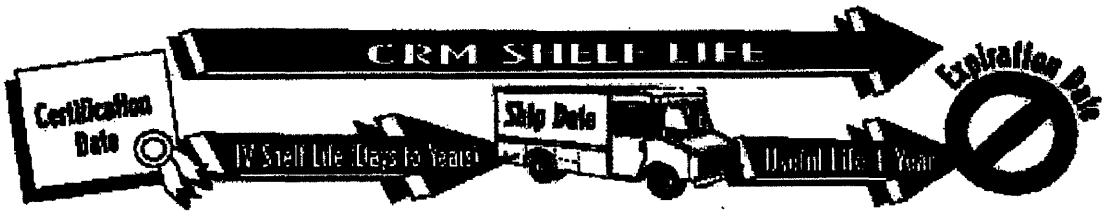
10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

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: F547766

010566

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
'12 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

010567

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 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 $(\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$

$(\bar{x})$ = 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** **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+	$^{238}Pb^{16}O_2$

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)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010570

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

010571

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 Tungsten in 0.1% (abs) HNO_3 1% (abs) HF**

Catalog Number:	CGW1-1, CGW1-2, and CGW1-5
Lot Number:	**Y-W01085**
Starting Material:	W Powder
Starting Material Purity (%):	99.993920
Starting Material Lot No	B23P45
Matrix:	0.1% (abs) HNO_3 1% (abs) HF

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 998 ± 2 µg/mL 991 ± 2 µg/g

Certified Density: 1.007 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 $(\bar{x}) = \frac{\sum x_1}{n}$

$(\bar{x})$ = mean
x_1 = individual results
n = number of measurements

Uncertainty $(\pm) = \frac{2[(\sum s_1)^2]^{1/2}}{(n)^{1/2}}$

$\sum s_1$ = 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 ± 2 µg/mL 991 ± 2 µg/g (Avg 2 runs)**
ICP Assay NIST SRM 3163 Lot Number: 990209

Assay Method #2 **1002 µg/mL 995 µg/g**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 7/22/05
DATE EXPIRED: 8/1/06
DATE OPENED: 7/22/05
INORG: 5308 PO: F55213

1 of 4
5308

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	0.01998	M	Dy	< 0.00599	O	Li	< 0.00008	M	Pr	< 0.00030	M	Te	< 0.02995
M	Sb	< 0.00050	M	Er	< 0.00499	M	Lu	< 0.00040	i	Re		M	Tb	< 0.00030
M	As	< 0.00999	M	Eu	< 0.00300	O	Mg	0.00256	M	Rh	< 0.00100	M	Tl	< 0.00100
M	Ba	< 0.00999	M	Gd	< 0.00100	M	Mn	< 0.00399	M	Rb	< 0.00100	M	Th	< 0.00100
M	Be	< 0.00050	M	Ga	< 0.00100	O	Hg	< 0.04794	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
O	B	0.07191	M	Au	< 0.00300	M	Nd	< 0.00200	O	Sc	< 0.00036	O	Ti	< 0.00360
M	Cd	< 0.00300	M	Hf	0.00100	O	Ni	< 0.03995	M	Se	< 0.00799	s	W	
O	Ca	0.00240	M	Ho	< 0.00050	O	Nb	< 0.06392	i	Si		M	U	< 0.00200
M	Ce	< 0.00499	M	In	< 0.00999	n	Os		M	Ag	< 0.00200	M	V	< 0.00200
M	Cs	< 0.00030	M	Ir	< 0.00499	M	Pd	< 0.00499	O	Na	0.05194	M	Yb	< 0.00100
M	Cr	< 0.00499	O	Fe	< 0.03995	n	P		M	Sr	< 0.00050	M	Y	< 0.03994
M	Co	< 0.00300	M	La	< 0.00050	M	Pt	< 0.00200	n	S		M	Zn	0.00120
M	Cu	< 0.00599	M	Pb	< 0.00300	O	K	0.03436	O	Ta	< 0.39951	M	Zr	< 0.00499

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 - 183.85; +6; 6,7,8,9; WOF_5^{-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_5^{-2} is soluble in % levels of HCl and HNO_3 provided it is in the WOF_5^{-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_5^{-2} for months in 1% HNO_3 / LDPE container. 1-10,000 ppm single element solutions as the WOF_5^{-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^0 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)
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)

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 29, 2005

Expiration Date: EXPIRES 1/2006

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

010575

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 Yttrium in 1.4% (abs) HNO_3**

Catalog Number:	CGY1-1, CGY1-2, and CGY1-5
Lot Number:	**Y-QY01107**
Starting Material:	Y_2O_3
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 $(\pm) = 2\left[\left(\sum s_i\right)^2\right]^{1/2} / (n)^{1/2}$

$\sum s_i$ = 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** **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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5000

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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5000

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; 8; $Y(OH)(H_2O)_x^{+2}$

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^0 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)
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	$^{73}Ge^{16}O$, $^{178}Hf^{+2}$

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)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010578

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, CGZR1-2, and CGZR1-5
Lot Number:	**Y-ZR01062**
Starting Material:	ZrO_2
Starting Material Purity (%):	99.994542
Starting Material Lot No	22855
Matrix:	H_2O tr. HNO_3 tr. HF

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 995 ± 3 µg/mL 996 ± 3 µg/g

Certified Density: 0.999 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 $(\bar{x}) = \frac{\sum x_i}{n}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements

Uncertainty $(\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$

$\sum s_i$ = 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.)

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 ± 3 µg/mL 996 ± 3 µg/g**
ICP Assay NIST SRM 3169 Lot Number: 990109

Assay Method #2 **1001 µg/mL 1002 µg/g**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 7/22/05
DATE EXPIRED: 8/1/06
DATE OPENED: 7/22/05
INORG: 5311 PO: F55213

1 of 4
5311

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 $Zr(F)_6^{-2}$ + $Zr(OH)_4F_2^{-2}$ 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)
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^+	$^{74}Ge^{16}O$, $^{74}Se^{16}O$, [$^{180}X^{+2}$ (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)

010582

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 16, 2005

Expiration Date:

EXPIRES
1 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

010583

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050722-11
SRR: 27844
SDG: 265478
CASE: CNWRA
VTSR: July 22, 2005
PROJECT#: 06002.01.242

Pipette Calibrations

Book/Page 04 021

010584

SwRI - Div. 01, Inorganic Labs' Fixed Volume Pipette Verification Log

Balance #: 12 Thermometer #: G010 diH20 Temperature (°C): 22

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
Lab30	1000	1.0060	1.0089	1.0082
TMA1	1000	1.0087	1.0082	1.0099
TMA2	1000	1.0009	1.0052	1.0081
TMA3	1000	— NOT	— Found	—
TMA6	1000	1.0001	0.9998	1.0001
TMB1	900	0.9025	0.9046	0.9010
TMC1	800	0.7957	0.7981 KE 7/21	0.7963
TMDD1	750	0.7456	~~0.7501~~ 0.7483	.7465
TMD1	700	0.7010	0.7009	KE 7/21/05 ~~0.0~~ 0.7025
TMD2	700	0.7009	KE 7/21/05 ~~0.0~~ 0.7072	0.7045
TME1	600	0.5920	0.5949	0.5947
TMF2	500	0.5009	0.5017	0.5011
TMF5	500	0.5050	0.5077	0.5058
ICF1	500	0.4979	0.4982	0.4947
L30-500	500	0.5051	0.5048	0.5045
TMG3	400	0.3952	0.3945	0.3940
TMH1	300	out	of	service
TMH2	300	KE 7/22/05 ~~out~~ 0.2975	~~of~~ 0.2480	~~Service~~ 0.2461
TMJ1	250	0.2560	0.2548	KE 7/22/05 ~~0.2500~~ 0.2501
TMJ2	250	0.2481	0.2485	0.2479
TMJ3	250	0.2490	0.2485	0.2483
TMK2	200	0.1987	0.1992	0.1991
TML1	150	0.1476	0.1477	0.1459
TMM1	120	0.1190	0.1185	0.1187
TMN3	100	out	of	service
ICN1	100	0.0995	0.0993	0.0992
TMQ1	80	.0791	0.0789	0.0793
TMR1	70	out	of service	
TMS1	60	out	of	service
LAB-30A	50	"	"	"
TMU1	40	KE ~~not~~ 0.0400	KE ~~found~~ 0.0399	0.0392
TMU2	40	0.0389	0.0399	0.0389
TMV1	30	0.0285	0.0298	0.0299
L30-20	20	0.0191	0.0197	0.0199
TMW1	25	0.0249	0.0249 KE	0.0250
TMY1	15	out	of	service

Analyst: [signature] Date: 7-21-05

Reviewed by: Orduña Date: 8/8/05

FRM-243-b (Rev 3/Mar 03)

Book/Page: 04 022

010585

SwRI – Div. 01, Inorganic Labs' Fixed Volume Pipette Verification Log

(Space provide for Inorganic Laboratories' Fixed Volume Pipette Verification Spreadsheet)

SwRI - Div. 01, Inorganic 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	1.0060	1.0089	1.0082	1.008	100.77
TMA1	1000	1.0087	1.0082	1.0099	1.009	100.89
TMA2	1000	1.0009	1.0052	1.0081	1.005	100.47
TMA3	1000	not	found			
TMA6	1000	1.0001	0.9998	1.0001	1.000	100.00
TMB1	900	0.9025	0.9046	0.9010	0.903	100.30
TMC1	800	0.7957	0.7981	0.7963	0.797	99.59
TMDD1	750	0.7456	0.7483	0.7465	0.747	99.57
TMD1	700	0.7010	0.7009	0.7025	0.701	100.21
TMD2	700	0.7009	0.7072	0.7045	0.704	100.60
TME1	600	0.5920	0.5949	0.5947	0.594	98.98
TMF2	500	0.5009	0.5017	0.5011	0.501	100.25
TMF5	500	0.5050	0.5077	0.5058	0.506	101.23
ICF1	500	0.4979	0.4982	0.4947	0.497	99.39
L30-500	500	0.5057	0.5048	0.5045	0.505	101.00
TMG3	400	0.3952	0.3945	0.3940	0.395	98.64
TMH1	300	Out	of	service		
TMH2	300	0.2975	0.2980	0.2961	0.297	99.07
TMJ1	250	0.2560	0.2548	0.2501	0.254	101.45
TMJ2	250	0.2481	0.2485	0.2479	0.248	99.27
TMJ3	250	0.2490	0.2485	0.2483	0.249	99.44
TMK2	200	0.1987	0.1992	0.1991	0.199	99.50
TML1	150	0.1476	0.1477	0.1459	0.147	98.04
TMM1	120	0.1190	0.1185	0.1187	0.119	98.94
TMN3	100	out	of	service	0.000	0.00
ICN1	100	0.0995	0.0993	0.0992	0.099	99.33
TMQ1	80	0.0791	0.0789	0.0793	0.079	98.88
TMR1	70	Out	of	service		
TMS1	60	Out	of	service		
LAB-30A	50	out	of	service		
TMU1	40	0.0400	0.0399	0.0392	0.040	99.25
TMU2	40	0.0389	0.0399	0.0389	0.039	98.08
TMV1	30	0.0285	0.0298	0.0299	0.029	98.00
L30-20	20	0.0197	0.0197	0.0199	0.020	98.83
TMW1	25	0.0249	0.0249	0.0250	0.025	99.73
TMY1	15	Out	of	service		

FRM-246 (Rev 1/Mar 03)

KE 8/9/05

Book/page: 08 019

010586

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

7-19-05

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	0.0200	0.0199	0.0201	0.020	100.00
ADJ200-A	100	0.0986	0.0994	0.0994	0.099	99.13
	200	0.2004	0.2004	0.1998	0.200	100.10
	20					
ADJ200-C	100					
	200					
	20					
ADJ200-D	100	OUT	OF	SERVICE		
	200					
	20	0.0202	0.0199	0.0201	0.020	100.33
ADJ200-G	100	0.0989	0.0990	0.0991	0.099	99.00
	200	0.2008	0.1997	0.2001	0.200	100.10
	20					
ADJ200-H	100					
	200					
	20					
ADJ200-J	100					
	200					
	20					
ADJ200-K	100	GLOVEBOX-	NOT IN	USE		
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					

FRM-247a (Rev 4/Apr 04)

Book/page: 08 020

010587

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 34 Thermometer #: G011 diH20 Temperature (° C) 21

20 µL – 200 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	20	.0200	.0199	.0201
ADJ200-A	100	.0986	.0994	.0994
	200	.2004	.2004	.1998
	20			
ADJ200-C	100	OUT	OF	SERVICE
	200		JW 8-10-05	
	20	.0202	.0199	.0201
ADJ200-D	100	.0989	.0990	.0991
	200	.2008	.1997	.2001
	20	.0202	.0199	.0201
ADJ200-G	100	.0989	.0990	.0991
	200	.2008	.1997	.2001
	20			
ADJ200-H	100			
	200		JW 7-14-05	
	20			
ADJ200-J	100			
	200			
	20			
ADJ200-K	100	Glovebox - NOT IN USE		
	200			
	20			
ADJ200	100			
	200			

note: values for ADJ200-G were entered as ADJ200D in error. JW

Analyst: John Wills Date: 7-14-05

Reviewed by: [illegible] Date: 08/10/05

Book/page: 08 021

010588

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

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				0.000	0.00
ADJ200-A	100				0.000	0.00
	200				0.000	0.00
	20				0.000	0.00
ADJ200-C	100				0.000	0.00
	200				0.000	0.00
	20				0.000	0.00
ADJ200-D	100				0.000	0.00
	200				0.000	0.00
	20	0.0203	0.0205	0.0204	0.020	102.00
ADJ200-G	100	0.0987	0.0991	0.0997	0.099	99.17
	200	0.1983	0.1995	0.1997	0.199	99.58
	20	0.0202	0.0198	0.0199	0.020	99.83
ADJ200-H	100	0.0981	0.0981	0.0989	0.098	98.37
	200	0.1968	0.1970	0.1968	0.197	98.43
	20	0.0201	0.0199	0.0199	0.020	99.83
ADJ200-J	100	0.1009	0.0990	0.1005	0.100	100.13
	200	0.2011	0.2007	0.2009	0.201	100.45
	20				0.000	0.00
ADJ200-K	100				0.000	0.00
	200				0.000	0.00
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					

J.V. 08/29/05

FRM-247a (Rev 4/Apr 04)

J.V. 08/29/05

Book/page: 08 022

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010589

Balance #: 16 Thermometer #: G011 diH20 Temperature (° C) 21

	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	0.0203	0.0205	0.0204
	ADJ200-G	100	0.0987	0.0991	0.0997
		200	0.1983	0.1995	0.1997
		20	0.0202	0.0198	0.0199
	ADJ200-H*	100	0.0981	0.0981	0.0989
		200	0.1968	0.1970	0.1968
		20	~~0.0201~~ 0.0201	0.0199	0.0199
	ADJ200-J	100	.1009	.0990	0.1005
		200	.2011	0.2007	0.2009
		20			
	ADJ200-K	100			
		200			
		20			
	ADJ200	100			
		200			

J.V. 08/02/05

J.V. 08/02/05

*This pipette could not be located on 8/2/05. It was found later and was calibrated on 8/4/05. TMJ

Analyst: [signature] Date: 08/02/05

Reviewed by: [signature] Date: 08/31/05

Book/page: 08 019

010590

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

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	0.1014	0.1017	0.1016	0.102	101.57
ADJ1000-C	500	0.4924	0.4929	0.4942	0.493	98.63
	1000	1.0014	0.9968	0.9956	0.998	99.79
	100	0.0991	0.1013	0.1005	0.100	100.30
ADJ1000-D	500	0.4961	0.4962	0.4944	0.496	99.11
	1000	0.9987	0.9964	0.9934	0.996	99.62
	100	0.1003	0.1006	0.1005	0.100	100.47
ADJ1000-E	500	0.4956	0.4958	0.4957	0.496	99.14
	1000	1.0018	1.0019	0.9966	1.000	100.01
	100	0.0999	0.1015	0.1018	0.101	101.07
ADJ1000-F	500	0.4962	0.4967	0.4983	0.497	99.41
	1000	0.9997	0.9952	0.9979	0.998	99.76
	100					
ADJ1000-G	500					
	1000					
	100					
ADJ1000-H	500					
	1000					
	100					
ADJ1000-J	500					
	1000					
	100					
ADJ1000-K	500	GLOVEBOX-	NOT IN	USE		
	1000					
	100					
ADJ1000	500					
	1000					

FRM-247b (Rev 3/Apr 04)

Book/page: 08 080

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010591

Balance #: 34 Thermometer #: G011 diH20 Temperature (° C) 21

	Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
100 µL – 1000 µL		100	.1014	.1017	.1016
	ADJ1000-C	500	.4924	.4929	.4942
		1000	1.0014	.9968	.9956
		100	.0991	.1013	.1005
	ADJ1000-D	500	.4961	.4962	.4944
		1000	.9987	.9964	.9934
		100	.1003	.1006	.1005
	ADJ1000-E	500	.4956	.4958	.4957
		1000	1.0018	1.0019	.9966
		100	.0999	.1015	.1018
	ADJ1000-F	500	.4962	.4967	.4983
		1000	.9997	.9952	.9979
		100			
	ADJ1000-G	500			
		1000			
		100			
	ADJ1000-H	500			
		1000			
		100			
	ADJ1000-J	500			
		1000			
		100			
	ADJ1000-K	500	GLOVEBOX – NOT IN USE		
		1000			
		100			
	ADJ1000	500			
		1000			

Analyst: John Willis Date: 7-19-05

Reviewed by: [illegible] Date: 08/08/05

Book/page: 08 081

010592

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

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				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	0.1013	0.1011	0.1009	0.101	101.11
ADJ1000-G	500	0.4934	0.4978	0.4964	0.496	99.17
	1000	0.9933	0.9931	0.9927	0.993	99.30
	100	0.1001	0.1004	0.1005	0.100	100.33
ADJ1000-H	500	0.4933	0.4929	0.4945	0.494	98.71
	1000	0.9856	0.9921	0.9932	0.990	99.03
	100	0.1000	0.1011	0.1015	0.101	100.87
ADJ1000-J	500	0.4935	0.4942	0.4951	0.494	98.85
	1000	0.9954	0.9964	0.9977	0.997	99.65
	100				0.000	0.00
ADJ1000	500				0.000	0.00
	1000				0.000	0.00
	100				0.000	0.00
ADJ1000	500				0.000	0.00
	1000				0.000	0.00

J.V. 08/02/05

FRM-247b (Rev 2/Oct 03)

J.V. 08/02/05

Book/page: 08 082

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010593

Balance #: 16 Thermometer #: G011 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	0.1013	0.1011	0.1009
ADJ1000-G	500	0.4934	0.4978	0.4964
	1000	0.9933	0.9931	0.9927
	100	0.1001	0.1004	0.1005
ADJ1000-H	500	0.4933	0.4929	0.4945
	1000	0.9856	0.9921	0.9932
	100	0.1000	0.1011	0.1015
ADJ1000-J	500	0.4935	0.4942	0.4951
	1000	0.9954	0.9964	0.9977
	100			
ADJ1000-K	500			
	1000			
	100			
ADJ1000	500			
	1000			

TV 08/02/05

TV 08/02/05

Analyst: J. Vaw Date: 08/02/05

Reviewed by: Walter Cepe Date: 08/08/05

Book/page: 08 139

010594

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

7-19-05

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	0.5033	0.5036	0.5088	0.505	101.05
ADJ5000-C	2500	2.4856	2.4923	2.5108	2.496	99.85
	5000	4.9936	4.9904	5.0086	4.998	99.95
	500					
ADJ5000-G	2500	OUT	OF	SERVICE		
	5000					
	500					
ADJ5000-H	2500	OUT	OF	SERVICE		
	5000					
	500	0.4961	0.4933	0.4968	0.495	99.08
ADJ5000-I	2500	2.5013	2.4917	2.4934	2.495	99.82
	5000	5.0064	5.0004	4.9998	5.002	100.04
	500					
ADJ5000-J	2500					
	5000					
	500					
ADJ5000-K	2500					
	5000					
	500					
ADJ5000-L	2500					
	5000					
	500					
ADJ5000-M	2500	GLOVEBOX-	NOT IN	USE		
	5000					
	500	0.5084	0.5021	0.5043	0.505	100.99
ADJ5000-N	2500	2.4824	2.4879	2.4835	2.485	99.38
	5000	5.0488	5.0425	5.0132	5.035	100.70
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					

FRM-247c (Rev 3/Apr 04)

010595

Book/page: 08 140

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

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	.5033	.5036	.5088
ADJ5000-C	2500	2.4856	2.4923	2.5108
	5000	4.9936	4.9904	5.0086
	500			
ADJ5000-G	2500	OUT	OF	SERVICE
	5000			
	500			
ADJ5000-H	2500	OUT	OF	SERVICE
	5000			
	500	.4961	.4933	.4968
ADJ5000-I	2500	2.5013	2.4917	2.4934
	5000	5.0064	5.0004	4.9998
	500			
ADJ5000-J	2500			
	5000			
	500			
ADJ5000-K	2500			
	5000		JW 7-19-05	
	500			
ADJ5000-L	2500			
	5000			
	500			
ADJ5000-M	2500	Glovebox - NOT	IN USE	
	5000			
	500	.5084	.5021	.5043
ADJ5000-N	2500	2.4824	2.4879	2.4835
	5000	5.0488	5.0425	5.0132
	500			
ADJ5000	2500	JW	7-19-05	
	5000	~~5.0488~~	~~5.0425~~	~~5.~~
	500	JW 7-19-05		
ADJ5000	2500			
	5000			

Analyst: [signature] Date: 7-19-05

Reviewed by: [signature] Date: 08/08/05

FRM-244 (c) (Rev 3/Apr 04)

Book/page: 08 141

010596

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

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	0.4988	0.4985	0.4984	0.499	99.71
ADJ5000-J	2500	2.4934	2.4942	2.4955	2.494	99.77
	5000	5.0023	5.0030	5.0090	5.005	100.10
	500	0.5047	0.5039	0.5055	0.505	100.94
ADJ5000-K	2500	2.5055	2.5009	2.5007	2.502	100.09
	5000	5.0054	5.0052	5.0061	5.006	100.11
	500	0.5025	0.5037	0.5011	0.502	100.49
ADJ5000-L	2500	2.4982	2.4945	2.4941	2.496	99.82
	5000	5.0046	5.0032	5.0015	5.003	100.06
	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

J.V. 08/02/05

FRM-247c (Rev 2/Mar 03)

JV 08/02/05

FRM-244 (Rev 2/Sept 02)

Book/page: 08 142
010597

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 16 Thermometer #: G 011 diH20 Temperature (° C) 21

	Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
500 µL – 5000 µL		500			
	ADJ5000-C	2500			
		5000			
		500			
	ADJ5000-G	2500			
		5000			
		500			
	ADJ5000-H	2500			
		5000			
		500			
	ADJ5000-I	2500			
		5000			
		500	0.4988	0.4985	0.4984
	ADJ5000-J	2500	2.4934	2.4942	2.4955
		5000	5.0023	5.0030	5.0090
		500	0.5047	0.5039	0.5055
	ADJ5000-K	2500	2.5055	2.5009	2.5007
		5000	5.0054	5.0052	5.0061
		500	0.5025	0.5037	0.5011
	ADJ5000-L	2500	2.4982	2.4945	2.4941
		5000	5.0046	5.0032	5.0015
		500			
	ADJ5000-M	2500			
		5000			
		500			
	ADJ5000-N	2500			
		5000			
		500			
	ADJ5000	2500			
		5000			
		500			
	ADJ5000	2500			
		5000			

J.V. 08/02/05

J.V. 08/02/05

J.V. 08/02/05

Analyst: J. Van Date: 08/02/05

Reviewed by: [signature] Date: 08/08/05

FRM-244 (c) (Rev 3/Apr 04)

010598

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050722-11
SRR: 27844
SDG: 265478
CASE: CNWRA
VTSR: July 22, 2005
PROJECT#: 06002.01.242

Balance Calibrations

1 - SN: 99-J50326-15

2 - SN: 99-J50031-1

Southwest Research Institute®
Division 01

BALANCE VERIFICATION LOG

BALANCE #:	LOCATION:	SERIAL #:	TOLERANCE:	COMMENTS:
12	Bldg. 70 Lab 47	1122510787	±0.0005	
Date	**Std Wt (g)**	**Recorded Wt (g)**	**Operator**	
8-9-05	2.0000	1.9998	KE	1
8-9-05	100.0000	99.9997	KE	2
8-10-05	2.0000	1.9999	JW	1
"	100.0000	99.9999	"	2
8-11-05	2.0000	2.0001	JW	1
"	100.0000	100.0000	"	2
8-12-05	2.0000	1.9998	JW	1
"	100.0000	99.9999	"	2
8-15-05	2.0000	2.0000	KE	1
↓		99.9999	"	2

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)

010599

1-SN: 99-J50526-15
2-SN: 99-J50031-1
3- SN: 5537

Southwest Research Institute
Division 01
BALANCE VERIFICATION LOG

BALANCE #:	LOCATION:	SERIAL #:	TOLERANCE:	COMMENTS:
12	Bldg. 70 Lab 47	1122510787	±0.0005	
Date	**Std Wt (g)**	**Recorded Wt (g)**	**Operator**	
8-16-05	2.0000	1.9999	JGV	1
↓	100.0000	100.0000	JGV	2
8-17-05	2.0000	1.9998	KE	1
"	100.0000	99.9996	KE	2
8-18-05	2.0004 ~~2.000042~~ Ki	2.0003	KE	3 see opp. page
↓	8/23/05 100.0000 70 KE	100.0062	KE	3
8-19-05	2.0004 ~~2.0000070~~ KO	2.0003	KE	3
8-19-05	100.0000 70 KE	100.0066	KE	3
8-22-05	8/23/05 2.0004 KE	2.0004	KE	3
8-22-05	100.0000 70 KE	100.0067	KE	3

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)

010600

1 - SN: 99-J50624-5

2 SN: 005537

Southwest Research Institute
Division 01

BALANCE VERIFICATION LOG

BALANCE #:	LOCATION:	SERIAL #:	TOLERANCE:	COMMENTS:
19	Bldg. 70 Lab 47	0068597	±0.05	
Date	**Std Wt (g)**	**Recorded Wt (g)**	**Operator**	
8-15-05	10.00	10.00	KE	1
↓ ↓	400.00	400.03	KE	2
8-16-05	10.00	10.00	JW	1
--	400.00	400.00	"	2
8-17-05	10.00	10.00	KE	1
"	400.00	400.01	KE	2
8-18-05	10.00	10.01	KE	2
8-18-05	400.00	400.01	KE	2
8-19-05	10.00	10.00	KE	2
"	400.00	400.02	KE	2

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)

010601

1- SN: 99-J50526-15
2- SN: 99-J50031-1
3 - SN: 5537

Southwest Research Institute
Division 01
BALANCE VERIFICATION LOG

BALANCE #:	LOCATION:	SERIAL #:	TOLERANCE:	COMMENTS:
34	Bldg. 70 Lab 47	1116031935	±0.0005/0.00005	
Date	**Std Wt (g)**	**Recorded Wt (g)**	**Operator**	
8/15/05	2.0000	2.0000	T.O.B	1
↓	100.0000	99.9999	T.O.B	2
8-16-05	2.0000	2.0001	[illegible]	1
"	100.0000	100.0000	"	2
8-17-05	2.0000	1.99997	T.O.B	1
"	100.0000	100.0002	T.O.B	2
8-18-05	2.0004 KE	2.0004	KE	3
8-18-05	100.0070 KE	100.0064	KE	3
8-19-05	8/23/05 2.0004 KE	2.0004	KE	3
"	100.0070 KE	100.0066	KE	3

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)

010602

010603

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 050722-11
SRR: 27844
SDG: 265478
CASE: CNWRA
VTSR: July 22, 2005
PROJECT#: 06002.01.242

DI Water Verification

D.I. WATER SYSTEM NOTEBOOK 010604
SOUTHWEST RESEARCH INSTITUTE
BUILDING 70

C4N024

Contact U.S. Filter (1-800-466-7873) for repairs/exchanges. (Make sure to have a P.O.)

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
8/4/05 8pm	DR	18.03	✓	✓	✓	10732.9	✓
8/5/05 825pm	DR	18.03	✓	✓	✓	10746.7	✓
8/8/05 731pm	DR	18.03	✓	✓	✓	10785.5	✓
8/9/05 245pm	DR	18.03	✓	✓	✓	10789.8	✓
8/10/05 715pm	DR	18.04	✓	✓	✓	10838.1	✓
8/11/05 851pm	DR	18.03	✓	✓	✓	10858.7	✓
8/12/05 830pm	DR	18.03	✓	✓	✓	10873.7	✓
8/15/05 515pm	DR	18.03	✓	✓	✓	10885.6	✓
8/16/05 716pm	DR	18.03	✓	✓	✓	10897.1	✓
8/17/05 7pm	DR	18.03	✓	✓	✓	10930.0	✓
8/18/05 810pm	DR	18.04	✓	✓	✓	10943.9	✓
8/19/05 7	DR	18.03	✓	✓	✓	10960.7	✓
8/22/05 740pm	DR	18.03	✓	✓	✓	10989.1	✓
8/23/05 825pm	DR	18.03	✓	✓	✓	11026.7	✓
8/24/05 900pm	DR	18.04	✓	✓	✓	11065.5	✓
8/25/05 841pm	DR	18.03	✓	✓	✓	11103.0	✓

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
8/4/05 801pm	DR	✓	✓ 3.5	30829.9	✓
8/5/05 736pm	DR	✓	X 3.5	30829.9	no usag, hunch.
8/8/05 731pm	DR	✓	X 3.5	30829.9	No usage.
8/9/05 246pm	DR	✓	✓ 3.5	30830.1	✓
8/10/05 716pm	DR	✓	✓ 3.5	30831.1	✓
8/11/05 851pm	DR	✓	✓ 3.5	30831.6	✓
8/12/05 831pm	DR	✓	✓ 3.5	30839.3	✓
8/15/05 516pm	DR	✓	✓ 3.5	30843.2	✓
8/16/05 717pm	DR	X	✓ 3.5	30843.2	No usage.
8/17/05 701pm	DR	✓	✓ 3.5	30843.4	✓
8/18/05 811pm	DR	✓	✓ 3.5	30844.7	✓
8/19/05 701pm	DR	✓	✓ 3.5	30844.9	✓
8/22/05 741pm	DR	✓	✓ 3.5	30853.5	✓
8/23/05 826pm	DR	✓	✓ 3.5	30885.1	✓
8/24/05 921pm	DR	✓	✓ 4	30886.5	✓
8/25/05 842pm	DR	✓	✓ 4.5	30889.1	✓

Legend: Check = Green (OK); X = Red (call for service)