010001

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 051021-5
SRR: 28178
SDG: 268844
CASE: CNWRA
VTSR: October 21, 2005
PROJECT#: 06002.01.222

FINAL REPORT

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010002

Sample ID
60-OB

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 10/21/05

Matrix: Liquid

Project No.: 06002.01.222

Lab System ID: 268844

SRR: 28178

Method: ICP SW846 6010B

Task Order: 051021-5

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Boron	2.18	0.500
Iron	1.04	1.00
Silicon	5.99	1.00
Sulfur	6.30	0.500

Most of the liquid samples contained some solid residue. Only the liquid portions were analyzed as per Xihua He's request on October 24, 2005. Prior to analysis, the samples were centrifuged for 10 minutes at 2000rpm to remove any solids.

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010003

Sample ID
60-PB

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 10/21/05

Matrix: Liquid

Project No.: 06002.01.222

Lab System ID: 268845

SRR: 28178

Method: ICP SW846 6010B

Task Order: 051021-5

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Boron	2.76	0.500
Iron	<1.00	1.00
Silicon	6.64	1.00
Sulfur	5.91	0.500

Most of the liquid samples contained some solid residue. Only the liquid portions were analyzed as per Xihua He's request on October 24, 2005. Prior to analysis, the samples were centrifuged for 10 minutes at 2000rpm to remove any solids.

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010004

Sample ID
60-QB

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 10/21/05

Matrix: Liquid

Project No.: 06002.01.222

Lab System ID: 268846

SRR: 28178

Method: ICP SW846 6010B

Task Order: 051021-5

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Boron	5.54	0.500
Iron	1.37	1.00
Silicon	10.4	1.00
Sulfur	5.30	0.500

Most of the liquid samples contained some solid residue. Only the liquid portions were analyzed as per Xihua He's request on October 24, 2005. Prior to analysis, the samples were centrifuged for 10 minutes at 2000rpm to remove any solids.

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SOUTHWEST RESEARCH INSTITUTE

DUPLICATE SUMMARY

010005

Sample ID
60-QB

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 10/21/05

Matrix: Liquid

Project No.: 06002.01.222

Lab System ID: 268846D

SRR: 28178

Method: ICP SW846 6010B

Task Order: 051021-5

Analysis	Original Sample Result (mg/L)	Duplicate Result (mg/L)	RPD
Boron	5.54	5.53	0.18%
Iron	1.37	1.18	14.9%
Silicon	10.4	10.4	0.00%
Sulfur	5.30	5.31	0.19%

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010006

Sample ID
60-RB

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 10/21/05

Matrix: Liquid

Project No.: 06002.01.222

Lab System ID: 268847

SRR: 28178

Method: ICP SW846 6010B

Task Order: 051021-5

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Boron	6.34	0.500
Iron	1.47	1.00
Silicon	11.2	1.00
Sulfur	5.16	0.500

Most of the liquid samples contained some solid residue. Only the liquid portions were analyzed as per Xihua He's request on October 24, 2005. Prior to analysis, the samples were centrifuged for 10 minutes at 2000rpm to remove any solids.

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SOUTHWEST RESEARCH INSTITUTE

MATRIX SPIKE SUMMARY

010007

Sample ID
60-RB

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 10/21/05

Matrix: Liquid

Project No.: 06002.01.222

Lab System ID: 268847S

SRR: 28178

Method: ICP SW846 6010B

Task Order: 051021-5

Analysis	Original Sample Result (mg/L)	Spike Result (mg/L)	Spike Added (mg/L)	Recovery
Boron	6.34	108	100	102%
Iron	1.47	28.5	25.0	108%
Silicon	11.2	113	100	102%
Sulfur	5.16	109	100	104%

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SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010008

Sample ID
60-SB

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 10/21/05

Matrix: Liquid

Project No.: 06002.01.222

Lab System ID: 268848

SRR: 28178

Method: ICP SW846 6010B

Task Order: 051021-5

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Boron	10.5	0.500
Iron	5.63	1.00
Silicon	16.8	1.00
Sulfur	4.21	0.500

Most of the liquid samples contained some solid residue. Only the liquid portions were analyzed as per Xihua He's request on October 24, 2005. Prior to analysis, the samples were centrifuged for 10 minutes at 2000rpm to remove any solids.

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SOUTHWEST RESEARCH INSTITUTE

LABORATORY CONTROL SAMPLE

010009

Sample ID
LCSW - K25H1

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Liquid

Project No.: 06002.01.222

Lab System ID: NA

SRR: 28178

Method: ICP SW846 6010B

Task Order: 051021-5

Analysis	Sample Result (mg/L)	True Value (mg/L)	Recovery
Boron	102	100	102%
Iron	27.6	25.0	110%
Silicon	102	100	102%
Sulfur	102	100	102%

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SOUTHWEST RESEARCH INSTITUTE

BLANK SUMMARY

010010

Sample ID
PBW - K25H1

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: NA

Matrix: Liquid

Project No.: 06002.01.222

Lab System ID: NA

SRR: 28178

Method: ICP SW846 6010B

Task Order: 051021-5

Analysis	Sample Result (mg/L)	Reporting Limit (mg/L)
Boron	<0.500	0.500
Iron	<1.00	1.00
Silicon	<1.00	1.00
Sulfur	<0.500	0.500

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SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 051021-5
SRR: 28178
SDG: 268844
CASE: CNWRA
VTSR: October 21, 2005
PROJECT#: 06002.01.222

010011

Task Orders/01-QPP-015

Southwest Research Institute

Laboratory Task Order

TO #: 051021-5 Revision: 1

010012

Project(s): 06002.01.222
Manager(s): DAMMANN, MIKE
To PM: 11/03/05
To QA: 11/04/05
To Client: 11/09/05

SDG: 268844
VTSR: 10/21/05
CASE: CNWRA

SRR #'s: 28178
Client(s): Div. 20

Instructions

DIVISION 20 - CNWRA. 10-day TAT. Using 10-day TAT for PM/preliminary, DRG/QAU; 13-day TAT hardcopy; subject to change.

Work is 10 CFR 50 Appendix B, 10 CFR Part 21, contact MARK EHNSTROM (ext. 3530) or CHARLIE BUTCHER (ext. 5928, pager 271-5172) or JO ANN BOYD (ext. 2169) BEFORE STARTING ANY WORK ON THIS TASK ORDER.

** NOTE ** Somewhere on your data, please make a notation indicating WHO and WHEN Mark Ehnstrom or Charlie Butcher or Jo Ann Boyd were contacted. This will help facilitate the final package to QA.

FIVE samples received for Boron, Iron, Silicon, Sulfur analyses by ICP. Point of Contact is XIHUA HE (x5194, xihua.he@swri.org).

CONTACT PM WITH ANY ADDITIONAL QUESTIONS.

REVISION 1, 11/02/05: Updated due dates, prelims sent to client, compiling all applicable paperwork. (Dramirez)

Documents Related to this task order: 19738[COC 28178]

Test: DIL-DILUTION
Section: METALPREP

Holding: 28 days from CED

Prep, Dilution Cnt: 5

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
268844		1	Liquid	60-OB	21 Oct 05	18 Nov 05
268845		1	Liquid	60-PB	21 Oct 05	18 Nov 05
268846		1	Liquid	60-QB	21 Oct 05	18 Nov 05
268847		1	Liquid	60-RB	21 Oct 05	18 Nov 05
268848		1	Liquid	60-SB	21 Oct 05	18 Nov 05
268848		2	Liquid	60-SB	21 Oct 05	18 Nov 05

Test: ICP-SWRI
Section: METALS

Holding: 180 days from CED

ICP Analysis by SwRI Method Cnt: 5

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
268844		1	Liquid	60-OB	21 Oct 05	19 Apr 06
268845		1	Liquid	60-PB	21 Oct 05	19 Apr 06
268846		1	Liquid	60-QB	21 Oct 05	19 Apr 06
268847		1	Liquid	60-RB	21 Oct 05	19 Apr 06
268848		1	Liquid	60-SB	21 Oct 05	19 Apr 06
268848		2	Liquid	60-SB	21 Oct 05	19 Apr 06

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IF STAMP IS NOT RED, THIS DOCUMENT IS UNCONTROLLED

01-QPP-015
Division 01
Revision 5
June 2004

010013

Document No. 3

Division 01

Chemistry and Chemical
Engineering Division

QUALITY PROJECT PLAN FOR

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

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

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-CH/AN* 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

010023

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 051021-5
SRR: 28178
SDG: 268844
CASE: CNWRA
VTSR: October 21, 2005
PROJECT#: 06002.01.222

Chain of Custody/Login Paperwork

19738

SAMPLE LIST/CHAIN OF CUSTODY

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

Shipper Name/Address:

Client: Div 20 Xihua He X5194

Client Purchase Order/Other ID: CNWRA

Site/Zone ID:

Requested Turnaround:
- 2 Weeks
- 3 Weeks
- Other: 10 days - 2 wks

SwRI Contact: Xihua He X5194

Analyses Requested

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers	ICP Analysis see Additional sheet				QA Nuclear						REMARKS
60-OB	10/21/05	10:00	L		1	✓										
60-PB	↓	↓	↓		1	✓										
60-QB					1	✓										
60-RB					1	✓										
60-SB					2	✓										

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

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

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

Temp: 22.0°C Therm #: 027

Comments: Rec'd Intact

Relinquished by (Print/Signature)	Date	Time
Brian K. Deeby / [signature]	10/21/05	10:00
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#: 20-06002-01-222

Received by SwRI Lab (Signature): [signature]

Date: 10/21/05 Time: 1000

Samples Disposed: Date: Time:

Samples Disposed by:

010024

SRC # 28178 10/21/05

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

SAMPLE LOG-IN SHEET

010025

Lab Name
Southwest Research Institute

Received By (Print Name)
DINO ROMAN

Log-in Date
10/21/2005

Received By (Signature)

Case Number
CNWRA

Sample Delivery Group No.

SAS Number
N/A

Remarks: 06002.01.222

			Corresponding			Remarks: Condition of Sample Shipment, etc
			EPA Sample #	Sample Tag #	Assigned Lab #	
1.	Custody Seal(s)	Present/Absent* Intact/Broken	60-OB	None	268844	Intact
2.	Custody Seal Nos.	N/A	60-PB	None	268845	Intact
			60-QB	None	268846	Intact
3.	Chain-of Custody Records	Present/Absent*	60-RB	None	268847	Intact
4.	Traffic Reports or Packing Lists	Present/Absent*	60-SB	None	268848	Intact
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	10/21/2005				
12.	Time Received	10:00:00				

Sample Transfer

Fraction	Fraction
Area # Inorg Cab 2	Area #
By DINO ROMAN	By
On 10/21/2005	On

* Contact SMO and attach record of resolution

Reviewed By Mary Hardo

Date 10-25-05.

Logbook No. Sample Receipt (28178)

Logbook Page No. 5597

FORM DC-1

OLMO4.2

010026

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 051021-5
SRR: 28178
SDG: 268844
CASE: CNWRA
VTSR: October 21, 2005
PROJECT#: 06002.01.222

Copies of Login Book

Sample Login Book

Oct 21, 2005

010027

SwRI Login Area
Division 1

Sample Receipt: 28176 | Project: 03159.34.00X | Client: Metcalf & Eddy
VTSR Date: Oct 21, 2005 | VTSR Time: 08:30:00 | Manager: QUARDERER, SHRADDHA

System ID	Customer Sample ID	Matrix
268838	D06494	Field QC
268839	D06544	Groundwater
268840	D06545	Groundwater
268841	D06546	Groundwater

Sample Receipt: 28177 | Project: 11543.13.00X | Client: CH2M-WG Idaho (C
VTSR Date: Oct 21, 2005 | VTSR Time: 08:30:00 | Manager: DAMMANN, MIKE

System ID	Customer Sample ID	Matrix
268842	CFA696102005GA1	Wastewater
268843	CFALS1102005CA1	Wastewater

Sample Receipt: 28178 | Project: 06002.01.222 | Client: Div. 20
VTSR Date: Oct 21, 2005 | VTSR Time: 10:00:00 | Manager: DAMMANN, MIKE

System ID	Customer Sample ID	Matrix
268844	60-OB	Liquid
268845	60-PB	Liquid
268846	60-QB	Liquid
268847	60-RB	Liquid
268848	60-SB	Liquid

Sample Receipt: 28179 | Project: OHD01.113 | Client: DIV 01
VTSR Date: Oct 21, 2005 | VTSR Time: 10:00:00 | Manager: BOYD, JOANN

System ID	Customer Sample ID	Matrix
268849	Air Filter Gross Alpha/Beta	Filter
268850	Air Filter Gross Alpha/Beta (Blank)	Filter
268851	Air Filter Radionuclides	Filter
268852	Soil Radionuclides	Soil

010028

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 051021-5
SRR: 28178
SDG: 268844
CASE: CNWRA
VTSR: October 21, 2005
PROJECT#: 06002.01.222

RAW DATA

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

BOOK / PAGE: 61 187

010029

CLIENT(S): Div. 20
TASK ORDER(S): 051021-5 SDG(S): 268844
PROJECT NO(S): 06002.01.222
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# 5373 HCl# 5418 H_2SO_4# ___ $HClO_4$# ___ HF# ___ H_2O_2# ___
INTERNAL STD: Sc @ 10 PPM ✓ Be @ 10 PPM ___ SOURCE: IV INORG# 5404 EXP: 10-1-06 AMT: 50uL
Oven/Hotplate/ Block ID: N/A Temperature (°C): N/A

Sample Identification		df	WT(g)	I.V.(ml)	F.V.(ml)
PBW-K25H1		1		5	5
LCSW-K25H1*		1		5	5
268844		25		0.2	5
268845		25		0.2	5
268846		25		0.2	5
268846d		25		0.2	5
268847		25		0.2	5
268847s*		25		0.2	5
268848		25		0.2	5

*20uL S IV# 4917 Exp.1/01/06 *20uL Si IV#4999 Exp.3/1/06
*20uL B IV# 5047 Exp.3/01/06
*20uL ICAL-1 Spex#5288 exp. 06/06 *50uL Spike-1 #5197 Exp.4/30/06
PBW&LCSW are prepared as 5mls 1%HNO_3 / 5% HCL

Contacted: Charlie Butche 10-25-05 9:32 AM

10-25-05

LOCATION: N/A

PREPARED BY: ___ DATE: 10-25-05
REVIEWED BY: John Wells DATE: 10-25-05
DISPOSAL INT/DATE/LOC: ___

FRM-191 (Rev 4/Jan 05)

Div. 20
TO#051021-5
Project No. 06002.01.222
Prep. Page 61-187

DL 10-28-05

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-K25H1	B_2496	0.500	U		mg/L	0.5				0.02	0.09725	0.0973	1	0.5	0.00389	10/25/05	11:47
pbw-K25H1	Fe2714	1.00	U		mg/L	1				0.04	0.11725	0.117	1	1	0.00469	10/25/05	11:47
pbw-K25H1	S_1820	0.500	U		mg/L	0.5				0.02	0.41875	0.419	1	0.5	0.01675	10/25/05	11:47
pbw-K25H1	Si2881	1.00	U		mg/L	1				0.04	0.693	0.693	1	1	0.02772	10/25/05	11:47
lcsw-K25H1	B_2496	102			mg/L	0.5		102.0%	100	0.02	101.54675	102	1	0.5	4.06187	10/25/05	11:52
lcsw-K25H1	Fe2714	27.6			mg/L	1		110.4%	25	0.04	27.5515	27.6	1	1	1.10206	10/25/05	11:52
lcsw-K25H1	S_1820	102			mg/L	0.5		102.0%	100	0.02	102.02175	102	1	0.5	4.08087	10/25/05	11:52
lcsw-K25H1	Si2881	102			mg/L	1		102.0%	100	0.04	101.6805	102	1	1	4.06722	10/25/05	11:52
268844	B_2496	2.18	✓		mg/L	0.5				0.02	2.18475	2.18	1	0.5	0.08739	10/25/05	11:56
268844	Fe2714	1.04			mg/L	1				0.04	1.0385	1.04	1	1	0.04154	10/25/05	11:56
268844	S_1820	6.30			mg/L	0.5				0.02	6.297	6.3	1	0.5	0.25188	10/25/05	11:56
268844	Si2881	5.99			mg/L	1				0.04	5.98825	5.99	1	1	0.23953	10/25/05	11:56
268845	B_2496	2.76			mg/L	0.5				0.02	2.76375	2.76	1	0.5	0.11055	10/25/05	12:01
268845	Fe2714	1.00	U		mg/L	1				0.04	0.81575	0.816	1	1	0.03263	10/25/05	12:01
268845	S_1820	5.91			mg/L	0.5				0.02	5.9125	5.91	1	0.5	0.2365	10/25/05	12:01
268845	Si2881	6.64			mg/L	1				0.04	6.639	6.64	1	1	0.26556	10/25/05	12:01
268846	B_2496	5.54			mg/L	0.5				0.02	5.5375	5.54	1	0.5	0.2215	10/25/05	12:06
268846	Fe2714	1.37			mg/L	1				0.04	1.3695	1.37	1	1	0.05478	10/25/05	12:06
268846	S_1820	5.30			mg/L	0.5				0.02	5.29625	5.3	1	0.5	0.21185	10/25/05	12:06
268846	Si2881	10.4			mg/L	1				0.04	10.39225	10.4	1	1	0.41569	10/25/05	12:06
268846d	B_2496	5.53			mg/L	0.5	0.2%			0.02	5.53475	5.53	1	0.5	0.22139	10/25/05	12:11
268846d	Fe2714	1.18			mg/L	1	14.9%			0.04	1.17625	1.18	1	1	0.04705	10/25/05	12:11
268846d	S_1820	5.31			mg/L	0.5	0.2%			0.02	5.31475	5.31	1	0.5	0.21259	10/25/05	12:11
268846d	Si2881	10.4			mg/L	1	0.0%			0.04	10.44675	10.4	1	1	0.41787	10/25/05	12:11
268847	B_2496	6.34			mg/L	0.5				0.02	6.33975	6.34	1	0.5	0.25359	10/25/05	12:15
268847	Fe2714	1.47			mg/L	1				0.04	1.4715	1.47	1	1	0.05886	10/25/05	12:15
268847	S_1820	5.16			mg/L	0.5				0.02	5.15875	5.16	1	0.5	0.20635	10/25/05	12:15
268847	Si2881	11.2			mg/L	1				0.04	11.15825	11.2	1	1	0.44633	10/25/05	12:15
268847s	B_2496	108			mg/L	0.5		101.7%	100	0.02	107.683	108	1	0.5	4.30732	10/25/05	12:20
268847s	Fe2714	28.5			mg/L	1		108.1%	25	0.04	28.5205	28.5	1	1	1.14082	10/25/05	12:20
268847s	S_1820	109			mg/L	0.5		103.8%	100	0.02	108.895	109	1	0.5	4.3558	10/25/05	12:20
268847s	Si2881	113			mg/L	1		101.8%	100	0.04	112.644	113	1	1	4.50576	10/25/05	12:20
268848	B_2496	10.5			mg/L	0.5				0.02	10.4615	10.5	1	0.5	0.41846	10/25/05	12:25
268848	Fe2714	5.63			mg/L	1				0.04	5.63225	5.63	1	1	0.22529	10/25/05	12:25
268848	S_1820	4.21			mg/L	0.5				0.02	4.208	4.21	1	0.5	0.16832	10/25/05	12:25
268848	Si2881	16.8			mg/L	1				0.04	16.7545	16.8	1	1	0.67018	10/25/05	12:25

10/28/05

268844 for B

$$\frac{0.08739\ \text{ug/ml} \times 1\text{ml}}{0.2\text{ml}} = 2.18\ \text{mg/L}$$

010030

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010031

SOUTHWEST RESEARCH INSTITUTE®

6220 Culebra Rd
San Antonio, Texas 78228

TJA_2 TRACE ICP DAILY LOG

ANALYST DL

DATE 10-25-05

As 189.042 Profile Line

As Intensity: 737.767

PEAK POSITION .037907

VERNIER POSITION 712

STDs PREP DATE:	
CLP_STD1_SC	05K03
CLP_STD2_SC	
CLP_STD3_SC	
CLP_STD4_SC	
CLP_STD5_SC	
CLP_STD6_SC	
BLK_SC	05K03

QC PREP DATE:	
CCV/ICV	05K03
CRI	05K03
ICSA	05K03
ICSAB	05K18

COMMENTS	FILE	CLIENT	TO#	PROJECT NO.	METHOD
B510215	Y05OCT	DIV. 20	051021-5	06002.01.222	6010B 61-187
B051025	Y05OCT	MOL-3015	N/A	01A001.113	6010B 61-188

10-25-05

COMMENTS:

MAINTENANCE:

REVIEWED BY: Oduña

DATE: 11/2/05

ICP Calibration Blank/ICB/CCB Solution

ID: BLK- 05H31

Date Prepared: 8-31-05 Prepared By: [signature]

Make up as needed in 1000ml volumetric flask.

Added ✓ 10 ml HNO3 INORG #: 5320

Added ✓ 50 ml HCL INORG #: 5338

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

ICP Calibration Blank/ICB/CCB Solution

ID: BLK- 05L03

Date Prepared: 10-3-05 Prepared By: [signature]

Make up as needed in 1000ml volumetric flask.

Added ✓ 10 ml HNO3 INORG #: 5371

Added ✓ 50 ml HCL INORG #: 5397

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

ICP Calibration Blank/ICB/CCB Solution

ID: BLK- 05L01

Date Prepared: 11-1-05 Prepared By: [signature]

Make up as needed in 1000ml volumetric flask.

Added ✓ 10 ml HNO3 INORG #: 5451

Added ✓ 50 ml HCL INORG #: 5399

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

010033

Date Prepared: 10-3-05 Prepared By: [illegible]

HNO3 INORG #: 5371 HCl INORG #: 5397

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
10-3-05	STD1- 05K03	Al	50	2.50	✓	INORVENT	5405	10000	10-1-06
		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	6-1-06
		Sc	10	0.500	✓	INORVENT	5175	10000	5-1-06
10-3-05	STD2- 05K03	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
10-3-05	STD3- 05K03	Cd	10	5.00	✓	INORVENT	5043	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
10-3-05	STD4- 05K03	Ag	2	1.00	✓	INORVENT	5406	1000	10-1-06
		As	10	5.00	✓	INORVENT	4947	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	5-175	10000	5-1-06
10-3-05	STD5- 05K03	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
10-3-05	STD6- 05K03	La	10	5.00	✓	INORVENT	5407	1000	10-1-06
		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	5408	1000	10-1-06
		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: 12-1-05 STD4: 12-1-05

STD2: 12-1-05 STD5: 12-1-05

STD3: 12-1-05 STD6: 12-1-05

ICP ICV/CCV SOLUTION

010034

CCV- 05 L03

Date Prepared: 10-3-05 Prepared By: [illegible]

HNO3 INORG #: 5371 HCl INORG #: 5397

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	5327	1000	8-15-06
Mo	5	5ml	✓	SPEX	5326	1000	8-15-06
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	5325	1000	~~8-15-05~~ DN 8-15-06
Y	5	5ml	✓	SPEX	4913	1000	11-30-05 10-17-05
Pd	1	1ml	✓	SPEX	4967	1000	~~1-15-05~~ DN 1-15-06
S	1	1ml	✓	SPEX	5296	1000	7-15-06
Th	1	1ml	✓	SPEX	5358	1000	8-30-06
U	1	1ml	✓	SPEX	5279	1000	6-30-06
W	1	1ml	✓	SPEX	5314	1000	7-30-06
Zr	5	5ml	✓	SPEX	5039	1000	2-28-06
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: 11-30-05

010035

Various ICP QC Solutions

Date Prepared: 10-18-05 Prepared By: [illegible]

HNO3 INORG #: 5373 HCl INORG #: 5398

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

Name: CRI -	Prepared		SOURCE	INORG #	EXPR DATE	Stock Conc mg/L	AMT added	CHECK
		CRDL-1	SPEX			mix	500 uL	
		CRI-Interm	INOR VENT			mix	5mL	
		Sc	INOR VENT			10000	500 uL	

Expiration Date:

Name: ICSA -	Prepared		SOURCE	INORG #	EXPR DATE	Stock Conc mg/L	AMT added	CHECK
		INT-A1	SPEX			mix	50 mL	
		Sc	INOR VENT			10000	500 uL	

10-18-05

Expiration Date:

Name: ICSAB -	Prepared		SOURCE	INORG #	EXPR DATE	Stock Conc mg/L	AMT added	CHECK
05 2 16	10-18-05	INT-A1	SPEX	5306	7-15-06	mix	50 mL	✓
		INT-B1 (ILMO2)	SPEX	5433	10-15-06	mix	5 mL	✓
		As	INOR VENT	4987	2-1-06	1000	500uL	✓
		Se	INOR VENT	5313	8-1-06	1000	500uL	✓
		Sb	INOR VENT	5042	3-1-06	1000	500uL	✓
		Tl	INOR VENT	4990	2-1-06	1000	500uL	✓
		B	INOR VENT	5047	3-1-06	1000	500uL	✓
		Li	INOR VENT	5244	6-1-06	1000	500uL	✓
		Mo	INOR VENT	5050	3-1-06	1000	500uL	✓
		P	INOR VENT	5254	6-1-06	1000	500uL	✓
		Si	INOR VENT	5046	3-1-06	1000	500uL	✓
		Sr	INOR VENT	5243	6-1-06	1000	500uL	✓
		Sn	INOR VENT	5174	5-1-06	1000	500uL	✓
		Ti	INOR VENT	4908	12-1-05	1000	500uL	✓
		Sc	INOR VENT	5175	5-1-06	10000	500uL	✓
		U / Zr	IV	5408/5311	10-1-06/8-1-06	1000	500uL	✓

Expiration Date:

For ILM04 and IREAP

Name: ICSAB4-	Prepared		SOURCE	INORG #	EXPR DATE	Stock Conc mg/L	AMT added	CHECK
		INT-A1	SPEX			mix	50 mL	
		Analytes B (ILMO4.0)	SPEX			mix	5 mL	
		Mo	INOR VENT			1000	500uL	
		Th	INOR VENT			1000	500uL	
		Ti	INOR VENT			1000	500uL	
		U	INOR VENT			1000	500uL	
		Zr	INOR VENT			1000	500uL	
		Sc	INOR VENT			10000	500uL	

10-18-05

Various ICP QC Solutions

010036

Date Prepared: 10-3-05 Prepared By: [illegible]

HNO3 INORG #: 5371 HCl INORG #: 5397

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

Name:	Prepared		SOURCE	INORG #	EXPR DATE	Stock Conc mg/L	AMT added	CHECK
CRI - 05203	10-3-05	CRDL-1	SPEX	5074	3-15-06	mix	500 uL	✓
		CRI-Interm	INOR VENT	5553	11-3-05	mix	5mL	✓
		Sc	INOR VENT	5175	5-1-06	10000	500 uL	✓
		Zr	SV	5311	8-1-06	1000	500uL	✓

Expiration Date: 12-3-05

Name:	Prepared		SOURCE	INORG #	EXPR DATE	Stock Conc mg/L	AMT added	CHECK
ICSA - 05203	10-3-05	INT-A1	SPEX	5306	7-15-06	mix	50 mL	✓
		Sc	INOR VENT	5175	5-1-06	10000	500 uL	✓

Expiration Date: 12-3-05

Name:	Prepared		SOURCE	INORG #	EXPR DATE	Stock Conc mg/L	AMT added	CHECK
ICSAB - 05203	10-3-05	INT-A1	SPEX	5306	7-15-06	mix	50 mL	✓
		INT-B1 (ILMO2)	SPEX	4511	10-15-05	mix	5 mL	✓
		As	INOR VENT	4947	2-1-06	1000	500uL	✓
		Se	INOR VENT	5313	8-1-06	1000	500uL	✓
		Sb	INOR VENT	5042	3-1-06	1000	500uL	✓
		Tl	INOR VENT	4990	2-1-06	1000	500uL	✓
		B	INOR VENT	5047	3-1-06	1000	500uL	✓
		Li	INOR VENT	5244	6-1-06	1000	500uL	✓
		Mo	INOR VENT	5050	3-1-06	1000	500uL	✓
		P	INOR VENT	5254	6-1-06	1000	500uL	✓
		Si	INOR VENT	5046	3-1-06	1000	500uL	✓
		Sr	INOR VENT	5243	6-1-06	1000	500uL	✓
		Sn	INOR VENT	5174	5-1-06	1000	500uL	✓
		Ti	INOR VENT	4908	12-1-05	1000	500uL	✓
		Sc	INOR VENT	5175	5-1-06	10000	500uL	✓

Expiration Date: 12-3-05

For ILM04 and IREAP

Name:	Prepared		SOURCE	INORG #	EXPR DATE	Stock Conc mg/L	AMT added	CHECK
ICSAB4-		INT-A1	SPEX			mix	50 mL	
		Analytes B (ILMO4.0)	SPEX			mix	5 mL	
		Mo	INOR VENT			1000	500uL	
		Th	INOR VENT			1000	500uL	
		Ti	INOR VENT			1000	500uL	
		U	INOR VENT			1000	500uL	
		Zr	INOR VENT			1000	500uL	
		Sc	INOR VENT			10000	500uL	

10-3-05

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

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

☐ Other _____

QC STD. ID's	
CCV	05K03
CRI	05K03
ICSA	05K03
ICSAB	05K18

ICP CAL.STD. ID's	
Std0	05K03
Std1	
Std2	
Std3	
Std4	
Std5	
Std6	05K03

010037

B Fe Si S

PROJ. NO.	PROJECT	TO#	DATE	MATRIX	LOGBK PG
06002.01.222	DIV. 20	051021-5	10-25-05	Liquid	61-187

INSTRUMENT: TRACE2 FILENAME: B510215

File converted to wsl? ☑

Standardization Rpt. 10/25/05 10:41:38 AM page 1

010038

Method: DAILY2 Standard: blk
Run Time: 10/25/05 10:37:04

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Avge	-.0000	.0004	-.0000	.0000	-.0000	-.0001	-.0000
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	38.37	.8566	17.78	76.24	48.59	5.154	54.63
#1	-.0000	.0004	-.0000	.0000	-.0000	-.0001	-.0000
#2	-.0000	.0004	-.0000	.0000	-.0000	-.0001	-.0000

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Avge	.0000	-.0000	-.0000	-.0000	.0003	.0000	.0001
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	16.14	177.3	104.9	101.5	5.917	314.8	8.625
#1	.0000	.0000	-.0000	-.0000	.0003	.0000	.0001
#2	.0000	-.0000	-.0000	-.0000	.0003	-.0000	.0001

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Avge	-.0000	.0000	-.0000	.0000	-.0000	-.0002	-.0092
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0003
%RSD	125.9	46.39	85.39	157.9	.8398	.8398	2.997
#1	-.0000	.0000	-.0000	.0000	-.0000	-.0002	-.0093
#2	-.0000	.0000	-.0000	-.0000	-.0000	-.0002	-.0090

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Avge	-.0000	.0001	.0001	.0000	.0000	.0003	-.0011
SDev	.0000	.0000	.0001	.0000	.0000	.0000	.0000
%RSD	578.6	10.35	110.0	16.54	141.4	10.33	4.136
#1	.0000	.0001	.0000	.0000	.0000	.0003	-.0010
#2	-.0000	.0001	.0001	.0000	.0000	.0003	-.0011

Elem	Sc3613	1960/1	1960/2	Si2881	Sn1899	Sr4215	Th2837
Avge	125.4	-.0001	.0000	.0015	.0000	-.0000	.0000
SDev	1.1	.0001	.0000	.0000	.0000	.0000	.0000
%RSD	.8403	60.58	93.01	.4826	84.31	70.08	156.9
#1	124.6	-.0002	.0001	.0015	.0000	-.0000	.0000
#2	126.1	-.0001	.0000	.0015	.0000	-.0000	-.0000

Elem	Ti3349	Tl1908	U_4090	V_2924	W_2079	Y_3710	Zn2062
Avge	-.0001	-.0002	-.0003	-.0001	.0001	-.0000	.0000
SDev	.0001	.0001	.0001	.0000	.0000	.0000	.0000
%RSD	57.13	41.03	47.17	32.78	2.115	343.5	39.35
#1	-.0001	-.0002	-.0004	-.0000	.0001	.0000	.0000
#2	-.0002	-.0001	-.0002	-.0001	.0001	-.0000	.0000

Elem	Zr3496
Avge	-.0000
SDev	.0001
%RSD	7418.
#1	.0001
#2	-.0001

DL 10-25-05

10/28/05

010039

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1253321	10000	--	--	--	--	--
SDev	10525.99	.0000000	--	--	--	--	--
%RSD	.8398480	.0000000	--	--	--	--	--
#1	1245878	10000	--	--	--	--	--
#2	1260764	10000	--	--	--	--	--

Method: DAILY2 Standard: clp_std4
Run Time: 10/25/05 10:41:50

010040

Elem	Ag3280	As1890	2203/1	2203/2	Sb2068	1960/1	1960/2
Avge	.0803	.1087	.3023	.2685	.1546	.2195	.2213
SDev	.0000	.0003	.0033	.0012	.0000	.0023	.0002
%RSD	.0032	.2770	1.092	.4450	.0184	1.063	.1007
#1	.0803	.1085	.3000	.2676	.1546	.2178	.2211
#2	.0804	.1089	.3047	.2693	.1546	.2211	.2214

Elem	Tl1908
Avge	.2018
SDev	.0004
%RSD	.2036
#1	.2015
#2	.2021

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1278658	10000	--	--	--	--	--
SDev	23784.24	.0000000	--	--	--	--	--
%RSD	1.860094	.0000000	--	--	--	--	--
#1	1295476	10000	--	--	--	--	--
#2	1261840	10000	--	--	--	--	--

Method: DAILY2 Standard: clp_std1
Run Time: 10/25/05 10:46:14

010041

Elem	Al3082	Ca3179	Fe2714	K_7664	Li6707	Mg2790	Na3302
Avge	.1068	.2243	.1022	.1615	2.683	.0937	.0081
SDev	.0001	.0000	.0001	.0000	.003	.0001	.0000
%RSD	.0828	.0136	.1249	.0183	.1301	.1072	.3828
#1	.1069	.2244	.1021	.1614	2.685	.0936	.0081
#2	.1068	.2243	.1022	.1615	2.680	.0938	.0082

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1254078	10000	--	--	--	--	--
SDev	6190.013	.0000000	--	--	--	--	--
%RSD	.4935907	.0000000	--	--	--	--	--
#1	1258455	10000	--	--	--	--	--
#2	1249701	10000	--	--	--	--	--

Method: DAILY2 Standard: clp_std5
Run Time: 10/25/05 10:49:54

010042

Elem	B_2496	Bi2230	Mo2020	P_1782	Si2881	Sn1899	Sr4215
Avge	.1740	.0311	.3226	.0361	.1709	.1555	2.355
SDev	.0007	.0001	.0001	.0001	.0002	.0003	.000
%RSD	.3925	.2421	.0296	.1270	.1090	.2173	.0133
#1	.1735	.0311	.3225	.0361	.1710	.1557	2.355
#2	.1745	.0312	.3226	.0362	.1707	.1553	2.355

Elem	Ti3349
Avge	2.869
SDev	.001
%RSD	.0261
#1	2.869
#2	2.870

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1276696	10000	--	--	--	--	--
SDev	1018.941	.0000000	--	--	--	--	--
%RSD	.0798108	.0000000	--	--	--	--	--
#1	1275975	10000	--	--	--	--	--
#2	1277416	10000	--	--	--	--	--

Method: DAILY2 Standard: clp_std2
Run Time: 10/25/05 10:53:35

010043

Elem	Ba4934	Be3130	Cr2677	Cu3247	Ni2316
Avge	.9916	1.500	.4439	.3114	.3379
SDev	.0003	.003	.0006	.0009	.0000
%RSD	.0279	.1805	.1383	.2960	.0118
#1	.9918	1.498	.4435	.3121	.3378
#2	.9914	1.502	.4443	.3108	.3379

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1295295	10000	--	--	--	--	--
SDev	9874.039	.0000000	--	--	--	--	--
%RSD	.7623004	.0000000	--	--	--	--	--
#1	1302277	10000	--	--	--	--	--
#2	1288313	10000	--	--	--	--	--

Method: DAILY2 Standard: clp_std3
Run Time: 10/25/05 10:56:53

010044

Elem	Cd2265	Co2286	Mn2576	V_2924	Zn2062
Avge	1.016	.2119	.9861	.2064	.2939
SDev	.003	.0003	.0011	.0002	.0010
%RSD	.2782	.1417	.1129	.1052	.3432
#1	1.018	.2121	.9869	.2066	.2946
#2	1.014	.2117	.9853	.2063	.2932

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1265536	10000	--	--	--	--	--
SDev	3698.876	.0000000	--	--	--	--	--
%RSD	.2922773	.0000000	--	--	--	--	--
#1	1262921	10000	--	--	--	--	--
#2	1268152	10000	--	--	--	--	--

010045

Method: DAILY2 Standard: clp_std6
Run Time: 10/25/05 11:00:36

Elem	La3988	Na5889	Pd3404	S_1820	Th2837	U_4090	W_2079
Avge	.4672	.0376	.2092	.0372	.1155	.0682	.1397
SDev	.0004	.0006	.0002	.0000	.0002	.0006	.0009
%RSD	.0851	1.661	.1145	.0564	.1392	.8009	.6762
#1	.4669	.0372	.2091	.0372	.1156	.0678	.1404
#2	.4675	.0381	.2094	.0372	.1153	.0686	.1390

Elem	Y_3710	Zr3496
Avge	.7670	2.057
SDev	.0006	.006
%RSD	.0845	.3030
#1	.7665	2.052
#2	.7674	2.061

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1287020	10000	--	--	--	--	--
SDev	29657.47	.0000000	--	--	--	--	--
%RSD	2.304352	.0000000	--	--	--	--	--
#1	1266049	10000	--	--	--	--	--
#2	1307991	10000	--	--	--	--	--

Standardization Report 10/25/05 11:04:28 AM page 1

Method: DAILY2 Slope = Conc(SIR)/IR **010046**

Element	Wavelen	High std	Low std	Slope	Y-intercept	Date Standardized
Ag3280	328.068	clp_std4	blk	24.8816	.000785	10/25/05 11:00:36
Al3082	308.215	clp_std1	blk	469.710	-.171827	10/25/05 11:00:36
As1890	189.042	clp_std4	blk	91.9905	.002787	10/25/05 11:00:36
B_2496	249.678	clp_std5	blk	57.4695	-.000989	10/25/05 11:00:36
Ba4934	493.409	clp_std2	blk	10.0846	.000173	10/25/05 11:00:36
Be3130	313.042	clp_std2	blk	3.33390	.000314	10/25/05 11:00:36
Bi2230	223.061	clp_std5	blk	159.143	.001457	10/25/05 11:00:36
Ca3179	317.933	clp_std1	blk	222.917	-.002222	10/25/05 11:00:36
Cd2265	226.502	clp_std3	blk	9.84403	.000062	10/25/05 11:00:36
Co2286	228.616	clp_std3	blk	47.1941	.000435	10/25/05 11:00:36
Cr2677	267.716	clp_std2	blk	22.5261	.000385	10/25/05 11:00:36
Cu3247	324.753	clp_std2	blk	32.1411	-.009286	10/25/05 11:00:36
Fe2714	271.441	clp_std1	blk	489.728	-.001584	10/25/05 11:00:36
K_7664	766.491	clp_std1	blk	309.957	-.042676	10/25/05 11:00:36
La3988	398.853	clp_std6	blk	21.4233	.000464	10/25/05 11:00:36
Li6707	670.784	clp_std1	blk	3.72754	-.000027	10/25/05 11:00:36
Mg2790	279.078	clp_std1	blk	266.760	.001068	10/25/05 11:00:36
Mn2576	257.610	clp_std3	blk	10.1419	-.000069	10/25/05 11:00:36
Mo2020	202.030	clp_std5	blk	31.0055	.000124	10/25/05 11:00:36
Na3302	330.232	clp_std1	blk	5994.90	1.11931	10/25/05 11:00:36
Na5889	588.991	clp_std6	blk	21.4861	.196659	10/25/05 11:00:36
Ni2316	231.604	clp_std2	blk	29.5979	.000184	10/25/05 11:00:36
P_1782	178.287	clp_std5	blk	277.307	-.023775	10/25/05 11:00:36
2203/1	220.351	clp_std4	blk	33.0821	-.002154	10/25/05 11:00:36
2203/2	220.352	clp_std4	blk	37.2499	-.000846	10/25/05 11:00:36
Pd3404	340.458	clp_std6	blk	49.0704	-.000020	10/25/05 11:00:36
S_1820	182.040	clp_std6	blk	270.999	-.082130	10/25/05 11:00:36
Sb2068	206.838	clp_std4	blk	64.2480	.068474	10/25/05 11:00:36
Sc3613	361.384	blk	dark	.797764	.000000	10/25/05 11:00:36
1960/1	196.021	clp_std4	blk	45.5455	.006194	10/25/05 11:00:36
1960/2	196.022	clp_std4	blk	45.1996	-.001466	10/25/05 11:00:36
Si2881	288.158	clp_std5	blk	58.8210	-.087832	10/25/05 11:00:36
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	64.3456	-.000384	10/25/05 11:00:36
Sr4215	421.552	clp_std5	blk	4.24662	.000014	10/25/05 11:00:36
Th2837	283.730	clp_std6	blk	90.4287	-.001961	10/25/05 11:00:36
Ti3349	334.941	clp_std5	blk	3.48510	.000465	10/25/05 11:00:36
Tl1908	190.864	clp_std4	blk	49.5097	.008409	10/25/05 11:00:36
U_4090	409.014	clp_std6	blk	145.843	.045997	10/25/05 11:00:36
V_2924	292.402	clp_std3	blk	48.4303	.002682	10/25/05 11:00:36
W_2079	207.914	clp_std6	blk	35.8125	-.004786	10/25/05 11:00:36
Y_3710	371.030	clp_std6	blk	13.0355	.000051	10/25/05 11:00:36
Zn2062	206.200	clp_std3	blk	34.0251	-.000299	10/25/05 11:00:36
Zr3496	349.621	clp_std6	blk	5.31436	.000010	10/25/05 11:00:36

Analysis Report QC Standard 10/25/05 11:11:04 AM page 1

Method: DAILY2 Sample Name: icv/ccv Operator: **010047**
Run Time: 10/25/05 11:06:30
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9973	9.839	5.115	4.829	9.997	.9790	4.974
SDev	.0018	.011	.018	.012	.016	.0002	.000
%RSD	.1824	.1164	.3547	.2448	.1636	.0248	.0025
#1	.9960	9.830	5.102	4.820	9.985	.9788	4.973
#2	.9986	9.847	5.128	4.837	10.01	.9791	4.974
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1.000	10.00	5.000	5.000	10.00	1.000	5.000
Range	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	20.06	1.007	5.057	1.963	2.016	9.911	18.82
SDev	.01	.001	.007	.001	.002	.017	.05
%RSD	.0449	.1441	.1416	.0473	.1088	.1693	.2681
#1	20.07	1.008	5.052	1.964	2.014	9.899	18.78
#2	20.05	1.006	5.062	1.963	2.017	9.923	18.85
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	4.892	4.833	20.12	1.010	5.027	28.78	Q41.33
SDev	.005	.010	.02	.000	.011	.21	.10
%RSD	.0989	.1994	.0834	.0427	.2139	.7169	.2426
#1	4.889	4.840	20.11	1.009	5.019	28.63	Q41.40
#2	4.896	4.826	20.13	1.010	5.034	28.92	Q41.26
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	4.965	5.099	5.021	4.981	1.005	1.001	1.001
SDev	.008	.047	.003	.014	.005	.019	.001
%RSD	.1575	.9296	.0659	.2779	.5288	1.895	.1311
#1	4.971	5.066	5.018	4.991	1.001	.9875	.9997
#2	4.960	5.133	5.023	4.972	1.009	1.014	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

010048

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	102.3	5.283	5.217	4.998	4.994	5.239	4.926
SDev	.2	.012	.025	.009	.008	.013	.000
%RSD	.1789	.2283	.4768	.1815	.1627	.2397	.0065
#1	102.4	5.292	5.199	4.991	5.000	5.230	4.926
#2	102.2	5.275	5.234	5.004	4.989	5.248	4.926
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	5.055	.9736	4.774	5.208	Q1.124	4.944	Q1.287
SDev	.007	.0031	.006	.027	.034	.003	.005
%RSD	.1313	.3193	.1356	.5279	2.999	.0674	.3653
#1	5.050	.9758	4.769	5.188	Q1.100	4.942	Q1.284
#2	5.060	.9714	4.778	5.227	Q1.148	4.946	Q1.291
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Fail	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	5.020	1.011	4.847
SDev	.005	.001	.003
%RSD	.0977	.1279	.0551
#1	5.023	1.012	4.845
#2	5.016	1.010	4.849
Errors	QC Pass	QC Pass	QC Pass
Value	5.000	1.000	5.000
Range	10.00	10.00	10.00

010049

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1282306	10000	--	--	--	--	--
SDev	2336.988	.0000000	--	--	--	--	--
%RSD	.1822489	.0000000	--	--	--	--	--
#1	1283958	10000	--	--	--	--	--
#2	1280653	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: icb/ccb Operator:
Run Time: 10/25/05 11:13:06
Comment:
Mode: CONC Corr. Factor: 1

010050

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0002	-.0000	.0062	.0001	.0000	.0020
SDev	.0007	.0020	.0008	.0026	.0001	.0000	.0003
%RSD	1278.	1261.	2608.	41.71	74.43	94.70	14.58
#1	-.0004	-.0012	.0005	.0080	.0002	.0000	.0018
#2	.0005	.0016	-.0006	.0044	.0001	.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	.0007	.0000	-.0002	.0000	-.0002	-.0008	.0094
SDev	.0009	.0003	.0002	.0007	.0005	.0150	.0115
%RSD	140.0	1875.	111.9	2655.	300.9	1783.	122.4
#1	.0000	-.0002	-.0000	.0005	.0002	-.0115	.0013
#2	.0014	.0002	-.0004	-.0005	-.0005	.0098	.0174
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	.0002	-.0020	.0000	.0003	H.1552	.0119
SDev	.0003	.0000	.0051	.0001	.0004	.0087	.0018
%RSD	145.2	21.11	260.3	1033.	141.2	5.593	15.35
#1	-.0000	.0002	-.0056	.0001	.0005	H.1613	.0106
#2	.0004	.0002	.0017	-.0001	.0000	H.1490	.0132
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	.0010	.0023	-.0001	.0001	.0015	.0098	-.0011
SDev	.0002	.0027	.0008	.0006	.0013	.0059	.0013
%RSD	20.75	120.6	1036.	541.5	85.17	59.81	119.9
#1	.0012	.0003	-.0007	.0005	.0006	H.0140	-.0002
#2	.0009	.0042	.0005	-.0003	.0024	.0057	-.0020
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

010051

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.5	.0043	.0021	.0023	.0001	.0028	.0015
SDev	.5	.0025	.0014	.0031	.0001	.0001	.0009
%RSD	.4792	57.95	69.88	135.2	173.5	4.794	61.20
#1	101.9	.0025	.0031	.0001	.0001	.0029	.0021
#2	101.2	.0061	.0010	.0045	-.0000	.0027	.0008
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	-.0015	.0001	.0047	.0120	.0005	.0016
SDev	.0000	.0010	.0003	.0001	.0249	.0007	.0018
%RSD	16.89	65.51	253.8	2.781	207.9	146.2	111.4
#1	.0000	-.0022	.0003	.0046	-.0056	.0010	.0003
#2	.0001	-.0008	-.0001	.0048	.0296	-.0000	.0029
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	.0001	.0003
%RSD	46.84	33.29	77.73
#1	.0002	-.0002	.0007
#2	.0001	-.0004	.0002
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010052

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1272638	10000	--	--	--	--	--
SDev	6141.222	.0000000	--	--	--	--	--
%RSD	.4825587	.0000000	--	--	--	--	--
#1	1276980	10000	--	--	--	--	--
#2	1268295	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: CRI Operator: **010053**
Run Time: 10/25/05 11:17:51
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0213	.1429	.0204	.1037	.0206	.0099	.0054
SDev	.0011	.0071	.0010	.0002	.0001	.0000	.0043
%RSD	5.128	4.967	4.795	.1896	.3275	.3944	79.83
#1	.0206	.1379	.0197	.1036	.0205	.0098	.0024
#2	.0221	.1480	.0211	.1039	.0206	.0099	.0084
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	.0042	.0106	.1000	.0203	.0496	.1167	.0375
SDev	.0008	.0004	.0004	.0004	.0003	.0021	.0145
%RSD	18.24	3.354	.3797	1.894	.5956	1.763	38.54
#1	.0037	.0104	.0998	.0206	.0498	.1153	.0273
#2	.0047	.0109	.1003	.0201	.0494	.1182	.0478
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	.0012	.0719	.0028	.0306	.0203	.3647	.0222
SDev	.0012	.0003	.0068	.0001	.0009	.1225	.0009
%RSD	104.1	.3722	247.0	.3051	4.219	33.59	4.060
#1	.0003	.0717	-.0021	.0305	.0197	.2781	.0215
#2	.0020	.0721	.0076	.0306	.0209	.4514	.0228
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	.0810	.1011	.0082	.0036	.0053	.0097	.1216
SDev	.0004	.0027	.0032	.0007	.0027	.0039	.0044
%RSD	.5382	2.707	39.22	20.59	51.79	39.61	3.637
#1	.0807	.0992	.0059	.0041	.0033	.0070	.1247
#2	.0813	.1030	.0105	.0031	.0072	.0125	.1185
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

010054

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.7	.0144	.0106	.1134	.0052	.0119	.1038
SDev	1.1	.0010	.0004	.0048	.0006	.0001	.0005
%RSD	1.098	6.663	3.810	4.209	11.30	.4392	.5077
#1	102.4	.0137	.0108	.1100	.0047	.0118	.1034
#2	100.9	.0151	.0103	.1168	.0056	.0119	.1042
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	.0212	-.0003	.0191	.0204	.2279	.1001	.0012
SDev	.0000	.0018	.0000	.0021	.0376	.0002	.0009
%RSD	.1374	632.6	.0256	10.40	16.50	.1783	71.73
#1	.0212	.0010	.0191	.0189	.2013	.1000	.0006
#2	.0213	-.0016	.0191	.0219	.2545	.1002	.0019
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	.0939
SDev	.0000	.0006	.0006
%RSD	7.051	1.382	.6932
#1	.0001	.0402	.0935
#2	.0001	.0410	.0944
Errors	NOCHECK	QC Pass	QC Pass
Value		.0400	.1000
Range		50.00	50.00

010055

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1274142	10000	--	--	--	--	--
SDev	13971.72	.0000000	--	--	--	--	--
%RSD	1.096560	.0000000	--	--	--	--	--
#1	1284021	10000	--	--	--	--	--
#2	1264262	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ICSA Operator: **010056**
Run Time: 10/25/05 11:22:36
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	506.6	.0037	-.0132	.0023	-.0000	.0026
SDev	.0004	.3	.0037	.0011	.0001	.0000	.0055
%RSD	403.7	.0626	99.63	8.397	2.536	26.11	208.2
#1	.0002	506.8	.0011	-.0124	.0023	-.0000	.0065
#2	-.0004	506.3	.0063	-.0139	.0023	-.0000	-.0012
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	455.2	-.0015	.0007	-.0001	.0016	189.9	.0100
SDev	1.1	.0001	.0004	.0006	.0002	.1	.0184
%RSD	.2345	6.425	66.56	517.5	12.02	.0637	183.5
#1	454.5	-.0015	.0010	-.0005	.0014	189.8	.0231
#2	456.0	-.0014	.0003	.0003	.0017	190.0	-.0030
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	.0053	.0005	540.3	-.0033	-.0006	.4360	-.0115
SDev	.0005	.0001	.8	.0000	.0004	.1992	.0079
%RSD	8.784	13.65	.1470	.7323	74.44	45.70	68.50
#1	.0049	.0006	539.8	-.0033	-.0003	.5769	-.0059
#2	.0056	.0005	540.9	-.0033	-.0009	.2951	-.0171
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	.0015	-.0066	.0346	-.0226	.0104	.0143	.0040
SDev	.0000	.0050	.0029	.0005	.0033	.0052	.0039
%RSD	2.191	76.67	8.524	2.033	31.49	36.25	98.19
#1	.0015	-.0101	.0326	-.0223	.0127	.0106	.0068
#2	.0015	-.0030	.0367	-.0230	.0081	.0179	.0012
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value							
Range							

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

010057

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	91.18	.0077	-.0051	-.0036	-.0035	-.0009	-.0032
SDev	.29	.0049	.0032	.0004	.0007	.0005	.0010
%RSD	.3160	64.24	61.55	10.45	19.16	54.21	29.52
#1	91.39	.0042	-.0029	-.0033	-.0040	-.0005	-.0039
#2	90.98	.0111	-.0074	-.0038	-.0031	-.0012	-.0025
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	.0167	.0302	-.0007	.0049	.0266	.0016	.0013
SDev	.0000	.0027	.0001	.0038	.0012	.0004	.0000
%RSD	.0395	9.052	13.30	77.92	4.435	27.04	2.704
#1	.0167	.0282	-.0008	.0076	.0258	.0019	.0013
#2	.0167	.0321	-.0007	.0022	.0275	.0013	.0013
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value							
Range							

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0073	.0004
SDev	.0000	.0010	.0003
%RSD	214.9	14.22	77.86
#1	-.0000	.0066	.0002
#2	.0000	.0080	.0006
Errors	NOCHECK	NOCHECK	NOCHECK
Value			
Range			

010058

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1142882	10000	--	--	--	--	--
SDev	3691.097	.0000000	--	--	--	--	--
%RSD	.3229640	.0000000	--	--	--	--	--
#1	1145492	10000	--	--	--	--	--
#2	1140272	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ICSAB Operator:
Run Time: 10/25/05 11:27:22
Comment:
Mode: CONC Corr. Factor: 1

010059

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.109	506.0	1.049	1.036	.5342	.4881	.0028
SDev	.001	.7	.007	.005	.0006	.0000	.0004
%RSD	.0461	.1392	.6515	.4352	.1020	.0029	13.05
#1	1.109	506.5	1.044	1.032	.5338	.4881	.0031
#2	1.109	505.5	1.054	1.039	.5346	.4882	.0025
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	455.0	.9681	.4892	.4900	.5535	189.7	-.0089
SDev	.0	.0006	.0006	.0007	.0001	.0	.0145
%RSD	.0010	.0587	.1330	.1493	.0219	.0251	163.9
#1	455.0	.9685	.4897	.4905	.5534	189.7	-.0191
#2	455.0	.9677	.4887	.4895	.5536	189.8	.0014
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	NOCHECK
Value	500.0	1.000	.5000	.5000	.5000	200.0	
Range	20.00	20.00	20.00	20.00	20.00	20.00	

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0043	1.231	540.9	.4948	1.018	.3600	-.0161
SDev	.0000	.003	.2	.0001	.004	.1499	.0004
%RSD	.3297	.2137	.0389	.0261	.3913	41.64	2.451
#1	.0043	1.233	541.0	.4948	1.021	.2540	-.0164
#2	.0043	1.229	540.7	.4949	1.015	.4660	-.0158
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	.9510	1.053	1.021	.9596	.0083	.0129	1.047
SDev	.0032	.004	.007	.0027	.0022	.0039	.016
%RSD	.3361	.3492	.6930	.2803	26.33	30.32	1.488
#1	.9533	1.055	1.016	.9615	.0067	.0101	1.058
#2	.9487	1.050	1.026	.9577	.0098	.0156	1.036
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

010060

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	91.04	1.035	1.028	1.063	.9801	1.030	1.006
SDev	.35	.010	.005	.002	.0006	.000	.003
%RSD	.3874	.9642	.4808	.1492	.0582	.0031	.2642
#1	91.29	1.028	1.031	1.062	.9797	1.030	1.004
#2	90.79	1.042	1.024	1.064	.9805	1.030	1.008
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	1.064	.0346	.9511	1.001	.9637	.4998	.0088
SDev	.002	.0030	.0002	.016	.0117	.0008	.0020
%RSD	.1415	8.668	.0254	1.559	1.211	.1581	23.05
#1	1.065	.0325	.9509	.9903	.9554	.4993	.0102
#2	1.063	.0367	.9512	1.012	.9719	.5004	.0074
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	.0001	.9447	.9311
SDev	.0002	.0011	.0007
%RSD	317.6	.1123	.0737
#1	-.0001	.9440	.9315
#2	.0002	.9455	.9306
Errors	NOCHECK	QC Pass	QC Pass
Value		1.000	1.000
Range		20.00	20.00

010061

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1141136	10000	--	--	--	--	--
SDev	4405.275	.0000000	--	--	--	--	--
%RSD	.3860429	.0000000	--	--	--	--	--
#1	1144251	10000	--	--	--	--	--
#2	1138021	10000	--	--	--	--	--

Analysis Report QC Standard 10/25/05 11:40:24 AM page 1

Method: DAILY2 Sample Name: ICV/CCV Operator: 010062
Run Time: 10/25/05 11:35:50
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9971	9.809	5.118	4.829	9.961	.9797	4.994
SDev	.0015	.005	.004	.017	.060	.0052	.014
%RSD	.1512	.0493	.0687	.3574	.5985	.5309	.2848
#1	.9982	9.806	5.120	4.817	9.919	.9834	4.984
#2	.9960	9.812	5.115	4.841	10.00	.9760	5.004
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	20.02	1.006	5.051	1.962	2.020	9.860	18.85
SDev	.13	.009	.016	.010	.003	.056	.11
%RSD	.6410	.9374	.3264	.5242	.1600	.5635	.5975
#1	20.11	1.013	5.063	1.969	2.018	9.899	18.77
#2	19.93	.9996	5.040	1.954	2.022	9.821	18.93
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	4.894	4.845	20.12	1.010	5.029	28.68	Q41.42
SDev	.007	.009	.09	.004	.016	.29	.00
%RSD	.1434	.1920	.4566	.4215	.3128	1.017	.0029
#1	4.889	4.838	20.18	1.013	5.040	28.88	Q41.42
#2	4.899	4.851	20.05	1.007	5.018	28.47	Q41.42
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	4.964	5.261	5.017	4.924	1.003	1.016	1.004
SDev	.031	.008	.013	.010	.001	.006	.002
%RSD	.6151	.1511	.2520	.2082	.1127	.5707	.1948
#1	4.986	5.255	5.026	4.917	1.004	1.020	1.003
#2	4.942	5.266	5.008	4.931	1.003	1.012	1.005
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

010063

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	102.1	5.279	5.171	5.009	4.955	5.207	4.930
SDev	2.0	.026	.054	.012	.003	.044	.027
%RSD	1.982	.4890	1.040	.2376	.0529	.8538	.5505
#1	100.6	5.261	5.133	5.017	4.953	5.176	4.949
#2	103.5	5.298	5.209	5.000	4.957	5.239	4.911
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	5.050	.9720	4.768	5.210	1.092	4.936	Q1.282
SDev	.005	.0006	.000	.002	.016	.014	.005
%RSD	.0934	.0642	.0028	.0433	1.502	.2762	.3949
#1	5.047	.9715	4.768	5.209	1.080	4.946	Q1.278
#2	5.053	.9724	4.768	5.212	Q1.103	4.927	Q1.285
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	5.011	1.012	4.857
SDev	.003	.011	.001
%RSD	.0696	1.071	.0285
#1	5.008	1.019	4.858
#2	5.013	1.004	4.856
Errors	QC Pass	QC Pass	QC Pass
Value	5.000	1.000	5.000
Range	10.00	10.00	10.00

010064

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1279440	10000	--	--	--	--	--
SDev	25405.64	.0000000	--	--	--	--	--
%RSD	1.985685	.0000000	--	--	--	--	--
#1	1261475	10000	--	--	--	--	--
#2	1297404	10000	--	--	--	--	--

Analysis Report Blank Sample 10/25/05 11:47:13 AM page 1

Method: DAILY2 Sample Name: icb/ccb Operator: 010065
Run Time: 10/25/05 11:42:27
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0008	.0055	.0011	.0067	.0001	.0000	.0015
SDev	.0000	.0002	.0029	.0005	.0000	.0000	.0008
%RSD	2.496	3.949	272.5	7.462	8.326	51.48	53.32
#1	.0008	.0053	-.0010	.0071	.0001	.0000	.0021
#2	.0008	.0056	.0031	.0064	.0001	.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	.0028	.0002	.0004	.0002	.0000	.0226	.0352
SDev	.0025	.0002	.0002	.0006	.0000	.0276	.0321
%RSD	89.92	91.82	63.63	380.7	63.05	122.2	91.13
#1	.0010	.0003	.0005	-.0003	.0000	.0031	.0125
#2	.0046	.0001	.0002	.0006	.0000	.0422	.0579
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	.0013	.0003	.0033	-.0000	-.0000	H.2836	.0164
SDev	.0007	.0001	.0046	.0000	.0006	.4590	.0042
%RSD	51.13	36.52	139.8	320.8	1446.	161.9	25.82
#1	.0018	.0002	.0066	-.0000	.0004	-.0410	.0134
#2	.0008	.0003	.0000	.0000	-.0005	H.6081	.0194
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	.0019	-.0021	-.0004	H.0071	H.0107	.0009
SDev	.0002	.0042	.0032	.0007	.0081	.0081	.0002
%RSD	27.09	223.4	146.7	164.7	113.5	75.80	23.42
#1	.0009	-.0011	.0001	-.0009	.0014	.0050	.0010
#2	.0006	.0048	-.0044	.0001	H.0128	H.0165	.0007
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC High	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

010066

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.2	-.0005	.0013	.0028	-.0010	.0007	.0000
SDev	1.5	.0030	.0041	.0012	.0006	.0018	.0018
%RSD	1.515	569.6	309.6	41.14	62.54	244.0	5990.
#1	101.3	.0016	-.0016	.0037	-.0005	-.0005	.0013
#2	99.12	-.0026	.0043	.0020	-.0014	.0020	-.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	-.0003	.0002	.0039	.0272	.0008	.0015
SDev	.0000	.0031	.0001	.0017	.0227	.0006	.0002
%RSD	45.74	970.8	36.79	43.65	83.52	78.52	15.16
#1	.0001	-.0025	.0001	.0052	.0432	.0003	.0017
#2	.0001	.0019	.0002	.0027	.0111	.0012	.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	.0001	-.0002	.0009
SDev	.0000	.0000	.0003
%RSD	21.22	8.460	32.58
#1	.0001	-.0002	.0007
#2	.0001	-.0002	.0011
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010067

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1255755	10000	--	--	--	--	--
SDev	19012.69	.0000000	--	--	--	--	--
%RSD	1.514044	.0000000	--	--	--	--	--
#1	1269199	10000	--	--	--	--	--
#2	1242311	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: pbw-K25H1 pg61-187 Operator: 010068
Run Time: 10/25/05 11:47:24
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.0075	-.0006	.0039	.0001	.0000	.0006
SDev	.0009	.0069	.0006	.0001	.0000	.0000	.0031
%RSD	1017.	91.96	104.4	2.227	28.91	4.408	527.4
#1	-.0007	.0026	-.0001	.0038	.0001	.0000	-.0016
#2	.0005	.0125	-.0010	.0040	.0001	.0000	.0028
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	.0088	-.0001	-.0002	.0006	.0009	.0047	.0144
SDev	.0014	.0001	.0009	.0001	.0003	.0231	.0290
%RSD	16.47	98.61	474.3	19.86	35.09	491.2	201.3
#1	.0078	-.0002	-.0009	.0005	.0011	-.0116	-.0061
#2	.0098	-.0000	.0005	.0007	.0007	.0210	.0349
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	.0032	.0000	.0000	H.1429	.0354
SDev	.0015	.0001	.0091	.0001	.0004	.3290	.0061
%RSD	884.9	69.00	284.0	165.9	790.7	230.2	17.31
#1	-.0009	.0001	-.0032	-.0000	-.0002	L-.0897	.0311
#2	.0012	.0002	.0097	.0001	.0003	H.3756	.0397
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	.0003	-.0001	-.0004	-.0012	.0021	H.0168	.0026
SDev	.0005	.0031	.0016	.0002	.0052	.0063	.0010
%RSD	152.2	4102.	438.8	13.63	248.7	37.33	39.97
#1	-.0000	-.0022	-.0015	-.0013	-.0016	H.0123	.0019
#2	.0007	.0021	.0008	-.0011	H.0057	H.0212	.0033
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

010069

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.95	.0053	.0018	H.0277	-.0009	.0030	.0011
SDev	1.08	.0026	.0006	.0081	.0006	.0013	.0021
%RSD	1.085	48.71	35.99	29.11	69.61	43.52	181.9
#1	100.7	.0072	.0022	H.0220	-.0014	.0039	-.0003
#2	99.19	.0035	.0013	H.0334	-.0005	.0021	.0026
Errors	NOCHECK	NOCHECK	NOCHECK	LC High	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	.0011	.0002	.0023	-.0033	.0005	.0008
SDev	.0001	.0016	.0000	.0009	.0344	.0000	.0026
%RSD	168.8	143.3	19.48	37.67	1028.	5.047	337.7
#1	-.0000	.0022	.0002	.0017	-.0277	.0004	-.0011
#2	.0001	-.0000	.0001	.0029	.0210	.0005	.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	.0001	.0000	.0008
SDev	.0000	.0001	.0003
%RSD	30.41	994.9	35.12
#1	.0001	-.0001	.0006
#2	.0001	.0001	.0010
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010070

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1252809	10000	--	--	--	--	--
SDev	13521.30	.0000000	--	--	--	--	--
%RSD	1.079278	.0000000	--	--	--	--	--
#1	1262370	10000	--	--	--	--	--
#2	1243248	10000	--	--	--	--	--

Method: DAILY2 Sample Name: lcsw-K25H1 Operator: 010071
Run Time: 10/25/05 11:52:10
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0515	1.949	2.044	4.062	2.009	.0499	.0016
SDev	.0003	.004	.007	.001	.005	.0000	.0008
%RSD	.6390	.1885	.3494	.0343	.2704	.0326	51.63
#1	.0513	1.952	2.049	4.061	2.012	.0499	.0010
#2	.0518	1.946	2.039	4.063	2.005	.0499	.0022

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	20.37	.0510	.4988	.1987	.2501	1.102	17.09
SDev	.02	.0000	.0017	.0006	.0002	.007	.02
%RSD	.1059	.0028	.3373	.3287	.0891	.6669	.1320
#1	20.36	.0510	.4976	.1982	.2503	1.107	17.11
#2	20.39	.0510	.5000	.1991	.2500	1.097	17.08

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	.0002	20.39	.5057	-.0007	18.18	26.03
SDev	.0001	.0000	.03	.0006	.0007	.07	.04
%RSD	4.912	17.41	.1314	.1210	99.86	.3814	.1414
#1	.0011	.0002	20.37	.5053	-.0012	18.23	26.06
#2	.0010	.0002	20.40	.5061	-.0002	18.13	26.00

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4975	.0039	.5096	.4992	.0046	4.081	.4966
SDev	.0001	.0002	.0041	.0062	.0011	.018	.0014
%RSD	.0287	5.709	.8025	1.238	24.18	.4344	.2756
#1	.4974	.0037	.5067	.4948	.0054	4.093	.4976
#2	.4976	.0041	.5125	.5035	.0038	4.068	.4956

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.83	2.137	2.100	4.067	.5026	2.112	.0008
SDev	.77	.036	.001	.007	.0055	.013	.0008
%RSD	.7913	1.705	.0421	.1726	1.091	.6029	102.0
#1	98.38	2.111	2.099	4.072	.4988	2.103	.0013
#2	97.29	2.163	2.101	4.062	.5065	2.121	.0002

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	-.0179	.0002	2.071	.0200	.4963	.0006
SDev	.0000	.0046	.0002	.001	.0012	.0014	.0008
%RSD	.2468	25.84	126.2	.0604	6.114	.2922	125.6
#1	.0007	-.0212	.0000	2.072	.0209	.4953	.0001
#2	.0007	-.0146	.0004	2.070	.0191	.4974	.0011

010072

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.5010	.0010
SDev	.0002	.0013	.0009
%RSD	231.7	.2656	97.23
#1	-.0002	.5001	.0003
#2	.0000	.5020	.0016

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1226302	10000	--	--	--	--	--
SDev	9781.408	.0000000	--	--	--	--	--
%RSD	.7976342	.0000000	--	--	--	--	--
#1	1233219	10000	--	--	--	--	--
#2	1219386	10000	--	--	--	--	--

Analysis Report 10/25/05 12:01:31 PM page 1

Method: DAILY2 Sample Name: 268844 Operator: 010073
Run Time: 10/25/05 11:56:55
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	.0196	-.0005	.0874	.0002	.0000	.0024
SDev	.0009	.0061	.0002	.0005	.0000	.0000	.0019
%RSD	278.2	31.05	42.83	.5651	10.44	47.85	78.77
#1	.0010	.0239	-.0006	.0877	.0002	.0000	.0037
#2	-.0003	.0153	-.0003	.0870	.0002	.0000	.0010

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0726	.0001	.0001	.0006	.0008	.0415	1.055
SDev	.0009	.0001	.0003	.0004	.0002	.0034	.003
%RSD	1.191	80.80	193.7	69.47	19.71	8.076	.3117
#1	.0732	.0001	.0003	.0003	.0007	.0439	1.058
#2	.0720	.0000	-.0001	.0009	.0009	.0392	1.053

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0323	.0094	.0009	-.0002	1.360	1.528
SDev	.0008	.0001	.0049	.0000	.0006	.017	.002
%RSD	279.6	.1919	51.52	.1282	274.7	1.247	.1307
#1	.0009	.0323	.0128	.0009	.0002	1.372	1.529
#2	-.0003	.0324	.0060	.0009	-.0006	1.348	1.526

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	.0020	.0016	-.0002	.0039	.2519	.0009
SDev	.0001	.0025	.0002	.0005	.0002	.0017	.0009
%RSD	21.58	127.0	12.51	235.6	5.741	.6918	110.6
#1	.0004	.0002	.0017	.0001	.0038	.2507	.0015
#2	.0005	.0038	.0015	-.0006	.0041	.2531	.0002

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.16	.0004	.0003	.2395	.0004	.0003	-.0004
SDev	.51	.0024	.0007	.0009	.0004	.0003	.0017
%RSD	.5191	560.5	249.1	.3686	97.15	105.9	424.6
#1	99.52	.0021	-.0002	.2402	.0007	.0006	.0008
#2	98.80	-.0013	.0007	.2389	.0001	.0001	-.0016

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0006	.0002	-.0026	.0153	.0009	-.0000
SDev	.0000	.0003	.0001	.0040	.0460	.0001	.0025
%RSD	31.05	40.69	44.47	151.0	301.0	15.35	6958.
#1	.0001	.0004	.0001	.0002	.0479	.0008	.0018
#2	.0001	.0008	.0002	-.0055	-.0173	.0009	-.0018

010074

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0001	.0007
SDev	.0001	.0001	.0002
%RSD	102.7	57.35	32.21
#1	.0001	.0001	.0008
#2	.0000	.0001	.0005

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1242904	10000	--	--	--	--	--
SDev	6457.299	.0000000	--	--	--	--	--
%RSD	.5195332	.0000000	--	--	--	--	--
#1	1247470	10000	--	--	--	--	--
#2	1238338	10000	--	--	--	--	--

Method: DAILY2 Sample Name: 268845 Operator: 010075
Run Time: 10/25/05 12:01:43
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	.0160	-.0009	.1106	.0002	.0000	-.0015
SDev	.0005	.0035	.0002	.0002	.0001	.0000	.0035
%RSD	139.4	22.10	17.14	.1403	27.13	5.264	232.1
#1	-.0007	.0135	-.0010	.1107	.0002	.0000	-.0039
#2	-.0000	.0185	-.0008	.1104	.0003	.0000	.0010

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0536	.0001	-.0005	.0011	.0012	.0326	1.110
SDev	.0007	.0001	.0002	.0006	.0002	.0121	.018
%RSD	1.353	92.01	40.01	52.64	19.35	37.11	1.580
#1	.0531	.0000	-.0006	.0007	.0011	.0241	1.098
#2	.0542	.0002	-.0003	.0014	.0014	.0412	1.123

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	.0427	.0013	.0007	-.0002	1.523	1.636
SDev	.0000	.0000	.0001	.0000	.0002	.140	.001
%RSD	9.356	.0589	9.322	5.376	84.16	9.198	.0888
#1	-.0002	.0426	.0012	.0007	-.0003	1.424	1.635
#2	-.0002	.0427	.0014	.0008	-.0001	1.622	1.637

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0014	.0029	-.0045	-.0008	.0038	.2365	.0005
SDev	.0013	.0036	.0019	.0010	.0017	.0004	.0001
%RSD	90.81	124.6	42.78	115.2	44.57	.1513	20.36
#1	.0005	.0003	-.0031	-.0015	.0026	.2368	.0006
#2	.0023	.0055	-.0058	-.0002	.0050	.2363	.0005

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.66	.0031	.0005	.2656	-.0020	.0014	.0013
SDev	.56	.0053	.0014	.0022	.0000	.0008	.0003
%RSD	.5680	171.7	285.3	.8118	.5395	57.54	21.66
#1	99.05	.0068	-.0005	.2640	-.0021	.0019	.0015
#2	98.26	-.0007	.0015	.2671	-.0020	.0008	.0011

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0032	.0004	.0033	.0041	.0012	.0014
SDev	.0000	.0031	.0002	.0004	.0059	.0005	.0018
%RSD	13.08	97.60	42.27	11.20	143.8	42.74	126.7
#1	.0001	.0010	.0003	.0031	-.0001	.0008	.0001
#2	.0001	.0054	.0005	.0036	.0083	.0016	.0027

010076

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0002	.0001	.0013
SDev	.0001	.0002	.0003
%RSD	25.70	181.9	20.59
#1	.0001	-.0000	.0012
#2	.0002	.0002	.0015

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1236552	10000	--	--	--	--	--
SDev	7026.520	.0000000	--	--	--	--	--
%RSD	.5682352	.0000000	--	--	--	--	--
#1	1241520	10000	--	--	--	--	--
#2	1231583	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 268846 Operator: C10077
Run Time: 10/25/05 12:06:28
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	.0364	-.0002	.2215	.0001	.0000	.0028
SDev	.0010	.0029	.0016	.0017	.0001	.0000	.0026
%RSD	251.0	7.921	844.6	.7835	55.34	44.09	94.00
#1	.0011	.0385	.0009	.2203	.0001	.0000	.0047
#2	-.0003	.0344	-.0013	.2227	.0002	.0000	.0009

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0333	.0001	.0004	.0006	.0008	.0548	1.243
SDev	.0001	.0002	.0005	.0004	.0009	.0056	.006
%RSD	.4285	195.5	144.8	70.92	122.5	10.19	.5015
#1	.0334	.0003	.0007	.0003	.0001	.0587	1.248
#2	.0332	-.0000	-.0000	.0009	.0014	.0508	1.239

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	.0867	.0020	.0016	-.0006	1.885	2.098
SDev	.0008	.0001	.0069	.0001	.0001	.038	.008
%RSD	142.4	.0804	349.1	5.938	21.94	1.996	.3690
#1	.0011	.0866	.0068	.0017	-.0007	1.912	2.104
#2	-.0000	.0867	-.0029	.0015	-.0005	1.859	2.093

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	.0001	.0034	-.0023	.0038	.2119	.0012
SDev	.0004	.0007	.0044	.0024	.0022	.0046	.0008
%RSD	107.1	753.2	131.6	102.3	58.13	2.178	72.80
#1	.0001	-.0004	.0065	-.0040	.0053	.2151	.0006
#2	.0007	.0006	.0002	-.0006	.0022	.2086	.0018

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.13	.0033	.0010	.4157	-.0004	.0018	.0000
SDev	.11	.0033	.0015	.0008	.0001	.0001	.0008
%RSD	.1078	98.11	156.0	.2049	25.51	4.211	3624.
#1	99.20	.0056	-.0001	.4163	-.0005	.0018	-.0006
#2	99.05	.0010	.0020	.4151	-.0003	.0017	.0006

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0003	.0003	.0019	.0258	.0006	-.0013
SDev	.0000	.0043	.0002	.0002	.0282	.0001	.0008
%RSD	36.51	1624.	72.59	12.70	109.6	10.50	62.11
#1	.0001	-.0028	.0001	.0017	.0457	.0006	-.0018
#2	.0000	.0033	.0004	.0020	.0058	.0006	-.0007

010078

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0001	.0009
SDev	.0001	.0001	.0006
%RSD	68.69	147.5	60.73
#1	.0001	.0001	.0005
#2	.0002	-.0000	.0013

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1242446	10000	--	--	--	--	--
SDev	1303.198	.0000000	--	--	--	--	--
%RSD	.1048897	.0000000	--	--	--	--	--
#1	1243368	10000	--	--	--	--	--
#2	1241525	10000	--	--	--	--	--

Method: DAILY2 Sample Name: 268846d Operator: 010079
Run Time: 10/25/05 12:11:13
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	.0434	-.0001	.2214	.0000	.0000	.0053
SDev	.0007	.0017	.0025	.0002	.0000	.0000	.0013
%RSD	81.82	3.940	3382.	.0712	73.80	182.4	25.33
#1	.0004	.0422	-.0019	.2215	.0000	-.0000	.0062
#2	.0014	.0446	.0017	.2213	.0001	.0000	.0043

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0340	-.0001	.0004	-.0003	.0003	.0471	1.245
SDev	.0004	.0001	.0003	.0009	.0003	.0067	.009
%RSD	1.075	195.7	83.70	293.0	111.5	14.14	.6951
#1	.0337	-.0002	.0007	-.0009	.0005	.0518	1.251
#2	.0342	.0000	.0002	.0003	.0001	.0423	1.239

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	.0872	.0068	.0015	-.0001	1.819	2.109
SDev	.0006	.0001	.0050	.0000	.0005	.010	.000
%RSD	54.44	.1651	73.01	1.469	388.1	.5685	.0174
#1	.0007	.0873	.0033	.0015	.0002	1.812	2.109
#2	.0015	.0871	.0103	.0016	-.0005	1.827	2.109

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.0081	.0002	-.0014	.0048	.2126	-.0016
SDev	.0005	.0016	.0006	.0012	.0017	.0035	.0001
%RSD	561.7	19.95	316.9	89.01	35.41	1.644	3.270
#1	-.0005	.0070	-.0003	-.0022	.0060	.2151	-.0015
#2	.0003	.0093	.0007	-.0005	.0036	.2101	-.0016

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.02	.0062	.0029	.4179	-.0008	.0040	.0012
SDev	.18	.0023	.0008	.0011	.0010	.0003	.0011
%RSD	.1834	37.29	26.78	.2682	123.7	6.415	92.16
#1	99.15	.0078	.0023	.4171	-.0015	.0042	.0020
#2	98.89	.0046	.0034	.4187	-.0001	.0038	.0004

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	-.0024	.0000	.0020	.0487	.0005	.0002
SDev	.0000	.0000	.0001	.0007	.0193	.0012	.0011
%RSD	32.74	1.146	122.2	36.36	39.62	248.4	573.1
#1	.0001	-.0024	.0000	.0025	.0350	-.0004	-.0006
#2	.0001	-.0024	.0001	.0015	.0623	.0014	.0010

010080

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0003	.0005
SDev	.0000	.0002	.0003
%RSD	194.6	68.63	61.50
#1	-.0000	.0002	.0003
#2	.0000	.0005	.0007

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1241117	10000	--	--	--	--	--
SDev	2211.830	.0000000	--	--	--	--	--
%RSD	.1782129	.0000000	--	--	--	--	--
#1	1242681	10000	--	--	--	--	--
#2	1239553	10000	--	--	--	--	--

Method: DAILY2 Sample Name: 268847 Operator:
Run Time: 10/25/05 12:15:59
Comment:
Mode: CONC Corr. Factor: 1

010081

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	.0404	-.0000	.2536	.0001	.0000	.0002
SDev	.0001	.0026	.0006	.0013	.0001	.0000	.0015
%RSD	45.22	6.550	159400.	.4933	55.25	53.06	908.7
#1	.0002	.0385	.0004	.2527	.0001	.0000	-.0009
#2	.0003	.0422	-.0004	.2545	.0002	.0001	.0012

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0326	.0001	-.0000	.0010	.0010	.0589	1.274
SDev	.0009	.0000	.0002	.0006	.0006	.0063	.004
%RSD	2.670	16.47	502.0	53.35	59.58	10.67	.3288
#1	.0332	.0001	-.0002	.0006	.0006	.0633	1.277
#2	.0320	.0002	.0001	.0014	.0014	.0544	1.271

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	.0989	.0005	.0021	.0002	1.820	2.231
SDev	.0006	.0001	.0042	.0001	.0003	.142	.000
%RSD	380.0	.0493	812.4	4.960	165.4	7.804	.0176
#1	-.0003	.0988	-.0025	.0020	.0004	1.921	2.231
#2	.0006	.0989	.0035	.0022	-.0000	1.720	2.231

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	.0022	-.0028	.0010	.0018	.2064	.0019
SDev	.0008	.0061	.0040	.0021	.0014	.0027	.0004
%RSD	171.9	279.1	141.8	213.8	78.97	1.294	21.98
#1	-.0001	.0065	.0000	-.0005	.0027	.2082	.0022
#2	.0010	-.0021	-.0057	.0025	.0008	.2045	.0016

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.41	-.0003	.0043	.4463	-.0003	.0028	.0010
SDev	.57	.0019	.0002	.0034	.0001	.0005	.0006
%RSD	.5903	722.9	5.190	.7702	29.82	17.26	57.84
#1	97.82	.0011	.0041	.4439	-.0003	.0031	.0015
#2	97.01	-.0016	.0045	.4488	-.0002	.0024	.0006

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0009	.0003	-.0002	.0216	.0010	.0013
SDev	.0000	.0037	.0002	.0020	.0234	.0009	.0016
%RSD	81.44	427.9	63.52	941.0	108.5	90.96	120.2
#1	.0000	-.0017	.0002	.0012	.0050	.0004	.0024
#2	.0001	.0034	.0004	-.0017	.0382	.0017	.0002

010082

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0000	.0012
SDev	.0001	.0000	.0005
%RSD	173.0	52.57	42.55
#1	-.0000	.0000	.0008
#2	.0001	.0001	.0016

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1221028	10000	--	--	--	--	--
SDev	7264.815	.0000000	--	--	--	--	--
%RSD	.5949753	.0000000	--	--	--	--	--
#1	1226165	10000	--	--	--	--	--
#2	1215891	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 268847s Operator:
Run Time: 10/25/05 12:20:44
Comment:
Mode: CONC Corr. Factor: 1

010083

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0497	1.913	1.987	4.307	1.934	.0484	.0042
SDev	.0006	.000	.000	.009	.000	.0001	.0003
%RSD	1.113	.0081	.0225	.2042	.0173	.2200	5.919
#1	.0493	1.913	1.987	4.301	1.935	.0483	.0043
#2	.0501	1.913	1.987	4.314	1.934	.0484	.0040

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	20.40	.0493	.4831	.1926	.2423	1.141	18.96
SDev	.06	.0002	.0003	.0011	.0003	.007	.04
%RSD	.3165	.4554	.0631	.5557	.1387	.6006	.2218
#1	20.35	.0492	.4834	.1918	.2425	1.146	18.99
#2	20.44	.0495	.4829	.1933	.2421	1.136	18.93

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0012	.1242	20.38	.4913	-.0009	20.24	28.96
SDev	.0002	.0001	.02	.0015	.0002	.20	.04
%RSD	18.11	.0630	.1002	.3011	17.30	1.002	.1261
#1	.0010	.1243	20.36	.4902	-.0010	20.10	28.98
#2	.0013	.1242	20.39	.4923	-.0008	20.38	28.93

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4781	.0035	.4907	.4810	.0053	4.356	.4827
SDev	.0019	.0060	.0038	.0032	.0015	.006	.0034
%RSD	.4021	172.3	.7653	.6585	28.30	.1370	.7097
#1	.4768	.0077	.4880	.4787	.0043	4.352	.4802
#2	.4795	-.0008	.4933	.4832	.0064	4.360	.4851

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.11	2.070	2.039	4.506	.4842	2.049	-.0006
SDev	.95	.001	.005	.001	.0034	.004	.0003
%RSD	.9732	.0578	.2645	.0205	.6946	.1949	60.34
#1	98.79	2.069	2.035	4.506	.4818	2.046	-.0003
#2	97.44	2.071	2.043	4.505	.4866	2.052	-.0008

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	-.0177	.0001	2.004	.0331	.4781	.0031
SDev	.0000	.0019	.0002	.002	.0056	.0010	.0010
%RSD	1.278	10.97	209.4	.0982	16.80	.2154	32.37
#1	.0007	-.0190	-.0001	2.005	.0292	.4774	.0038
#2	.0007	-.0163	.0003	2.002	.0370	.4789	.0024

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Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.4867	.0009
SDev	.0001	.0028	.0005
%RSD	86.97	.5828	60.25
#1	-.0002	.4847	.0005
#2	-.0000	.4887	.0012

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1229734	10000	--	--	--	--	--
SDev	12100.72	.0000000	--	--	--	--	--
%RSD	.9840106	.0000000	--	--	--	--	--
#1	1238291	10000	--	--	--	--	--
#2	1221178	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: 268848 Operator: 010085
Run Time: 10/25/05 12:25:30
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	.0589	-.0032	.4185	.0004	.0000	.0008
SDev	.0011	.0023	.0011	.0020	.0001	.0000	.0019
%RSD	122.6	3.868	34.33	.4729	36.55	16.61	230.5
#1	.0001	.0605	-.0024	.4199	.0005	.0000	-.0005
#2	.0018	.0572	-.0040	.4171	.0003	.0000	.0021

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0317	-.0001	-.0000	.0018	.0019	.2253	1.558
SDev	.0004	.0000	.0009	.0010	.0006	.0090	.015
%RSD	1.307	10.32	5947.	58.59	29.51	3.999	.9649
#1	.0315	-.0000	-.0007	.0025	.0023	.2189	1.547
#2	.0320	-.0001	.0006	.0010	.0015	.2317	1.569

Elem	La3988	Li6707	Mg2790	Mn2576	Mo2020	Na3302	Na5889
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	.1440	.0085	.0090	.0003	2.546	2.938
SDev	.0004	.0001	.0013	.0002	.0009	.015	.006
%RSD	90.02	.0864	15.35	2.033	293.9	.5763	.2019
#1	.0002	.1439	.0076	.0091	-.0003	2.535	2.934
#2	.0008	.1441	.0094	.0088	.0009	2.556	2.942

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0019	.0100	-.0028	-.0017	.0032	.1683	.0041
SDev	.0003	.0020	.0034	.0025	.0041	.0026	.0044
%RSD	15.60	19.69	119.8	151.0	129.3	1.564	106.5
#1	.0017	.0086	-.0053	.0001	.0003	.1702	.0072
#2	.0021	.0114	-.0004	-.0035	.0061	.1665	.0010

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.54	.0035	.0004	.6702	-.0021	.0014	.0017
SDev	.78	.0030	.0020	.0032	.0005	.0003	.0008
%RSD	.7971	87.39	521.1	.4803	26.47	22.26	46.24
#1	96.99	.0013	.0018	.6679	-.0017	.0016	.0023
#2	98.09	.0056	-.0010	.6725	-.0024	.0012	.0012

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0034	.0004	.0037	.0324	.0014	.0021
SDev	.0000	.0032	.0002	.0024	.0237	.0014	.0034
%RSD	16.27	94.36	45.75	63.13	73.30	96.07	164.6
#1	.0001	.0057	.0006	.0054	.0156	.0024	-.0003
#2	.0001	.0011	.0003	.0021	.0491	.0005	.0045

010086

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0003	.0003	.0017
SDev	.0001	.0001	.0004
%RSD	51.89	16.48	22.29
#1	.0004	.0003	.0020
#2	.0002	.0004	.0014

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1222518	10000	--	--	--	--	--
SDev	9741.810	.0000000	--	--	--	--	--
%RSD	.7968640	.0000000	--	--	--	--	--
#1	1215630	10000	--	--	--	--	--
#2	1229407	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ccv2 Operator: 010087
Run Time: 10/25/05 12:33:59
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9955	9.769	5.111	4.832	9.943	.9792	5.008
SDev	.0016	.006	.000	.013	.035	.0016	.013
%RSD	.1597	.0569	.0022	.2766	.3540	.1601	.2610
#1	.9966	9.773	5.111	4.822	9.968	.9781	5.018
#2	.9943	9.765	5.112	4.841	9.918	.9803	4.999
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	1.100	11.00	5.500	5.500	11.00	1.100	5.500
Low	.9000	9.000	4.500	4.500	9.000	.9000	4.500

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.98	1.003	5.044	1.957	2.021	9.850	18.77
SDev	.06	.001	.013	.007	.007	.040	.02
%RSD	.2936	.1406	.2677	.3482	.3237	.4111	.1233
#1	19.94	1.002	5.034	1.952	2.025	9.821	18.79
#2	20.02	1.004	5.054	1.961	2.016	9.878	18.75
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	4.893	4.814	20.05	1.010	5.043	28.61	H41.26
SDev	.005	.007	.03	.001	.014	.15	.10
%RSD	.1088	.1542	.1333	.1078	.2743	.5212	.2327
#1	4.897	4.820	20.03	1.009	5.033	28.51	H41.33
#2	4.889	4.809	20.07	1.010	5.053	28.72	H41.19
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	4.931	5.379	4.982	4.918	1.006	1.013	1.002
SDev	.003	.024	.005	.057	.002	.000	.004
%RSD	.0549	.4442	.0950	1.155	.2209	.0199	.4327
#1	4.933	5.396	4.985	4.878	1.005	1.013	.9987
#2	4.929	5.362	4.978	4.958	1.008	1.013	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

010088

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.95	5.281	5.178	5.010	4.939	5.212	4.922
SDev	.00	.033	.073	.002	.036	.038	.008
%RSD	.0039	.6270	1.417	.0470	.7351	.7266	.1560
#1	99.95	5.304	5.126	5.008	4.914	5.186	4.916
#2	99.95	5.258	5.230	5.011	4.965	5.239	4.927
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				5.500	5.500	5.500	5.500
Low				4.500	4.500	4.500	4.500

Elem	Sr4215	Th2837	Ti3349	Tl1908	U_4090	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.054	.9667	4.765	5.200	H1.105	4.927	H1.280
SDev	.006	.0044	.001	.014	.041	.005	.006
%RSD	.1275	.4507	.0113	.2699	3.756	.1104	.4339
#1	5.049	.9698	4.765	5.190	1.075	4.923	H1.277
#2	5.058	.9637	4.764	5.210	H1.134	4.930	H1.284
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC High	LC Pass	LC High
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	5.007	1.008	4.868
SDev	.005	.006	.001
%RSD	.0908	.6050	.0194
#1	5.010	1.004	4.867
#2	5.004	1.013	4.868
Errors	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500
Low	4.500	.9000	4.500

010089

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1252776	10000	--	--	--	--	--
SDev	89.09545	.0000000	--	--	--	--	--
%RSD	.0071118	.0000000	--	--	--	--	--
#1	1252839	10000	--	--	--	--	--
#2	1252713	10000	--	--	--	--	--

Method: DAILY2 Sample Name: ccb2 Operator: 010090
Run Time: 10/25/05 12:40:35
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0010	-.0109	-.0016	.0056	.0000	.0001	-.0033
SDev	.0003	.0028	.0012	.0006	.0001	.0000	.0011
%RSD	25.57	25.96	77.91	10.58	175.1	21.03	32.50
#1	-.0012	-.0129	-.0007	.0060	-.0000	.0001	-.0026
#2	-.0008	-.0089	-.0025	.0052	.0001	.0001	-.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	.0018	-.0001	-.0006	-.0000	-.0001	-.0145	-.0130
SDev	.0029	.0002	.0001	.0002	.0002	.0317	.0335
%RSD	161.6	401.3	24.93	591.9	206.5	218.7	258.2
#1	-.0003	-.0002	-.0007	-.0002	-.0003	-.0369	-.0366
#2	.0038	.0001	-.0005	.0001	.0001	.0079	.0107
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	-.0008	.0001	-.0088	-.0000	-.0002	L-.1373	.0125
SDev	.0004	.0001	.0006	.0000	.0003	.4520	.0077
%RSD	50.28	107.4	6.919	5326.	125.9	329.3	61.55
#1	-.0011	.0000	-.0092	.0000	-.0004	L-.4569	.0071
#2	-.0005	.0002	-.0084	-.0000	-.0000	H.1824	.0180
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	-.0004	.0013	-.0049	.0006	-.0019	.0044	-.0012
SDev	.0010	.0043	.0013	.0015	.0063	.0039	.0009
%RSD	264.4	330.1	25.75	255.3	324.2	88.32	76.00
#1	-.0011	.0043	-.0058	-.0005	L-.0064	.0017	-.0018
#2	.0003	-.0017	-.0040	.0016	.0025	.0072	-.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

010091

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	102.0	-.0041	.0033	.0003	-.0012	.0008	-.0004
SDev	.7	.0012	.0029	.0003	.0014	.0015	.0004
%RSD	.7000	29.07	86.97	115.5	115.0	180.8	94.37
#1	102.5	-.0033	.0013	.0001	-.0022	-.0002	-.0006
#2	101.4	-.0050	.0054	.0005	-.0002	.0019	-.0001
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	-.0009	.0001	.0027	-.0351	-.0000	-.0024
SDev	.0000	.0002	.0000	.0032	.0110	.0000	.0004
%RSD	413.4	25.79	32.43	119.4	31.30	94.78	18.29
#1	-.0000	-.0011	.0001	.0049	-.0428	-.0000	-.0021
#2	.0000	-.0008	.0001	.0004	-.0273	-.0001	-.0027
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	-.0005	-.0000
SDev	.0001	.0000	.0000
%RSD	140.3	3.729	155.5
#1	.0000	-.0005	-.0000
#2	.0001	-.0005	.0000
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010092

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1277822	10000	--	--	--	--	--
SDev	8930.052	.0000000	--	--	--	--	--
%RSD	.6988497	.0000000	--	--	--	--	--
#1	1284136	10000	--	--	--	--	--
#2	1271507	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: CRI Operator: **010093**
Run Time: 10/25/05 12:45:20
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0203	.0952	.0209	.1039	.0206	.0099	.0025
SDev	.0010	.0087	.0016	.0001	.0000	.0000	.0035
%RSD	4.765	9.128	7.461	.0893	.1382	.3215	137.0
#1	.0196	.0891	.0221	.1038	.0206	.0099	.0001
#2	.0210	.1014	.0198	.1040	.0206	.0100	.0050
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	.0104	.1000	.0213	.0498	.1107	.0148
SDev	.0019	.0001	.0011	.0011	.0005	.0233	.0323
%RSD	50.33	.5228	1.065	5.056	1.016	21.07	218.1
#1	.0024	.0103	.0993	.0205	.0495	.0942	-.0080
#2	.0051	.0104	.1008	.0221	.0502	.1272	.0377
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	.0005	.0719	-.0007	.0308	.0211	.1977	.0142
SDev	.0011	.0001	.0062	.0002	.0003	.2035	.0013
%RSD	211.2	.1577	839.1	.5434	1.357	102.9	8.986
#1	-.0003	.0718	-.0051	.0307	.0213	.0538	.0133
#2	.0013	.0720	.0036	.0309	.0209	.3416	.0151
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	.0812	.1107	.0015	.0064	.0032	.0070	.1241
SDev	.0006	.0051	.0014	.0004	.0045	.0067	.0024
%RSD	.7491	4.589	93.75	6.128	138.3	96.38	1.974
#1	.0816	.1143	.0005	.0067	.0001	.0022	.1224
#2	.0808	.1071	.0025	.0061	.0064	.0118	.1259
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

010094

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.88	.0120	.0142	.1120	.0048	.0135	.1025
SDev	2.07	.0011	.0005	.0043	.0002	.0000	.0000
%RSD	2.069	9.191	3.498	3.798	4.458	.2811	.0046
#1	101.3	.0113	.0146	.1090	.0046	.0135	.1025
#2	98.42	.0128	.0138	.1150	.0049	.0135	.1025
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	.0211	.0046	.0193	.0218	.2012	.1005	.0018
SDev	.0000	.0028	.0001	.0036	.0408	.0008	.0032
%RSD	.0306	60.70	.6690	16.34	20.26	.8131	185.8
#1	.0211	.0026	.0192	.0243	.1724	.0999	.0041
#2	.0211	.0066	.0194	.0193	.2300	.1011	-.0005
Errors	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK	LC Pass	NOCHECK
High	.0300		.0300	.0300		.1500	
Low	.0100		.0100	.0100		.0500	

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0003	.0404	.0947
SDev	.0001	.0004	.0005
%RSD	24.40	.8950	.5552
#1	.0002	.0402	.0944
#2	.0003	.0407	.0951
Errors	NOCHECK	LC Pass	NOCHECK
High		.0600	
Low		.0200	

010095

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1251894	10000	--	--	--	--	--
SDev	25836.97	.0000000	--	--	--	--	--
%RSD	2.063832	.0000000	--	--	--	--	--
#1	1270163	10000	--	--	--	--	--
#2	1233624	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: ICSA Operator: **010096**
Run Time: 10/25/05 12:50:08
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0012	504.7	-.0007	-.0134	.0023	.0001	.0003
SDev	.0006	.1	.0021	.0002	.0001	.0000	.0050
%RSD	52.59	.0169	312.9	1.434	3.367	11.10	1456.
#1	-.0016	504.8	.0008	-.0132	.0022	.0001	-.0032
#2	-.0007	504.7	-.0022	-.0135	.0023	.0001	.0039
Errors	NOCHECK	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High		600.0					
Low		400.0					

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	454.0	-.0010	-.0000	-.0005	.0020	189.3	.0027
SDev	.7	.0002	.0001	.0004	.0000	.3	.0093
%RSD	.1625	17.24	242.4	72.46	1.272	.1349	339.6
#1	454.5	-.0009	-.0001	-.0008	.0020	189.5	-.0038
#2	453.4	-.0012	.0000	-.0003	.0020	189.1	.0093
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	.0039	.0006	538.6	-.0033	-.0004	.2512	-.0132
SDev	.0002	.0000	.5	.0002	.0018	.2428	.0055
%RSD	4.904	1.602	.0853	5.797	455.2	96.67	41.79
#1	.0038	.0005	538.2	-.0034	-.0017	.0795	-.0171
#2	.0041	.0006	538.9	-.0031	.0009	.4229	-.0093
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	.0015	-.0026	.0313	-.0262	.0081	.0211	.0060
SDev	.0009	.0064	.0000	.0027	.0031	.0032	.0065
%RSD	59.50	251.3	.0917	10.41	38.70	15.33	109.3
#1	.0009	-.0071	.0314	-.0281	.0059	.0188	.0014
#2	.0022	.0020	.0313	-.0243	.0103	.0234	.0106
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

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

010097

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	90.08	.0079	-.0065	-.0054	-.0070	-.0017	.0011
SDev	.44	.0073	.0020	.0015	.0018	.0011	.0020
%RSD	.4923	92.15	30.41	27.83	25.83	67.66	171.8
#1	89.77	.0131	-.0079	-.0064	-.0083	-.0009	-.0002
#2	90.39	.0028	-.0051	-.0043	-.0057	-.0025	.0025
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	.0313	-.0008	.0090	-.0035	.0008	.0024
SDev	.0000	.0058	.0002	.0038	.0070	.0010	.0042
%RSD	.2348	18.67	28.15	42.34	202.7	130.7	176.7
#1	.0166	.0272	-.0010	.0063	-.0084	.0001	-.0006
#2	.0166	.0354	-.0007	.0117	.0015	.0015	.0054
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High							
Low							

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0074	.0001
SDev	.0001	.0000	.0005
%RSD	151.6	.5727	438.7
#1	-.0000	.0074	-.0002
#2	.0001	.0073	.0005
Errors	NOCHECK	NOCHECK	NOCHECK
High			
Low			

010098

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1129028	10000	--	--	--	--	--
SDev	5487.856	.0000000	--	--	--	--	--
%RSD	.4860688	.0000000	--	--	--	--	--
#1	1125148	10000	--	--	--	--	--
#2	1132909	10000	--	--	--	--	--

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010099

Method: DAILY2 Sample Name: ICSAB Operator:
Run Time: 10/25/05 12:54:53
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.105	505.4	1.047	1.035	.5281	.4900	.0061
SDev	.003	.1	.001	.001	.0020	.0021	.0083
%RSD	.2753	.0133	.1385	.0735	.3778	.4192	135.1
#1	1.108	505.5	1.048	1.034	.5267	.4914	.0119
#2	1.103	505.4	1.046	1.035	.5295	.4885	.0003
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	457.6	.9682	.4891	.4897	.5523	190.1	-.0023
SDev	2.9	.0033	.0024	.0018	.0004	.9	.0439
%RSD	.6341	.3400	.4906	.3613	.0657	.4528	1895.
#1	459.6	.9705	.4908	.4910	.5521	190.7	.0287
#2	455.5	.9659	.4874	.4885	.5526	189.5	-.0334
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	H1.225	542.3	.4959	1.028	.4314	-.0180
SDev	.0006	.000	2.2	.0014	.002	.4994	.0050
%RSD	12.30	.0099	.4003	.2881	.1603	115.8	27.76
#1	.0051	H1.225	543.8	.4969	1.029	.7845	-.0145
#2	.0043	H1.225	540.7	.4948	1.026	.0783	-.0216
Errors	NOCHECK	LC High	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	.9405	1.093	1.029	.9616	.0082	.0116	1.049
SDev	.0052	.002	.003	.0028	.0060	.0067	.009
%RSD	.5547	.1670	.3040	.2894	73.13	57.60	.8960
#1	.9442	1.094	1.031	.9636	.0125	.0069	1.056
#2	.9368	1.091	1.027	.9596	.0040	.0163	1.042
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

010100

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	89.10	1.044	1.032	1.065	.9842	1.036	1.013
SDev	1.19	.009	.008	.008	.0029	.002	.006
%RSD	1.334	.8680	.7402	.7858	.2943	.2000	.5676
#1	88.26	1.037	1.037	1.071	.9862	1.037	1.017
#2	89.95	1.050	1.026	1.059	.9821	1.034	1.009
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	1.060	.0313	.9495	1.001	.9674	.4970	.0086
SDev	.000	.0068	.0004	.012	.0580	.0015	.0072
%RSD	.0161	21.74	.0417	1.213	5.997	.3033	84.22
#1	1.061	.0265	.9498	.9926	1.008	.4981	.0035
#2	1.060	.0361	.9492	1.010	.9264	.4959	.0136
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	.0000	.9506	.9435
SDev	.0001	.0059	.0035
%RSD	685.4	.6184	.3689
#1	-.0001	.9548	.9459
#2	.0001	.9465	.9410
Errors	NOCHECK	LC Pass	NOCHECK
High		1.200	
Low		.8000	

010101

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1116851	10000	--	--	--	--	--
SDev	14934.10	.0000000	--	--	--	--	--
%RSD	1.337161	.0000000	--	--	--	--	--
#1	1106291	10000	--	--	--	--	--
#2	1127411	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: CCV3 Operator:
Run Time: 10/25/05 13:03:18
Comment:
Mode: CONC Corr. Factor: 1

010102

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9928	9.726	5.093	4.817	9.864	.9822	4.991
SDev	.0020	.017	.004	.014	.038	.0027	.022
%RSD	.1970	.1741	.0816	.2904	.3809	.2803	.4335
#1	.9941	9.738	5.096	4.827	9.890	.9803	5.007
#2	.9914	9.714	5.090	4.807	9.837	.9842	4.976
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	20.03	1.005	5.046	1.963	2.012	9.824	18.70
SDev	.13	.004	.009	.004	.010	.046	.06
%RSD	.6422	.4015	.1757	.2244	.5060	.4707	.3055
#1	19.94	1.002	5.040	1.960	2.020	9.792	18.74
#2	20.12	1.008	5.053	1.966	2.005	9.857	18.66
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	4.885	4.810	20.11	1.011	5.054	28.53	H41.17
SDev	.011	.003	.06	.002	.003	.10	.12
%RSD	.2309	.0639	.2826	.2432	.0672	.3643	.2923
#1	4.893	4.812	20.07	1.009	5.057	28.46	H41.25
#2	4.877	4.808	20.15	1.013	5.052	28.60	H41.08
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC High
High	5.500	5.500	22.00	1.100	5.500	33.00	33.00
Low	4.500	4.500	18.00	.9000	4.500	27.00	27.00

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.923	5.353	5.013	4.953	1.006	1.008	.9998
SDev	.007	.019	.061	.053	.004	.004	.0092
%RSD	.1478	.3473	1.207	1.080	.4192	.4443	.9232
#1	4.918	5.366	4.970	4.916	1.003	1.011	1.006
#2	4.928	5.340	5.056	4.991	1.009	1.005	.9932
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

010103

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.26	5.314	5.224	5.000	4.973	5.254	4.938
SDev	2.11	.043	.031	.006	.056	.035	.012
%RSD	2.122	.8016	.5956	.1173	1.123	.6650	.2473
#1	100.7	5.284	5.202	5.004	4.934	5.229	4.929
#2	97.77	5.344	5.246	4.995	5.013	5.279	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	5.043	.9683	4.758	5.184	H1.113	4.926	H1.290
SDev	.019	.0010	.014	.003	.020	.003	.004
%RSD	.3791	.1049	.2864	.0652	1.797	.0549	.3388
#1	5.056	.9691	4.768	5.186	1.099	4.924	H1.287
#2	5.029	.9676	4.749	5.182	H1.127	4.928	H1.293
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC High	LC Pass	LC High
High	5.500	1.100	5.500	5.500	1.100	5.500	1.100
Low	4.500	.9000	4.500	4.500	.9000	4.500	.9000

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	4.991	1.016	4.889
SDev	.019	.010	.016
%RSD	.3809	.9429	.3236
#1	5.005	1.009	4.901
#2	4.978	1.023	4.878
Errors	LC Pass	LC Pass	LC Pass
High	5.500	1.100	5.500
Low	4.500	.9000	4.500

010104

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1244034	10000	--	--	--	--	--
SDev	26391.35	.0000000	--	--	--	--	--
%RSD	2.121434	.0000000	--	--	--	--	--
#1	1262695	10000	--	--	--	--	--
#2	1225372	10000	--	--	--	--	--

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Method: DAILY2 Sample Name: CCB3 Operator: 010105
Run Time: 10/25/05 13:11:45
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	-.0086	.0005	.0052	.0001	.0001	.0009
SDev	.0003	.0020	.0010	.0011	.0001	.0000	.0024
%RSD	360.5	23.16	229.5	21.67	129.9	18.47	260.1
#1	-.0003	-.0072	.0012	.0044	.0000	.0001	-.0008
#2	.0001	-.0100	-.0003	.0060	.0002	.0001	.0026
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0500	.0050	.0500	.0050	.0050	.0100
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0100

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	.0000	-.0002	-.0002	.0004	.0075	.0132
SDev	.0002	.0000	.0004	.0014	.0008	.0045	.0148
%RSD	10.53	112.6	202.6	666.7	214.6	60.06	112.4
#1	.0016	.0001	-.0005	-.0012	-.0002	.0107	.0027
#2	.0014	.0000	.0001	.0008	.0010	.0043	.0236
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	.0002	-.0021	.0000	-.0000	H.2445	.0170
SDev	.0001	.0001	.0036	.0001	.0000	.0220	.0039
%RSD	251.1	29.26	177.4	469.7	6.948	9.012	22.81
#1	.0001	.0001	-.0046	-.0001	-.0000	H.2600	.0198
#2	-.0000	.0002	.0005	.0001	-.0001	H.2289	.0143
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	.0000	.0014	.0020	-.0040	.0017	H.0132	-.0006
SDev	.0008	.0050	.0024	.0010	.0021	.0017	.0035
%RSD	2093.	349.1	123.9	24.22	126.1	12.64	541.8
#1	-.0005	.0049	.0037	-.0047	.0002	H.0120	-.0031
#2	.0006	-.0021	.0002	-.0033	.0032	H.0143	.0018
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

010106

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.2	.0044	.0035	.0032	-.0020	.0038	-.0000
SDev	1.8	.0010	.0006	.0004	.0002	.0007	.0019
%RSD	1.745	23.65	16.62	11.40	8.019	19.27	11480.
#1	102.4	.0036	.0031	.0029	-.0019	.0033	-.0013
#2	99.95	.0051	.0040	.0035	-.0021	.0043	.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	.0000	.0002	.0001	.0047	.0111	.0006	-.0012
SDev	.0000	.0011	.0003	.0036	.0115	.0008	.0003
%RSD	104.1	498.1	299.1	76.29	103.8	140.0	24.15
#1	.0000	-.0006	-.0001	.0022	.0030	.0000	-.0015
#2	.0000	.0010	.0003	.0072	.0192	.0011	-.0010
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	-.0003	.0007
SDev	.0002	.0001	.0008
%RSD	205.3	42.40	118.4
#1	-.0000	-.0004	.0001
#2	.0002	-.0002	.0013
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

010107

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1268478	10000	--	--	--	--	--
SDev	22114.76	.0000000	--	--	--	--	--
%RSD	1.743409	.0000000	--	--	--	--	--
#1	1284116	10000	--	--	--	--	--
#2	1252841	10000	--	--	--	--	--

010108

#	Sample Name	File	Method	Date	Time	OpID	Type	Mode
1	blk	Y05OCT	DAILY2	10/25/05	10:37		X	IR
2	clp_std4	Y05OCT	DAILY2	10/25/05	10:41		X	IR
3	clp_std1	Y05OCT	DAILY2	10/25/05	10:46		X	IR
4	clp_std5	Y05OCT	DAILY2	10/25/05	10:49		X	IR
5	clp_std2	Y05OCT	DAILY2	10/25/05	10:53		X	IR
6	clp_std3	Y05OCT	DAILY2	10/25/05	10:56		X	IR
7	clp_std6	Y05OCT	DAILY2	10/25/05	11:00		X	IR
8	icv/ccv	Y05OCT	DAILY2	10/25/05	11:06		Q	CONC
9	icb/ccb	Y05OCT	DAILY2	10/25/05	11:13		B	CONC
10	CRI	Y05OCT	DAILY2	10/25/05	11:17		Q	CONC
11	ICSA	Y05OCT	DAILY2	10/25/05	11:22		Q	CONC
12	ICSAB	Y05OCT	DAILY2	10/25/05	11:27		Q	CONC
13	ICV/CCV	Y05OCT	DAILY2	10/25/05	11:35		Q	CONC
14	icb/ccb	Y05OCT	DAILY2	10/25/05	11:42		B	CONC
15	pbw-K25H1 pg61-187	Y05OCT	DAILY2	10/25/05	11:47		S	CONC
16	lcsw-K25H1	Y05OCT	DAILY2	10/25/05	11:52		S	CONC
17	268844	Y05OCT	DAILY2	10/25/05	11:56		S	CONC
18	268845	Y05OCT	DAILY2	10/25/05	12:01		S	CONC
19	268846	Y05OCT	DAILY2	10/25/05	12:06		S	CONC
20	268846d	Y05OCT	DAILY2	10/25/05	12:11		S	CONC
21	268847	Y05OCT	DAILY2	10/25/05	12:15		S	CONC
22	268847s	Y05OCT	DAILY2	10/25/05	12:20		S	CONC
23	268848	Y05OCT	DAILY2	10/25/05	12:25		S	CONC
24	ccv2	Y05OCT	DAILY2	10/25/05	12:33		S	CONC
25	ccb2	Y05OCT	DAILY2	10/25/05	12:40		S	CONC
26	CRI	Y05OCT	DAILY2	10/25/05	12:45		S	CONC
27	ICSA	Y05OCT	DAILY2	10/25/05	12:50		S	CONC
28	ICSAB	Y05OCT	DAILY2	10/25/05	12:54		S	CONC
29	CCV3	Y05OCT	DAILY2	10/25/05	13:03		S	CONC
30	CCB3	Y05OCT	DAILY2	10/25/05	13:11		S	CONC

010109

#	Sample Name	B_2496	Fe2714	S_1820	Si2881	Sc3613	*Sc
1	blk	.00001	0	.0003	.00149	125.35	1253321
2	clp_std4						1278658
3	clp_std1		.10215				1254078
4	clp_std5	.17402			.17086		1276696
5	clp_std2						1295295
6	clp_std3						1265536
7	clp_std6			.03716			1287020
8	icv/ccv	4.829	9.911	1.001	4.998	102.3	1282306
9	icb/ccb	.0062	-.0008	.0098	.0023	101.5	1272638
10	CRI	.1037	.1167	.0097	.1134	101.7	1274142
11	ICSA	-.0132	189.9	.0143	-.0036	91.18	1142882
12	ICSAB	1.036	189.7	.0129	1.063	91.04	1141136
13	ICV/CCV	4.829	9.860	1.016	5.009	102.1	1279440
14	icb/ccb	.0067	.0226	H.0107	.0028	100.2	1255755
15	pbw-K25H1 pg61-187	.0039	.0047	H.0168	H.0277	99.95	1252809
16	lcsw-K25H1	4.062	1.102	4.081	4.067	97.83	1226302
17	268844	.0874	.0415	.2519	.2395	99.16	1242904
18	268845	.1106	.0326	.2365	.2656	98.66	1236552
19	268846	.2215	.0548	.2119	.4157	99.13	1242446
20	268846d	.2214	.0471	.2126	.4179	99.02	1241117
21	268847	.2536	.0589	.2064	.4463	97.41	1221028
22	268847s	4.307	1.141	4.356	4.506	98.11	1229734
23	268848	.4185	.2253	.1683	.6702	97.54	1222518
24	ccv2	4.832	9.850	1.013	5.010	99.95	1252776
25	ccb2	.0056	-.0145	.0044	.0003	102.0	1277822
26	CRI	.1039	.1107	.0070	.1120	99.88	1251894
27	ICSA	-.0134	189.3	.0211	-.0054	90.08	1129028
28	ICSAB	1.035	190.1	.0116	1.065	89.10	1116851
29	CCV3	4.817	9.824	1.008	5.000	99.26	1244034
30	CCB3	.0052	.0075	H.0132	.0032	101.2	1268478

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 051021-5
SRR: 28178
SDG: 268844
CASE: CNWRA
VTSR: October 21, 2005
PROJECT#: 06002.01.222

Certificates of Analysis

010111

Fisher Scientific

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

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.

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 8/29/05
DATE EXPIRED: 9/8/2015
DATE OPENED: 9/8/05
INORG: 5368-5373 PO: 652021

010112

Fisher Scientific

TRACEMETAL GRADE HYDROCHLORIC ACID CERTIFICATE OF ANALYSIS

B McKelvey

Dr. B. McKelvey
QA/QC Manager

CATALOG NUMBER: A508
LOT NUMBER: 4105031
RELEASE DATE: July, 2005
EXPIRY DATE: July, 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

Analyte	Maximum Specification	Actual Value (in ppm)	Analyte	Maximum Specification	Actual Value (in ppm)
Bromide (Br)	10 ppm	<10	Total Sulphur (S)	0.3 ppm	<0.3
Total Phosphorus (P)	0.01 ppm	<0.01	Free Chlorine (Cl2)	0.5 ppm	<0.5

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.

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 9/9/05
DATE EXPIRED: 9/15/2005
DATE OPENED: 9/15/05 (B)
INORG: 5321-5399 PO: F526094

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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 **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: 3/1/06
DATE OPENED: 3/31/05
INORG: 5175 PO: 3/1/06

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

010115

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'	$^{16}O_2{}^{13}CH$, $^{29}Si^{16}O$, $^{90}Zr^{+2}$

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)
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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)

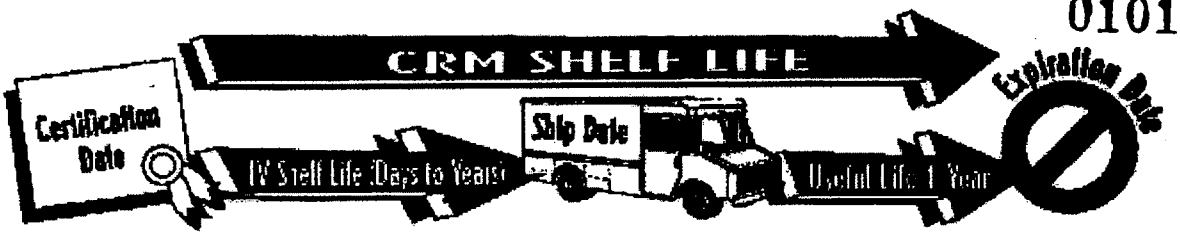
10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

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

010116



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 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 Boron in H_2O**

Catalog Number:	CGB1-1, CGB1-2, and CGB1-5
Lot Number:	**X-B02047**
Starting Material:	H3BO3
Starting Material Purity (%):	99.999998
Starting Material Lot No	OV0133
Matrix:	H_2O

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 2/28/05
DATE EXPIRED: 3/1/2006 DR
DATE OPENED: 2/28/05
INORG: 5047 PO: F55148

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 1005 ± 2 µg/mL

Certified Density: 0.999 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

Certified Value $(\bar{x}) = \frac{\sum x_i}{n}$

Uncertainty $(\pm) = \frac{2[(\sum s)^2]^{1/2}}{(n)^{1/2}}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements
$\sum S$ = The summation of all significant estimated errors. (Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 **TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS**

☐ "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

☐ This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **1005 ± 2 µg/mL (Avg 2 runs)**
ICP Assay NIST SRM 3107 Lot Number: 991907

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4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98. **010118**

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

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Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 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^0); Organic Matrices (dry ash mixed with Na_2CO_3 in Pt^0 at 450°C then increase heat to 1000°C to fuse; or perform a Na_2O_2 fusion in a Ni^0 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

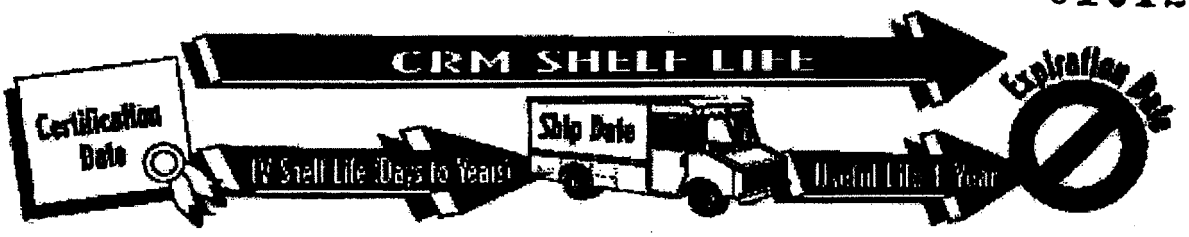
10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

5047
3 of 4

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010120



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

5047
4 of 4

inorganic ventures / iv labs

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e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

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certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 DESCRIPTION OF CRM

Custom-Grade **10000 µg/mL Iron in 4.8% (abs) HNO_3**

Catalog Number:	CGFE10-1, CGFE10-2, and CGFE10-5
Lot Number:	**X-FE03041**
Starting Material:	Fe metal
Starting Material Purity (%):	99.998667
Starting Material Lot No	23387
Matrix:	4.8% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 2/28/05
DATE EXPIRED: 3/1/2006 DR
DATE OPENED: 2/28/05
INORG: 5048 PO: F55148

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 10,041 ± 21 µg/mL

Certified Density: 1.061 g/mL (measured at 22° C)

The Certified Value is based upon the most precise method used to analyze this CRM. The following equations are used in the calculation of the certified value and the uncertainty:

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** **10,041 ± 21 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

Assay Method #2 **10,017 ± 40 µg/mL**
ICP Assay NIST SRM 3126a Lot Number: 000606

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4.2 **BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.

010122

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

010123

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 55.847; +3; 6; $Fe(H_2O)_6^{3+}$

Chemical Compatibility - Stable in HCl, HNO_3, H_2SO_4, HF and H_3PO_4. Avoid basic media. Stable with most metals and inorganic anions in acidic media.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO_3 / LDPE container.

Fe Containing Samples (Preparation and Solution) - Metal (Soluble in HCl); Oxides (If the oxide has been at a high temperature then Na_2CO_3 fusion in Pt° followed by HCl dissolution otherwise dissolve in dilute HCl); Ores (See Oxides above using only the fusion approach).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES	238.204 nm	0.005 / 0.001 µg/mL	1	ion	Ru, Co
ICP-OES	239.562 nm	0.005 / 0.001 µg/mL	1	ion	Co, W, Cr
ICP-OES	259.940 nm	0.006 / 0.001 µg/mL	1	ion	Hf, Nb
ICP-MS	56 amu	970 ppt	n/a	M⁺	$^{40}Ar^{15}N^{1}H$, $^{40}Ar^{16}O$, $^{38}Ar^{17}O^{1}H$, $^{38}Ar^{18}O$, $^{37}Cl^{18}O^{1}H$, $^{40}Ca^{16}O$

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Saftey Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105
Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)
Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration" - Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

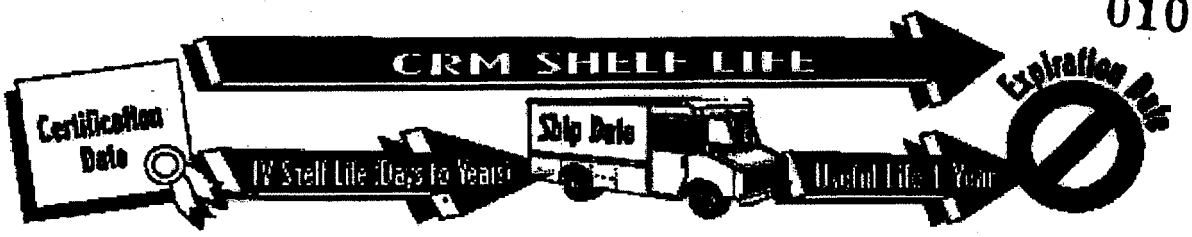
10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

10.6 MIL-STD-45662A (Obsolete/Observed)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010124



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 A 2006

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Nick Maida, QA Administrator	Nicholas Maida
Certificate Approved By:	Katalin Le, QC Manager	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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inorganic ventures / iv labs

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certificate of analysis

1.0 **Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer: Certificate #883-02.** The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statisical Principles."

2.0 DESCRIPTION OF CRM

Custom-Grade **1000 µg/mL 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: 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. 010126

4.3 **THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001.Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.

4.4 **GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al		0.02730	M	Dy	<	0.01358	O	Li	<	0.00009	M	Pr	<	0.00068	M	Te	<	0.06791
M	Sb	<	0.00113	M	Er	<	0.01132	M	Lu	<	0.00091	M	Re	<	0.00226	M	Tb	<	0.00068
M	As	<	0.02264	M	Eu	<	0.00679	O	Mg	<	0.04991	M	Rh	<	0.00226	M	Tl	<	0.00226
M	Ba	<	0.02264	M	Gd	<	0.00226	M	Mn	<	0.00906	M	Rb	<	0.00226	M	Th	<	0.00226
O	Be	<	0.00091	M	Ga	<	0.00226	O	Hg	<	0.04991	M	Ru	<	0.00453	M	Tm	<	0.00091
M	Bi	<	0.00091	M	Ge	<	0.01358	M	Mo	<	0.00453	M	Sm	<	0.00226	M	Sn	<	0.01132
O	B		0.02409	M	Au	<	0.00679	M	Nd	<	0.00453	O	Sc	<	0.00091	O	Ti		0.01325
M	Cd	<	0.00679	M	Hf	<	0.00453	O	Ni	<	0.01044	M	Se	<	0.01811	M	W	<	0.02264
O	Ca		0.00135	M	Ho	<	0.00113	M	Nb	<	0.00113	s	Si			M	U	<	0.00453
M	Ce	<	0.01132	M	In	<	0.02264	n	Os			M	Ag	<	0.00453	O	V	<	0.00408
M	Cs	<	0.00068	M	Ir	<	0.01132	M	Pd	<	0.01132	O	Na		0.02008	M	Yb	<	0.00226
O	Cr	<	0.00681	O	Fe	<	0.00499	O	P	<	0.02269	O	Sr	<	0.00032	M	Y	<	0.09055
M	Co	<	0.00679	M	La	<	0.00113	M	Pt	<	0.00453	O	S	<	0.11342	M	Zn	<	0.04528
O	Cu	<	0.00454	M	Pb	<	0.00679	O	K	<	0.00771	M	Ta		0.00200	M	Zr	<	0.01132

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact IV Technical Staff

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7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

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Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 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[a] with Na_2CO_3); Geological Samples (Fuse in Pt[a] 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[a] 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 ≤ 50ppm.)
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)

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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: 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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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 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: 4917 PO: F55102 WS 12/15/04

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:

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n}$$

$$\text{Uncertainty } (\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$$

$(\bar{x})$ = 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** **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.

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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

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Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 32.066; +6; 6; (O=)$_3$ 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^+	$^{16}O_2$, $^{16}N^{16}O$, $^{14}N^{18}O$, $^{16}N^{17}O$, $^{16}N^{17}O^1H$, $^{14}N^{18}O^1H$

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

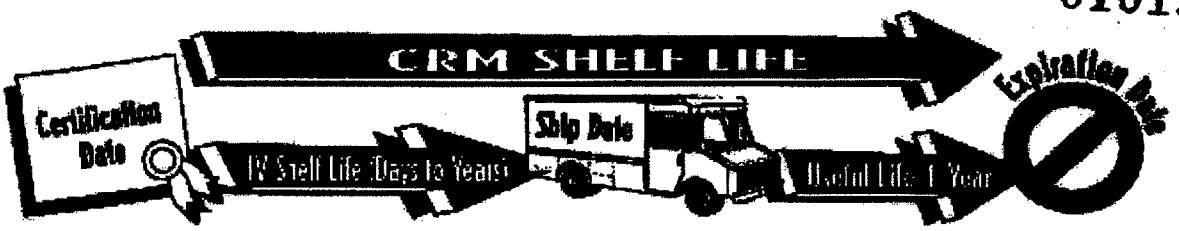
10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

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 105 for KE
DATE OPENED: 12/9/04
INORG: 4917 PO: F55102

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010132



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

SPEXertificate ™

010133

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

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

This Certified Reference Material has been prepared and certified under an ISO 9001 system consistent with the following guides:

010134

Guide To The Expression Of Uncertainty In Measurement 1995
EURACHEM/CITAC Guide: Quantifying Uncertainty in Analytical Measurement – Second Edition
ASTM Guide D6362-98
ISO Guide 34: Quality system guidelines for the production of reference materials.
ISO Guide 17025: Certification of reference materials, general and statistical principles
ISO Guide 31: Contents of certificates of reference materials
NIST Technical Note 1297
ILAC-G12-2000: Guidelines for the requirements for the competence of reference materials producers
ISO/REMCO N280

Material Source:

All analytes and matrix materials are obtained and verified by SPEX CertiPrep from pre-qualified vendors as per ISO 9000 guidelines. Vendor identifications are proprietary, however sources of all materials used in the preparation and testing of SPEX CertiPrep CRMs are tracked and documented. For further information contact CRM Sales.

Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilution is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come in contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles, and Class A glassware have been used in all preparations.

Homogeneity:

The Homogeneity of the CRM has been confirmed by procedures consistent with ISO guide 17025, ISO/REMCO N280 and ASTM D6362-98 Appendix X2. Random, replicate samples of the final, packaged material have been analyzed for the certified values by procedures consistent with the intended use of the CRM.

The mathematical expression $k_s = s^2 m$ is employed to determine the sampling size

s = relative standard deviation in % for one component of the sample. (ie. The sub-sampling uncertainty)

m = the sub-sampling mass

k_s = mass of sub-sample necessary to ensure a relative sub-sampling error of 1% (68% confidence level) in a single determination

Statistical estimator and Confidence limits:

The certified value 'x' listed on the reverse of this document is at the 95% level of confidence and can be expressed as

X = x+/-U where X =True value (Labeled Value), U= Expanded uncertainty

$U = ku_c$ where k=2 is the coverage factor at the 95% confidence level

u_c is obtained by combining the individual element standard uncertainty components u_i and $u_c = \sqrt{\Sigma u_i^2}$

Certification Traveler Report:

All certified values reported were derived from Traveler Report (Spex CertiPrep's traceability documentation) identified by the lot number of this CRM. For further information contact CRM Sales.

Legal Notice:

SPEX CertiPrep reference materials are not for any cosmetic, drug or household application and are to be used only by qualified individuals who are trained in appropriate procedures. No claims against SPEX CertiPrep, Inc. of any kind whatsoever, whether based on breach of warranty, alleged negligence, or otherwise, with respect to this RM shall be greater than the purchase price. In no event shall SPEX CertiPrep, Inc. be liable for any loss of profits or any incidental, special, or consequential damages.

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Certificate of Reference Material

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 2/26/05
DATE EXPIRED: 3/28/2006 DR
DATE OPENED: 3/28/05
INORG: 5038 PO: F55148

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. Kocherlakota

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Report of Certification

010136

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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203 Norcross Avenue • Metuchen, NJ 08840 USA

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 7/7/05
DATE EXPIRED: 7/15/2006 DK
DATE OPENED: 7/7/05
INORG: 5296 PO: 55203

SPEXertificate™ 010137

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. Kochetkova

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Certificate of Reference Material

010138

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 12/03/04
DATE EXPIRED: 11/30/2005
DATE OPENED: 12/03/04
INORG: 4909 PO: F55102

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

010139

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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010140

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 12/09/04
DATE EXPIRED: 11/30/2005 VX
DATE OPENED: 12/09/04
INORG: 4911 PO: F5510

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. Kocherakota

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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

010141

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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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

010142

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 12/02/04
DATE EXPIRED: 11/30/2005 MS
DATE OPENED: 12/02/04
INORG: 4910 PO: F55102

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

010143

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

SPEXertificate™

Certificate of Reference Material

010144

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 3/4/05
DATE EXPIRED: 3/15/06
DATE OPENED: 3/15/05
INORG: 5634 PO: F55154

Catalog Number: CRDL-1 **Lot No.:** 27-175AS
Description: **Contract Required Detection Limits Standard**
Matrix: 5% Nitric Acid/Tr-TART- 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
Sb	120	119.77	3102a	As	20	20.01	3103a
Co	100	99.69	3113	Cr	20	19.94	3112a
V	100	99.90	3165	TL	20	19.95	3158
Ni	80	80.05	3136	Be	10	9.98	3105a
Cu	50	50.71	3114	Cd	10	9.99	3108
Zn	40	39.69	3168a	Se	10	9.98	3149
Mn	30	30.05	3132	Pb	6	5.99	3128
Ag	20	19.87	3151				

Spex Reference Multi: Lot #5-242VY, 17-87AS, 4-29BD-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: MAR. -- 2005 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:

010145

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

SPEX CertiPrep
203 Norcross Avenue • Metuchen, NJ 08840 USA

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

010146

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: F5523

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.

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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

2 of 4
5311

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

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Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 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)

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010149

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 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

010150

SPEXertificate™

Certificate of Reference Material

Catalog Number: INT-A1 **Lot No.:** 29-98AS
Description: **Interferents A**
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.

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 7/20/05
DATE EXPIRED: 7/15/06
DATE OPENED: 7/20/05
INORG: 5300 PO: 55212

Instrumental Analysis by ICP Spectrometer:

Element	Labeled (mg/L)	Measured (mg/L)	NIST SRM	Element	Labeled (mg/L)	Measured (mg/L)	NIST SRM
Al	5,000	4,978	3101a	Mg	5,000	4,977	3131a
Ca	5,000	4,975	3109a	Fe	2,000	1,993	3126a

Spex Reference Multi: Lot #20-167AS, 13-74AS, 15-97AS, 18-59AS-REF

Trace Metallic Impurities in the Actual Solution, in PPB, via ICPMS Analysis:

Ag	<200.0	Cs	<0.20	In	0.10	Ni	12.00	Sc	<6.00	Tl	<0.50
As	<4.00	Cu	2.00	Ir	<0.70	P	450.00	Se	<30.00	Tm	0.10
Au	<0.70	Dy	<0.20	K	750.0	Pb	7.00	Si	<1000.00	U	<0.40
B	<10.00	Er	<0.06	La	50.00	Pd	<0.30	Sm	<0.20	V	<0.70
Ba	10.00	Eu	0.40	Li	<5.00	Pr	0.02	Sn	<0.30	W	<0.90
Be	<7.00	Ga	<0.30	Lu	<0.02	Pt	<0.30	Sr	100.00	Y	5.00
Bi	<0.20	Gd	<0.20	Mn	50.00	Rb	<0.10	Ta	<0.20	Yb	<0.30
Cd	<0.30	Ge	<10.00	Mo	0.60	Re	<0.30	Tb	<0.06	Zn	60.00
Ce	6.00	Hf	<0.10	Na	60.00	Rh	0.80	Te	<2.00	Zr	2.00
Co	10.00	Hg	<6.00	Nb	<0.09	Ru	<0.40	Th	<5.00		
Cr	<8.00	Ho	<1.00	Nd	<0.20	Sb	<1.00	Ti	<5.00		

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: JUL. -- -- 2005 Certifying Officer: N. Kocherlakota

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010151

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 051021-5
SRR: 28178
SDG: 268844
CASE: CNWRA
VTSR: October 21, 2005
PROJECT#: 06002.01.222

Pipette Calibrations

Book/Page 04 025

010152

SwRI - Div. 01, Inorganic Labs' Fixed Volume Pipette Verification Log

Balance #: 12 Thermometer #: G011 diH20 Temperature (°C): 21°C

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
Lab30	1000	.9964	.9968	.9963
TMA1	1000	1.0022	1.0055	1.0045
TMA2	1000	1.0046	1.0047	1.0021
TMA3	1000	not	Found	
TMA6	1000	1.0076	1.0042	1.0037
TMB1	900	.8959	.9013	.8910
TMC1	800	.7955	.7947	.7920
TMDD1	750	.7509	.7522	.7502
TMD1	700	.7024	.7006	.6992
TMD2	700	.7029	.7025	.6997
TME1	600	.5935	.5896	.5925
TMF2	500	.5010	.4996	.4999
TMF5	500	.5022	.5036	.5039
ICF1	500	.4973	.4960	.4947
L30-500	500	0.5078	.5071	.5064
TMG3	400	.3952	.3964	.3948
TMH1	300	out	of	service
TMH2	300	.3000	.3025	KE ~~.3~~ .2981
TMJ1	250	.2490	.2499	.2490
TMJ2	250	.2491	KE ~~.48~~ .2483	.2479
TMJ3	250	.2500	.2498	.2497
TMK2	200	.1999	.2018	.2010
TML1	150	.1489	.1499	.1499
TMM1	120	.1186	.1190	.1196
TMN3	100	~~oof~~ KE out	of KE	service
ICN1	100 *	KE 9/21/05 ~~.0974~~ .0998	~~.0959~~ KE .0982	~~.0960~~ KE ~~.09~~ .1001
TMQ1	80	.0800	.0797	.0799
TMR1	70	out	of	service
TMS1	60	"	"	"
LAB-30A	50	"	"	"
TMU1	40	.0403	.0398	.0396
TMU2	40	.0397	.0395	.0393
TMV1	30	.0297	.0297	.0294
L30-20	20	.0200	.0200	.0199
TMW1	25	.0249	.0249	.0247
TMY1	15	out	of	service

* tip was loose. KE 9/21/05

Analyst: [signature] Date: 9-21-05

Reviewed by: [signature] Date: 9-21-05

Book/Page: 04 026

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SwRI – Div. 01, Inorganic Labs' Fixed Volume Pipette Verification Log

(Space provide for Inorganic Laboratories' Fixed Volume Pipette Verification Spreadsheet)

KE 9/21/05

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	0.9964	0.9968	0.9963	0.996	99.65
TMA1	1000	1.0022	1.0055	1.0045	1.004	100.41
TMA2	1000	1.0046	1.0047	1.0021	1.004	100.38
TMA3	1000	not	found			
TMA6	1000	1.0076	1.0042	1.0037	1.005	100.52
TMB1	900	0.8959	0.9013	0.8910	0.896	99.56
TMC1	800	0.7955	0.7947	0.7920	0.794	99.26
TMDD1	750	0.7509	0.7522	0.7502	0.751	100.15
TMD1	700	0.7024	0.7006	0.6992	0.701	100.10
TMD2	700	0.7029	0.7025	0.6997	0.702	100.24
TME1	600	0.5935	0.5896	0.5925	0.592	98.64
TMF2	500	0.5010	0.4996	0.4999	0.500	100.03
TMF5	500	0.5022	0.5036	0.5039	0.503	100.65
ICF1	500	0.4973	0.4960	0.4947	0.496	99.20
L30-500	500	0.5078	0.5071	0.5064	0.507	101.42
TMG3	400	0.3952	0.3964	0.3948	0.395	98.87
TMH1	300	Out	of	service		
TMH2	300	0.3000	0.3025	0.2981	0.300	100.07
TMJ1	250	0.2490	0.2499	0.2490	0.249	99.72
TMJ2	250	0.2491	0.2483	0.2479	0.248	99.37
TMJ3	250	0.2500	0.2498	0.2497	0.250	99.93
TMK2	200	0.1999	0.2018	0.2010	0.201	100.45
TML1	150	0.1489	0.1499	0.1499	0.150	99.71
TMM1	120	0.1186	0.1190	0.1196	0.119	99.22
TMN3	100	out	of	service		
ICN1	100	0.0998	0.0982	0.1001	0.099	99.37
TMQ1	80	0.0800	0.0797	0.0799	0.080	99.83
TMR1	70	Out	of	service		
TMS1	60	Out	of	service		
LAB-30A	50	out	of	service		
TMU1	40	0.0403	0.0398	0.0396	0.040	99.75
TMU2	40	0.0397	0.0395	0.0393	0.040	98.75
TMV1	30	0.0297	0.0297	0.0294	0.030	98.67
L30-20	20	0.0200	0.0200	0.0199	0.020	99.83
TMW1	25	0.0249	0.0249	0.0247	0.025	99.33
TMY1	15	Out	of	service		

FRM-246 (Rev 1/Mar 03)

Book/page: 08 029

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

010154

mf 10/5/05

SwRI – Div. 01, Inorganic Laboratory Adjustable Pipette Verification Spreadsheet

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	20					
ADJ200-A	100					
	200					
	20					
ADJ200-C	100					
	200					
	20					
ADJ200-D	100					
	200					
	20	0.0205	0.0203	0.0202	0.0203	101.67
ADJ200-G	100	0.0988	0.0983	0.0990	0.0987	98.70
	200	0.1978	0.1980	0.1979	0.1979	98.95
	20	0.0204	0.0203	0.0201	0.0203	101.33
ADJ200-H	100	0.0997	0.0997	0.0993	0.0996	99.57
	200	0.1998	0.1999	0.1980	0.1992	99.62
	20	0.0202	0.0203	0.0203	0.0203	101.33
ADJ200-J	100	0.0989	0.0997	0.0990	0.0992	99.20
	200	0.1988	0.1996	0.1979	0.1988	99.38
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200-K	100					
	200					

FRM-247a (Rev 3/Oct 03)

Book/page: 08 030

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010155

Balance #: 12 Thermometer #: G011 diH20 Temperature (° C) 21.0

20 µL – 200 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	20			
ADJ200-A	100			
	200			
	20			
ADJ200-C	100			
	200			
	20			
ADJ200-D	100			
	200			
	20	0.0205	0.0203	0.0202
ADJ200-G	100	0.0988	0.0983	0.0990
	200	0.1978	0.1980	0.1979
	20	0.0204	0.0203	0.0201
ADJ200-H	100	0.0997	0.0997	0.0993
	200	0.1998	0.1999	0.1980
	20	0.0202	0.0203	0.0203
ADJ200-J *	100	0.0989	0.0997	0.0990
	200	0.1988	0.1996	0.1979
	20			
ADJ200-K	100			
	200			
	20			
ADJ200	100			
	200			

mf 10/4/05

mf 10/4/05

* This pipette was verified on 10/5/05. mf
* Should not have cross-out RJS 11/1/05

Analyst: [signature] Date: 10/4/05

Reviewed by: [signature] Date: 10-14-05

Book/page: 08 031

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

010156

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	0.0199	0.0200	0.0200	0.020	99.83
ADJ200-A	100	0.0993	0.0993	0.0993	0.099	99.30
	200	0.1990	0.1998	0.1995	0.199	99.72
	20					
ADJ200-C	100	OUT	OF	SERVICE		
	200					
	20	0.0199	0.0203	0.0202	0.020	100.67
ADJ200-D	100	0.0984	0.0989	0.0988	0.099	98.70
	200	0.1989	0.1989	0.1980	0.199	99.30
	20					
ADJ200-G	100					
	200					
	20					
ADJ200-H	100					
	200					
	20					
ADJ200-J	100					
	200					
	20					
ADJ200-K	100	NOT	IN USE-	GLOVEBOX		
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					

FRM-247a (Rev 4/Apr 04)

Book/page: 08 032

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010157

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	.0199	.0200	.0200
ADJ200-A	100	.0993	.0993	.0993
	200	.1990	.1998	.1995
	20			
ADJ200-C	100	OUT	OF	SERVICE
	200			
	20	.0199	.0203	.0202
ADJ200-D	100	.0984	.0989	.0988
	200	.1989	.1999	.1980
	20			
ADJ200-G	100			
	200			
	20			
ADJ200-H	100		10-20-05	
	200			
	20			
ADJ200-J	100			
	200			
	20			
ADJ200-K	100	NOT	IN USE –	GLOVEBOX
	200			
	20			
ADJ200	100		10-20-05	
	200			

Analyst: John Wilber Date: 10-20-05

Reviewed by: Lorena Ortiz Date: 11/2/05

Book/page: 08 089

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

010158

10/5/05

SwRI – Div. 01, Inorganic Laboratory Adjustable Pipette Verification Spreadsheet

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	100				0.000	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	0.1016	0.1007	0.101	101.20
ADJ1000-G	500	0.4938	0.4962	0.4947	0.495	98.98
	1000	0.9902	0.9906	0.9891	0.990	99.00
	100	0.1007	0.1005	0.1003	0.101	100.50
ADJ1000-H	500	0.4919	0.4954	0.4969	0.495	98.95
	1000	0.9924	0.9960	0.9926	0.994	99.37
	100	0.0996	0.0990	0.0998	0.099	99.47
ADJ1000-J	500	0.4907	0.4910	0.4910	0.491	98.18
	1000	0.9819	0.9823	0.9842	0.983	98.28
	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

FRM-247b (Rev 2/Oct 03)

Book/page: 08 090

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

010159

Balance #: 12 Thermometer #: G011 diH20 Temperature (° C) 21.0

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	0.1016	0.1007
ADJ1000-G	500	0.4938	0.4962	0.4947
	1000	0.9902	0.9906	0.9891
	100	0.1007	0.1005	0.1003
ADJ1000-H	500	0.4919	0.4954	0.4969
	1000	0.9924	0.9960	0.9926
	100	0.0996	0.0990	0.0998
ADJ1000-J *	500	0.4907	0.4910	0.4910
	1000	0.9819	0.9823	0.9842
	100			
ADJ1000-K	500			
	1000			
	100			
ADJ1000	500			
	1000			

10/4/05 mf

10/4/05 mf

*This pipette was verified on 10/5/05. mf

Analyst: [signature] Date: 10/4/05

Reviewed by: John Wells Date: 10-14-05

Book/page: 08 091

010160

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

10-20-05

SwRI – Div. 01, Inorganic Laboratory Adjustable Pipette Verification Spreadsheet

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	100	0.1018	0.1020	0.1014	0.102	101.73
ADJ1000-C	500	0.4990	0.4988	0.4992	0.499	99.80
	1000	1.0032	1.0018	1.0009	1.002	100.20
	100	0.0992	0.0991	0.0989	0.099	99.07
ADJ1000-D	500	0.4928	0.4932	0.4936	0.493	98.64
	1000	0.9999	1.0009	1.0059	1.002	100.22
	100	0.1004	0.1004	0.1006	0.100	100.47
ADJ1000-E	500	0.4942	0.4968	0.4981	0.496	99.27
	1000	0.9990	0.9984	0.9991	0.999	99.88
	100	0.1008	0.1010	0.1004	0.101	100.73
ADJ1000-F	500	0.4991	0.4939	0.4978	0.497	99.39
	1000	0.9994	1.0018	1.0001	1.000	100.04
	100					
ADJ1000-G	500					
	1000					
	100					
ADJ1000-H	500					
	1000					
	100					
ADJ1000-J	500					
	1000					
	100					
ADJ1000-K	500	NOT	IN USE	GLOVEBOX		
	1000					
	100					
ADJ1000	500					
	1000					

FRM-247b (Rev 3/Apr 04)

Book/page: 08 092

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010161

Balance #: 34 Thermometer #: G011 diH20 Temperature (° C) 21

100 µL – 1000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	100	.1018	.1012	.1014
ADJ1000-C	500	.4990	.4988	.4992
	1000	1.0032	1.0018	1.0009
	100	.0992	.0991	.0989
ADJ1000-D	500	.4928	.4932	.4936
	1000	.9999	1.0009	1.0059
	100	.1004	.1004	.1006
ADJ1000-E	500	.4942	.4968	.4981
	1000	JW 10-20-05 ~~.09~~ .9990	.9984	.9991
	100	.1008	.1010	.1004
ADJ1000-F	500	.4991	.4939	.4978
	1000	.9994	1.0018	1.0001
	100			
ADJ1000-G	500			
	1000			
	100			
ADJ1000-H	500		JW 10-20-05	
	1000			
	100			
ADJ1000-J	500			
	1000			
	100			
ADJ1000-K	500	NOT	IN USE —	Glovebox
	1000			
	100			
ADJ1000	500		JW 10-20-05	
	1000			

Analyst: [signature] Date: 10-20-05

Reviewed by: [signature] Date: 11/2/05

Book/page: 08 149

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

010162

10/4/05

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				0.000	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	0.5050	0.4915	0.4951	0.497	99.44
ADJ5000-J	2500	2.4949	2.4965	2.4957	2.496	99.83
	5000	4.9926	4.9919	4.9947	4.993	99.86
	500	0.4914	0.4921	0.4919	0.492	98.36
ADJ5000-K	2500	2.4973	2.4979	2.4969	2.497	99.89
	5000	5.0084	5.0009	5.0106	5.007	100.13
	500	0.4956	0.4981	0.4973	0.497	99.40
ADJ5000-L	2500	2.4884	2.4967	2.4926	2.493	99.70
	5000	4.9849	4.9843	4.9887	4.986	99.72
	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

FRM-247c (Rev 2/Mar 03)

Book/page: 08 150

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

010163

Balance #: 12 Thermometer #: G011 diH20 Temperature (° C) 21.0

500 µL – 5000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	500			
ADJ5000-C	2500			
	5000			
	500			
ADJ5000-G	2500			
	5000			
	500			
ADJ5000-H	2500			
	5000			
	500			
ADJ5000-I	2500			
	5000			
	500	0.5050	0.4915	0.4951
ADJ5000-J*	2500	2.4949	2.4965	2.4957
	5000	4.9926	4.9919	4.9947
	500	0.4914	0.4921	0.4919
ADJ5000-K	2500	2.4973	2.4979	2.4969
	5000	5.0084	5.0009	5.0106
	500	0.4956	0.4981	0.4973
ADJ5000-L	2500	2.4884	2.4967	2.4926
	5000	4.9849	4.9843	4.9887
	500			
ADJ5000-M	2500			
	5000			
	500			
ADJ5000-N	2500			
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			

10/4/05

10/4/05

*This pipette was verified on 10/5/05.

Analyst: Michael Hardy Date: 10/4/05

Reviewed by: John Wilkes Date: 10-14-05

FRM-244 (c) (Rev 3/Apr 04)

Book/page: 08 151

SwRI – Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log

(Space provided for Inorganic Laboratories' Adjustable Volume Pipette Verification Spreadsheet)

10-20-05

010164

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	0.5069	0.5052	0.5048	0.506	101.13
ADJ5000-C	2500	2.4918	2.4998	2.4953	2.496	99.83
	5000	5.0067	5.0220	4.9989	5.009	100.18
	500					
ADJ5000-G	2500	OUT	OF	SERVICE		
	5000					
	500					
ADJ5000-H	2500	OUT	OF	SERVICE		
	5000					
	500	0.5067	0.5033	0.5038	0.505	100.92
ADJ5000-I	2500	2.4920	2.5086	2.5072	2.503	100.10
	5000	4.9991	4.9991	4.9938	4.997	99.95
	500					
ADJ5000-J	2500					
	5000					
	500					
ADJ5000-K	2500					
	5000					
	500					
ADJ5000-L	2500					
	5000					
	500					
ADJ5000-M	2500	NOT	IN USE-	GLOVEBOX		
	5000					
	500	0.4975	0.4960	0.4982	0.497	99.45
ADJ5000-N	2500	2.4918	2.4978	2.4994	2.496	99.85
	5000	5.0250	5.0274	5.0146	5.022	100.45
	500	0.5055	0.5064	0.5052	0.506	101.14
ADJ5000	2500	2.4987	2.5166	2.5186	2.511	100.45
	5000	5.0496	5.0333	5.0472	5.043	100.87
	500					
ADJ5000	2500					
	5000					

FRM-247c (Rev 3/Apr 04)

Book/page: 08 152

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010165

Balance #: 34 Thermometer #: 6011 diH20 Temperature (° C) 21

500 µL – 5000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	500	.5069	.5052	.5048
ADJ5000-C	2500	2.4918	2.4998	2.4953
	5000	5.0067	5.0220	4.9989
	500			
ADJ5000-G	2500	OUT	OF	SERVICE
	5000			
	500			
ADJ5000-H	2500	OUT	OF	SERVICE
	5000			
	500	.5067	.5033	.5038
ADJ5000-I	2500	2.4920	2.5086	2.5072
	5000	4.9991	4.9991	4.9938
	500			
ADJ5000-J	2500			
	5000			
	500			
ADJ5000-K	2500		10-20-05	
	5000			
	500			
ADJ5000-L	2500			
	5000			
	500			
ADJ5000-M	2500	NOT	IN USE-	GLOVEBOX
	5000			
	500	.4975	.4960	.4982
ADJ5000-N	2500	2.4918	2.4978	2.4994
	5000	5.0250	5.0274	5.0146
	500	.5055	.5064	.5052
ADJ5000 -O	2500	2.4987	2.5166	2.5186
	5000	5.0496	5.0333	5.0472
	500			
ADJ5000	2500		10-20-05	
	5000			

Analyst: John Willis Date: 10-20-05

Reviewed by: Teresa Chin Date: 11/2/05

FRM-244 (c) (Rev 3/Apr 04)

010166

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 051021-5
SRR: 28178
SDG: 268844
CASE: CNWRA
VTSR: October 21, 2005
PROJECT#: 06002.01.222

Balance Calibrations

#1 - SN: 99-J50526-15
#2 - SN: 99-J50031-1

Southwest Research Institute®
Division 01
BALANCE VERIFICATION LOG

010167

BALANCE #:	LOCATION:	SERIAL #:	TOLERANCE:	COMMENTS:
12	Bldg. 70 Lab 47	1122510787	±0.0005	
Date	Std Wt (g)	Recorded Wt (g)	Operator	
10-19-05	2.0000	2.0001	KE	1
"	100.0000	100.0001	"	2
10-20-05	2.0000	2.0000	KE	1
"	100.0000	100.0000	"	2
10-21-05	2.0000	1.9998	KE	1
"	100.0000	99.9996	"	2
10-24-05	2.0000	2.0000	KE	1
"	100.0000	99.9997	"	2
10-25-05	2.0000	2.0000	KE	1
"	100.0000	99.9996	"	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.

#1 - SN: 99-J50624-5
2 - SN: 5537

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	
10-24-05	10.00	10.00	KE	1
"	400.04 KE	400.00	"	2
10-25-05	10.00	10.00	KE	1
"	400.04 KE	400.01	"	2
10-26-05	10.00	10.00	KE	1
"	400.04	400.01	"	2
10-27-05	10.00	10.00	JW	1
"	400.04	400.00	"	2
10-28-05	10.00	10.00	JW	1
"	400.04	400.02	"	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.

#1 - SN#99-J50526-15

#2 - SN#99-J50031-1

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**	
10/21/05	100.0000	99.9999	WAN	#2
10/22/05	2.0000	2.0000	WAN	#1
10-24-05	2.0000	2.0000	KE	1
"	100.0000	100.0001	KE	2
10-25-05	2.0000	2.0000	KE	1
"	100.0000	99.9997	"	2
10-26-05	2.0000	1.9999	KE	1
"	100.0000	99.9999	KE	2
10-27-05	2.0000	2.0000	JW	1
"	100.0000	100.0000	"	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)

010169

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 051021-5
SRR: 28178
SDG: 268844
CASE: CNWRA
VTSR: October 21, 2005
PROJECT#: 06002.01.222

DI Water Verification

010170

C40027

D.I. WATER SYSTEM NOTEBOOK
SOUTHWEST RESEARCH INSTITUTE
BUILDING 70

Contact U.S. Filter (1-800-466-7873) for repairs/exchanges. (Make sure to have a P.O.)

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
10/12/05 659pm	DR	18.02	✓	✓	✓	11879.8	✓
10/13/05 651pm	DR	18.02	✓	✓	✓	11902.0	✓
10/14/05 503pm	DR	18.02	✓	✓	✓	11908.4	✓
10/17/05 610pm	DR	18.02	✓	✓	✓	11939.5	✓
10/18/05 548pm	DR	18.01	✓	✓	✓	11956.0	✓
10/19/05 655pm	DR	18.02	✓	✓	✓	11972.4	✓
10/20/05 605pm	DR	18.01	✓	✓	✓	11989.1	✓
10/21/05 4pm	DR	18.02	✓	✓	✓	12017.2	✓
10/24/05 3pm	DR	18.01	✓	✓	✓	12035.1	✓
10/25/05 7pm	DR	18.02	✓	✓	✓	12045.7	✓
10/26/05 645pm	DR	18.03	✓	✓	✓	12050.6	✓
10/27/05 621pm	DR	18.02	✓	✓	✓	12055.3	✓
10/28/05 540pm	DR	18.03	✓	✓	✓	12065.3	✓
10/31/05 6pm	DR	18.03	✓	✓	✓	12094.7	✓
11/1/05 7pm	DR	18.03	✓	✓	✓	12137.9	✓

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
10/6/05 7pm	DR	X	✓ 7.5	30913.2	No usage
10/13/05 652pm	DR	X	✓ 7.5	30913.2	No usage
10/14/05 504pm	DR	✓	✓ 7	30913.6	✓
10/17/05 611pm	DR	✓	✓ 7	30914.8	✓
10/18/05 546pm	DR	✓	✓ 6.5	30917.2	✓
10/19/05 656pm	DR	✓	✓ 6.5	30917.8	✓
10/20/05 606pm	DR	✓	✓ 6.5	30921.6	✓
10/21/05 401pm	DR	✓	✓ 7.5	30930.5	✓
10/24/05 3pm	DR	✓	✓ 7.5	30930.8	✓
10/25/05 7pm	DR	✓	✓ 7	30931.8	✓
10/26/05 646pm	DR	X	✓ 7	30932.0	Need to adjust water in milk jar (X)
10/27/05 622pm	DR	✓	✓ 6.5	30935.8	✓
10/28/05 540pm	DR	✓	✓ 7	30938.7	✓
10/31/05 601pm	DR	X	✓ 7	30938.7	No usage
11/1/05 7pm	DR	X	✓ 7	30939.1	Slight usage

Legend: Check = Green (OK); X = Red (call for service)