SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 040112-2
SRR: 25389
SDG: 239636
CASE: CNWRA
VTSR: January 09, 2004
PROJECT#: 06002.01.081

FINAL REPORT

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010001

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 01/09/04

Matrix: Liquid

Project No.: 20.06002.01.081

SRR: 25389

TO: 040112-2

Sample ID	Lab System ID	Iron Results (mg/L)
Prep Blank - A19E2	----	<0.025
Lab Control - A19E2	----	0.963
True Value	----	1.00
Recovery	----	96.3%
Prep Blank - A21E2	----	<0.025
Lab Control - A21E2	----	0.983
True Value	----	1.00
Recovery	----	98.3%
Vessel A	239636	<0.250
Vessel B	239637	0.874
Spike result	239637	20.9
Spike added	239637	20.0
Recovery	239637	100%
Vessel C	239638	1.56
Vessel D	239639	0.857

Reporting Limit: 0.025 mg/L

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SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 040112-2
SRR: 25389
SDG: 239636
CASE: CNWRA
VTSR: January 09, 2004
PROJECT#: 06002.01.081

Task Orders/01-QPP-015

Southwest Research Institute

Laboratory Task Order

TO #: 040112-2 Revision: 0

SDG: 239636
VTSR: 01/09/04
CASE: CNWRA

SRR #'s: 25389
Client(s): DIV 20

Project(s): 06002.01.081
Manager(s): DAMMANN, MIKE
To PM: 01/23/04
To QA: 01/23/04
To Client: 01/25/04 10002

Instructions

DIVISION 20 - CNWRA. 14-day TAT listed on COC (subject to change). Point of Contact is Lie Tai Yang (x2483) or Brian Derby (363-6439) . Analysis for Total Iron by ICP. Work is 10 CFR 50, Part 21, Appendix B. CONTACT Charlie Butcher (ext. 5928, pager 271-5172) before starting ANY WORK on this task order. CONTACT PM WITH ANY QUESTIONS.

Documents Related to this task order: 8439, 8440

Test: DIL-DILUTION
Section: METALPREP

Holding: 28 days from CED

Prep, Dilution

Cnt: 4

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
239636		1	Liquid	Vessel A	09 Jan 04	06 Feb 04
239636		2	Liquid	Vessel A	09 Jan 04	06 Feb 04
239637		1	Liquid	Vessel B	09 Jan 04	06 Feb 04
239637		2	Liquid	Vessel B	09 Jan 04	06 Feb 04
239638		1	Liquid	Vessel C	09 Jan 04	06 Feb 04
239638		2	Liquid	Vessel C	09 Jan 04	06 Feb 04
239639		1	Liquid	Vessel D	09 Jan 04	06 Feb 04
239639		2	Liquid	Vessel D	09 Jan 04	06 Feb 04

Test: ICP-SWRI
Section: METALS

Holding: 180 days from CED

ICP Analysis by SwRI Method (Total Iron)

Cnt: 4

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
239636		1	Liquid	Vessel A	09 Jan 04	07 Jul 04
239636		2	Liquid	Vessel A	09 Jan 04	07 Jul 04
239637		1	Liquid	Vessel B	09 Jan 04	07 Jul 04
239637		2	Liquid	Vessel B	09 Jan 04	07 Jul 04
239638		1	Liquid	Vessel C	09 Jan 04	07 Jul 04
239638		2	Liquid	Vessel C	09 Jan 04	07 Jul 04
239639		1	Liquid	Vessel D	09 Jan 04	07 Jul 04
239639		2	Liquid	Vessel D	09 Jan 04	07 Jul 04

10003

Sample Receipt

Southwest Research Institute

Sample Receipt Number: 25389

VTSR: 01/09/04

Time: 14:40:00

Project: 06002.01.081
Case #: CNWRA
Client: DIV 20

Manager: DAMMANN, MIKE
Logged in by: Dino.Roman
Creation Date: 01/09/04

Notes

Samples were received at ambient temperature @ 22.0 °C.

Qc Note: As per method.

Parameters: Analysis/ICP analysis for Fe, as per COC

Note: See chain of custody as part of the SRR system for more information. Contact Project Manager for questions.

Note: Turnaround time is 14 days, as per chain of custody.

Note: Samples were received intact.

Note: Project is Nuclear Safety Related, 10 CFR 50, Part 21, and Appendix B.

Note: Contact Joann Boyd @ 2169 or Pager 351-1617. For Institute QA contact before starting any work on this project.

Note: Have SPQP (Latest Revision) on the bench at the time of prep or analysis of samples.

Note: All personnel must be QA Nuclear Certified.

POC: Lictai Yang X2483.
*** Dino.Roman Jan 9 2004 3:31PM ***

System ID	Customer ID	CED	Matrix	Containers	Special Reqs.
239636	Vessel A	01/09/04	Liquid	2	
239637	Vessel B	01/09/04	Liquid	2	
239638	Vessel C	01/09/04	Liquid	2	
239639	Vessel D	01/09/04	Liquid	2	
Containers: 8				Samples: 4	

These documents are associated with this receipt: 8439, 8440

Thermometer: 027
Temperature: 22.0

Client: DIV 20

SR#: 25389

FRM-002

Page Printed: 23 Jan 2004 14:41:58
ver (12/26/2003)

8440

CONTROLLED COPY
IF STAMP IS NOT RED, THIS DOCUMENT IS UNCONTROLLED

01-QPP-015 010004
Division 01
Revision 4
November 2002

Document No. 3

Division 01

Chemistry and Chemical Engineering Division

QUALITY PROJECT PLAN FOR

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

DIV. 20 SRR #25389
PROJECT #06002.01.081
CASE: CNWRA
VTSR: 01/09/04 1440

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:

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

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

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

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

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

1.0 INTRODUCTION

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

2.0 SCOPE

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

3.0 REFERENCES

3.1 *SwRI Quality System Manual – 2000*

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

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

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

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

4.1 Indoctrination and Training

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

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

4.2 Qualification of Personnel

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

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

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

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

4.3 Design Control

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

4.4 Right of Access

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

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

4.5 Control of Supplier-Generated Documents

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

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

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

4.6 Acceptance of Services Only

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

4.7 Commercial Grade Items

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

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

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

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

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

(a) Damage was not sustained during shipment;

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

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

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

(a) Chemical name;

(b) Chemical grade;

(c) Lot code;

(d) Date received; and

(e) Shelf life, when applicable.

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

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

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

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

(a) Sample control number;

(b) Purchase order number;

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

(d) Work order number;

(e) Nuclear QA label; and

(f) Sample retention date, when applicable.

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

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

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

4.8 Inspection

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

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

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

(b) Testing processes;

(c) Calibration and major equipment;

(d) Sample and record retention; and

(e) Test records.

4.9 Inspection and Testing

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

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

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

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

4.10 Handling, Storage, Packaging, Preservation, and Delivery

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

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

4.11 Quality Assurance Records

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

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

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

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

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

4.12 10 CFR, Part 21

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

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

4.13 Certified Test Report

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

4.14 Valid Documents List

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

5.0 HISTORY OF REVISIONS

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

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 040112-2
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PROJECT#: 06002.01.081

Chain of Custody/Login Paperwork

8439

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 SwRI
Lie Tai Yang

Client Purchase Order/Other ID:

Site/Zone ID:

Requested Turnaround:
- ☑ 2 Weeks
- ☐ 3 Weeks
- ☐ Other: _____

SwRI Contact: Lie Tai Yang
X 2483

Analyses Requested

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers	Total IRON / ICP Analysis for Fe										REMARKS
vessel A	010904	1340	L		2	✓										Samples Intact
vessel B	010904	1340	L		2	✓										↓
vessel C	010904	1340	L		2	✓										
vessel D	010904	1340	L		2	✓										

DIV. 20 SRR #25389
PROJECT #06002.01.081
CASE: CNWRA
VTSR: 01/09/04 1440

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

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

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

Temp: 22.0°C
Therm #: 027

Comments:

Relinquished by (Print/Signature)	Date	Time
Brian K Deeby / [signature]	1/9/03	2:30
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#: 20.06002.01.081

Received by SwRI Lab: (Signature) [signature]

Date: 1/9/04 Time: 1440

Samples Disposed: Date: Time:

Samples Disposed by:

110013

Southwest Research Institute

LOG-IN CHECKLIST

Sample Receipt Report No.: **25389**

010014

Project Information All product information shall be derived from a contract, statement of work (SOW), or project manager (PM).		
Previous PM information	Yes ☐	No ☒
Current PM information	Yes ☒	No ☐
Sponsor's Documentation All original documentation must be attached to the work order and sent to Div 01 Quality Assurance (DQA).		
Delivery documentation (*) = (Tape on 8 ½ x 11 white paper)	Yes ☐	No ☒
Hand carried	Yes ☒	No ☐
Correspondence	Yes ☐	No ☒
Custody seals*	Yes ☐	No ☒
Chain-of-custody/Traffic report	Yes ☒	No ☐
Sample tags* (Confirm with container information before removal)	Yes ☐	No ☒
Hazard notifications	Yes ☒	No ☐
Product Condition Sample(s) shall not be left unattended once an ice chest has been opened.		
Sample(s) received intact	Yes ☒	No ☐
Container(s) received leaking	Yes ☐	No ☒
Container(s) received damaged	Yes ☐	No ☒
Lid(s) received damaged	Yes ☐	No ☒
Product Preparation		
FRM-115 (pH) Preservation Report / Metals & Wetchem H2O	Yes ☐	No ☒
Product Storage Sample(s) shall be stored in a designated location with their corresponding sample control records (SCR).		
Sample(s) in designated location	Yes ☒	No ☐
Sample Receipt Report All copies must be legible.		
Computerized sample receipt report with original documents	Yes ☒	No ☐
Sample custodian signature and date on all original documents.	Yes ☒	No ☐
Copy of sample receipt report to PM	Yes ☒	No ☐
PM sample receipt report approval with initial and date	Yes ☒	No ☐
Case file documents to DQA	Yes ☒	No ☐
Print sample log-in page and place in log-in notebook	Yes ☒	No ☐
Chain-of-Custody/Traffic Report		
Sample Custodian's signature, date, and time	Yes ☒	No ☐
Document thermometer no. / temperature (Confirm calibration is current)	Yes ☒	No ☐
Document condition of sample(s)	Yes ☒	No ☐
FRM-109		
Discrepancies	Yes ☐	No ☒
FRM-109 to PM	Yes ☐	No ☒
FRM-109 to Client (Only for required contracts)	Yes ☐	No ☒
FRM-109 to Inorganics for discrepancies of FRM-115	Yes ☐	No ☒
Ice Chest Shipment		
Clean ice chest/Discard used bags and ice/Return Sponsor's packing material	Yes ☐	No ☒
SwRI shipping ticket with project identification	Yes ☐	No ☒
Log-In Closure		
Sample Custodian's Signature:	Date: 01/09/04	Time: 3:24 PM

SAMPLE LOG-IN SHEET

010015

Lab Name: Southwest Research Institute	Page 1 of 1
Received By (Print Name): DINO ROMAN	Log-in Date: 01/09/2004
Received By (Signature): DR	
Case Number: CNWRA	Sample Delivery Group No. / SAS Number: N/A

Remarks: 06002.01.081

1.	Custody Seal(s)	Present/~~Absent*~~ Intact/Broken
2.	Custody Seal Nos.	N/A
3.	Chain-of Custody Records	Present/Absent*
4.	Traffic Reports or Packing Lists	Present/Absent*
5.	Airbill	Airbill/Sticker Present/Absent*
6.	Airbill No.	HAND DELIVERED
7.	Sample Tags	Present/Absent*
	Sample Tag Numbers	Listed/Not listed on Chain of Custody
8.	Sample Condition	Intact/Broken*/Leaking
9.	Cooler Temperature	22.0C
10.	Does Information on custody records, traffic reports, and sample tags agree?	Yes/No*
11.	Date Received at Lab	01/09/2004
12.	Time Received	14:40:00

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc
Vessel A	None	239636	Intact
Vessel B	None	239637	Intact
Vessel C	None	239638	Intact
Vessel D	None	239639	Intact

Sample Transfer

Fraction: Inorg	Fraction:
Area #: Inorg #2	Area #:
By: DINO ROMAN	By:
On: 01/09/2004	On:

* Contact SMO and attach record of resolution

Reviewed By	CYNTHIA A. SANCEDA	Logbook No.	Sample Receipt (25389)
Date	01.14.2004	Logbook Page No.	4946 (SECTION 2 OF 2)

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 040112-2
SRR: 25389
SDG: 239636
CASE: CNWRA
VTSR: January 09, 2004
PROJECT#: 06002.01.081

Copies of Login Book

Sample Login Book

Jan 09, 2004

010016

SwRI Login Area
Division 1

Sample Receipt: 25388	Project: 03162.22.006	Client: HEB
VTSR Date: Jan 09, 2004	VTSR Time: 11:50:00	Manager: SCHATTENBERG, HERB

System ID	Customer Sample ID	Matrix
239633	PC Resirc System	Liquid
239634	PC Silo	Liquid
239635	RBD Cotton Seed	Liquid

Sample Receipt: 25389	Project: 06002.01.081	Client: DIV 20
VTSR Date: Jan 09, 2004	VTSR Time: 14:40:00	Manager: DAMMANN, MIKE

System ID	Customer Sample ID	Matrix
239636	Vessel A	Liquid
239637	Vessel B	Liquid
239638	Vessel C	Liquid
239639	Vessel D	Liquid

Number of samples for today: 34

Number of Containers for today: 39

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 040112-2
SRR: 25389
SDG: 239636
CASE: CNWRA
VTSR: January 09, 2004
PROJECT#: 06002.01.081

RAW DATA

Div 20
to#040112-2/040115-4
06002.01.081

system id	elem	result	qual	units	rl	tv	rec	@Instr. ug/ml	date	time	iv	fv	mg/L
239636r	Fe2714	0.250	U	mg/L	0.25			-0.01370	01/22/04	13:46	0.5	5	-0.137
239637r	Fe2714	0.874		mg/L	0.25			0.08742	01/22/04	13:51	0.5	5	0.874
239637s	Fe2714	20.9		mg/L	0.50	20	100.3%	1.04659	01/19/04	16:44	0.25	5	20.932
239638r	Fe2714	1.56		mg/L	0.25			0.15592	01/22/04	13:56	0.5	5	1.559
239639r	Fe2714	0.857		mg/L	0.25			0.08570	01/22/04	14:01	0.5	5	0.857
239746r	Fe2714	1.86		mg/L	0.25			0.18561	01/22/04	14:05	0.5	5	1.856
239746d	Fe2714	1.87		mg/L	0.50			0.09326	01/19/04	17:03	0.25	5	1.8652
lcsw-A19E2	Fe2714	0.963		mg/L	0.025	1	96.3%	0.96348	01/19/04	16:29	5	5	0.9635
lcsw-A21E2	Fe2714	0.983		mg/L	0.025	1	98.3%	0.98328	01/22/04	13:42	5	5	0.9833
pbw-A19E2 pg56-028	Fe2714	0.025	U	mg/L	0.025			0.00376	01/19/04	16:24	5	5	0.0038
pbw-A21E2 pg56-032	Fe2714	0.025	U	mg/L	0.025			-0.00853	01/22/04	13:37	5	5	-0.0085

instrument result(in ug/ml) * fv / iv = result(in mg/L)

1-22-04

1/23/04

2-2-04

010017

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

BOOK / PAGE: 56 028

CLIENT(S): DIV. 20
TASK ORDER(S): 040112-2 / 040115-4 SDG(S): 239636 / 239746 10018
PROJECT NO(S): 06002.01.081
METHOD: 3005A___ 3050B___ 3050B-7.5___ 3010A___ 3020A___ 7760A___ 7740A___ $HClO_4$___ H_2SO_4 Sb___
Microwave___ Fusion___ Teflon___ Rock___ OTHER DF-20
MATRIX: Water___ Soil___ Biota___ Solid___ Liquid ✓ TCLP Ext___ OTHER___
INSTRUMENT: GFAA___ ICP ✓ ICP-MS___ IC___ FLAA___ HYDRIDE___ OTHER___
ACID INORG #: HNO_3# * HCl# * H_2SO_4#___ $HClO_4$#___ HF#___
INTERNAL STD: Sc @ 10 PPM ✓ Be @ 10 PPM___ SOURCE: IV INORG# 4331 EXP: 12/04 AMT: 50 µl
Oven/Hotplate ID: N/A Temperature (°C):___

SAMPLE IDENTIFICATION	pH	WT (g)	I.V. (mL)	F.V. (mL)	
PBW-A19E2			5mL	5	
LCSW-A19E2 **			↓	↓	
239636			0.25mL	↓	
37 KE 1/19/04			↓	↓	
~~d~~S **			↓	↓	
38			↓	↓	
39			↓	↓	
239746			↓	↓	
↓ 46d			↓	↓	
		KE 1/19/04			
** Spiked 50µl Spike-1	(Spex, # ~~48~~ 4306,		exp. 10/04)		
20µl ICAL-1	(Spex, # 4245,		exp. 9/04)		
* 10% HNO_3 / 5% HCl	RLB-	02-035-03	exp. 4/04		
pipettes:					
5ml - ADJ-5000 Lab 27C					
1mL - ADJ-1000 C					
200µl - ADJ-20					
		1/19/04 KE			
					LOCATION:
					All used

PREPARED BY: [signature] DATE: 1-19-04
REVIEWED BY: [signature] DATE: 1-19-04
DISPOSAL INT/DATE/LOC: ___

FRM-191 (Rev 2/Mar 03)

010019

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

BOOK / PAGE: 56 032

CLIENT(S): Div. 20
TASK ORDER(S): 040112-2/040115-4 SDG(S): 239636/239746
PROJECT NO(S): 06002.01.081
METHOD: 3005A___3050B___3050B-7.5___3010A___3020A___7760A___7740A___$HClO_4$___H_2SO_4 Sb___
Microwave___Fusion___Teflon___Rock___OTHER DF 10
MATRIX: Water___Soil___Biota___Solid___Liquid___TCLP Ext___OTHER___
INSTRUMENT: GFAA___ICP✓___ICP-MS___IC___FLAA___HYDRIDE___OTHER___
ACID INORG #: HNO_3# ** HCl# ** H_2SO_4#___ $HClO_4$#___ HF#___
INTERNAL STD: Sc @ 10 PPM✓ Be @ 10 PPM___ SOURCE: IV INORG# 4331 EXP: 12/04 AMT: 50µl
Oven/Hotplate ID: N/A Temperature (°C):___

SAMPLE IDENTIFICATION	pH	WT (g)	I.V. (mL)	F.V. (mL)	
PBW-A21E2			5	5ml	
LCSW-A21E2 *			↓	↓	
239636r			0.5mL		
37r					
38r					
39r					
239746r					
* Spiked 50µl spike-1 (Spex #4306, exp. 10/04)					
20µl ICAL-1 (Spex, #4245, exp. 9/04)					
** 10% HNO_3/5% HCl RLB-02-035-06 exp. 4/21/04					
Pipette:					
5mL - Adj-5000 Lab 27C					
1mL - Adj-1000F					
200µl - Adj-200C					
Aliquot 0.5ml and dilute to		4.5ml	RLB-02-035-06 Solution.		
		1/21/04			
					LOCATION: N/A / All used

PREPARED BY: [signature] DATE: 1-21-04
REVIEWED BY: John Wells DATE: 1-21-04

Trace Metals Reagent Logbook 010020

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

BOOK / PAGE: 02 035

Reagent I.D.:	Preparation Description:	Prep Date:	Exp Date:	Initials:
RLB02-035-1	5% Potassium Permanganate	1-8-04	1-8-05	BV
	Add 150 G #3663 to 3 Liter	↓	↓	↓
	mark on bottle add reag. water.	↓	↓	↓
RLB-02-035-02	2% HNO_3	1-13-04	4-13-04	Jee
R	add 196 mls di water to a 250mL	↓	↓	↓
	Nalgene bottle, add 4mls HNO_3 —	↓	↓	↓
↓	— wing #4342 F.V. is 200mls	↓	↓	↓
RLB-02-035-03	1% HNO_3 / 5% HCL	1-19-04	4-19-04	KE
↓	to a 100 mL Nalgene bottle added	↓	↓	↓
	50mL Di-water. 1 ml HNO_3 #4344	↓	↓	↓
	add 5ml HCL #4394, dilute to	↓	↓	↓
↓	100 mL / with Di-water	↓	↓	↓
RLB 02-035-04	5% Potassium Persulfate	1-20-04	1-20-05	BV
	Add 150 G of $K_2S_2O_8$ to 3.0L	↓	↓	↓
	of reag. water. #1523	↓	↓	↓
RLB-02-035-05	1:1 HNO_3	1-21-04	4-21-04	KE
	Mixed 10m HNO_3 # 4344 with	↓	↓	↓
↓	10mL DI-water	↓	↓	↓
RLB-02-035-06	1% HNO_3 / 5% HCl	1-21-04	4-21-04	KE
	1ml HNO_3 #4344	↓	↓	↓
	5ml HCL #4395	↓	↓	↓
↓	dilute to 100 ml w/Di-wate	↓	↓	↓

BOOK/ PAGE 15 092

SOUTHWEST RESEARCH INSTITUTE®

6220 Culebra Rd
San Antonio, Texas 78228

010021

TJA TRACE ICP DAILY LOG

ANALYST [illegible] DATE 1-19-04

As 189.042 Profile Line As Intensity: 395.174

PEAK POSITION -.035512
VERNIER POSITION 282
AUTOSAMPLER Yes X No

QC PREP DATE:	
CCV/ICV	04A15
CRI	03L26
ICSA	04A08
ICSAB	03M08

STDs PREP DATE:	
CLP_STD1_SC	03M22
CLP_STD2_SC	03K05
CLP_STD3_SC	04A02
CLP_STD4_SC	04A07
CLP_STD5_SC	03M04
CLP_STD6_SC	04A15
BLK_SC	03M31

COMMENTS	FILE	CLIENT	TO#	PROJECT NO.	METHOD
A040119	Y04SAN	DIV20	040112-2 040115-4	06002.01.081	SW846 6020
A040119A	Y04SAN	DIV18	040115-6	R9356.01.003	SW846 6020

[illegible] 1-19-04

COMMENTS:

MAINTENANCE:

REVIEWED BY: Teresa O'Brien DATE: 1/26/04

BOOK/ PAGE 151096

SOUTHWEST RESEARCH INSTITUTE®

6220 Culebra Rd
San Antonio, Texas 78228

010022

TJA TRACE ICP DAILY LOG

ANALYST [illegible] DATE 1-22-04

As 189.042 Profile Line As Intensity: 382

PEAK POSITION -.040619
VERNIER POSITION 277
AUTOSAMPLER Yes X No

QC PREP DATE:	
CCV/ICV	04A15
CRI	03L26
ICSA	04A08
ICSAB	03M08

STDs PREP DATE:	
CLP_STD1_SC	03M22
CLP_STD2_SC	~~03L05~~ 04A22
CLP_STD3_SC	~~04A05~~ 04A02
CLP_STD4_SC	04A07
CLP_STD5_SC	03M04
CLP_STD6_SC	04A15
BLK_SC	03M31

1-22-04 DH 1-22-04

COMMENTS	FILE	CLIENT	TO#	PROJECT NO.	METHOD
A040122	Y04JAN	W.L. Gore	040107-2 040114-2	01.01446.003	SWRI SS 226
A040122A	Y04JAN	W.L. Gore	031218-5	01.01446.003	SWRI SS 220
A040122B	Y04JAN	Div 20	040112-2 040115-2	06002.01.081	SWRI 56032
A040122C	Y04JAN	Div 20	040121-5	06002.01.081	SWRI 56033

1-22-04

COMMENTS:

MAINTENANCE:

REVIEWED BY: Terence O'Brien DATE: 1/26/04

ICP Calibration Blank/ICB/CCB Solution

ID: BLK- 03L21

Date Prepared: 11-21-03 Prepared By: DL

Make up as needed in 1000ml volumetric flask.

Added ✓ 10 ml HNO3 INORG #: 4299

Added ✓ 50 ml HCL INORG #: 4289

Added ✓ 1000ul of 10000ppm Sc (INORG. VENT.) EXP. Date: 10-1-04 INORG #: 4262

010023

ICP Calibration Blank/ICB/CCB Solution

ID: BLK-03M04

Date Prepared: 12/4/03 Prepared By: TOB

Make up as needed in 1000ml volumetric flask.

Added ✓ 10 ml HNO3 INORG #: 4299

Added ✓ 50 ml HCL INORG #: 4335

Added ✓ 1000ul of 10000ppm Sc (INORG. VENT.) EXP. Date: 10-1-04 INORG #: 4262

ICP Calibration Blank/ICB/CCB Solution

ID: BLK-03M31

Date Prepared: 12/31/03 Prepared By: TOB

Make up as needed in 1000ml volumetric flask.

Added ✓ 10 ml HNO3 INORG #: 4347

Added ✓ 50 ml HCL INORG #: 4339

Added ✓ 1000ul of 10000ppm Sc (INORG. VENT.) EXP. Date: 10/1/04 INORG #: 4262

ICP Calibration Blank/ICB/CCB Solution

ID: BLK- 04A22

Date Prepared: 1-22-04 Prepared By: DL

Make up as needed in 1000ml volumetric flask.

Added ✓ 10 ml HNO3 INORG #: 4344

Added ✓ 50 ml HCL INORG #: 4395

Added ✓ 1000ul of 10000ppm Sc (INORG. VENT.) EXP. Date: 10-1-04 INORG #: 4262

ICP ICV/CCV SOLUTION

010024

CCV-04A 15

Date Prepared: 1-15-04 Prepared By: DL

HNO3 INORG #: 4344 HCl INORG #: 4394

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	4262	10000	10-1-04
B	5	5ml		SPEX	4139	1000	6-30-04
Li	5	5ml		SPEX	4065	1000	5-15-04
Mo	5	5ml		SPEX	4066	1000	5-15-04
P	5	5ml		SPEX	4307	1000	10-30-04
Si	5	5ml		SPEX	4232	1000	8-30-04
Ti	5	5ml		SPEX	4234	1000	8-30-04
Sr	5	5ml		SPEX	4308	1000	10-30-04
Sn	5	5ml		SPEX	4141	1000	6-30-04
Bi	5	5ml		SPEX	4138	1000	6-30-04
La	5	5ml		SPEX	4064	1000	5-15-04
Y	5	5ml		SPEX	4067	1000	5-15-04
Pd	1	1ml		SPEX	1-15-04 ~~3428~~ 4417	1000	1-15-05
S	1	1ml		SPEX	4140	1000	6-30-04
Th	1	1ml		SPEX	4233	1000	8-30-04
U	1	1ml		SPEX	4142	1000	6-30-04
W	1	1ml		SPEX	4212	1000	8-15-04
Zr	5	5ml		SPEX	4213	1000	8-15-04
Na	10	1ml		SPEX	3951	10000	2-15-04
ICV-2A	vary	10ml		SPEX	4328	mix	11-30-04
ICV-2B	vary	1ml		SPEX	4329	mix	11-30-04
ICV-2C	vary	10ml		SPEX	4330	mix	11-30-04

Expiration Date: 2-15-04

ICP Calibration Standards

010025

Date Prepared: 12-22-03 Prepared By: [illegible]

HNO3 INORG #: 4343 HCl INORG #: 4338

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
03M22	STD1- 12-22-03	Al	50	2.50	✓	INORVENT	4220	10000	9-1-04
		Ca	50	2.50	✓	INORVENT	3900	10000	2-1-04
		Fe	50	2.50	✓	INORVENT	3963	10000	3-1-04
		K	50	2.50	✓	INORVENT	4320	10000	12-1-04
		Mg	25	1.25	✓	INORVENT	4204	10000	8-1-04
		Na	50	2.50	✓	INORVENT	4205	10000	4-1-04
		Li	10	5.00	✓	INORVENT	4149	1000	7-1-04
		Sc	10	0.500	✓	INORVENT	4262	10000	10-1-04
	STD2-	Ba	10	5.00		INORVENT		1000	
		Be	5	2.50		INORVENT		1000	
		Cr	10	5.00		INORVENT		1000	
		Cu	10	5.00		INORVENT		1000	
		Ni	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD3-	Cd	10	5.00		INORVENT		1000	
		Co	10	5.00		INORVENT		1000	
		Mn	10	5.00		INORVENT		1000	
		V	10	5.00		INORVENT		1000	
		Zn	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD4-	Ag	2	1.00		INORVENT		1000	
		As	10	5.00		INORVENT		1000	
		Pb	10	5.00		INORVENT		1000	
		Sb	10	5.00		INORVENT		1000	
		Se	10	5.00		INORVENT		1000	
		TL	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD5-	B	10	5.00		INORVENT		1000	
		Mo	10	5.00		INORVENT		1000	
		P	10	5.00		INORVENT		1000	
		Si	10	5.00		INORVENT		1000	
		Ti	10	5.00		INORVENT		1000	
		Sr	10	5.00		INORVENT		1000	
		Sn	10	5.00		INORVENT		1000	
		Bi	5	2.50		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD6-	La	10	5.00		INORVENT		1000	
		Na	1	0.05		INORVENT		10000	
		Pd	10	5.00		INORVENT		1000	
		S	10	5.00		INORVENT		1000	
		Th	10	5.00		INORVENT		1000	
		U	10	5.00		INORVENT		1000	
		W	5	2.50		INORVENT		1000	
		Y	10	5.00		INORVENT		1000	
		Zr	10	5.00		INORVENT		1000	
		SC	10	0.500		INORVENT		10000	

Expiration Dates:

STD1: 2-1-04 **STD4:**

STD2: **STD5:**

STD3: **STD6:**

ICP Calibration Standards

010026

Date Prepared: 1-22-04 Prepared By: [illegible]

HNO3 INORG #: 4344 HCl INORG #: 4395

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
	STD1-	Al	50	2.50		INORVENT		10000	
		Ca	50	2.50		INORVENT		10000	
		Fe	50	2.50		INORVENT		10000	
		K	50	2.50		INORVENT		10000	
		Mg	25	1.25		INORVENT		10000	
		Na	50	2.50		INORVENT		10000	
		Li	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
04422 1-22-04	STD2-	Ba	10	5.00	✓	INORVENT	3971	1000	3-1-04
		Be	5	2.50	✓	INORVENT	4062	1000	6-1-04
		Cr	10	5.00	✓	INORVENT	4318	1000	12-1-04
		Cu	10	5.00	✓	INORVENT	3955	1000	3-1-04
		Ni	10	5.00	✓	INORVENT	3957	1000	3-1-04
		Sc	10	0.500	✓	INORVENT	4262	10000	10-1-04
	STD3-	Cd	10	5.00		INORVENT		1000	
		Co	10	5.00		INORVENT		1000	
		Mn	10	5.00		INORVENT		1000	
		V	10	5.00		INORVENT		1000	
		Zn	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD4-	Ag	2	1.00		INORVENT		1000	
		As	10	5.00		INORVENT		1000	
		Pb	10	5.00		INORVENT		1000	
		Sb	10	5.00		INORVENT		1000	
		Se	10	5.00		INORVENT		1000	
		TL	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD5-	B	10	5.00		INORVENT		1000	
		Mo	10	5.00		INORVENT		1000	
		P	10	5.00		INORVENT		1000	
		Si	10	5.00		INORVENT		1000	
		Ti	10	5.00		INORVENT		1000	
		Sr	10	5.00		INORVENT		1000	
		Sn	10	5.00		INORVENT		1000	
		Bi	5	2.50		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD6-	La	10	5.00		INORVENT		1000	
		Na	1	0.05		INORVENT		10000	
		Pd	10	5.00		INORVENT		1000	
		S	10	5.00		INORVENT		1000	
		Th	10	5.00		INORVENT		1000	
		U	10	5.00		INORVENT		1000	
		W	5	2.50		INORVENT		1000	
		Y	10	5.00		INORVENT		1000	
		Zr	10	5.00		INORVENT		1000	
		SC	10	0.500		INORVENT		10000	

Expiration Dates:

STD1: **STD4:**

STD2: 3-1-04 **STD5:**

STD3: **STD6:**

ICP Calibration Standards

010027

Date Prepared: 1/2/04 Prepared By: T. [illegible]

HNO3 INORG #: 4341 HCl INORG #: 4339

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 Inorg	Source	INORG # Exp Date	Stock Conc (ppm) 1/19/04	Exp Date Check
	STD1-	Al	50	2.50		INORVENT		10000	
		Ca	50	2.50		INORVENT		10000	
		Fe	50	2.50		INORVENT		10000	
		K	50	2.50		INORVENT		10000	
		Mg	25	1.25		INORVENT		10000	
		Na	50	2.50		INORVENT		10000	
		Li	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD2-	Ba	10	5.00		INORVENT		1000	
		Be	5	2.50		INORVENT		1000	
		Cr	10	5.00		INORVENT		1000	
		Cu	10	5.00		INORVENT		1000	
		Ni	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
04A02	STD3-	Cd	10	5.00	3972	INORVENT	3/1/04	1000	✓
		Co	10	5.00	3973	INORVENT	3/1/04	1000	✓
		Mn	10	5.00	3921	INORVENT	2/1/04	1000	✓
		V	10	5.00	4321	INORVENT	12/1/04	1000	✓
		Zn	10	5.00	4319	INORVENT	12/1/04	1000	✓
		Sc	10	0.500	4262	INORVENT	10/1/04	10000	✓
~~04A02~~	STD4-	Ag	2	1.00		INORVENT		1000	
		As	10	5.00		INORVENT		1000	
		Pb	10	5.00		INORVENT		1000	
		Sb	10	5.00		INORVENT		1000	
		Se	10	5.00		INORVENT		1000	
		TL	10	5.00		INORVENT		1000	
		Sc	10	0.500	~~4262~~	INORVENT	~~10/1/04~~	10000	
	STD5-	B	10	5.00		INORVENT		1000	
		Mo	10	5.00		INORVENT		1000	
		P	10	5.00		INORVENT		1000	
		Si	10	5.00		INORVENT		1000	
		Ti	10	5.00		INORVENT		1000	
		Sr	10	5.00		INORVENT		1000	
		Sn	10	5.00		INORVENT		1000	
		Bi	5	2.50		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD6-	La	10	5.00		INORVENT		1000	
		Na	1	0.05		INORVENT		10000	
		Pd	10	5.00		INORVENT		1000	
		S	10	5.00		INORVENT		1000	
		Th	10	5.00		INORVENT		1000	
		U	10	5.00		INORVENT		1000	
		W	5	2.50		INORVENT		1000	
		Y	10	5.00		INORVENT		1000	
		Zr	10	5.00		INORVENT		1000	
		SC	10	0.500		INORVENT		10000	

Expiration Dates:

STD1:

STD2:

STD3: 2/1/04

STD4:

STD5:

STD6:

ICP Calibration Standards

010028

Date Prepared: 1-7-04 Prepared By: DL

HNO3 INORG #: 4341 HCl INORG #: 4339

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
	STD1-	Al	50	2.50		INORVENT		10000	
		Ca	50	2.50		INORVENT		10000	
		Fe	50	2.50		INORVENT		10000	
		K	50	2.50		INORVENT		10000	
		Mg	25	1.25		INORVENT		10000	
		Na	50	2.50		INORVENT		10000	
		Li	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD2-	Ba	10	5.00		INORVENT		1000	
		Be	5	2.50		INORVENT		1000	
		Cr	10	5.00		INORVENT		1000	
		Cu	10	5.00		INORVENT		1000	
		Ni	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD3-	Cd	10	5.00		INORVENT		1000	
		Co	10	5.00		INORVENT		1000	
		Mn	10	5.00		INORVENT		1000	
		V	10	5.00		INORVENT		1000	
		Zn	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
03 04A07	STD4- 1-7-04	Ag	2	1.00	✓	INORVENT	4222	1000	9-1-04
		As	10	5.00	✓	INORVENT	3899	1000	2-1-04
		Pb	10	5.00	✓	INORVENT	4313	1000	11-1-04
		Sb	10	5.00	✓	INORVENT	3953	1000	3-1-04
		Se	10	5.00	✓	INORVENT	4152	1000	7-1-04
		TL	10	5.00	✓	INORVENT	3922	1000	2-1-04
		Sc	10	0.500	✓	INORVENT	4262	10000	10-1-04
	STD5-	B	10	5.00		INORVENT		1000	
		Mo	10	5.00		INORVENT		1000	
		P	10	5.00		INORVENT		1000	
		Si	10	5.00		INORVENT		1000	
		Ti	10	5.00		INORVENT		1000	
		Sr	10	5.00		INORVENT		1000	
		Sn	10	5.00		INORVENT		1000	
		Bi	5	2.50		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD6-	La	10	5.00		INORVENT		1000	
		Na	1	0.05		INORVENT		10000	
		Pd	10	5.00		INORVENT		1000	
		S	10	5.00		INORVENT		1000	
		Th	10	5.00		INORVENT		1000	
		U	10	5.00		INORVENT		1000	
		W	5	2.50		INORVENT		1000	
		Y	10	5.00		INORVENT		1000	
		Zr	10	5.00		INORVENT		1000	
		SC	10	0.500		INORVENT		10000	

Expiration Dates:

STD1:

STD2:

STD3:

STD4: 2-1-04

STD5:

STD6:

ICP Calibration Standards

010029

Date Prepared: 12-4-03 Prepared By: DL

HNO3 INORG #: 4300 HCl INORG #: 4336

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
	STD1-	Al	50	2.50		INORVENT		10000	
		Ca	50	2.50		INORVENT		10000	
		Fe	50	2.50		INORVENT		10000	
		K	50	2.50		INORVENT		10000	
		Mg	25	1.25		INORVENT		10000	
		Na	50	2.50		INORVENT		10000	
		Li	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD2-	Ba	10	5.00		INORVENT		1000	
		Be	5	2.50		INORVENT		1000	
		Cr	10	5.00		INORVENT		1000	
		Cu	10	5.00		INORVENT		1000	
		Ni	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD3-	Cd	10	5.00		INORVENT		1000	
		Co	10	5.00		INORVENT		1000	
		Mn	10	5.00		INORVENT		1000	
		V	10	5.00		INORVENT		1000	
		Zn	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD4-	Ag	2	1.00		INORVENT		1000	
		As	10	5.00		INORVENT		1000	
		Pb	10	5.00		INORVENT		1000	
		Sb	10	5.00		INORVENT		1000	
		Se	10	5.00		INORVENT		1000	
		TL	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
03MO4 12-4-03	STD5-	B	10	5.00	✓	INORVENT	3954	1000	3-1-04
		Mo	10	5.00	✓	INORVENT	3956	1000	3-1-04
		P	10	5.00	✓	INORVENT	3901	1000	2-1-04
		Si	10	5.00	✓	INORVENT	4153	1000	7-1-04
		Ti	10	5.00	✓	INORVENT	4332	1000	12-1-04
		Sr	10	5.00	✓	INORVENT	4154	1000	7-1-04
		Sn	10	5.00	✓	INORVENT	4026	1000	4-1-04
		Bi	5	2.50	✓	INORVENT	4000	1000	5-1-04
		Sc	10	0.500	✓	INORVENT	4262	10000	10-1-04
	STD6-	La	10	5.00		INORVENT		1000	
		Na	1	0.05		INORVENT		10000	
		Pd	10	5.00		INORVENT		1000	
		S	10	5.00		INORVENT		1000	
		Th	10	5.00		INORVENT		1000	
		U	10	5.00		INORVENT		1000	
		W	5	2.50		INORVENT		1000	
		Y	10	5.00		INORVENT		1000	
		Zr	10	5.00		INORVENT		1000	
		SC	10	0.500		INORVENT		10000	

Expiration Dates:

STD1: **STD4:**

STD2: **STD5:** 02-01-04

STD3: **STD6:**

ICP Calibration Standards

010030

Date Prepared: 1-15-04 Prepared By: DL

HNO3 INORG #: 4344 HCl INORG #: 4394

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
	STD1-	Al	50	2.50		INORVENT		10000	
		Ca	50	2.50		INORVENT		10000	
		Fe	50	2.50		INORVENT		10000	
		K	50	2.50		INORVENT		10000	
		Mg	25	1.25		INORVENT		10000	
		Na	50	2.50		INORVENT		10000	
		Li	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD2-	Ba	10	5.00		INORVENT		1000	
		Be	5	2.50		INORVENT		1000	
		Cr	10	5.00		INORVENT		1000	
		Cu	10	5.00		INORVENT		1000	
		Ni	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD3-	Cd	10	5.00		INORVENT		1000	
		Co	10	5.00		INORVENT		1000	
		Mn	10	5.00		INORVENT		1000	
		V	10	5.00		INORVENT		1000	
		Zn	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD4-	Ag	2	1.00		INORVENT		1000	
		As	10	5.00		INORVENT		1000	
		Pb	10	5.00		INORVENT		1000	
		Sb	10	5.00		INORVENT		1000	
		Se	10	5.00		INORVENT		1000	
		TL	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD5-	B	10	5.00		INORVENT		1000	
		Mo	10	5.00		INORVENT		1000	
		P	10	5.00		INORVENT		1000	
		Si	10	5.00		INORVENT		1000	
		Ti	10	5.00		INORVENT		1000	
		Sr	10	5.00		INORVENT		1000	
		Sn	10	5.00		INORVENT		1000	
		Bi	5	2.50		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
04AIS	STD6- 1.15.04	La	10	5.00	✓	INORVENT	4221	1000	9-1-04
		Na	1	0.05	✓	INORVENT	4205	10000	8-1-04
		Pd	10	5.00	✓	INORVENT	3964	1000	3-1-04
		S	10	5.00	✓	INORVENT	4317	1000	12-1-04
		Th	10	5.00	✓	INORVENT	4283	1000	11-1-04
		U	10	5.00	✓	INORVENT	3974	1000	3-1-04
		W	5	2.50	✓	INORVENT	4203	1000	8-1-04
		Y	10	5.00	✓	INORVENT	4063	1000	6-1-04
		Zr	10	5.00	✓	INORVENT	3954	1000	3-1-04
		SC	10	0.500	✓	INORVENT	4262	10000	10-1-04

Expiration Dates:

STD1: STD4:

STD2: STD5:

STD3: STD6: 3-1-04

ICP ANALYSIS

PROJ. NO.	PROJECT	TO#	DATE	MATRIX	LOGBK PG
06002.01.081	Div 20	040112-2 040115-4	1-19-04	Liquid	56 028

INSTRUMENT: TRACE 1 FILENAME: B040119

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INSTRUMENT DL:

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Method: DAILY1 Standard: blk

Run Time: 01/19/04 15:46:22

010031

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Avge	-.0000	.0006	-.0000	.0001	-.0000	-.0001	.0000
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	428.0	.5173	12.40	13.55	5.022	2.143	1919.
#1	.0000	.0006	-.0000	.0001	-.0000	-.0001	-.0000
#2	-.0000	.0006	-.0000	.0001	-.0000	-.0001	.0000

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Avge	.0000	.0000	-.0000	.0000	.0003	-.0000	.0003
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0017
%RSD	9.297	328.0	73.74	53.43	1.895	16.17	583.7
#1	.0000	.0000	-.0000	.0000	.0003	-.0000	-.0009
#2	.0000	-.0000	-.0000	.0000	.0003	-.0000	.0015

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Avge	.0006	.0002	-.0000	.0000	-.0000	-.0065	-.0002
SDev	.0000	.0000	.0000	.0000	.0000	.0010	.0001
%RSD	.2991	20.98	718.3	27.84	18.13	14.80	24.64
#1	.0006	.0002	.0000	.0000	-.0000	-.0072	-.0002
#2	.0006	.0002	-.0000	.0000	-.0000	-.0058	-.0002

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Avge	-.0000	.0002	.0001	-.0001	-.0000	.0000	.0000
SDev	.0000	.0000	.0001	.0002	.0000	.0000	.0000
%RSD	25.45	14.85	146.8	353.7	356.0	64.01	718.3
#1	-.0000	.0002	.0002	-.0002	.0000	.0000	-.0000
#2	-.0001	.0002	-.0000	.0001	-.0000	.0000	.0000

Elem	Sc3613	1960/1	1960/2	Si2881	Sn1899	Sr4215	Th2837
Avge	75.06	-.0001	.0002	.0013	-.0000	.0000	.0000
SDev	.35	.0001	.0000	.0000	.0000	.0000	.0000
%RSD	.4671	49.63	16.38	2.177	74.54	13.31	94.02
#1	74.81	-.0002	.0002	.0013	-.0000	.0000	.0000
#2	75.31	-.0001	.0002	.0012	-.0000	.0000	.0000

Elem	Ti3372	Tl1908	U_3859	V_2924	W_2079	Y_3710	Zn2062
Avge	-.0015	-.0001	.0043	-.0000	.0001	-.0000	.0000
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	.3557	36.61	.0614	35.79	54.45	309.4	85.15
#1	-.0015	-.0000	.0043	-.0000	.0000	-.0000	.0000
#2	-.0015	-.0001	.0043	-.0000	.0001	.0000	.0000

Elem	Zr3496
Avge	.0002
SDev	.0001
%RSD	51.58
#1	.0002
#2	.0003

1-19-04

2-2-04

1/22/04

010032

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	750544	10000	--	--	--	--	--
SDev	3454.924	.0000000	--	--	--	--	--
%RSD	.4603226	.0000000	--	--	--	--	--
#1	748101	10000	--	--	--	--	--
#2	752987	10000	--	--	--	--	--

Method: DAILY1 Standard: clp_std4
Run Time: 01/19/04 15:50:59

010033

Elem	Ag3280	As1890	2203/1	2203/2	Sb2068	1960/1	1960/2
Avge	.0527	.0907	.4019	.4127	.0993	.1861	.3146
SDev	.0001	.0003	.0015	.0012	.0002	.0003	.0081
%RSD	.1345	.3822	.3650	.2865	.1991	.1772	2.585
#1	.0526	.0904	.4029	.4119	.0991	.1864	.3089
#2	.0527	.0909	.4009	.4135	.0994	.1859	.3204

Elem	Tl1908
Avge	.0277
SDev	.0001
%RSD	.4672
#1	.0278
#2	.0276

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	741605	10000	--	--	--	--	--
SDev	5994.851	.0000000	--	--	--	--	--
%RSD	.8083618	.0000000	--	--	--	--	--
#1	737366	10000	--	--	--	--	--
#2	745844	10000	--	--	--	--	--

Method: DAILY1 Standard: clp_std1
Run Time: 01/19/04 15:54:51

P10034

Elem	Al3082	Ca3179	Fe2714	K_7664	Li6707	Mg2790	Na3302
Avge	.1278	.1469	.0980	1.756	3.673	.0496	.0134
SDev	.0001	.0008	.0007	.011	.024	.0003	.0001
%RSD	.1123	.5727	.7060	.5995	.6557	.5076	.5640
#1	.1277	.1463	.0975	1.764	3.690	.0494	.0134
#2	.1279	.1475	.0985	1.749	3.656	.0498	.0135

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	705498	10000	--	--	--	--	--
SDev	714.8850	.0000000	--	--	--	--	--
%RSD	.1013306	.0000000	--	--	--	--	--
#1	706003	10000	--	--	--	--	--
#2	704992	10000	--	--	--	--	--

Method: DAILY1 Standard: clp_std5
Run Time: 01/19/04 15:58:43

010035

Elem	B_2496	Bi2230	Mo2020	P_1782	Si2881	Sn1899	Sr4215
Avge	.3469	.0531	.1331	.0706	.1217	.1585	1.592
SDev	.0011	.0002	.0019	.0009	.0001	.0004	.013
%RSD	.3273	.3522	1.414	1.334	.0728	.2617	.7987
#1	.3461	.0532	.1318	.0699	.1216	.1582	1.601
#2	.3477	.0530	.1344	.0712	.1218	.1588	1.583

Elem	Ti3372
Avge	1.085
SDev	.002
%RSD	.2030
#1	1.084
#2	1.087

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	726518	10000	--	--	--	--	--
SDev	6779.740	.0000000	--	--	--	--	--
%RSD	.9331827	.0000000	--	--	--	--	--
#1	721724	10000	--	--	--	--	--
#2	731312	10000	--	--	--	--	--

Method: DAILY1 Standard: clp_std2
Run Time: 01/19/04 16:02:14

010036

Elem	Ba4934	Be3130	Cr2677	Cu3247	Ni2316
Avge	.6664	.2352	.2936	.3135	.6951
SDev	.0055	.0031	.0010	.0007	.0068
%RSD	.8310	1.322	.3255	.2118	.9782
#1	.6624	.2330	.2930	.3131	.6903
#2	.6703	.2374	.2943	.3140	.6999

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	650728	10000	--	--	--	--	--
SDev	181686.8	.0000000	--	--	--	--	--
%RSD	27.92055	.0000000	--	--	--	--	--
#1	522256	10000	--	--	--	--	--
#2	779200	10000	--	--	--	--	--

Method: DAILY1 Standard: clp_std3
Run Time: 01/19/04 16:05:23

010037

Elem	Cd2265	Co2286	Mn2576	V_2924	Zn2062
Avge	1.035	.2521	.3945	.0733	.0792
SDev	.006	.0005	.0009	.0001	.0000
%RSD	.6148	.2006	.2391	.1487	.0451
#1	1.039	.2524	.3951	.0733	.0793
#2	1.030	.2517	.3938	.0734	.0792

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	724076	10000	--	--	--	--	--
SDev	7447.956	.0000000	--	--	--	--	--
%RSD	1.028616	.0000000	--	--	--	--	--
#1	718809	10000	--	--	--	--	--
#2	729342	10000	--	--	--	--	--

Method: DAILY1 Standard: clp_std6
Run Time: 01/19/04 16:09:16

010038

Elem	La4086	Na5889	Pd3404	S_1820	Th2837	U_3859	W_2079
Avge	.4097	.1692	.1580	.0503	.0577	.0345	.1045
SDev	.0012	.0027	.0005	.0001	.0003	.0001	.0004
%RSD	.3024	1.568	.3288	.1178	.5615	.2184	.3710
#1	.4088	.1673	.1576	.0503	.0580	.0345	.1042
#2	.4106	.1710	.1583	.0504	.0575	.0344	.1048

Elem	Y_3710	Zr3496
Avge	1.020	1.242
SDev	.001	.003
%RSD	.1381	.2313
#1	1.019	1.240
#2	1.021	1.244

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	711564	10000	--	--	--	--	--
SDev	8367.194	.0000000	--	--	--	--	--
%RSD	1.175889	.0000000	--	--	--	--	--
#1	705647	10000	--	--	--	--	--
#2	717480	10000	--	--	--	--	--

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Method: DAILY1 Slope = Conc(SIR)/IR

010039

Element	Wavelen	High std	Low std	Slope	Y-intercept	Date Standardized
Ag3280	328.068	clp_std4	blk	37.9583	.000075	01/19/04 04:09:16
Al3082	308.215	clp_std1	blk	392.894	-.227187	01/19/04 04:09:16
As1890	189.042	clp_std4	blk	110.274	.002424	01/19/04 04:09:16
B_2496	249.678	clp_std5	blk	28.8315	-.002075	01/19/04 04:09:16
Ba4934	493.409	clp_std2	blk	15.0060	.000620	01/19/04 04:09:16
Be3130	313.042	clp_std2	blk	21.2493	.002307	01/19/04 04:09:16
Bi2230	223.061	clp_std5	blk	93.4516	-.000119	01/19/04 04:09:16
Ca3179	317.933	clp_std1	blk	340.380	-.007258	01/19/04 04:09:16
Cd2265	226.502	clp_std3	blk	9.66075	-.000019	01/19/04 04:09:16
Co2286	228.616	clp_std3	blk	39.6722	.000554	01/19/04 04:09:16
Cr2677	267.716	clp_std2	blk	34.0576	-.000727	01/19/04 04:09:16
Cu3247	324.753	clp_std2	blk	31.9286	-.010487	01/19/04 04:09:16
Fe2714	271.441	clp_std1	blk	510.271	.012242	01/19/04 04:09:16
K_7664	766.491	clp_std1	blk	28.4747	-.008105	01/19/04 04:09:16
La4086	408.672	clp_std6	blk	23.6256	-.013803	01/19/04 04:09:16
Li6707	670.784	clp_std1	blk	2.72242	-.000538	01/19/04 04:09:16
Mg2790	279.078	clp_std1	blk	503.971	.000330	01/19/04 04:09:16
Mn2576	257.610	clp_std3	blk	25.3502	-.000084	01/19/04 04:09:16
Mo2020	202.030	clp_std5	blk	75.1409	.000801	01/19/04 04:09:16
Na5889	588.995	clp_std6	blk	5.69268	.036984	01/19/04 04:09:16
Na3302	330.232	clp_std1	blk	3666.99	.743060	01/19/04 04:09:16
Ni2316	231.604	clp_std2	blk	14.3856	.000680	01/19/04 04:09:16
P_1782	178.287	clp_std5	blk	142.097	-.028862	01/19/04 04:09:16
2203/1	220.351	clp_std4	blk	24.8885	-.002595	01/19/04 04:09:16
2203/2	220.352	clp_std4	blk	24.2273	.001351	01/19/04 04:09:16
Pd3404	340.458	clp_std6	blk	64.2560	.000170	01/19/04 04:09:16
S_1820	182.040	clp_std6	blk	199.160	-.005315	01/19/04 04:09:16
Sb2068	206.838	clp_std4	blk	100.731	-.000330	01/19/04 04:09:16
Sc3613	361.384	blk	dark	1.33454	-.169019	01/19/04 04:09:16
1960/1	196.021	clp_std4	blk	53.6970	.006482	01/19/04 04:09:16
1960/2	196.022	clp_std4	blk	31.8053	-.006210	01/19/04 04:09:16
Si2881	288.158	clp_std5	blk	82.7668	-.104491	01/19/04 04:09:16
Pb220	220.353	NONE	NONE	.000000	.000000	*NOT STANDARDIZED
Se196	196.026	NONE	NONE	1.00000	.000000	*NOT STANDARDIZED
Sn1899	189.989	clp_std5	blk	63.1225	.000714	01/19/04 04:09:16
Sr4215	421.552	clp_std5	blk	6.28006	-.000046	01/19/04 04:09:16
Th2837	283.730	clp_std6	blk	181.867	-.001451	01/19/04 04:09:16
Ti3372	337.280	clp_std5	blk	9.20106	.013810	01/19/04 04:09:16
Tl1908	190.864	clp_std4	blk	360.581	.020161	01/19/04 04:09:16
U_3859	385.958	clp_std6	blk	331.782	-1.43800	01/19/04 04:09:16
V_2924	292.402	clp_std3	blk	136.365	.000727	01/19/04 04:09:16
W_2079	207.910	clp_std6	blk	47.8577	-.003121	01/19/04 04:09:16
Y_3710	371.030	clp_std6	blk	9.79926	.000033	01/19/04 04:09:16
Zn2062	206.200	clp_std3	blk	126.220	-.000421	01/19/04 04:09:16
Zr3496	349.621	clp_std6	blk	8.56686	-.002109	01/19/04 04:09:16

Analysis Report QC Standard 01/19/04 04:18:20 PM page 1

Method: DAILY1 Sample Name: icv/ccv Operator:
Run Time: 01/19/04 16:13:53
Comment:
Mode: CONC Corr. Factor: 1

010040

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9654	10.04	5.352	4.868	10.16	1.010	5.391
SDev	.0065	.06	.041	.041	.04	.011	.016
%RSD	.6716	.6402	.7578	.8520	.3558	1.068	.2995
#1	.9608	9.994	5.323	4.838	10.19	1.002	5.402
#2	.9700	10.09	5.381	4.897	10.14	1.017	5.379
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	20.29	1.016	5.019	2.000	2.034	10.40	19.76
SDev	.25	.004	.053	.024	.009	.09	.07
%RSD	1.212	.4305	1.054	1.217	.4564	.8303	.3758
#1	20.12	1.013	4.982	1.983	2.027	10.34	19.71
#2	20.47	1.019	5.056	2.017	2.041	10.46	19.81
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	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.980	4.945	20.41	1.034	5.149	Q42.29	28.36
SDev	.048	.017	.18	.011	.065	.23	.04
%RSD	.9695	.3341	.9043	1.109	1.270	.5448	.1371
#1	5.015	4.956	20.28	1.026	5.102	Q42.13	28.39
#2	4.946	4.933	20.54	1.042	5.195	Q42.46	28.33
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Fail	QC Pass
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	5.485	5.062	5.172	1.033	1.074	1.051
SDev	.010	.145	.038	.081	.022	.004	.004
%RSD	.1953	2.648	.7580	1.569	2.087	.3636	.3862
#1	4.958	5.382	5.035	5.115	1.048	1.077	1.048
#2	4.972	Q5.587	5.089	5.230	1.018	1.071	1.054
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

6 10041

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.36	5.570	5.668	4.981	5.130	Q5.630	Q5.887
SDev	.53	.036	.066	.038	.067	.056	.046
%RSD	.5408	.6402	1.167	.7632	1.303	.9937	.7864
#1	98.74	5.545	5.621	4.954	5.083	Q5.590	Q5.854
#2	97.99	5.595	5.715	5.008	5.178	Q5.669	Q5.919
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Fail	QC Fail
Value				5.000	5.000	5.000	5.000
Range				10.00	10.00	10.00	10.00

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.160	1.066	5.049	5.349	.9727	5.029	Q1.115
SDev	.025	.006	.027	.029	.0432	.049	.003
%RSD	.4828	.5987	.5319	.5397	4.439	.9737	.2470
#1	5.178	1.071	5.030	5.329	1.003	4.995	Q1.113
#2	5.143	1.062	5.068	5.370	.9422	5.064	Q1.117
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	5.014	1.021	4.999
SDev	.021	.011	.003
%RSD	.4203	1.111	.0558
#1	5.029	1.013	4.997
#2	4.999	1.029	5.001
Errors	QC Pass	QC Pass	QC Pass
Value	5.000	1.000	5.000
Range	10.00	10.00	10.00

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	738250	10000	--	--	--	--	--
SDev	3920.907	.0000000	--	--	--	--	--
%RSD	.5311087	.0000000	--	--	--	--	--
#1	741022	10000	--	--	--	--	--
#2	735477	10000	--	--	--	--	--

Analysis Report Blank Sample 01/19/04 04:24:43 PM page 1

Method: DAILY1 Sample Name: icb/ccb Operator:
Run Time: 01/19/04 16:20:17
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	-.0001	H.0069	.0281	H.0137	.0012	H.0057
SDev	.0012	.0118	.0024	.0081	.0078	.0007	.0016
%RSD	80.21	10000.	34.81	28.95	56.91	56.32	29.04
#1	.0023	.0082	H.0086	.0338	H.0193	.0017	H.0069
#2	.0006	-.0085	H.0052	.0223	H.0082	.0007	.0045
Errors	LC Pass	LC Pass	LC High	LC Pass	LC High	LC Pass	LC High
High	.0050	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0272	.0013	H.0068	.0017	.0027	.0068	-.0215
SDev	.0165	.0007	.0038	.0017	.0015	.0080	.0939
%RSD	60.89	50.44	55.38	102.2	55.93	118.9	437.1
#1	.0389	.0018	H.0095	.0029	.0037	.0124	-.0878
#2	.0155	.0009	.0041	.0005	.0016	.0011	.0449
Errors	LC Pass	LC Pass	LC High	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	H.0071	.0045	.0225	.0013	H.0140	.0303	L-.1135
SDev	.0049	.0024	.0185	.0008	.0059	.0077	.3950
%RSD	68.75	52.55	82.50	61.38	42.08	25.45	348.0
#1	H.0105	H.0062	.0355	.0019	H.0182	.0358	L-.3928
#2	.0036	.0028	.0094	.0007	H.0098	.0249	H.1658
Errors	LC High	LC Pass	LC Pass	LC Pass	LC High	LC Pass	LC Low
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	H.0067	H.0120	.0089	.0076	.0024	.0000	.0022
SDev	.0030	.0089	.0072	.0027	.0025	.0014	.0021
%RSD	45.25	73.91	80.88	35.05	104.6	3870.	93.61
#1	H.0088	H.0183	.0140	.0095	.0041	.0010	.0036
#2	.0045	.0057	.0038	.0057	.0006	-.0010	.0007
Errors	LC High	LC High	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

Analysis Report Blank Sample 01/19/04 04:24:43 PM

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	96.51	.0078	.0079	.0076	H.0080	H.0079	H.0090
SDev	1.30	.0037	.0017	.0055	.0042	.0024	.0067
%RSD	1.348	47.64	21.83	72.40	52.00	30.25	74.59
#1	95.59	.0104	.0092	H.0115	H.0110	H.0096	H.0137
#2	97.43	.0052	.0067	.0037	H.0051	H.0062	.0042
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC High	LC High	LC High
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	H.0071	.0012	H.0071	H.0224	.0180	H.0063	H.0112
SDev	.0041	.0011	.0043	.0067	.0050	.0041	.0028
%RSD	57.31	87.69	61.06	29.88	27.67	65.04	24.91
#1	H.0100	.0005	H.0101	H.0272	.0215	H.0092	H.0132
#2	.0042	.0020	.0040	H.0177	.0145	.0034	.0092
Errors	LC High	LC Pass	LC High	LC High	LC Pass	LC High	LC High
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	H.0072	.0009	H.0073
SDev	.0042	.0011	.0035
%RSD	58.33	126.5	48.66
#1	H.0101	.0017	H.0098
#2	.0042	.0001	.0048
Errors	LC High	LC Pass	LC High
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	724374	10000	--	--	--	--	--
SDev	9695.141	.0000000	--	--	--	--	--
%RSD	1.338416	.0000000	--	--	--	--	--
#1	717519	10000	--	--	--	--	--
#2	731230	10000	--	--	--	--	--

Analysis Report 01/19/04 04:29:20 PM page 1

Method: DAILY1 Sample Name: pbw-A19E2 pg56-028 Operator:
Run Time: 01/19/04 16:24:53
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0007	-.0014	.0111	.0007	-.0001	-.0004
SDev	.0003	.0005	.0002	.0017	.0003	.0000	.0020
%RSD	107.6	78.80	17.09	15.15	44.51	6.834	566.3
#1	.0005	.0011	-.0016	.0123	.0010	-.0001	-.0018
#2	.0001	.0003	-.0012	.0099	.0005	-.0001	.0011
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0248	.0001	.0041	-.0001	.0002	.0038	-.0133
SDev	.0009	.0001	.0002	.0002	.0001	.0034	.0844
%RSD	3.659	81.96	4.158	295.0	61.58	89.85	634.7
#1	.0254	.0000	.0040	-.0002	.0004	.0062	-.0730
#2	.0241	.0002	.0042	.0001	.0001	.0014	.0464
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0008	.0002	.0060	.0001	.0028	-.0015	-.0256
SDev	.0003	.0001	.0000	.0001	.0005	.0099	.2222
%RSD	38.97	34.62	.2317	43.00	18.64	658.8	866.4
#1	.0010	.0002	.0060	.0002	.0032	-.0085	L-.1827
#2	.0006	.0003	.0060	.0001	.0025	.0055	H.1315
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	.0076	.0022	.0003	.0008	H.0201	.0030
SDev	.0008	.0011	.0003	.0027	.0005	.0019	.0016
%RSD	202.6	14.00	11.46	873.1	59.66	9.483	52.52
#1	.0009	.0084	.0024	.0022	.0005	H.0214	.0042
#2	-.0002	.0068	.0020	-.0016	.0012	H.0187	.0019
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

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	96.58	.0011	.0002	.0064	.0009	.0005	.0014
SDev	.61	.0003	.0020	.0005	.0019	.0012	.0026
%RSD	.6348	23.88	852.7	8.074	202.2	233.7	195.5
#1	96.14	.0013	-.0012	.0060	.0023	-.0003	-.0005
#2	97.01	.0009	.0016	.0067	-.0004	.0014	.0032
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	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	.0025	.0006	H.0171	.0264	.0004	.0063
SDev	.0001	.0015	.0006	.0085	.0123	.0000	.0035
%RSD	38.83	59.02	104.4	49.40	46.83	.4010	55.91
#1	.0005	.0035	.0010	H.0112	.0176	.0004	.0038
#2	.0003	.0015	.0001	H.0231	.0351	.0004	.0088
Errors	LC Pass	LC Pass	LC Pass	LC High	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	.0004	.0015	.0008
SDev	.0001	.0003	.0004
%RSD	41.44	17.39	50.71
#1	.0005	.0017	.0005
#2	.0002	.0013	.0011
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	724896	10000	--	--	--	--	--
SDev	4628.014	.0000000	--	--	--	--	--
%RSD	.6384379	.0000000	--	--	--	--	--
#1	721624	10000	--	--	--	--	--
#2	728169	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: lcsw-A19E2 Operator:
Run Time: 01/19/04 16:29:30
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0468	1.903	1.940	.0065	2.009	.0488	-.0011
SDev	.0005	.000	.008	.0018	.006	.0000	.0044
%RSD	1.052	.0077	.3889	26.85	.2742	.0778	419.9
#1	.0465	1.903	1.945	.0078	2.005	.0488	-.0042
#2	.0472	1.903	1.934	.0053	2.013	.0489	.0021

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.24	.0470	.4759	.1884	.2454	.9635	16.58
SDev	.00	.0001	.0011	.0006	.0005	.0020	.01
%RSD	.0001	.0990	.2358	.3172	.2111	.2054	.0867
#1	19.24	.0471	.4767	.1880	.2450	.9649	16.59
#2	19.24	.0470	.4751	.1888	.2457	.9621	16.57

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	-.0001	19.65	.4876	.0015	26.07	16.88
SDev	.0001	.0003	.03	.0004	.0001	.04	.56
%RSD	39.02	385.5	.1672	.0758	5.478	.1513	3.303
#1	.0003	-.0003	19.63	.4878	.0016	26.10	16.49
#2	.0002	.0001	19.67	.4873	.0014	26.05	17.27

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4707	.0050	.4788	.4851	-.0011	.0122	.4824
SDev	.0007	.0140	.0058	.0009	.0004	.0096	.0030
%RSD	.1469	279.9	1.217	.1878	38.47	78.72	.6176
#1	.4712	-.0049	.4747	.4858	-.0014	.0190	.4803
#2	.4702	.0149	.4829	.4845	-.0008	.0054	.4845

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	91.40	2.011	2.046	.0138	.4825	2.033	.0004
SDev	.62	.001	.003	.0010	.0013	.003	.0013
%RSD	.6745	.0689	.1537	7.225	.2765	.1257	335.9
#1	90.96	2.012	2.049	.0131	.4816	2.034	.0013
#2	91.83	2.010	2.044	.0145	.4835	2.031	-.0005

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	-.0021	.0006	2.017	-.0331	.4778	.0056
SDev	.0000	.0003	.0003	.024	.0067	.0002	.0003
%RSD	2.165	12.61	56.90	1.196	20.11	.0362	4.401
#1	.0002	-.0023	.0004	2.000	-.0284	.4777	.0058
#2	.0002	-.0020	.0009	2.034	-.0378	.4779	.0054

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.4695	.0053
SDev	.0000	.0041	.0064
%RSD	105.7	.8647	121.5
#1	-.0001	.4724	.0007
#2	-.0000	.4666	.0098

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	686052	10000	--	--	--	--	--
SDev	4601.851	.0000000	--	--	--	--	--
%RSD	.6707729	.0000000	--	--	--	--	--
#1	682798	10000	--	--	--	--	--
#2	689306	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 239636 Operator:
Run Time: 01/19/04 16:34:19
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0105	.0044	.0215	.0061	-.0000	-.0003
SDev	.0005	.0075	.0045	.0007	.0029	.0001	.0012
%RSD	156.9	71.78	103.3	3.194	47.55	379.0	369.8
#1	.0007	.0158	.0075	.0220	.0081	.0001	-.0012
#2	-.0000	.0051	.0012	.0211	.0040	-.0001	.0005

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.086	.0000	.0053	.0002	.0015	-.0083	10.90
SDev	.010	.0001	.0011	.0004	.0010	.0071	.08
%RSD	.4746	459.7	20.36	239.3	63.87	85.55	.7328
#1	2.093	.0001	.0061	.0005	.0022	-.0033	10.96
#2	2.079	-.0001	.0045	-.0001	.0008	-.0133	10.84

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0008	.0001	12.85	.0016	.0006	S113.8	125.1
SDev	.0002	.0002	.01	.0007	.0003	75.3	2.2
%RSD	23.62	173.1	.1051	44.28	53.33	66.18	1.737
#1	.0009	-.0000	12.84	.0021	.0004	167.0	123.6
#2	.0007	.0003	12.86	.0011	.0008	S60.53	126.6

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0014	2.239	.0046	.0030	-.0000	23.76	.0025
SDev	.0006	.042	.0002	.0023	.0009	.01	.0028
%RSD	45.88	1.857	4.830	78.13	11180.	.0466	111.5
#1	.0019	2.210	.0048	.0046	.0006	23.75	.0045
#2	.0010	2.269	.0045	.0013	-.0006	23.76	.0005

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	94.36	.0109	.0118	.2359	.0035	.0115	.0070
SDev	.13	.0025	.0033	.0014	.0016	.0030	.0017
%RSD	.1424	22.97	27.56	.5825	45.96	26.08	24.35
#1	94.26	.0127	.0141	.2369	.0047	.0137	.0082
#2	94.45	.0092	.0095	.2350	.0024	.0094	.0058

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0013	-.0023	.0005	.0130	-.0316	.0011	.0062
SDev	.0000	.0014	.0003	.0122	.0094	.0008	.0019
%RSD	2.591	57.90	55.44	93.80	29.77	76.00	31.04
#1	.0013	-.0033	.0007	.0217	-.0249	.0017	.0075
#2	.0012	-.0014	.0003	.0044	-.0382	.0005	.0048

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0035	.0017
SDev	.0000	.0011	.0017
%RSD	21.88	32.19	99.79
#1	-.0000	.0043	.0005
#2	-.0001	.0027	.0029

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	708282	10000	--	--	--	--	--
SDev	1055.710	.0000000	--	--	--	--	--
%RSD	.1490524	.0000000	--	--	--	--	--
#1	707535	10000	--	--	--	--	--
#2	709028	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 239637 Operator:
Run Time: 01/19/04 16:39:11
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0089	.0014	.0375	.0010	-.0001	-.0006
SDev	.0005	.0081	.0010	.0003	.0003	.0001	.0021
%RSD	183.9	91.42	70.37	.6588	30.69	109.6	321.8
#1	.0007	.0146	.0021	.0373	.0012	-.0000	.0008
#2	-.0001	.0031	.0007	.0377	.0007	-.0002	-.0021

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.6487	.0001	.0049	-.0004	.0005	.0488	24.11
SDev	.0081	.0000	.0002	.0001	.0001	.0006	.22
%RSD	1.244	10.13	4.411	21.89	10.69	1.296	.9114
#1	.6544	.0001	.0051	-.0005	.0005	.0492	24.27
#2	.6430	.0001	.0048	-.0004	.0006	.0483	23.96

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	.0002	.3784	.0004	.0043	S61.42	176.2
SDev	.0005	.0003	.0313	.0001	.0000	3.10	.3
%RSD	46.47	144.0	8.280	27.79	1.035	5.054	.1800
#1	.0013	-.0000	.4005	.0005	.0043	S63.61	176.0
#2	.0007	.0004	.3562	.0003	.0043	S59.22	176.4

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0008	6.440	.0005	.0026	-.0009	31.37	.0004
SDev	.0005	.025	.0001	.0014	.0002	.04	.0026
%RSD	62.82	.3808	19.33	53.28	25.10	.1222	664.0
#1	.0004	6.458	.0006	.0036	-.0011	31.34	.0022
#2	.0011	6.423	.0004	.0016	-.0008	31.40	-.0014

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	93.09	.0041	.0003	.3935	.0019	.0016	.0017
SDev	1.18	.0014	.0035	.0036	.0010	.0028	.0010
%RSD	1.270	32.71	1155.	.9234	50.39	176.2	59.38
#1	92.26	.0051	.0028	.3961	.0026	.0036	.0025
#2	93.93	.0032	-.0022	.3909	.0012	-.0004	.0010

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0008	.0027	.0006	.0080	-.0366	.0003	.0048
SDev	.0000	.0020	.0003	.0075	.0021	.0001	.0007
%RSD	2.836	75.57	58.28	93.96	5.685	48.61	14.11
#1	.0009	.0041	.0003	.0133	-.0380	.0004	.0043
#2	.0008	.0012	.0008	.0027	-.0351	.0002	.0052

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0048	.0041
SDev	.0000	.0002	.0036
%RSD	73.49	3.960	87.20
#1	.0000	.0046	.0016
#2	.0001	.0049	.0066

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	698729	10000	--	--	--	--	--
SDev	8845.906	.0000000	--	--	--	--	--
%RSD	1.266000	.0000000	--	--	--	--	--
#1	692474	10000	--	--	--	--	--
#2	704984	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 239637s Operator:
Run Time: 01/19/04 16:44:03
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0492	1.926	1.985	.0406	1.924	.0508	-.0002
SDev	.0003	.005	.011	.0003	.018	.0004	.0007
%RSD	.5966	.2465	.5313	.7362	.9593	.8511	424.3
#1	.0495	1.930	1.977	.0408	1.911	.0505	.0003
#2	.0490	1.923	1.992	.0404	1.937	.0511	-.0007

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	20.51	.0489	.4957	.1941	.2452	1.047	46.76
SDev	.01	.0005	.0023	.0002	.0005	.008	.43
%RSD	.0253	1.059	.4726	.1116	.1905	.7662	.9269
#1	20.52	.0485	.4940	.1939	.2449	1.052	47.07
#2	20.51	.0493	.4973	.1942	.2455	1.041	46.45

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	.0006	20.17	.4936	.0041	S60.23	213.9
SDev	.0006	.0002	.01	.0005	.0002	3.40	.1
%RSD	84.80	34.15	.0455	.1094	4.439	5.646	.0451
#1	.0010	.0005	20.17	.4933	.0040	S62.63	213.9
#2	.0003	.0008	20.18	.4940	.0042	S57.83	213.8

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4878	7.226	.4967	.5010	.0021	29.34	.4905
SDev	.0029	.097	.0013	.0037	.0010	.14	.0002
%RSD	.5865	1.346	.2675	.7417	50.40	.4681	.0479
#1	.4858	7.158	.4977	.4984	.0028	29.24	.4903
#2	.4898	7.295	.4958	.5037	.0013	29.44	.4906

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	93.49	2.034	2.067	.4312	.4991	2.054	.0031
SDev	1.23	.006	.006	.0014	.0020	.002	.0017
%RSD	1.315	.3135	.2988	.3284	.4073	.0969	53.64
#1	92.63	2.030	2.072	.4302	.4977	2.056	.0043
#2	94.36	2.039	2.063	.4322	.5005	2.053	.0019

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	-.0028	.0007	2.121	-.0225	.4851	.0067
SDev	.0000	.0014	.0003	.022	.0018	.0018	.0034
%RSD	.6344	49.18	37.90	1.045	8.128	.3605	50.61
#1	.0010	-.0037	.0009	2.105	-.0212	.4839	.0091
#2	.0010	-.0018	.0005	2.136	-.0238	.4863	.0043

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.5164	.0033
SDev	.0001	.0050	.0001
%RSD	108.8	.9756	3.739
#1	.0001	.5128	.0032
#2	.0000	.5200	.0034

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	701783	10000	--	--	--	--	--
SDev	9217.844	.0000000	--	--	--	--	--
%RSD	1.313489	.0000000	--	--	--	--	--
#1	695265	10000	--	--	--	--	--
#2	708301	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 239638 Operator:
Run Time: 01/19/04 16:48:54
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.0233	.0055	.0262	.0082	-.0001	.0006
SDev	.0002	.0048	.0046	.0001	.0031	.0001	.0018
%RSD	142.7	20.55	83.92	.3353	38.04	88.25	312.7
#1	.0000	.0267	.0088	.0263	.0104	-.0002	-.0007
#2	-.0003	.0199	.0023	.0262	.0060	-.0001	.0019

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.8345	-.0000	.0055	.0001	.0020	.0824	39.75
SDev	.0345	.0001	.0001	.0011	.0007	.0243	.45
%RSD	4.135	331.0	1.830	1802.	36.26	29.49	1.137
#1	.8589	-.0001	.0055	.0008	.0025	.0995	40.06
#2	.8101	.0000	.0056	-.0007	.0015	.0652	39.43

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	.0012	.4976	.0021	-.0003	S36.33	1409.
SDev	.0005	.0003	.0304	.0009	.0000	17.26	3.
%RSD	72.18	24.30	6.115	43.78	4.328	47.51	.1804
#1	.0010	.0010	.5191	.0027	-.0003	S48.53	1411.
#2	.0003	.0014	.4761	.0014	-.0003	S24.12	1407.

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0033	7.327	.0011	.0032	-.0004	57.05	.0055
SDev	.0011	.031	.0037	.0006	.0007	.27	.0005
%RSD	32.77	.4166	346.4	20.30	193.1	.4680	8.886
#1	.0041	7.306	-.0015	.0036	-.0009	56.87	.0058
#2	.0026	7.349	.0037	.0027	.0001	57.24	.0051

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	90.40	.0060	.0074	.2761	.0025	.0070	.0067
SDev	1.13	.0030	.0083	.0044	.0008	.0066	.0014
%RSD	1.247	50.18	112.2	1.580	32.50	94.15	21.65
#1	89.60	.0082	.0133	.2792	.0019	.0116	.0056
#2	91.20	.0039	.0015	.2730	.0030	.0023	.0077

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0023	.0055	.0004	.0115	-.1256	.0017	.0092
SDev	.0000	.0051	.0001	.0014	.0084	.0017	.0015
%RSD	.1760	92.14	27.32	11.93	6.693	99.96	16.31
#1	.0023	.0091	.0005	.0125	-.1196	.0029	.0102
#2	.0023	.0019	.0004	.0105	-.1315	.0005	.0081

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0072	.0007
SDev	.0002	.0005	.0006
%RSD	1079.	6.776	88.40
#1	.0002	.0076	.0012
#2	-.0002	.0069	.0003

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	678653	10000	--	--	--	--	--
SDev	8452.755	.0000000	--	--	--	--	--
%RSD	1.245519	.0000000	--	--	--	--	--
#1	672676	10000	--	--	--	--	--
#2	684630	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 239639 Operator:
Run Time: 01/19/04 16:53:46
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	.0155	-.0034	.0303	.0012	-.0002	-.0007
SDev	.0002	.0002	.0032	.0006	.0002	.0001	.0027
%RSD	70.93	1.105	95.90	1.932	19.23	68.98	408.8
#1	-.0003	.0156	-.0011	.0298	.0013	-.0001	.0013
#2	-.0001	.0154	-.0056	.0307	.0010	-.0003	-.0026

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.591	-.0001	.0040	-.0006	.0009	.0450	51.65
SDev	.006	.0000	.0001	.0005	.0006	.0094	.64
%RSD	.3656	17.37	1.291	88.64	64.26	20.82	1.239
#1	1.587	-.0000	.0040	-.0002	.0012	.0516	52.10
#2	1.595	-.0001	.0041	-.0010	.0005	.0383	51.19

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0021	.3553	.0007	-.0004	S33.63	1690.
SDev	.0001	.0003	.0039	.0001	.0008	21.54	8.
%RSD	23.51	15.91	1.100	11.61	213.3	64.06	.4784
#1	.0003	.0019	.3580	.0007	.0002	S48.86	1685.
#2	.0004	.0024	.3525	.0006	-.0010	S18.40	1696.

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	7.251	-.0015	.0022	-.0009	59.00	.0025
SDev	.0005	.041	.0019	.0009	.0003	.00	.0008
%RSD	57.89	.5652	125.9	41.08	29.56	.0003	30.15
#1	.0012	7.222	-.0029	.0028	-.0011	59.00	.0030
#2	.0005	7.280	-.0002	.0016	-.0007	59.00	.0020

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	87.74	.0068	-.0007	.3804	.0010	.0018	.0043
SDev	.24	.0117	.0003	.0007	.0000	.0037	.0003
%RSD	.2789	173.0	41.66	.1846	4.079	206.6	6.059
#1	87.91	-.0015	-.0005	.3799	.0009	-.0008	.0045
#2	87.57	.0150	-.0009	.3809	.0010	.0044	.0041

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0034	.0045	.0009	.0061	-.1177	-.0002	.0018
SDev	.0000	.0011	.0001	.0020	.0031	.0007	.0013
%RSD	.0795	24.42	6.324	32.23	2.655	321.0	68.64
#1	.0033	.0052	.0009	.0075	-.1154	.0003	.0009
#2	.0034	.0037	.0008	.0047	-.1199	-.0008	.0027

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0061	.0046
SDev	.0001	.0001	.0012
%RSD	242.6	1.970	25.64
#1	.0000	.0062	.0037
#2	-.0001	.0060	.0054

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	658709	10000	--	--	--	--	--
SDev	1817.264	.0000000	--	--	--	--	--
%RSD	.2758828	.0000000	--	--	--	--	--
#1	659994	10000	--	--	--	--	--
#2	657424	10000	--	--	--	--	--

Analysis Report 01/19/04 05:03:20 PM page 1

Method: DAILY1 Sample Name: 239746 Operator:
Run Time: 01/19/04 16:58:38
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	.0257	-.0012	.0879	.0009	-.0001	-.0028
SDev	.0010	.0103	.0015	.0000	.0001	.0001	.0016
%RSD	322.9	40.15	126.8	.0021	9.039	128.4	56.28
#1	.0004	.0330	-.0022	.0879	.0010	-.0002	-.0017
#2	-.0010	.0184	-.0001	.0879	.0009	-.0000	-.0039

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	6.243	-.0002	.0040	-.0004	.0011	.0855	8.841
SDev	.032	.0001	.0001	.0003	.0002	.0039	.079
%RSD	.5186	44.54	3.174	65.67	17.94	4.574	.8919
#1	6.266	-.0002	.0041	-.0002	.0010	.0883	8.897
#2	6.220	-.0003	.0039	-.0006	.0012	.0828	8.785

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0017	5.057	.0003	-.0005	S58.21	512.2
SDev	.0014	.0002	.004	.0000	.0010	9.04	6.9
%RSD	1755.	9.045	.0886	.6240	191.1	15.54	1.344
#1	.0011	.0016	5.060	.0003	.0002	S64.60	517.1
#2	-.0009	.0018	5.054	.0003	-.0012	S51.81	507.4

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0012	1.683	.0076	.0098	-.0018	8.532	.0014
SDev	.0001	.044	.0033	.0009	.0011	.128	.0051
%RSD	5.861	2.593	43.18	9.033	62.62	1.504	379.1
#1	.0011	1.713	.0099	.0104	-.0010	8.622	.0050
#2	.0012	1.652	.0053	.0092	-.0026	8.441	-.0023

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	89.49	.0051	-.0032	.4717	.0091	-.0004	.0047
SDev	1.24	.0043	.0006	.0066	.0017	.0011	.0022
%RSD	1.391	83.95	17.84	1.397	18.55	264.1	46.11
#1	88.61	.0082	-.0036	.4764	.0102	.0003	.0062
#2	90.37	.0021	-.0028	.4671	.0079	-.0011	.0032

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0052	.0024	.0011	.0133	-.0409	-.0000	.0020
SDev	.0000	.0004	.0012	.0088	.0200	.0000	.0014
%RSD	.1292	19.21	106.0	66.55	48.82	.1554	70.49
#1	.0052	.0020	.0020	.0070	-.0268	-.0000	.0031
#2	.0052	.0027	.0003	.0195	-.0550	-.0000	.0010

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0144	.0100
SDev	.0001	.0002	.0041
%RSD	155.6	1.344	40.86
#1	.0000	.0143	.0128
#2	-.0001	.0145	.0071

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	671798	10000	--	--	--	--	--
SDev	9258.149	.0000000	--	--	--	--	--
%RSD	1.378114	.0000000	--	--	--	--	--
#1	665252	10000	--	--	--	--	--
#2	678345	10000	--	--	--	--	--

Analysis Report 01/19/04 05:08:13 PM page 1

Method: DAILY1 Sample Name: 239746d Operator:
Run Time: 01/19/04 17:03:30
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0032	.0398	-.0007	.0898	.0010	-.0001	.0079
SDev	.0041	.0198	.0069	.0020	.0001	.0001	.0114
%RSD	128.8	49.69	967.1	2.207	8.682	67.83	143.8
#1	.0061	.0538	.0041	.0912	.0011	-.0002	.0160
#2	.0003	.0258	-.0056	.0884	.0009	-.0001	-.0001

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	6.186	.0007	.0047	-.0003	.0036	.0933	8.625
SDev	.035	.0010	.0001	.0006	.0005	.0087	.030
%RSD	.5709	140.1	2.600	197.3	13.50	9.309	.3425
#1	6.211	.0014	.0048	.0001	.0039	.0994	8.646
#2	6.161	.0000	.0046	-.0007	.0033	.0871	8.604

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0034	.0017	5.017	.0003	.0005	S57.24	499.6
SDev	.0038	.0002	.033	.0001	.0008	9.60	2.3
%RSD	112.3	12.39	.6604	41.33	177.3	16.76	.4524
#1	.0061	.0015	5.040	.0003	.0011	S64.03	501.2
#2	.0007	.0018	4.993	.0002	-.0001	S50.46	498.0

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	1.614	.0107	.0094	-.0005	8.224	.0111
SDev	.0003	.025	.0031	.0028	.0000	.015	.0123
%RSD	27.99	1.573	28.86	29.50	1.632	.1770	110.5
#1	.0011	1.632	.0085	.0114	-.0005	8.214	.0198
#2	.0008	1.596	.0129	.0075	-.0005	8.234	.0024

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	90.64	.0075	-.0021	.5063	.0098	.0011	.0053
SDev	2.06	.0022	.0016	.0063	.0008	.0004	.0055
%RSD	2.269	28.82	77.70	1.244	8.316	33.14	103.9
#1	89.19	.0090	-.0033	.5108	.0104	.0009	.0091
#2	92.10	.0060	-.0009	.5019	.0093	.0014	.0014

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0055	-.0003	.0022	.0113	-.0004	.0002	.0060
SDev	.0002	.0003	.0024	.0054	.0650	.0003	.0104
%RSD	3.011	116.4	107.6	47.94	15380.	151.3	173.6
#1	.0056	-.0001	.0039	.0152	.0456	.0004	.0134
#2	.0054	-.0005	.0005	.0075	-.0464	-.0000	-.0014

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0169	.0071
SDev	.0001	.0004	.0007
%RSD	2156.	2.331	9.618
#1	.0001	.0172	.0066
#2	-.0001	.0166	.0075

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	680408	10000	--	--	--	--	--
SDev	15412.81	.0000000	--	--	--	--	--
%RSD	2.265232	.0000000	--	--	--	--	--
#1	669509	10000	--	--	--	--	--
#2	691306	10000	--	--	--	--	--

Analysis Report QC Standard 01/19/04 05:17:06 PM page 1

Method: DAILY1 Sample Name: icv/ccv Operator:
Run Time: 01/19/04 17:12:21
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9682	9.956	5.309	4.808	10.07	1.021	5.362
SDev	.0009	.027	.006	.032	.01	.001	.026
%RSD	.0956	.2757	.1134	.6621	.1253	.1069	.4836
#1	.9676	9.975	5.304	4.786	10.08	1.021	5.380
#2	.9689	9.937	5.313	4.831	10.06	1.022	5.343
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	20.58	1.024	5.025	2.017	2.006	10.47	19.44
SDev	.04	.001	.013	.005	.005	.05	.09
%RSD	.1952	.0493	.2504	.2321	.2387	.5132	.4533
#1	20.55	1.023	5.016	2.013	2.009	10.43	19.50
#2	20.61	1.024	5.034	2.020	2.003	10.50	19.38
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	20.00	1.000	5.000	2.000	2.000	10.00	20.00
Range	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.923	4.917	20.42	1.038	5.175	Q41.68	28.19
SDev	.014	.045	.02	.004	.035	.28	.23
%RSD	.2866	.9197	.0862	.3389	.6693	.6799	.8208
#1	4.933	4.949	20.40	1.036	5.150	Q41.88	28.35
#2	4.913	4.885	20.43	1.040	5.199	Q41.48	28.03
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Fail	QC Pass
Value	5.000	5.000	20.00	1.000	5.000	30.00	30.00
Range	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.010	5.466	5.128	5.152	.9730	1.036	1.045
SDev	.002	.008	.054	.054	.0043	.013	.007
%RSD	.0376	.1381	1.051	1.047	.4459	1.259	.6547
#1	5.012	5.461	5.166	5.114	.9699	1.045	1.040
#2	5.009	5.472	5.090	5.191	.9761	1.027	1.049
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

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	90.99	5.579	5.544	4.957	5.139	Q5.550	Q5.880
SDev	.12	.071	.037	.008	.018	.001	.013
%RSD	.1288	1.279	.6595	.1651	.3499	.0105	.2228
#1	91.07	5.630	5.518	4.963	5.126	Q5.550	Q5.871
#2	90.91	5.529	5.570	4.951	5.152	Q5.551	Q5.889
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Fail	QC Fail
Value				5.000	5.000	5.000	5.000
Range				10.00	10.00	10.00	10.00

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.180	1.027	5.061	5.308	.9521	5.051	1.035
SDev	.025	.001	.003	.048	.0107	.004	.029
%RSD	.4855	.0847	.0576	.9124	1.120	.0725	2.790
#1	5.198	1.026	5.064	5.273	.9446	5.049	1.015
#2	5.162	1.028	5.059	5.342	.9597	5.054	1.056
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	5.000	1.000	5.000	5.000	1.000	5.000	1.000
Range	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	5.000	1.031	4.919
SDev	.004	.008	.039
%RSD	.0850	.7829	.8017
#1	5.003	1.025	4.891
#2	4.997	1.036	4.947
Errors	QC Pass	QC Pass	QC Pass
Value	5.000	1.000	5.000
Range	10.00	10.00	10.00

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	683042	10000	--	--	--	--	--
SDev	864.7916	.0000000	--	--	--	--	--
%RSD	.1266089	.0000000	--	--	--	--	--
#1	683653	10000	--	--	--	--	--
#2	682430	10000	--	--	--	--	--

Analysis Report Blank Sample 01/19/04 05:24:02 PM page 1

Method: DAILY1 Sample Name: icb/ccb Operator:
Run Time: 01/19/04 17:19:16
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	-.0003	H.0063	.0257	H.0136	.0013	H.0060
SDev	.0005	.0128	.0040	.0073	.0076	.0005	.0069
%RSD	31.38	3977.	64.06	28.39	56.24	40.55	114.6
#1	.0018	.0087	H.0091	.0309	H.0190	.0016	H.0109
#2	.0012	-.0094	.0034	.0206	H.0082	.0009	.0011
Errors	LC Pass	LC Pass	LC High	LC Pass	LC High	LC Pass	LC High
High	.0050	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0282	.0013	H.0064	.0017	.0027	.0101	.0040
SDev	.0149	.0009	.0035	.0019	.0018	.0124	.0589
%RSD	52.89	67.79	54.43	111.0	63.54	122.3	1461.
#1	.0387	.0019	H.0088	.0030	.0040	.0189	-.0376
#2	.0176	.0007	.0039	.0004	.0015	.0014	.0457
Errors	LC Pass	LC Pass	LC High	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	H.0061	.0049	.0235	.0013	H.0125	H.0507	L-.0582
SDev	.0033	.0025	.0152	.0008	.0050	.0141	.1155
%RSD	54.14	50.52	64.65	59.41	40.36	27.82	198.6
#1	H.0084	H.0066	.0342	.0018	H.0160	H.0607	L-.1399
#2	.0038	.0031	.0128	.0007	H.0089	.0408	.0235
Errors	LC High	LC Pass	LC Pass	LC Pass	LC High	LC High	LC Low
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	H.0067	.0047	.0056	.0089	.0016	H.0120	.0022
SDev	.0033	.0051	.0008	.0039	.0004	.0031	.0029
%RSD	48.71	106.8	14.39	43.71	27.27	25.92	133.6
#1	H.0090	.0012	.0062	.0116	.0019	.0098	.0001
#2	.0044	.0083	.0050	.0061	.0013	H.0141	.0043
Errors	LC High	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

Analysis Report Blank Sample 01/19/04 05:24:02 PM

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	92.02	.0077	.0074	.0061	H.0078	H.0075	H.0100
SDev	.85	.0024	.0078	.0042	.0029	.0060	.0048
%RSD	.9269	30.89	105.1	68.49	36.68	79.64	48.12
#1	91.42	.0094	.0130	.0091	H.0098	H.0118	H.0134
#2	92.62	.0060	.0019	.0031	H.0058	.0033	H.0066
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC High	LC High	LC High
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	H.0070	.0027	H.0074	.0100	.0324	H.0068	.0098
SDev	.0040	.0024	.0036	.0020	.0060	.0040	.0069
%RSD	56.27	86.85	49.15	19.70	18.60	59.08	70.24
#1	H.0098	.0044	H.0100	.0086	.0281	H.0096	H.0147
#2	.0042	.0010	.0048	H.0113	.0366	.0039	.0049
Errors	LC High	LC Pass	LC High	LC Pass	LC Pass	LC High	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	H.0067	.0010	H.0132
SDev	.0039	.0003	.0044
%RSD	57.60	26.39	33.84
#1	H.0094	.0012	H.0100
#2	.0040	.0008	H.0163
Errors	LC High	LC Pass	LC High
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	690745	10000	--	--	--	--	--
SDev	6395.074	.0000000	--	--	--	--	--
%RSD	.9258227	.0000000	--	--	--	--	--
#1	686223	10000	--	--	--	--	--
#2	695267	10000	--	--	--	--	--

ICP ANALYSIS

PROJ. NO.	PROJECT	TO#	DATE	MATRIX	LOGBK PG
06002.01.081	Div. 20	040112-2 040115-4	1-22-04	Liquid	56032

INSTRUMENT: TRACE 1 FILENAME: A040122B

INSTRUMENT DL:

Method: DAILY1 Standard: blk
Run Time: 01/22/04 12:58:54

A10071

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Avge	.0005	.0006	-.0000	.0000	-.0000	-.0001	.0000
SDev	.0007	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	134.9	2.382	46.04	74.71	4.002	6.467	12.34
#1	.0000	.0006	-.0000	.0000	-.0000	-.0001	.0000
#2	.0010	.0006	-.0000	.0000	-.0000	-.0001	.0000

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Avge	.0000	.0000	-.0000	.0000	.0004	-.0001	.0013
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0001
%RSD	19.34	169.3	24.11	628.8	1.098	2.751	4.386
#1	.0000	.0000	-.0000	-.0000	.0004	-.0001	.0012
#2	.0000	-.0000	-.0000	.0000	.0004	-.0001	.0013

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Avge	.0006	.0001	-.0000	.0000	.0000	-.0056	-.0002
SDev	.0000	.0000	.0000	.0000	.0001	.0002	.0000
%RSD	2.605	3.166	21.06	.8756	416.0	3.005	5.969
#1	.0006	.0001	-.0000	.0000	-.0000	-.0057	-.0002
#2	.0006	.0001	-.0000	.0000	.0001	-.0055	-.0002

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Avge	-.0000	.0001	.0001	-.0001	.0000	-.0000	.0000
SDev	.0000	.0000	.0001	.0000	.0000	.0001	.0000
%RSD	18.54	12.25	56.40	49.84	27.78	1123.	38.03
#1	-.0000	.0001	.0002	-.0000	.0000	.0000	.0000
#2	-.0000	.0001	.0001	-.0001	.0000	-.0000	.0000

Elem	Sc3613	1960/1	1960/2	Si2881	Sn1899	Sr4215	Th2837
Avge	72.93	-.0001	.0002	.0016	.0000	.0000	.0000
SDev	.64	.0001	.0001	.0000	.0000	.0000	.0000
%RSD	.8789	110.6	70.92	.4299	.8756	14.85	50.95
#1	72.47	-.0002	.0001	.0016	.0000	.0000	.0000
#2	73.38	-.0000	.0003	.0016	.0000	.0000	.0000

Elem	Ti3372	Tl1908	U_3859	V_2924	W_2079	Y_3710	Zn2062
Avge	-.0014	-.0000	.0037	-.0000	.0002	-.0000	-.0000
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	1.032	95.49	.5056	141.4	27.36	141.4	.8756
#1	-.0014	-.0000	.0037	-.0000	.0002	.0000	-.0000
#2	-.0014	-.0001	.0037	.0000	.0001	-.0000	-.0000

Elem	Zr3496
Avge	.0002
SDev	.0000
%RSD	14.15
#1	.0001
#2	.0002

1-22-04

2/2/04

1/23/04

P10072

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	729190	10000	--	--	--	--	--
SDev	6384.467	.0000000	--	--	--	--	--
%RSD	.8755567	.0000000	--	--	--	--	--
#1	724675	10000	--	--	--	--	--
#2	733704	10000	--	--	--	--	--

Method: DAILY1 Standard: clp_std4 010073
Run Time: 01/22/04 13:03:31

Elem	Ag3280	As1890	2203/1	2203/2	Sb2068	1960/1	1960/2
Avge	.0525	.0949	.3785	.3861	.1060	.2039	.3531
SDev	.0002	.0003	.0001	.0022	.0000	.0004	.0030
%RSD	.4226	.2637	.0277	.5683	.0203	.2070	.8535
#1	.0523	.0950	.3786	.3845	.1060	.2036	.3510
#2	.0526	.0947	.3784	.3876	.1059	.2042	.3553

Elem	T11908
Avge	.0265
SDev	.0000
%RSD	.0454
#1	.0265
#2	.0265

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	736472	10000	--	--	--	--	--
SDev	9285.020	.0000000	--	--	--	--	--
%RSD	1.260744	.0000000	--	--	--	--	--
#1	729906	10000	--	--	--	--	--
#2	743037	10000	--	--	--	--	--

Method: DAILY1 Standard: clp_std1
Run Time: 01/22/04 13:07:24

10074

Elem	Al3082	Ca3179	Fe2714	K_7664	Li6707	Mg2790	Na3302
Avge	.1360	.1233	.0909	1.817	3.588	.0512	.0142
SDev	.0001	.0009	.0006	.002	.012	.0003	.0001
%RSD	.0349	.7725	.6184	.1118	.3336	.6364	.6626
#1	.1360	.1226	.0905	1.815	3.580	.0510	.0141
#2	.1360	.1240	.0913	1.818	3.597	.0515	.0142

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	701050	10000	--	--	--	--	--
SDev	4149.303	.0000000	--	--	--	--	--
%RSD	.5918697	.0000000	--	--	--	--	--
#1	698116	10000	--	--	--	--	--
#2	703984	10000	--	--	--	--	--

Method: DAILY1 Standard: clp_std5
Run Time: 01/22/04 13:11:16

010075

Elem	B_2496	Bi2230	Mo2020	P_1782	Si2881	Sn1899	Sr4215
Avge	.3909	.0589	.1290	.0485	.1276	.1408	1.617
SDev	.0029	.0004	.0003	.0002	.0009	.0001	.005
%RSD	.7467	.6872	.2372	.4503	.7451	.0643	.3365
#1	.3889	.0586	.1288	.0484	.1269	.1407	1.613
#2	.3930	.0592	.1293	.0487	.1283	.1409	1.621

Elem	Ti3372
Avge	1.082
SDev	.002
%RSD	.1958
#1	1.084
#2	1.081

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	686955	10000	--	--	--	--	--
SDev	4907.321	.0000000	--	--	--	--	--
%RSD	.7143584	.0000000	--	--	--	--	--
#1	683485	10000	--	--	--	--	--
#2	690425	10000	--	--	--	--	--

Standardization Rpt. 01/22/04 01:17:46 PM page 1

Method: DAILY1 Standard: clp_std2
Run Time: 01/22/04 13:14:47

010076

Elem	Ba4934	Be3130	Cr2677	Cu3247	Ni2316
Avge	.7070	.2091	.2506	.3811	.6204
SDev	.0026	.0003	.0003	.0002	.0007
%RSD	.3663	.1197	.1240	.0495	.1133
#1	.7088	.2093	.2503	.3813	.6199
#2	.7052	.2089	.2508	.3810	.6209

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	706892	10000	--	--	--	--	--
SDev	13766.66	.0000000	--	--	--	--	--
%RSD	1.947493	.0000000	--	--	--	--	--
#1	697157	10000	--	--	--	--	--
#2	716626	10000	--	--	--	--	--

Method: DAILY1 Standard: clp_std3
Run Time: 01/22/04 13:17:56

010077

Elem	Cd2265	Co2286	Mn2576	V_2924	Zn2062
Avge	.9349	.2337	.3601	.0703	.0641
SDev	.0061	.0008	.0024	.0002	.0004
%RSD	.6529	.3196	.6555	.2886	.5905
#1	.9392	.2342	.3618	.0704	.0644
#2	.9306	.2332	.3585	.0702	.0639

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	718413	10000	--	--	--	--	--
SDev	11276.94	.0000000	--	--	--	--	--
%RSD	1.569701	.0000000	--	--	--	--	--
#1	710439	10000	--	--	--	--	--
#2	726387	10000	--	--	--	--	--

Method: DAILY1 Standard: clp_std6
Run Time: 01/22/04 13:21:49

010078

Elem	La4086	Na5889	Pd3404	S_1820	Th2837	U_3859	W_2079
Avge	.4350	.1790	.1736	.0497	.0561	.0377	.0965
SDev	.0025	.0010	.0008	.0002	.0001	.0000	.0004
%RSD	.5697	.5862	.4538	.3651	.2275	.0737	.3877
#1	.4333	.1783	.1731	.0498	.0561	.0377	.0963
#2	.4368	.1798	.1742	.0495	.0562	.0378	.0968

Elem	Y_3710	Zr3496
Avge	1.024	1.242
SDev	.001	.002
%RSD	.1339	.1977
#1	1.023	1.240
#2	1.025	1.244

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	698890	10000	--	--	--	--	--
SDev	7918.182	.0000000	--	--	--	--	--
%RSD	1.132965	.0000000	--	--	--	--	--
#1	693291	10000	--	--	--	--	--
#2	704489	10000	--	--	--	--	--

Standardization Report 01/22/04 01:26:15 PM page 1

Method: DAILY1 Slope = Conc(SIR)/IR 010079

Element	Wavelen	High std	Low std	Slope	Y-intercept	Date Standardized
Ag3280	328.068	clp_std4	blk	38.4862	-.019545	01/22/04 01:21:49
Al3082	308.215	clp_std1	blk	369.204	-.208835	01/22/04 01:21:49
As1890	189.042	clp_std4	blk	105.389	.003621	01/22/04 01:21:49
B_2496	249.678	clp_std5	blk	25.5810	-.000370	01/22/04 01:21:49
Ba4934	493.409	clp_std2	blk	14.1432	.000562	01/22/04 01:21:49
Be3130	313.042	clp_std2	blk	23.8965	.002901	01/22/04 01:21:49
Bi2230	223.061	clp_std5	blk	84.2937	-.002140	01/22/04 01:21:49
Ca3179	317.933	clp_std1	blk	405.543	-.007780	01/22/04 01:21:49
Cd2265	226.502	clp_std3	blk	10.6939	-.000074	01/22/04 01:21:49
Co2286	228.616	clp_std3	blk	42.7895	.000498	01/22/04 01:21:49
Cr2677	267.716	clp_std2	blk	39.9096	-.000080	01/22/04 01:21:49
Cu3247	324.753	clp_std2	blk	26.2666	-.011437	01/22/04 01:21:49
Fe2714	271.441	clp_std1	blk	549.595	.029391	01/22/04 01:21:49
K_7664	766.491	clp_std1	blk	27.5422	-.035026	01/22/04 01:21:49
La4086	408.672	clp_std6	blk	22.2509	-.013638	01/22/04 01:21:49
Li6707	670.784	clp_std1	blk	2.78709	-.000201	01/22/04 01:21:49
Mg2790	279.078	clp_std1	blk	487.654	.002343	01/22/04 01:21:49
Mn2576	257.610	clp_std3	blk	27.7666	-.000076	01/22/04 01:21:49
Mo2020	202.030	clp_std5	blk	77.5061	-.000992	01/22/04 01:21:49
Na5889	588.995	clp_std6	blk	5.41640	.030336	01/22/04 01:21:49
Na3302	330.232	clp_std1	blk	3491.08	.593509	01/22/04 01:21:49
Ni2316	231.604	clp_std2	blk	16.1180	.000708	01/22/04 01:21:49
P_1782	178.287	clp_std5	blk	206.661	-.027476	01/22/04 01:21:49
2203/1	220.351	clp_std4	blk	26.4290	-.003415	01/22/04 01:21:49
2203/2	220.352	clp_std4	blk	25.8965	.001931	01/22/04 01:21:49
Pd3404	340.458	clp_std6	blk	58.4757	-.001686	01/22/04 01:21:49
S_1820	182.040	clp_std6	blk	201.612	.000922	01/22/04 01:21:49
Sb2068	206.838	clp_std4	blk	94.3972	-.002464	01/22/04 01:21:49
Sc3613	361.384	blk	dark	1.37362	-.173969	01/22/04 01:21:49
1960/1	196.021	clp_std4	blk	49.0276	.004290	01/22/04 01:21:49
1960/2	196.022	clp_std4	blk	28.3344	-.004784	01/22/04 01:21:49
Si2881	288.158	clp_std5	blk	79.0993	-.123389	01/22/04 01:21:49
Pb220	220.353	NONE	NONE	.000000	.000000	*NOT STANDARDIZED
Se196	196.026	NONE	NONE	1.00000	.000000	*NOT STANDARDIZED
Sn1899	189.989	clp_std5	blk	71.0836	-.001755	01/22/04 01:21:49
Sr4215	421.552	clp_std5	blk	6.18488	-.000038	01/22/04 01:21:49
Th2837	283.730	clp_std6	blk	187.070	-.003985	01/22/04 01:21:49
Ti3372	337.280	clp_std5	blk	9.22579	.013132	01/22/04 01:21:49
Tl1908	190.864	clp_std4	blk	377.263	.014426	01/22/04 01:21:49
U_3859	385.958	clp_std6	blk	293.847	-1.09346	01/22/04 01:21:49
V_2924	292.402	clp_std3	blk	142.250	.000393	01/22/04 01:21:49
W_2079	207.910	clp_std6	blk	51.8639	-.007976	01/22/04 01:21:49
Y_3710	371.030	clp_std6	blk	9.76601	.000013	01/22/04 01:21:49
Zn2062	206.200	clp_std3	blk	155.942	.000214	01/22/04 01:21:49
Zr3496	349.621	clp_std6	blk	8.56628	-.001327	01/22/04 01:21:49

Analysis Report QC Standard 01/22/04 01:30:52 PM page 1

Method: DAILY1 Sample Name: icv/ccv Operator:
Run Time: 01/22/04 13:26:25
Comment:
Mode: CONC Corr. Factor: 1

010080

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9555	9.940	5.294	4.944	10.06	1.047	5.434
SDev	.0086	.113	.053	.017	.06	.002	.005
%RSD	.9033	1.137	1.009	.3427	.6247	.2023	.0908
#1	.9494	9.860	5.332	4.932	10.02	1.048	5.431
#2	.9617	10.02	5.256	4.956	10.11	1.045	5.438
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	20.18	1.036	5.037	2.097	1.991	10.34	20.00
SDev	.19	.010	.012	.004	.025	.06	.40
%RSD	.9218	.9197	.2354	.1667	1.236	.5501	2.021
#1	20.32	1.043	5.045	2.100	1.973	10.30	19.71
#2	20.05	1.029	5.028	2.095	2.008	10.38	20.29
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	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.991	4.956	20.32	1.048	5.200	Q41.40	Q26.97
SDev	.018	.083	.08	.001	.024	.56	.40
%RSD	.3545	1.667	.4044	.1064	.4684	1.349	1.478
#1	5.003	4.897	20.26	1.048	5.217	Q41.01	Q26.69
#2	4.978	5.014	20.37	1.047	5.183	Q41.80	27.25
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Fail	QC Fail
Value	5.000	5.000	20.00	1.000	5.000	30.00	30.00
Range	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.259	Q5.507	4.848	5.177	1.031	1.058	1.049
SDev	.030	.018	.324	.123	.004	.006	.003
%RSD	.5785	.3250	6.676	2.369	.4250	.5561	.2770
#1	5.280	5.494	5.077	5.090	1.035	1.062	1.051
#2	5.237	Q5.520	4.619	5.264	1.028	1.054	1.047
Errors	QC Pass	QC Fail	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

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.97	5.461	5.637	4.989	5.062	Q5.573	Q6.060
SDev	.47	.175	.122	.032	.026	.023	.037
%RSD	.4653	3.198	2.168	.6317	.5158	.4172	.6036
#1	100.3	5.584	5.550	4.967	5.081	Q5.556	Q6.086
#2	99.64	5.337	5.723	5.011	5.044	Q5.589	Q6.034
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Fail	QC Fail
Value				5.000	5.000	5.000	5.000
Range				10.00	10.00	10.00	10.00

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.288	1.042	5.059	5.465	.9914	5.045	Q1.167
SDev	.020	.013	.002	.025	.0260	.010	.005
%RSD	.3808	1.224	.0467	.4559	2.620	.1935	.4060
#1	5.303	1.033	5.057	5.483	1.010	5.038	Q1.170
#2	5.274	1.051	5.060	5.448	.9731	5.052	Q1.163
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	5.048	1.031	5.047
SDev	.013	.015	.010
%RSD	.2571	1.477	.2063
#1	5.057	1.042	5.039
#2	5.038	1.020	5.054
Errors	QC Pass	QC Pass	QC Pass
Value	5.000	1.000	5.000
Range	10.00	10.00	10.00

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	729006	10000	--	--	--	--	--
SDev	3361.586	.0000000	--	--	--	--	--
%RSD	.4611191	.0000000	--	--	--	--	--
#1	731383	10000	--	--	--	--	--
#2	726629	10000	--	--	--	--	--

Analysis Report Blank Sample 01/22/04 01:37:19 PM page 1

Method: DAILY1 Sample Name: icb/ccb Operator:
Run Time: 01/22/04 13:32:49
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	L-.0187	.0212	.0005	.0049	.0008	-.0001	-.0007
SDev	.0007	.0014	.0038	.0017	.0007	.0004	.0036
%RSD	3.598	6.460	800.3	34.39	90.52	503.8	494.8
#1	L-.0182	.0222	-.0022	.0061	.0013	.0002	.0018
#2	L-.0191	.0202	.0032	.0037	.0003	-.0003	-.0032
Errors	LC Low	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0020	-.0001	.0003	.0000	.0010	-.0054	-.0032
SDev	.0013	.0001	.0003	.0002	.0002	.0052	.0049
%RSD	62.74	65.07	111.6	1254.	22.24	96.89	154.8
#1	.0029	-.0001	.0006	-.0001	.0011	-.0091	.0003
#2	.0011	-.0002	.0001	.0002	.0008	-.0017	-.0067
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	.0004	-.0030	.0001	.0001	.0081	-.0299
SDev	.0004	.0003	.0035	.0000	.0010	.0023	.1407
%RSD	62.89	63.14	117.1	26.60	698.7	28.99	470.4
#1	.0009	.0006	-.0005	.0001	.0008	.0097	H.0696
#2	.0004	.0002	-.0055	.0001	-.0005	.0064	L-.1294
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	.0086	-.0005	.0039	-.0012	.0006	-.0003
SDev	.0000	.0024	.0031	.0029	.0003	.0058	.0004
%RSD	8.872	27.94	598.4	74.01	25.60	960.5	156.2
#1	.0002	.0069	.0017	.0059	-.0014	-.0035	.0000
#2	.0001	H.0103	-.0027	.0018	-.0010	.0047	-.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

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	94.24	-.0076	.0061	.0051	.0024	.0016	.0007
SDev	.40	.0006	.0027	.0012	.0029	.0016	.0007
%RSD	.4202	7.403	43.18	23.65	122.7	100.3	98.19
#1	93.96	-.0080	.0080	.0060	H.0045	.0027	.0012
#2	94.52	-.0072	.0043	.0043	.0003	.0005	.0002
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	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	.0023	.0003	.0002	-.0114	.0001	.0012
SDev	.0004	.0005	.0006	.0038	.0045	.0004	.0040
%RSD	99.06	21.34	186.1	2298.	39.56	557.4	343.5
#1	.0007	.0020	.0008	.0029	-.0082	.0004	.0040
#2	.0001	.0027	-.0001	-.0025	-.0146	-.0002	-.0017
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	.0003	.0002	.0002
SDev	.0003	.0003	.0002
%RSD	89.85	149.9	106.8
#1	.0006	.0004	.0003
#2	.0001	-.0000	.0000
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	687316	10000	--	--	--	--	--
SDev	2842.569	.0000000	--	--	--	--	--
%RSD	.4135753	.0000000	--	--	--	--	--
#1	685306	10000	--	--	--	--	--
#2	689326	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: pbw-A21E2 pg56-032 Operator:
Run Time: 01/22/04 13:37:30
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	L-.0188	.0210	-.0001	.0034	.0000	-.0001	-.0015
SDev	.0001	.0092	.0004	.0006	.0000	.0001	.0018
%RSD	.4950	43.82	349.6	16.30	319.6	38.22	122.7
#1	L-.0189	.0275	-.0003	.0038	.0000	-.0002	-.0028
#2	L-.0188	.0145	.0001	.0030	-.0000	-.0001	-.0002
Errors	LC Low	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	-.0000	.0024	-.0002	.0006	-.0085	-.0050
SDev	.0007	.0001	.0003	.0000	.0001	.0008	.0041
%RSD	404.0	293.8	11.61	21.29	16.54	9.263	81.62
#1	-.0007	.0001	.0026	-.0002	.0007	-.0080	-.0078
#2	.0003	-.0001	.0022	-.0001	.0005	-.0091	-.0021
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0001	-.0016	.0001	-.0015	.0083	-.0224
SDev	.0001	.0000	.0036	.0000	.0001	.0003	.0227
%RSD	94.07	15.72	221.4	4.375	5.615	3.732	101.2
#1	.0002	.0001	-.0041	.0001	-.0016	.0085	-.0385
#2	.0000	.0001	.0009	.0001	-.0014	.0080	-.0064
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	H.0101	.0016	-.0000	-.0021	H.3989	.0013
SDev	.0001	.0001	.0023	.0004	.0005	.0161	.0013
%RSD	91.15	.7844	144.0	1561.	23.80	4.037	99.74
#1	-.0003	H.0100	.0032	.0003	-.0025	H.4103	.0022
#2	-.0001	H.0101	-.0000	-.0003	-.0018	H.3875	.0004
Errors	LC Pass	LC High	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

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	94.35	-.0035	.0016	H.0138	.0005	-.0001	-.0017
SDev	.87	.0030	.0025	.0006	.0010	.0027	.0024
%RSD	.9180	83.40	155.5	4.240	199.7	2970.	140.8
#1	93.74	-.0015	.0034	H.0142	.0012	.0018	-.0034
#2	94.97	-.0056	-.0002	H.0133	-.0002	-.0020	-.0000
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	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	-.0008	.0001	-.0028	-.0114	-.0006	.0010
SDev	.0000	.0021	.0002	.0064	.0099	.0001	.0038
%RSD	34.69	265.7	310.6	228.3	87.06	24.17	387.2
#1	.0000	.0007	-.0001	.0017	-.0184	-.0005	.0036
#2	.0000	-.0022	.0002	-.0074	-.0044	-.0006	-.0017
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0002	.0002
SDev	.0000	.0003	.0008
%RSD	.2792	148.6	391.4
#1	-.0000	.0004	-.0003
#2	-.0000	-.0000	.0007
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	688106	10000	--	--	--	--	--
SDev	6361.133	.0000000	--	--	--	--	--
%RSD	.9244408	.0000000	--	--	--	--	--
#1	683608	10000	--	--	--	--	--
#2	692604	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: lcsw-A21E2 Operator:
Run Time: 01/22/04 13:42:06
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0305	1.869	1.952	.0026	1.988	.0507	-.0018
SDev	.0002	.032	.028	.0004	.019	.0008	.0027
%RSD	.6029	1.715	1.410	14.50	.9527	1.592	151.0
#1	.0304	1.846	1.971	.0028	1.975	.0513	.0001
#2	.0307	1.891	1.932	.0023	2.002	.0501	-.0037

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	18.96	.0488	.4823	.2012	.2398	.9833	16.44
SDev	.57	.0014	.0091	.0053	.0046	.0364	.60
%RSD	3.023	2.962	1.893	2.641	1.925	3.705	3.661
#1	19.36	.0499	.4887	.2049	.2366	1.009	16.01
#2	18.55	.0478	.4758	.1974	.2431	.9575	16.86

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	.0003	19.32	.4985	-.0012	25.21	16.09
SDev	.0000	.0000	.04	.0107	.0011	.72	.54
%RSD	6.780	15.63	.2240	2.142	88.90	2.839	3.382
#1	.0005	.0002	19.35	.5060	-.0005	24.71	15.71
#2	.0005	.0003	19.29	.4909	-.0020	25.72	16.48

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.5027	.0021	.4855	.4879	-.0009	.0992	.4872
SDev	.0120	.0108	.0152	.0137	.0027	.0136	.0021
%RSD	2.384	520.9	3.136	2.799	291.9	13.74	.4350
#1	.5112	.0097	.4962	.4975	-.0028	.1088	.4857
#2	.4943	-.0056	.4747	.4782	.0010	.0896	.4887

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	95.78	2.026	2.049	.0126	.4866	2.039	.0010
SDev	2.98	.010	.021	.0038	.0142	.011	.0006
%RSD	3.111	.4792	1.040	30.15	2.911	.5372	62.86
#1	97.88	2.033	2.033	.0099	.4966	2.031	.0015
#2	93.67	2.020	2.064	.0153	.4766	2.047	.0006

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	-.0061	-.0001	2.055	.0090	.4826	-.0019
SDev	.0000	.0019	.0002	.020	.0188	.0063	.0055
%RSD	6.983	31.38	153.2	.9723	210.1	1.310	290.7
#1	.0002	-.0075	.0000	2.069	.0223	.4870	.0020
#2	.0002	-.0048	-.0003	2.041	-.0044	.4781	-.0058

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.4856	.0013
SDev	.0002	.0244	.0014
%RSD	143.0	5.015	101.9
#1	.0003	.5028	.0023
#2	-.0000	.4684	.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	698472	10000	--	--	--	--	--
SDev	21744.95	.0000000	--	--	--	--	--
%RSD	3.113217	.0000000	--	--	--	--	--
#1	713848	10000	--	--	--	--	--
#2	683096	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 239636r Operator:
Run Time: 01/22/04 13:46:56
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0207	.0230	.0011	.0365	.0015	-.0002	-.0067
SDev	.0034	.0117	.0019	.0016	.0009	.0000	.0069
%RSD	16.49	50.99	170.6	4.461	57.58	3.915	103.5
#1	-.0231	.0147	.0025	.0354	.0021	-.0002	-.0116
#2	-.0183	.0313	-.0002	.0377	.0009	-.0002	-.0018

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	3.785	-.0005	.0039	.0005	.0073	-.0137	28.51
SDev	.006	.0007	.0003	.0002	.0001	.0028	.16
%RSD	.1628	148.9	6.357	41.49	1.403	20.25	.5466
#1	3.781	-.0009	.0037	.0006	.0074	-.0157	28.40
#2	3.789	.0000	.0041	.0003	.0072	-.0117	28.62

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0005	.0014	25.61	.0008	-.0029	S53.40	291.2
SDev	.0022	.0006	.14	.0002	.0006	.31	.3
%RSD	445.8	39.55	.5425	25.86	19.21	.5895	.0952
#1	-.0020	.0010	25.51	.0010	-.0025	S53.63	291.0
#2	.0011	.0018	25.70	.0007	-.0033	S53.18	291.4

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	4.620	-.0014	.0038	-.0028	63.91	-.0075
SDev	.0001	.051	.0008	.0025	.0012	2.00	.0084
%RSD	9.042	1.106	56.30	66.27	43.64	3.131	112.5
#1	.0011	4.656	-.0019	.0056	-.0036	65.32	-.0135
#2	.0009	4.584	-.0008	.0020	-.0019	62.49	-.0015

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	93.45	.0063	.0073	.4675	.0021	.0070	-.0006
SDev	.22	.0016	.0024	.0118	.0014	.0021	.0083
%RSD	.2378	25.27	32.18	2.515	68.48	30.04	1361.
#1	93.29	.0052	.0057	.4591	.0031	.0055	-.0065
#2	93.60	.0074	.0090	.4758	.0011	.0085	.0053

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0025	-.0053	-.0020	-.0216	-.0842	-.0004	-.0058
SDev	.0001	.0019	.0023	.0150	.0385	.0003	.0059
%RSD	5.900	36.71	113.3	69.30	45.71	79.83	102.6
#1	.0024	-.0039	-.0037	-.0322	-.1114	-.0006	-.0099
#2	.0026	-.0067	-.0004	-.0110	-.0570	-.0002	-.0016

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0052	.0003
SDev	.0000	.0003	.0003
%RSD	15.20	6.041	92.46
#1	-.0001	.0049	.0001
#2	-.0001	.0054	.0005

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	681502	10000	--	--	--	--	--
SDev	1611.496	.0000000	--	--	--	--	--
%RSD	.2364626	.0000000	--	--	--	--	--
#1	680362	10000	--	--	--	--	--
#2	682641	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 239637r Operator:
Run Time: 01/22/04 13:51:48
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0192	.0282	.0042	.0762	.0008	-.0002	-.0017
SDev	.0006	.0056	.0016	.0008	.0001	.0001	.0044
%RSD	3.381	20.01	39.54	1.096	10.53	27.60	257.3
#1	-.0197	.0242	.0053	.0757	.0007	-.0002	-.0048
#2	-.0187	.0322	.0030	.0768	.0008	-.0002	.0014

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.262	.0000	.0045	.0000	.0023	.0874	60.73
SDev	.004	.0001	.0010	.0001	.0002	.0007	.10
%RSD	.3332	507.1	22.67	138.6	7.542	.8276	.1581
#1	1.265	-.0001	.0038	.0001	.0021	.0869	60.66
#2	1.259	.0001	.0052	.0000	.0024	.0879	60.80

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	.0031	.7092	.0006	.0048	S46.65	428.4
SDev	.0009	.0004	.0169	.0001	.0007	.95	.6
%RSD	92.13	13.65	2.391	12.90	14.73	2.035	.1370
#1	.0003	.0028	.7212	.0005	.0043	S47.32	428.8
#2	.0016	.0034	.6972	.0006	.0053	S45.98	428.0

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0013	14.29	.0022	-.0010	-.0016	79.31	.0001
SDev	.0012	.06	.0011	.0009	.0028	.64	.0020
%RSD	92.34	.3909	51.57	89.96	176.2	.8102	3840.
#1	.0005	14.25	.0014	-.0016	-.0036	79.77	.0015
#2	.0022	14.33	.0030	-.0004	.0004	78.86	-.0014

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.48	.0072	.0014	.8457	.0001	.0033	.0055
SDev	1.06	.0024	.0028	.0046	.0010	.0011	.0023
%RSD	1.090	34.09	201.7	.5381	1493.	31.78	42.18
#1	96.73	.0055	.0034	.8489	-.0006	.0041	.0039
#2	98.23	.0089	-.0006	.8425	.0007	.0026	.0071

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0017	.0001	-.0001	-.0032	-.0269	-.0005	-.0007
SDev	.0000	.0014	.0001	.0043	.0156	.0001	.0034
%RSD	1.023	990.5	115.7	134.7	57.74	26.59	476.7
#1	.0017	-.0008	-.0002	-.0002	-.0379	-.0004	.0017
#2	.0017	.0011	-.0000	-.0063	-.0159	-.0006	-.0031

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0087	.0017
SDev	.0000	.0001	.0005
%RSD	29.70	.7295	31.67
#1	-.0001	.0087	.0013
#2	-.0001	.0088	.0020

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	710842	10000	--	--	--	--	--
SDev	7742.112	.0000000	--	--	--	--	--
%RSD	1.089146	.0000000	--	--	--	--	--
#1	705368	10000	--	--	--	--	--
#2	716317	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 239638r Operator:
Run Time: 01/22/04 13:56:40
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0188	.0380	-.0008	.0534	.0025	-.0002	-.0004
SDev	.0003	.0103	.0027	.0003	.0001	.0000	.0026
%RSD	1.582	27.19	348.6	.6502	2.422	2.031	686.3
#1	-.0190	.0453	-.0026	.0531	.0024	-.0002	.0014
#2	-.0186	.0307	.0011	.0536	.0025	-.0002	-.0022

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.491	.0000	.0041	.0002	.0035	.1559	98.65
SDev	.002	.0001	.0002	.0000	.0006	.0026	.65
%RSD	.1078	1045.	4.428	11.76	17.78	1.671	.6582
#1	1.490	.0000	.0042	.0002	.0030	.1541	99.11
#2	1.492	-.0000	.0040	.0002	.0039	.1578	98.19

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0021	.0117	.8335	.0007	-.0024	S-34.40	3114.
SDev	.0001	.0007	.0030	.0000	.0009	2.20	6.
%RSD	2.752	5.707	.3585	1.225	36.72	6.408	.1916
#1	.0021	.0113	.8356	.0007	-.0030	S-32.84	3109.
#2	.0020	.0122	.8313	.0007	-.0018	S-35.96	3118.

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0018	15.37	-.0002	.0010	-.0024	116.3	.0007
SDev	.0004	.08	.0013	.0006	.0000	.9	.0024
%RSD	23.27	.5341	517.2	55.68	.0170	.8008	350.9
#1	.0015	15.31	.0006	.0015	-.0024	117.0	.0023
#2	.0021	15.42	-.0011	.0006	-.0024	115.6	-.0010

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	86.15	.0046	.0003	.5734	.0006	.0017	.0051
SDev	.87	.0008	.0019	.0002	.0008	.0015	.0022
%RSD	1.015	17.68	673.5	.0421	130.5	87.33	42.01
#1	85.53	.0052	.0016	.5733	.0012	.0028	.0066
#2	86.77	.0041	-.0010	.5736	.0000	.0007	.0036

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0051	.0044	-.0003	-.0032	-.1404	-.0002	-.0000
SDev	.0000	.0007	.0001	.0100	.0085	.0002	.0001
%RSD	.3370	16.75	45.94	313.5	6.083	80.20	530.3
#1	.0051	.0039	-.0002	.0039	-.1464	-.0003	.0000
#2	.0051	.0050	-.0004	-.0103	-.1343	-.0001	-.0001

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0107	.0002
SDev	.0000	.0005	.0004
%RSD	68.65	4.293	158.0
#1	-.0000	.0111	-.0000
#2	-.0000	.0104	.0005

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	628358	10000	--	--	--	--	--
SDev	6361.133	.0000000	--	--	--	--	--
%RSD	1.012342	.0000000	--	--	--	--	--
#1	623860	10000	--	--	--	--	--
#2	632856	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 239639r Operator:
Run Time: 01/22/04 14:01:19
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0189	.0432	-.0003	.0625	.0014	-.0001	-.0020
SDev	.0008	.0035	.0016	.0010	.0002	.0001	.0010
%RSD	4.402	8.057	542.9	1.626	14.38	130.7	50.95
#1	-.0195	.0456	.0008	.0618	.0015	-.0001	-.0027
#2	-.0183	.0407	-.0014	.0632	.0012	-.0000	-.0013

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.336	.0001	.0046	-.0004	.0063	.0857	123.1
SDev	.013	.0001	.0002	.0011	.0003	.0202	.1
%RSD	.9824	89.08	3.852	291.1	4.824	23.55	.1008
#1	1.346	.0001	.0045	.0004	.0065	.1000	123.2
#2	1.327	.0000	.0047	-.0012	.0061	.0714	123.1

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0014	.0136	.6560	.0007	-.0018	S-54.02	3621.
SDev	.0004	.0005	.0038	.0002	.0002	.33	30.
%RSD	25.63	3.396	.5845	24.96	10.11	.6140	.8400
#1	.0012	.0132	.6587	.0008	-.0019	S-53.78	3642.
#2	.0017	.0139	.6533	.0005	-.0017	S-54.25	3599.

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0016	15.17	-.0002	.0015	-.0030	119.7	-.0006
SDev	.0008	.06	.0019	.0028	.0008	.6	.0003
%RSD	51.80	.4216	975.6	185.0	27.40	.5411	45.46
#1	.0021	15.21	-.0016	.0035	-.0024	120.2	-.0009
#2	.0010	15.12	.0012	-.0005	-.0036	119.3	-.0004

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	88.15	.0008	.0014	.7190	.0009	.0013	.0034
SDev	1.24	.0011	.0012	.0047	.0012	.0004	.0039
%RSD	1.406	138.6	80.77	.6585	129.4	31.90	115.3
#1	87.28	.0016	.0006	.7223	.0018	.0010	.0061
#2	89.03	.0000	.0023	.7156	.0001	.0015	.0006

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0057	.0024	-.0003	.0016	-.1213	-.0004	-.0006
SDev	.0000	.0012	.0003	.0048	.0042	.0008	.0006
%RSD	.0209	49.28	95.06	295.6	3.435	187.7	92.30
#1	.0057	.0032	-.0005	-.0018	-.1242	.0001	-.0002
#2	.0057	.0015	-.0001	.0050	-.1183	-.0010	-.0010

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0111	.0009
SDev	.0002	.0007	.0008
%RSD	183.0	6.019	90.55
#1	.0000	.0116	.0015
#2	-.0002	.0106	.0003

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	642954	10000	--	--	--	--	--
SDev	8995.105	.0000000	--	--	--	--	--
%RSD	1.399027	.0000000	--	--	--	--	--
#1	636594	10000	--	--	--	--	--
#2	649315	10000	--	--	--	--	--

Analysis Report 01/22/04 02:10:22 PM page 1

Method: DAILY1 Sample Name: 239646r Operator:
Run Time: 01/22/04 14:05:55
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0191	.0498	.0016	.1784	.0013	.0001	-.0021
SDev	.0004	.0078	.0040	.0003	.0000	.0000	.0018
%RSD	2.081	15.66	252.7	.1603	1.768	52.43	85.73
#1	-.0194	.0553	.0044	.1782	.0013	.0001	-.0034
#2	-.0189	.0443	-.0012	.1786	.0013	.0000	-.0008

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	11.74	.0001	.0048	.0016	.0019	.1856	24.29
SDev	.10	.0000	.0002	.0002	.0001	.0016	.00
%RSD	.8111	27.14	4.471	11.75	4.914	.8512	.0059
#1	11.81	.0001	.0046	.0018	.0018	.1867	24.28
#2	11.67	.0001	.0049	.0015	.0019	.1845	24.29

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	.0050	9.739	.0004	-.0018	S24.27	1178.
SDev	.0003	.0001	.044	.0000	.0001	.64	.
%RSD	22.76	1.380	.4517	7.905	3.898	2.643	.0315
#1	.0012	.0050	9.770	.0005	-.0018	S24.73	1179.
#2	.0017	.0051	9.708	.0004	-.0019	S23.82	1178.

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0033	3.412	.0180	.0176	-.0020	17.53	-.0002
SDev	.0001	.034	.0014	.0029	.0011	.08	.0006
%RSD	4.166	.9967	8.030	16.40	53.24	.4825	356.7
#1	.0032	3.388	.0169	.0197	-.0027	17.59	.0003
#2	.0034	3.436	.0190	.0156	-.0012	17.47	-.0006

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	94.62	.0015	-.0010	.9311	.0177	-.0002	.0021
SDev	1.08	.0074	.0019	.0027	.0014	.0012	.0004
%RSD	1.139	488.2	187.3	.2872	8.155	774.9	18.29
#1	93.86	.0068	-.0024	.9330	.0188	.0007	.0019
#2	95.38	-.0037	.0003	.9292	.0167	-.0010	.0024

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0111	-.0017	-.0004	.0024	-.0679	-.0001	-.0018
SDev	.0000	.0016	.0002	.0052	.0056	.0003	.0001
%RSD	.1758	92.49	46.17	218.7	8.197	207.3	4.379
#1	.0111	-.0028	-.0005	-.0013	-.0719	.0001	-.0017
#2	.0111	-.0006	-.0003	.0060	-.0640	-.0003	-.0018

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0248	-.0000
SDev	.0001	.0005	.0000
%RSD	585.3	2.106	98.08
#1	.0001	.0244	-.0000
#2	-.0000	.0251	-.0001

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	690036	10000	--	--	--	--	--
SDev	7791.610	.0000000	--	--	--	--	--
%RSD	1.129161	.0000000	--	--	--	--	--
#1	684526	10000	--	--	--	--	--
#2	695545	10000	--	--	--	--	--

Analysis Report QC Standard 01/22/04 02:18:33 PM page 1

Method: DAILY1 Sample Name: icv/ccv Operator:
Run Time: 01/22/04 14:14:07
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.9454	10.00	5.257	4.910	10.14	1.010	5.434
SDev	.0038	.00	.012	.053	.06	.004	.044
%RSD	.4055	.0335	.2333	1.084	.6271	.3791	.8099
#1	.9481	10.00	5.248	4.873	10.10	1.007	5.403
#2	.9426	10.01	5.265	4.948	10.19	1.013	5.465
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1.000	10.00	5.000	5.000	10.00	1.000	5.000
Range	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.71	1.013	4.971	2.065	2.009	10.14	20.74
SDev	.08	.011	.062	.016	.003	.08	.07
%RSD	.3983	1.087	1.243	.7886	.1377	.7444	.3383
#1	19.65	1.005	4.928	2.054	2.007	10.08	20.69
#2	19.77	1.020	5.015	2.077	2.011	10.19	20.79
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	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.064	5.089	20.24	1.036	5.156	Q41.13	27.53
SDev	.019	.033	.13	.010	.042	.29	.15
%RSD	.3843	.6397	.6509	.9513	.8060	.7127	.5376
#1	5.050	5.066	20.15	1.029	5.126	Q40.92	27.64
#2	5.078	5.112	20.33	1.043	5.185	Q41.33	27.43
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Fail	QC Pass
Value	5.000	5.000	20.00	1.000	5.000	30.00	30.00
Range	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.174	Q5.525	5.032	5.063	1.013	1.049	1.059
SDev	.051	.094	.024	.047	.007	.016	.003
%RSD	.9845	1.708	.4820	.9199	.6610	1.484	.3203
#1	5.138	5.459	5.014	5.030	1.008	1.038	1.057
#2	5.210	Q5.592	5.049	5.096	1.018	1.060	1.061
Errors	QC Pass	QC Fail	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

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.54	5.636	5.583	4.958	5.047	Q5.595	Q5.968
SDev	.25	.057	.118	.022	.039	.098	.073
%RSD	.2537	1.012	2.115	.4446	.7745	1.745	1.224
#1	97.72	5.596	5.499	4.942	5.020	Q5.526	Q5.917
#2	97.37	5.676	5.666	4.974	5.075	Q5.664	Q6.020
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Fail	QC Fail
Value				5.000	5.000	5.000	5.000
Range				10.00	10.00	10.00	10.00

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.357	1.022	5.039	Q5.514	.9947	4.981	1.093
SDev	.017	.012	.007	.020	.0060	.022	.022
%RSD	.3102	1.209	.1304	.3708	.6043	.4508	2.025
#1	5.345	1.013	5.044	5.500	.9904	4.965	1.077
#2	5.369	1.031	5.035	Q5.529	.9989	4.997	Q1.109
Errors	QC Pass	QC Pass	QC Pass	QC Fail	QC Pass	QC Pass	QC Pass
Value	5.000	1.000	5.000	5.000	1.000	5.000	1.000
Range	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	5.065	1.005	5.044
SDev	.010	.016	.008
%RSD	.1991	1.612	.1501
#1	5.057	.9934	5.039
#2	5.072	1.016	5.050
Errors	QC Pass	QC Pass	QC Pass
Value	5.000	1.000	5.000
Range	10.00	10.00	10.00

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	711354	10000	--	--	--	--	--
SDev	1800.294	.0000000	--	--	--	--	--
%RSD	.2530799	.0000000	--	--	--	--	--
#1	712627	10000	--	--	--	--	--
#2	710081	10000	--	--	--	--	--

010104

Analysis Report Blank Sample 01/22/04 02:24:57 PM page 1

Method: DAILY1 Sample Name: icb/ccb Operator:
Run Time: 01/22/04 14:20:30
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	L-.0188	.0101	-.0000	.0060	.0009	.0004	-.0015
SDev	.0003	.0071	.0044	.0016	.0009	.0002	.0008
%RSD	1.435	70.16	10030.	26.66	93.17	51.90	52.50
#1	L-.0186	.0151	-.0032	.0071	.0015	.0005	-.0010
#2	L-.0190	.0051	.0031	.0049	.0003	.0003	-.0021
Errors	LC Low	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.0050	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0048	-.0000	.0004	-.0005	-.0001	-.0027	.0038
SDev	.0016	.0001	.0006	.0002	.0001	.0043	.0121
%RSD	34.12	365.9	174.9	42.88	73.42	157.4	323.0
#1	.0060	.0001	.0008	-.0004	-.0002	.0003	.0123
#2	.0037	-.0001	-.0001	-.0007	-.0001	-.0058	-.0048
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	.0012	-.0009	.0001	-.0003	H.1398	H.1449
SDev	.0009	.0004	.0009	.0001	.0003	.0209	.0640
%RSD	133.4	31.53	99.26	158.1	120.1	14.97	44.15
#1	.0013	.0015	-.0003	.0001	-.0000	H.1546	H.1902
#2	.0000	.0009	-.0015	-.0000	-.0005	H.1250	H.0997
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC High	LC High
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.0009	.0016	.0005	-.0009	H.0214	-.0010
SDev	.0004	.0082	.0017	.0012	.0001	.0053	.0004
%RSD	621.7	891.7	104.8	229.3	8.536	24.53	35.72
#1	.0002	.0067	.0028	.0014	-.0008	H.0177	-.0008
#2	-.0004	-.0049	.0004	-.0003	-.0009	H.0252	-.0013
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

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.9	.0004	-.0005	-.0053	.0009	-.0002	-.0024
SDev	.9	.0008	.0001	.0005	.0014	.0002	.0002
%RSD	.8527	216.4	9.538	9.771	153.6	99.75	8.404
#1	100.3	-.0002	-.0005	-.0050	.0018	-.0004	-.0022
#2	101.5	.0009	-.0006	-.0057	-.0001	-.0001	-.0025
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	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	-.0026	.0001	.0068	.0380	.0000	.0027
SDev	.0004	.0003	.0006	.0043	.0091	.0003	.0030
%RSD	93.45	11.00	1135.	63.14	23.90	1977.	113.2
#1	.0008	-.0024	.0005	.0098	.0315	.0002	.0005
#2	.0002	-.0028	-.0004	.0037	.0444	-.0002	.0048
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	.0004	.0001	.0005
SDev	.0004	.0004	.0004
%RSD	100.8	439.8	83.98
#1	.0007	-.0002	.0008
#2	.0001	.0004	.0002
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	736019	10000	--	--	--	--	--
SDev	6223.954	.0000000	--	--	--	--	--
%RSD	.8456241	.0000000	--	--	--	--	--
#1	731618	10000	--	--	--	--	--
#2	740420	10000	--	--	--	--	--

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 040112-2
SRR: 25389
SDG: 239636
CASE: CNWRA
VTSR: January 09, 2004
PROJECT#: 06002.01.081

Certificates of Analysis

010107

FISHER SCIENTIFIC
TRACEMETAL GRADE NITRIC ACID
CERTIFICATE OF ANALYSIS

Catalog No. A509

Lot No: 1103070
Release Date: July, 2003
Expiry Date: July, 2006

Tests	Units	Value
Assay	%	69%
Color	APHA	<10
Aluminum	ppb	<0.2
Antimony	ppb	<0.1
Arsenic	ppb	<0.1
Barium	ppb	<0.1
Beryllium	ppb	<0.1
Bismuth	ppb	<0.1
Boron	ppb	<1
Cadmium	ppb	<0.1
Calcium	ppb	<0.5
Chromium	ppb	<0.1
Cobalt	ppb	<0.1
Copper	ppb	<0.1
Iron	ppb	<0.5
Lead	ppb	<0.1
Lithium	ppb	<0.1
Magnesium	ppb	<0.2
Manganese	ppb	<0.1
Mercury	ppb	<0.2
Molybdenum	ppb	<0.1
Nickel	ppb	<0.1
Potassium	ppb	<0.2
Selenium	ppb	<0.1
Silver	ppb	<0.1
Sodium	ppb	<0.2
Strontium	ppb	<0.1
Thorium	ppb	<0.1
Tin	ppb	<0.1
Titanium	ppb	<0.1
Uranium	ppb	<0.1
Vanadium	ppb	<0.1
Zinc	ppb	<0.2
Zirconium	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.

B McKelvey

Dr. B. McKelvey
QA/QC Manager
Fisher Scientific Chemical Division
Pittsburgh, PA., 15275 Phone (412) 490-8300

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A Fisher Scientific Company

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/25/03
DATE EXPIRED: 11/25/2013
DATE OPENED: 11/25/03
INORG: 4341-4346 PO: F52279

010108

FISHER SCIENTIFIC
TRACEMETAL GRADE HYDROCHLORIC ACID

CERTIFICATE OF ANALYSIS

Catalog No. A508

Lot No: 4103030
Date: March, 2003

Tests	Units	Value
Assay	%	36%
Color	APHA	<10
Aluminum	ppb	<0.5
Antimony	ppb	<0.1
Arsenic	ppb	<0.1
Barium	ppb	<0.1
Beryllium	ppb	<0.1
Bismuth	ppb	<0.1
Boron	ppb	<1
Cadmium	ppb	<0.1
Calcium	ppb	<0.5
Chromium	ppb	<0.1
Cobalt	ppb	<0.1
Copper	ppb	<0.1
Iron	ppb	<0.5
Lead	ppb	<0.1
Lithium	ppb	<0.1
Magnesium	ppb	<0.5
Manganese	ppb	<0.1
Mercury	ppb	<0.2
Molybdenum	ppb	<0.1
Nickel	ppb	<0.1
Potassium	ppb	<0.1
Selenium	ppb	<0.1
Silver	ppb	<0.1
Sodium	ppb	<0.5
Strontium	ppb	<0.1
Thorium	ppb	<0.1
Tin	ppb	<0.1
Titanium	ppb	<0.1
Uranium	ppb	<0.1
Vanadium	ppb	<0.1
Zinc	ppb	<0.5
Zirconium	ppb	<0.1

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/25/03
DATE EXPIRED: 11/25/2013
DATE OPENED: 11/25/03
INORG: 4335-4340 PO: F59279

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.

B McKelvey

Dr. B. McKelvey
QA/QC Manager
Fisher Scientific Chemical Division
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010109

FISHER SCIENTIFIC
TRACEMETAL GRADE HYDROCHLORIC ACID

CERTIFICATE OF ANALYSIS

Catalog No. A508

Lot No: 4103070
Release Date: August, 2003
Expiry Date: August, 2006

Tests	Units	Value
Assay	%	36%
Color	APHA	<10
Aluminum	ppb	<0.5
Antimony	ppb	<0.1
Arsenic	ppb	<0.1
Barium	ppb	<0.1
Beryllium	ppb	<0.1
Bismuth	ppb	<0.1
Boron	ppb	<1
Cadmium	ppb	<0.1
Calcium	ppb	<0.5
Chromium	ppb	<0.1
Cobalt	ppb	<0.1
Copper	ppb	<0.1
Iron	ppb	<0.5
Lead	ppb	<0.1
Lithium	ppb	<0.1
Magnesium	ppb	<0.5
Manganese	ppb	<0.1
Mercury	ppb	<0.2
Molybdenum	ppb	<0.1
Nickel	ppb	<0.1
Potassium	ppb	<0.1
Selenium	ppb	<0.1
Silver	ppb	<0.1
Sodium	ppb	<0.5
Strontium	ppb	<0.1
Thorium	ppb	<0.1
Tin	ppb	<0.1
Titanium	ppb	<0.1
Uranium	ppb	<0.1
Vanadium	ppb	<0.1
Zinc	ppb	<0.5
Zirconium	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.

B McKelvey

Dr. B. McKelvey
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INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 01/06/04
DATE EXPIRED: 01/06/2014
DATE OPENED: 01/06/04
INORG: 4393-4398 PO: F52095

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 10/31/03
DATE EXPIRED: 10/31/04
DATE OPENED: 11/3/03 DK
INORG: 43046 PO: 25861

SPEXertificate™

Certificate of Reference Material

010110

Catalog Number: SPIKE-1 **Lot No.:** 25-23AS
Description: **Spike Sample Standard 1**
Matrix: 5% Nitric Acid/tr Tartaric Acid - HF

This **ASSURANCE** ®certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

The CRM is prepared from high purity single element concentrates of individual elements using Class A laboratory ware to give precise concentration.

Refer to side 2 for details of measurement uncertainties.

Instrumental Analysis by ICP Spectrometer:

Element	Labeled (mg/L)	Measured (mg/L)	NIST SRM	Element	Labeled (mg/L)	Measured (mg/L)	NIST SRM
Al	200	199.51	3101a	Pb	50	49.98	3128
As	200	199.89	3103a	Sb	50	50.02	3102a
Ba	200	199.68	3104a	V	50	49.95	3165
Se	200	200.10	3149	Zn	50	50.02	3168a
TL	200	200.07	3158	Cu	25	25.34	3114
Fe	100	99.91	3126a	Cr	20	20.04	3112a
Co	50	50.25	3113	Ag	5	5.00	3151
Mn	50	49.98	3132	Be	5	5.00	3105a
Ni	50	50.11	3136	Cd	5	4.99	3108

Spex Reference Multi: Lot #2-61BD, 17-55AS, 19-85ASREF

Balances are calibrated regularly with weight sets traceable to NIST#s 32856, 32867 and others. This CRM is guaranteed stable and accurate to +/- 0.5% on the average of all the certified concentrations with no single component exceeding +/- 2%. This guarantee is valid for a period of one year from the date of certification only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: OCT - - 2003 Certifying Officer: N. Kocherakota

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SPEXertificate™ 010111

Certificate of Reference Material

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 09/5/03
DATE EXPIRED: 09/15/2004
DATE OPENED: 09/16/03
INORG: 4045 PO: E5328

Catalog Number: ICAL-1 **Lot No.:** 25-176AS
Description: **Instrument Calibration Standard 1**
Matrix: 5% Nitric Acid

This **ASSURANCE** ®certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

The CRM is prepared from high purity single element concentrates of individual elements using Class A laboratory ware to give precise concentration.

Refer to side 2 for details of measurement uncertainties.

Instrumental Analysis by ICP Spectrometer:

Element	Labeled (mg/L)	Measured (mg/L)	NIST SRM
Ca	5,000	4,984.92	3109a
K	5,000	4,990.26	3141a
Mg	5,000	4,991.82	3131a
Na	5,000	4,998.07	3152a

Spex Reference Multi: Lot #10-100AS, 12-113AS, 5-198VY, 6-28VY-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: SEP -- 2003 Certifying Officer: N. Kocherlakota

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inorganic ventures / iv labs

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

010112

certificate of analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Scandium IN 5% HNO_3 (abs)

Catalog Number: CGSC1-1and CGSC1-5

Lot Number: **W-SC02055**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/24/03
DATE EXPIRED: 12/01/2004
DATE OPENED: 11/25/03
INORG: 4331 PO: F52279

Starting Material:	Sc_2O_3
Starting Material Purity:	99.99%
Starting Material Lot No:	632-5721

CERTIFIED CONCENTRATION: 1000 ± 5 μg/mL

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

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n} \qquad \text{Uncertainty } (\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$$

$(\bar{x})$ = mean x_i = individual results n = number of measurements $\sum S_i$ = The summation of all significant estimated errors.

Classical Wet Assay: 1000 ± 5 μg/mL
Method: EDTA Titration vs NIST SRM 928 Lead Nitrate.

Instrument Analysis: 995 ± 5 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3148a.

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

TRACE METALLIC IMPURITIES DETERMINED BY ICP-MS AND ICP-OES IN μg/mL:

Custom-Grade solutions tested for trace metallic impurities by **ICP-MS** were analyzed in an **ULPA-Filtered Clean Room.** An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 μm .

O	Al	<0.070	M	Dy	<0.00060	M	Li	<0.0010	M	Pr	<0.000030	M	Te	<0.0030
M	Sb	<0.000050	M	Er	<0.00050	M	Lu	<0.000040	M	Re	<0.00010	M	Tb	<0.000030
M	As	<0.0010	M	Eu	<0.00030	M	Mg	<0.0030	M	Rh	<0.00010	M	Tl	<0.00010
M	Ba	<0.0010	M	Gd	<0.00010	M	Mn	<0.00040	M	Rb	<0.00010	M	Th	0.0028
M	Be	<0.000050	M	Ga	<0.00010	O	Hg	i	M	Ru	<0.00020	M	Tm	<0.000040
M	Bi	0.0043	M	Ge	<0.00060	M	Mo	<0.00020	M	Sm	<0.00010	M	Sn	<0.00050
O	B	<0.020	M	Au	<0.00030	M	Nd	<0.00020	s	Sc		M	Ti	<0.0050
M	Cd	<0.00030	M	Hf	0.0030	O	Ni	<0.084	O	Se	<0.67	M	W	<0.0010
O	Ca	0.016	M	Ho	<0.000050	M	Nb	<0.000050	O	Si	<0.034	M	U	<0.00020
M	Ce	<0.00050	M	In	<0.00010	n	Os		M	Ag	0.0050	M	V	<0.00020
M	Cs	<0.000030	M	Ir	<0.00050	M	Pd	<0.00050	O	Na	<0.16	M	Yb	<0.00010
M	Cr	<0.00050	O	Fe	<0.16	O	P	i	M	Sr	<0.000050	M	Y	<0.0040
M	Co	<0.00030	M	La	<0.000050	M	Pt	<0.00020	n	S		M	Zn	0.0075
M	Cu	<0.00060	M	Pb	0.00050	O	K	<5.01	M	Ta	<0.00070	M	Zr	0.032

M - checked by ICP-MS O - checked by ICP-OES i - spectral interference n - not checked for s - solution standard element

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 1.038 g/mL

QA:KL Rev.031303JT6

Paul R. Haines

Quality Assurance Manager Expires: EXPIRES 12/2004

inorganic ventures / iv labs

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10113

certificate of analysis

CUSTOM-GRADE SOLUTION

10,000 µg/mL Scandium IN 5% HNO_3 (abs)

Catalog Number: CGSC10-1and CGSC10-5

Lot Number: **T-SC02053**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 09/24/03
DATE EXPIRED: 10/01/2004
DATE OPENED: 09/24/03
INORG: 4202 PO: E52232

Starting Material:	Sc_2O_3
Starting Material Purity:	99.999%
Starting Material Lot No:	632-5721

CERTIFIED CONCENTRATION: 10,047 ± 29 µg/mL

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

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n} \qquad \text{Uncertainty } (\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$$

$(\bar{x})$ = mean x_i = individual results n = number of measurements $\sum S_i$ = The summation of all significant estimated errors.

Classical Wet Assay: 10,047 ± 29 µg/mL
Method: EDTA Titration vs NIST SRM 928 Lead Nitrate.

Instrument Analysis: 9994 ± 41 µg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3148a.

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

TRACE METALLIC IMPURITIES DETERMINED BY ICP-MS AND ICP-OES IN µg/mL:

Custom-Grade solutions tested for trace metallic impurities by **ICP-MS** were analyzed in an **ULPA-Filtered Clean Room.** An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm .

O	Al	<0.070	M	Dy	<0.0060	M	Li	<0.010	M	Pr	<0.00030	M	Te	<0.030
M	Sb	<0.00050	M	Er	<0.0050	M	Lu	<0.00040	M	Re	<0.0010	M	Tb	<0.00030
M	As	<0.010	M	Eu	<0.0030	M	Mg	<0.030	M	Rh	<0.0010	M	Tl	<0.0010
M	Ba	<0.010	M	Gd	<0.0010	M	Mn	<0.0040	M	Rb	<0.0010	M	Th	0.028
M	Be	<0.00050	M	Ga	<0.0010	i	Hg		M	Ru	<0.0020	M	Tm	<0.00040
M	Bi	0.043	M	Ge	<0.0060	M	Mo	<0.0020	M	Sm	<0.0010	M	Sn	<0.0050
O	B	<0.034	M	Au	<0.0030	M	Nd	<0.0020	s	Sc		n	Ti	
M	Cd	<0.0030	M	Hf	0.030	O	Ni	<0.084	O	Se	<0.67	M	W	<0.010
O	Ca	0.17	M	Ho	<0.00050	M	Nb	<0.00050	O	Si	<0.034	M	U	<0.0020
M	Ce	<0.0050	M	In	<0.0010	n	Os		M	Ag	0.0050	M	V	<0.0020
M	Cs	<0.00030	M	Ir	<0.0050	M	Pd	<0.0050	O	Na	<0.16	M	Yb	<0.0010
M	Cr	<0.0050	O	Fe	<0.16	i	P		M	Sr	<0.00050	M	Y	<0.040
M	Co	<0.0030	M	La	<0.00050	M	Pt	<0.0020	n	S		M	Zn	0.075
M	Cu	<0.0060	M	Pb	0.0050	O	K	<5.01	M	Ta	<0.0070	M	Zr	0.32

M - checked by ICP-MS O - checked by ICP-OES i - spectral interference n - not checked for s - solution standard element

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 1.073 g/mL

(over)

QA:KL Rev.021203DN

Paul R. Haines
Quality Assurance Manager

Expires: EXPIRES 01/2004

SPEXertificate™

010114

Certificate of Reference Material

Catalog Number: PLB9-2X/2Y/2T **Lot No.** 9-143B

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 relevent to the certified properties listed below.

Certified Value: 999.5 mg/L

Uncertainty Associated with Measurement: +/-3.0mg/L

Certified Value is Traceable to: NIST SRM 3107

The CRM is prepared gravimetrically using high purity (NH4)2(B4O7)-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.

Instrumentation Analysis By ICP spectrometer: 998 mg/L

Uncertified Properties:

Density: 1.000 @ 23.7 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.06	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	<0.01	Sb	<0.001
Bi	<0.001	Li	<0.001	Sn	<0.001
Cd	<0.001	Mn	<0.001	Ti	<0.001
Co	<0.001	Mo	<0.001	Tl	<0.001
Ca	0.003	Mg	<0.001	V	0.004
Cr	<0.003	Na	0.026	Zr	<0.001
		Ni	<0.001	Zn	<0.007

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: JUN '03 Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 06/20/03
DATE EXPIRED: 06/30/2004
DATE OPENED: 06/23/03
INORG: 4139 PO: F52370

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010115

Certificate of Reference Material

Catalog Number: PLLI2-2X/2Y **Lot No.** 9-102LI

Description: 1000 mg/L Lithium

Matrix: 2% HNO3

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevent to the certified properties listed below.

Certified Value: 1002 mg/L

Uncertainty Associated with Measurement: +/- 3 mg/L

Certified Value is Traceable to: NIST SRM 3129a

The CRM is prepared gravimetrically using high purity Lithium Carbonate Lot# 03021A. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1002 mg/L

Method: Evaporate to dryness. Fume with Sulfuric Acid. Ignite and weigh as Li2SO4.

Instrumentation Analysis By ICP spectrometer: 1002 mg/L

Uncertified Properties:

Density: 1.014 @ 24.5 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.009	Cu	0.01	Pb	0.001
As	0.004	Fe	0.045	Re	0.002
Ag	<0.001	Ga	<0.001	Rb	<0.001
B	<0.004	In	<0.001	Sr	0.001
Ba	0.004	K	0.05	Sb	0.002
Be	0.002	Mn	<0.001	Sn	<0.001
Bi	<0.001	Mo	0.002	Ti	0.005
Ca	0.03	Mg	0.003	Tl	<0.001
Cr	<0.001	Na	0.02	V	<0.001
Cd	<0.001	Ni	<0.001	Zr	<0.001
Co	0.002			Zn	0.20

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: MAY '03 Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 05/13/03
DATE EXPIRED: 05/15/2004
DATE OPENED: 05/13/03
INORG: 4065 PO: F52181

SPEXertificate™

010116

Certificate of Reference Material

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 05/12/03
DATE EXPIRED: 05/15/2004
DATE OPENED: 05/12/03
INORG: 4066 PO: F52181

Catalog Number: PLMO9-2X/2Y/2T **Lot No.** 9-49MO
Description: 1000 mg/L Molybdenum
Matrix: H2O

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevent to the certified properties listed below.

Certified Value: 1000 mg/L
Uncertainty Associated with Measurement: +/- 3 mg/L
Certified Value is Traceable to: NIST SRM 3134

The CRM is prepared gravimetrically using high purity Ammonium Molybdate Lot# 03011C. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 999 mg/L

Method: Precipitation using 8-Hydroxyquinoline. Filter, dry, and weigh as MoO2(C9H6NO)2

Instrumentation Analysis By ICP spectrometer: 1001 mg/L

Uncertified Properties:

Density: 0.9987 @ 24.6 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.001	Cu	0.004	Pb	0.001
As	0.04	Fe	<0.01	Re	0.03
Ag	<0.001	Ga	<0.001	Rb	<0.001
B	<0.003	In	<0.001	Sr	<0.001
Ba	<0.001	K	0.02	Sb	<0.001
Be	<0.001	Li	<0.001	Sn	<0.001
Bi	<0.001	Mg	0.007	Ti	0.004
Ca	0.006	Mn	<0.001	Tl	<0.001
Cr	<0.005	Na	0.009	V	0.004
Cd	<0.05	Ni	<0.001	Zr	<0.001
Co	<0.001			Zn	<0.001

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: MAY '03 Certifying Officer: N. Kocherlakota

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Certificate of Reference Material

010117

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 10/31/03
DATE EXPIRED: 10/31/2004
DATE OPENED: 11/3/03 DK
INORG: 4307 PO: F52361

Catalog Number: PLP9-2X/2Y/2T **Lot No.** 9-150P

Description: 1000 mg/L Phosphorus

Matrix: H2O

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevent to the certified properties listed below.

Certified Value: 1002.5 mg/L

Uncertainty Associated with Measurement: +/- 3 mg/L

Certified Value is Traceable to: NIST SRM 3139a

The CRM is prepared gravimetrically using high purity (NH4)H2(PO4) Lot# W1002B. 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 Magnesia Mixture. Filter, ignite, and weigh as Mg2P2O7.

Instrumentation Analysis By ICP spectrometer: 1002 mg/L

Uncertified Properties:

Density: 0.9996 @ 24.0 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.002	Cu	<0.001	Pb	<0.001
As	0.001	Fe	<0.001	Rb	<0.001
Ag	<0.002	Ga	<0.001	Re	<0.001
B	<0.002	In	<0.001	Sn	<0.001
Ba	<0.001	K	0.006	Sr	<0.001
Be	<0.001	Li	<0.001	Sb	0.004
Bi	<0.001	Mg	<0.001	Ti	0.004
Ca	0.004	Mn	<0.001	Tl	<0.001
Cr	<0.008	Mo	<0.001	V	<0.006
Cd	<0.001	Na	0.003	Zr	<0.001
Co	<0.001	Ni	<0.001	Zn	0.07

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

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Catalog Number: PLSI9-2X/2Y/2T **Lot No.** 10-07SI

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 relevent to the certified properties listed below.

Certified Value: 998.5 mg/L

Uncertainty Associated with Measurement: +/- 3 mg/L

Certified Value is Traceable to: NIST SRM #3150

The CRM is prepared gravimetrically using high purity (NH4)2SiF6 Lot# 02021D. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 997 mg/L

Method: Precipitation using Ammonium Molybdate and 8-Hydroxy Quinoline. Filter, dry, and weigh as (C9H7ON)4(H4)[Si(Mo12O40)]

Instrumentation Analysis By ICP spectrometer: 1000 mg/L

Uncertified Properties:

Density: 1.010 @ 26.5 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.002	Cu	<0.001	Pb	<0.001
As	<0.001	Fe	0.020	Rb	<0.001
Ag	<0.001	Ga	<0.001	Re	<0.001
B	<0.003	In	<0.001	Sr	<0.001
Ba	<0.001	K	<0.010	Sb	0.03
Be	<0.001	Li	<0.001	Ti	<0.001
Bi	<0.001	Mg	<0.001	Tl	<0.001
Ca	0.018	Mn	<0.001	V	<0.001
Cr	<0.002	Mo	<0.001	Zr	0.05
Cd	<0.001	Na	0.02	Zn	0.06
Co	<0.001	Ni	0.001		

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

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Catalog Number: PLTI9-2X/2Y/2T **Lot No.** 10-38TI

Description: 1000 mg/L Titanium

Matrix: H2O/ 0.24% F-

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevent to the certified properties listed below.

Certified Value: 1001 mg/L

Uncertainty Associated with Measurement: 3.0mg/L

Certified Value is Traceable to: NIST SRM #3162a

The CRM is prepared gravimetrically using high purity (NH4)2TiF6 Lot# 02021E. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1003 mg/L

Method: Precipitation using Ammonium Hydroxide. Filter, ignite, and weigh as TiO2.

Instrumentation Analysis By ICP spectrometer: 999 mg/L

Uncertified Properties:

Density: 1.001 @ 22.5 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.006	Cu	<0.10	Pb	<0.001
As	<0.001	Fe	<0.01	Rb	<0.001
Ag	<0.001	Ga	<0.001	Re	<0.001
B	0.003	In	<0.001	Si	0.52
Ba	<0.001	K	<0.01	Sr	0.001
Be	<0.001	Li	<0.001	Sb	<0.001
Bi	<0.001	Mg	<0.001	Tl	<0.001
Ca	0.013	Mn	<0.001	V	<0.001
Cr	<0.003	Mo	<0.001	Zr	0.01
Cd	<0.001	Na	0.02	Zn	0.03
Co	0.002	Ni	<0.001		

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

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Catalog Number: PLSR2-2X/2Y/2T **Lot No.** 9-166SR

Description: 1000 mg/L Strontium in 2% HNO3

Matrix: 2% HNO3

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevent to the certified properties listed below.

Certified Value: 1002.5 mg/L

Uncertainty Associated with Measurement: +/- 3 mg/L

Certified Value is Traceable to: NIST SRM 3153a

The CRM is prepared gravimetrically using high purity Strontium Carbonate Lot# 02001B. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1002 mg/L

Method: EDTA titration using Methyl Thymol Blue as indicator. EDTA standardized against Pb(NO3)2 NIST SRM #928.

Instrumentation Analysis By ICP spectrometer: 1003 mg/L

Uncertified Properties:

Density: 1.010 @ 22.7 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.02	Cu	<0.001	Pb	<0.001
As	<0.001	Fe	0.001	Rb	<0.001
Ag	<0.002	Ga	<0.001	Re	<0.001
B	<0.003	In	<0.001	Si	0.043
Ba	0.008	K	0.10	Sb	<0.001
Be	<0.001	Li	0.007	Ti	<0.002
Bi	<0.001	Mg	<0.003	Tl	<0.001
Ca	0.014	Mn	<0.001	V	<0.001
Cr	0.001	Mo	<0.001	Zr	<0.001
Cd	<0.001	Na	0.01	Zn	0.04
Co	<0.001	Ni	<0.001		

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

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Catalog Number: PLSN5-2X/2Y/2T **Lot No.** 9-62SN

Description: 1000 mg/L Tin

Matrix: 20% HCL

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevent to the certified properties listed below.

Certified Value: 1000 mg/L

Uncertainty Associated with Measurement: +/- 3 mg/L

Certified Value is Traceable to: NIST SRM 3161a

The CRM is prepared gravimetrically using high purity Tin Metal Lot# 02891N. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 999 mg/L

Method: Precipitation using Ammonium Hydroxide. Filter, ignite, and weigh as SnO2.

Instrumentation Analysis By ICP spectrometer: 1001 mg/L

Uncertified Properties:

Density: 1.034 @ 24.8 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.007	Cu	<0.001	Pb	0.001
As	0.01	Fe	0.02	Rb	<0.001
Ag	0.002	Ga	<0.001	Re	<0.001
B	<0.03	In	<0.001	Sr	<0.001
Ba	<0.001	K	0.10	Sb	0.002
Be	<0.001	Li	<0.001	Ti	<0.001
Bi	<0.001	Mg	<0.001	Tl	<0.001
Ca	0.004	Mn	<0.001	V	<0.001
Cr	<0.005	Mo	<0.001	Zr	<0.001
Cd	<0.001	Na	0.02	Zn	0.03
Co	0.008	Ni	<0.01		

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

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Catalog Number: PLBI4-2X/2Y **Lot No.** 9-36BI

Description: 1000 mg/L Bismuth

Matrix: 10% HNO3

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevent to the certified properties listed below.

Certified Value: 1001 mg/L

Uncertainty Associated with Measurement: +/- 3 mg/L

Certified Value is Traceable to: NIST SRM 3106

The CRM is prepared gravimetrically using high purity Bismuth Metal Lot# 04941B. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1001 mg/L

Method: EDTA titration using Xylenol Orange as indicator. EDTA standardized against Pb(NO3)2 NIST SRM #928.

Instrumentation Analysis By ICP spectrometer: 1001 mg/L

Uncertified Properties:

Density: 1.052 @ 23.1 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.002	Cu	0.034	Pb	0.006
As	<0.001	Fe	0.001	Re	<0.001
Ag	0.002	Ga	<0.001	Rb	<0.001
B	<0.04	In	<0.001	Sr	<0.001
Ba	<0.001	K	0.001	Sb	<0.001
Be	<0.001	Li	<0.001	Sn	<0.001
Cd	<0.001	Mn	<0.001	Ti	<0.001
Co	<0.001	Mo	<0.001	Tl	<0.001
Ca	0.006	Mg	<0.001	V	<0.002
Cr	<0.005	Na	0.005	Zr	<0.001
		Ni	<0.001	Zn	0.02

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

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Catalog Number: PLLA2-2X/2Y **Lot No.** 10-17LA

Description: 1000 mg/L Lanthanum

Matrix: 2% HNO3

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevent to the certified properties listed below.

Certified Value: 996.5 mg/L

Uncertainty Associated with Measurement: +/- 3 mg/L

Certified Value is Traceable to: NIST SRM 3127a

The CRM is prepared gravimetrically using high purity Lanthanum Oxide Lot# 06981D. 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: 998 mg/L

Method: EDTA titration using Methyl Thymol Blue as indicator. EDTA standardized against Pb(NO3)2 NIST SRM #928.

Instrumentation Analysis By ICP spectrometer: 995 mg/L

Uncertified Properties:

Density: 1.010 @ 23.8 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Ce	0.009	Lu	<0.001	Tm	<0.001
Ca	0.05	Mn	<0.001	Ti	<0.001
Dy	<0.001	Mo	<0.001	Tb	<0.001
Er	<0.001	Nd	<0.001	Ta	<0.001
Eu	<0.001	Ni	<0.001	Tl	<0.001
Fe	0.006	Na	0.006	V	<0.001
Gd	<0.2	Pr	<0.001	W	<0.001
Ga	<0.001	Rb	<0.001	Y	<0.001
Hf	<0.001	Sc	<0.003	Yb	<0.001
Ho	<0.001	Sm	<0.001	Zr	<0.001
In	<0.001	Th	<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: MAY '03 Certifying Officer: N. Kocherlakota

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INORG: 4067 PO: F52181

Catalog Number: PLY2-2X/2Y/2T **Lot No.** 9-152Y

Description: 1,000 mg/L Yttrium

Matrix: 2% HNO3

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevent to the certified properties listed below.

Certified Value: 1001.5 mg/L

Uncertainty Associated with Measurement: +/- 3 mg/L

Certified Value is Traceable to: NIST SRM 3167a.

The CRM is prepared gravimetrically using high purity Yttrium Oxide Lot# 08001A. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1002 mg/L

Method: EDTA titration using Methyl Thymol Blue as indicator. EDTA standardized against Pb(NO3)2 NIST SRM #928.

Instrumentation Analysis By ICP spectrometer: 1001 mg/L

Uncertified Properties:

Density: 1.010 @ 24.8 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Ce	<0.001	La	<0.001	Tb	<0.001
Ca	0.007	Lu	<0.001	Tm	<0.001
Dy	<0.001	Mn	<0.001	Tl	<0.001
Er	<0.001	Mo	<0.001	Th	<0.001
Eu	<0.001	Nd	<0.001	Ta	<0.001
Fe	0.003	Ni	<0.001	Ti	<0.001
Gd	<0.001	Na	0.005	V	<0.001
Ga	<0.001	Pr	<0.001	W	<0.001
Hf	<0.001	Rb	<0.001	Yb	<0.001
Ho	<0.001	Sc	<0.001	Zr	0.003
In	<0.001	Sm	<0.001		

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

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Catalog Number: PLPD3-2X/2Y **Lot No.** 10-108PD

Description: 1000 mg/L Palladium

Matrix: 10% HCl

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: 1002.5 mg/L

Uncertainty Associated with Measurement: +/- 3 mg/L

Certified Value is Traceable to: NIST SRM 3138

The CRM is prepared gravimetrically using high purity Palladium Powder Lot# 01021A. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1002 mg/L

Method: Precipitation using Glyoxime. Filter, dry, and weigh as Pd(C4H7O2N2)2

Instrumental Analysis by ICP spectrometer: 1003 mg/L

Uncertified Properties:

Density: 1.017 @ 23.6 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.01	Fe	0.024	Re	<0.001
Au	0.003	Ga	<0.001	Rh	0.001
Ag	0.005	Ir	<0.001	Rb	<0.001
B	<0.002	In	<0.001	Ru	<0.001
Be	<0.003	Mg	0.008	Sn	0.007
Bi	<0.001	Mn	<0.001	Te	<0.002
Ca	0.014	Na	0.02	Ti	<0.001
Cd	<0.001	Ni	<0.001	W	<0.001
Co	0.004	Pb	0.002	Zr	<0.001
Cr	<0.003	Pt	<0.001	Zn	1.0
Cu	0.001				

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: JAN '04 Certifying Officer: N. Kocherlakota

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DATE OPENED: 06/23/03
INORG: 440 PO: 52370

Catalog Number: PLS9-2X/2Y/2T **Lot No.** 8-74S

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 relevent to the certified properties listed below.

Certified Value: 1003 mg/L

Uncertainty Associated with Measurement: +/- 3 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 BaS04.

Instrumentation Analysis By ICP spectrometer: 1003 mg/L

Uncertified Properties:

Density: 1.007 @ 23.6 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	<0.001	Cu	<0.001	Pb	0.002
As	<0.001	Fe	0.008	Rb	<0.001
Ag	<0.001	Ga	<0.001	Re	<0.001
B	<0.004	In	<0.001	Sn	<0.001
Ba	<0.001	K	<0.001	Sr	<0.001
Be	<0.001	Li	<0.001	Sb	<0.001
Bi	<0.001	Mg	0.005	Ti	<0.002
Ca	0.009	Mn	<0.001	Tl	<0.001
Cr	<0.004	Mo	<0.001	V	<0.001
Cd	<0.001	Na	0.02	Zr	<0.001
Co	<0.001	Ni	<0.001	Zn	0.0075

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

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Catalog Number: PLTH2-2X/2Y **Lot No.** 10-24TH

Description: 1000 mg/L Thorium

Matrix: 2% HNO3

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevent to the certified properties listed below.

Certified Value: 999 mg/L

Uncertainty Associated with Measurement: +/- 3.0 mg/L

Certified Value is Traceable to: NIST SRM #3159

The CRM is prepared gravimetrically using high purity Th(NO3)4-4H2O Lot# 01851R. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1000 mg/L

Method: EDTA titration using Xylenol Orange as indicator. EDTA syandardized against Pb(NO3)2 NIST SRM #928.

Instrumentation Analysis By ICP spectrometer: 998 mg/L

Uncertified Properties:

Density: 1.010 @ 22.0 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Ce	0.01	La	0.003	Tb	<0.001
Ca	0.27	Lu	<0.001	Tm	<0.001
Dy	<0.001	Mn	<0.001	Ti	<0.002
Er	<0.001	Mo	<0.001	Ta	<0.001
Eu	<0.001	Nd	0.003	Tl	<0.001
Fe	<0.01	Ni	<0.001	V	<0.001
Gd	<0.001	Na	0.04	W	<0.001
Ga	<0.001	Pr	<0.001	Y	0.002
Hf	<0.001	Rb	<0.001	Yb	<0.001
Ho	<0.001	Sc	<0.03	Zr	<0.001
In	<0.001	Sm	<0.001		

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: AUG '03 Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 09/05/03
DATE EXPIRED: 08/30/2004
DATE OPENED: 09/05/03
INORG: 4033 PO: F59225

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Certificate of Reference Material

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 06/20/03
DATE EXPIRED: 06/30/2004
DATE OPENED: 06/23/03
INORG: 442 PO: F52370

Catalog Number: PLU2-2X/2Y **Lot No.** 9-179U
Description: 1000 mg/L Uranium
Matrix: 2% HNO3

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevent to the certified properties listed below.

Certified Value: 999.5 mg/L
Uncertainty Associated with Measurement: +/- 3 mg/L
Certified Value is Traceable to: NIST SRM 3164.

The CRM is prepared gravimetrically using high purity Uranium Oxide Lot# 04001D. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 999 mg/L

Method: Evaporate to dryness. Ignite and weigh as U3O8.

Instrumentation Analysis By ICP spectrometer: 1000 mg/L

Uncertified Properties:

Density: 1.010 @ 23.6 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.005	Cu	0.02	Pb	0.004
As	0.06	Fe	0.011	Rb	<0.001
Ag	<0.001	Ga	<0.001	Re	<0.001
B	<0.005	In	<0.001	Si	<0.10
Ba	0.004	K	0.008	Sr	0.003
Be	<0.001	Li	<0.001	Sb	0.003
Bi	<0.001	Mg	0.003	Ti	<0.001
Ca	0.012	Mn	0.003	Tl	<0.001
Cr	<0.010	Mo	0.006	V	<0.003
Cd	<0.001	Na	0.10	Zr	<0.001
Co	<0.001	Ni	<0.001	Zn	0.008

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: JUN '03 Certifying Officer: N. Kocherlakota

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Certificate of Reference Material

Catalog Number: PLW9-2X/2Y **Lot No.** 9-177W

Description: 1000 mg/L Tungsten

Matrix: H2O

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevent to the certified properties listed below.

Certified Value: 1,000 mg/L

Uncertainty Associated with Measurement: +/- 3 mg/L

Certified Value is Traceable to: NIST SRM 3163

The CRM is prepared gravimetrically using high purity Ammonium Tungstate Lot# 02001H. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1000 mg/L

Method: Fume with Sulfuric Acid to dryness. Ignite and weigh as WO3.

Instrumentation Analysis By ICP spectrometer: 1000 mg/L

Uncertified Properties:

Density: 0.9979 @ 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	0.002	Cu	<0.001	Pb	<0.001
As	0.01	Fe	<0.01	Rb	<0.001
Ag	<0.003	Ga	<0.001	Re	0.004
B	<0.005	In	<0.001	Si	.56
Ba	<0.001	K	0.05	Sr	<0.001
Be	<0.001	Li	<0.001	Sb	0.001
Bi	<0.001	Mg	<0.001	Ti	<0.001
Ca	0.009	Mn	<0.001	Tl	<0.001
Cr	<0.001	Mo	0.005	V	0.001
Cd	<0.001	Na	0.03	Zr	<0.001
Co	0.001	Ni	<0.001	Zn	0.01

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: AUG '03 Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 08/11/03
DATE EXPIRED: 08/15/2004
DATE OPENED: 08/13/03
INORG: 4212 PO: F52218

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010130

Certificate of Reference Material

Catalog Number: PLZR2-2X/2Y/2T **Lot No.** 10-05ZR

Description: 1000 mg/L Zirconium

Matrix: 2% HNO3

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevent to the certified properties listed below.

Certified Value: 997 mg/L

Uncertainty Associated with Measurement: +/- 3.0 mg/L

Certified Value is Traceable to: NIST SRM 3169

The CRM is prepared gravimetrically using high purity Zirconyl Nitrate Lot# 11011C. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 997 mg/L

Method: Evaporate to dryness. Fume with Sulfuric Acid. Ignite and weigh as ZrO2.

Instrumentation Analysis By ICP spectrometer: 997 mg/L

Uncertified Properties:

Density: 1.010 @ 23.6 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.03	Cu	0.002	Pb	0.002
As	<0.001	Fe	0.017	Rb	<0.001
Ag	<0.05	Ga	<0.001	Re	<0.001
B	<0.004	In	<0.001	Si	0.10
Ba	<0.001	K	0.10	Sr	<0.001
Be	<0.001	Li	0.002	Sb	<0.001
Bi	<0.001	Mg	0.003	Ti	<0.001
Ca	0.11	Mn	<0.001	Tl	<0.001
Cr	<0.009	Mo	<0.001	V	<0.001
Cd	0.004	Na	0.04	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: AUG '03 Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 08/11/03
DATE EXPIRED: 08/15/2004
DATE OPENED: 08/13/03
INORG: 4013 PO: E52018

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Certificate of Reference Material

Catalog Number: PLNA2-3X/3Y **Lot No.** T8-73NA

Description: 10,000 mg/L Sodium

Matrix: 5% HNO3

This **ASSURANCE** ® certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for inorganic spectroscopic instrumentation such as ICPOES, DCP, AA, ICPMS, and XRF. It can be employed in USEPA, ASTM and other methods relevent to the certified properties listed below.

Certified Value: 10,036.5 mg/L

Uncertainty Associated with Measurement: +/- 30 mg/L

Certified Value is Traceable to: NIST SRM 3152a

The CRM is prepared gravimetrically using high purity Sodium Carbonate Lot# 02021A. 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: 10,039 mg/L

Method: Evaporate to dryness. Fume with Sulfuric Acid. Ignite and weigh as Na2SO4.

Instrumentation Analysis By ICP spectrometer: 10,034 mg/ L

Uncertified Properties:

Density: 1.048 @ 23.9 Degrees Celsius

Trace Metallic Impurities in the Actual Solution via ICP / ICPMS Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.02	Cu	<0.002	Pb	<0.001
As	<0.08	Fe	0.03	Re	<0.001
Ag	<0.02	Ga	<0.001	Rb	<0.001
B	<0.1	In	<0.001	Sr	<0.001
Ba	0.008	K	1.36	Sb	<0.001
Be	<0.01	Li	<0.002	Sn	<0.001
Bi	<0.001	Mg	0.60	Ti	<0.03
Ca	0.60	Mn	<0.02	Tl	<0.001
Cr	0.002	Mo	<0.001	V	<0.001
Cd	<0.01	Ni	<0.003	Zr	<0.001
Co	<0.001			Zn	<0.05

Balances are calibrated regularly with weight sets traceable to NIST #32856, #32857 and others. This CRM is guaranteed stable to +/-0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: FEB -- '03 Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 02/13/03
DATE EXPIRED: 02/15/2004
DATE OPENED: 02/13/03
INORG: 3951 PO: E52060

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Certificate of Reference Material

INTERGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/20/03
DATE EXPIRED: 11/30/2004
DATE OPENED: 11/21/03
INORG: 4328 PO: F52278

Catalog Number: ICV-2A **Lot No.:** 24-84AS
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	Element	Labeled (mg/L)	Measured (mg/L)	NIST SRM
Ca	2,000	2,005.40	3109a	Ni	500	500.58	3136
K	2,000	1,997.89	3141a	V	500	504.23	3165
Mg	2,000	1,992.26	3131a	Cr	200	203.21	3112a
Na	2,000	1,992.99	3152a	Cu	200	199.75	3114
Al	1,000	1,005.90	3101a	Ag	100	100.46	3151
Ba	1,000	1,001.51	3104a	Be	100	100.04	3105a
Fe	1,000	1,003.17	3126a	Mn	100	100.64	3132
Co	500	505.10	3113	Zn	100	100.52	3168a

Spex Reference Multi: Lot #4-63BD, 14-125AS

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 - - 2003 Certifying Officer: N. Kocheriakota

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010133

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 -- 2003 Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/20/03
DATE EXPIRED: 11/30/2004
DATE OPENED: 11/21/03
INORG: 4329 PO: F52278

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Certificate of Reference Material

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/20/03
DATE EXPIRED: 11/30/2004
DATE OPENED: 11/21/03
INORG: 4330 PO: F52278

Catalog Number: ICV-2C **Lot No.:** 24-85AS
Description: **Initial Calibration Verification Standard II**
Matrix: 5% Nitric Acid

This **ASSURÅNCE** ®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	497.85	3103a
Pb	500	495.41	3128
Se	500	501.98	3149
TL	500	501.89	3158
Cd	100	99.77	3108

Spex Reference Multi: Lot #4-51BDREF, 15-39AS, 11-173AS

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 - - 2003 Certifying Officer: N. Kocherlakota

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inorganic ventures / iv labs

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

certificate of analysis

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

010135

2.0 DESCRIPTION OF CRM

Custom-Grade **10000 µg/mL Aluminum in 5% (abs) HNO_3**

Catalog Number:	CGAL10-1 and CGAL10-5
Lot Number:	**W-AL04008**
Starting Material:	Al metal
Starting Material Purity (%):	99.998460
Starting Material Lot No	607116
Matrix:	5% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 08/26/03
DATE EXPIRED: 09/01/2004
DATE OPENED: 08/26/03
INORG: 4220 PO: F52224

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 10070 ± 31 µg/mL

Certified Density: 1.059 g/mL (measured at 22° C)

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

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

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

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

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

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

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

4.1 **Assay Method #1** **10006 ± 55 µg/mL**
ICP Assay NIST SRM 3101a Lot Number: 992003

Assay Method #2 **10070 ± 31 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

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

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

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

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

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

S	Al		M	Dy	< 0.02695	O	Li	0.00011	M	Pr	< 0.00135	M	Te	< 0.13473
M	Sb	< 0.00225	M	Er	< 0.02245	M	Lu	< 0.00180	M	Re	< 0.00449	M	Tb	< 0.00135
M	As	< 0.04491	M	Eu	< 0.01347	O	Mg	0.00470	M	Rh	< 0.00449	M	Tl	< 0.00449
M	Ba	< 0.04491	M	Gd	< 0.00449	M	Mn	< 0.01796	M	Rb	< 0.00449	M	Th	< 0.00449
O	Be	< 0.00017	M	Ga	< 0.00449	O	Hg	< 0.00700	M	Ru	< 0.00898	M	Tm	< 0.00180
M	Bi	< 0.00180	M	Ge	< 0.02695	M	Mo	< 0.00898	M	Sm	< 0.00449	M	Sn	< 0.02245
O	B	0.01164	M	Au	< 0.01347	M	Nd	< 0.00898	M	Sc	< 0.04491	M	Ti	< 0.22454
M	Cd	< 0.01347	M	Hf	< 0.00898	O	Ni	< 0.00600	M	Se	< 0.03593	M	W	< 0.04491
O	Ca	0.01903	M	Ho	< 0.00225	M	Nb	< 0.00225	O	Si	0.07389	M	U	< 0.00898
M	Ce	< 0.02245	O	In	< 0.03000	n	Os		M	Ag	< 0.00898	M	V	< 0.00898
M	Cs	< 0.00135	M	Ir	< 0.02245	M	Pd	< 0.02245	O	Na	0.03359	M	Yb	< 0.00449
O	Cr	0.00336	O	Fe	0.00493	O	P	< 0.03000	M	Sr	< 0.00225	M	Y	< 0.17963
M	Co	< 0.01347	M	La	< 0.00225	M	Pt	< 0.00898	O	S	< 0.10000	M	Zn	< 0.08982
M	Cu	< 0.02695	M	Pb	< 0.01347	O	K	0.02911	M	Ta	< 0.03144	M	Zr	< 0.02245

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

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

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

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 26.98154; +3; 6; $Al(H_2O)_6^{3+}$

Chemical Compatibility - Soluble in HCl, HNO_3, HF and H_2SO_4. Avoid neutral media. Soluble in strongly basic NaOH forming the $Al(OH)_4(H_2O)_2^{1-}$ species. Stable with most metals and inorganic anions. The phosphate is insoluble in water and only slightly soluble in acid.

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

Al Containing Samples (Preparation and Solution) - Metal (Best dissolved in HCl / HNO_3); α- Al_2O_3 (Na_2CO_3 fusion in Pt[a]); γ- Al_2O_3 (Soluble in acids such as HCl); Ores (Carbonate fusion in Pt[a] followed by HCl dissolution); Organic Matrices (sulfuric/peroxide digestion or nitric / sulfuric / perchloric acid decomposition, or dry ash and dissolution in dilute HCl.

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

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≥ppm)
ICP-OES 394.401 nm	0.05 / 0.006 µg/mL	1	atom	U, Ce
ICP-OES 396.152 nm	0.03 / 0.006 µg/mL	1	atom	Mo, Zr, Ce
ICP-OES 167.078 nm	0.1 / 0.009 µg/mL	1	ion	Fe
ICP-MS 27 amu	30 ppt	n/a	M[+]	$^{12}C^{15}N$, $^{13}C^{14}N$, $^{1}H^{12}C^{14}N$, $^{11}B^{16}O$, $^{54}Cr^{2+}$, $^{54}Fe^{2+}$

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

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105

Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)

Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter) , Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

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

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

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

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

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

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 08/26/03
DATE EXPIRED: 09/01/2004
DATE OPENED: 08/26/03
INORG: 4220 PO: F52224

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010138

11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: February 13, 2003

Expiration Date:

EXPIRES
1 2004

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Supervisor	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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inorganic ventures / iv labs

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certificate of analysis

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

2.0 DESCRIPTION OF CRM

Custom-Grade 10000 µg/mL Calcium in 1.4% (abs) HNO_3

Catalog Number:	CGCA10-1 AND CGCA10-5
Lot Number:	T-CA03010
Starting Material:	CaO
Starting Material Purity (%):	99.9981
Starting Material Lot No	C27L01
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Pg. 1 of
DATE RECEIVED: 01/09/03
DATE EXPIRED: 02/01/2004
DATE OPENED: 01/10/03
INORG: 3900 PO: F52071

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 10,007 ± 22 µg/mL

Certified Density: 1.037 g/mL (measured at 22° C)

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

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

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

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

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

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

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

4.1 **Assay Method #1** **10,034 ± 25 µg/mL**
ICP Assay NIST SRM 3109a Lot Number: 000622

Assay Method #2 **10,007 ± 22 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

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

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

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

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

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

O	Al		0.00064	M	Dy	<	0.02560	O	Li	<	0.00002	M	Pr	<	0.00128	M	Te	<	0.12798
M	Sb	<	0.00213	M	Er	<	0.02133	M	Lu	<	0.00171	M	Re	<	0.00427	M	Tb	<	0.00128
M	As	<	0.04266	M	Eu	<	0.01280	O	Mg		0.07143	M	Rh	<	0.00427	M	Tl	<	0.00427
O	Ba		0.00071	M	Gd	<	0.00427	O	Mn		0.00041	M	Rb	<	0.00427	M	Th	<	0.00427
O	Be	<	0.00009	M	Ga	<	0.00427	O	Hg	<	0.01100	M	Ru	<	0.00853	M	Tm	<	0.00171
M	Bi	<	0.00171	M	Ge	<	0.02560	M	Mo	<	0.00853	M	Sm	<	0.00427	M	Sn	<	0.02133
O	B	<	0.00054	M	Au	<	0.01280	M	Nd	<	0.00853	O	Sc	<	0.00002	M	Ti	<	0.21329
O	Cd	<	0.00450	M	Hf	<	0.00853	O	Ni	<	0.00230	O	Se	<	0.00620	M	W	<	0.04266
S	Ca			M	Ho	<	0.00213	M	Nb	<	0.00213	O	Si		0.00214	M	U	<	0.00853
M	Ce	<	0.02133	O	In	<	0.00200	n	Os			O	Ag	<	0.04000	O	V	<	0.00090
M	Cs	<	0.00128	M	Ir	<	0.02133	M	Pd	<	0.02133	O	Na		0.00571	M	Yb	<	0.00427
O	Cr		0.00238	O	Fe	<	0.00110	O	P	<	0.00480	O	Sr		0.08095	M	Y	<	0.17064
O	Co	<	0.00120	M	La	<	0.00213	M	Pt	<	0.00853	O	S		0.04048	O	Zn		0.07381
O	Cu		0.00405	M	Pb	<	0.01280	O	K	<	0.00170	M	Ta	<	0.02986	M	Zr	<	0.02133

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

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

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

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 40.078; +2; 6; $Ca(H_2O)_6^{+2}$

Chemical Compatibility - Soluble in HCl and HNO_3. Avoid H_2SO_4, HF, H_3PO_4 and neutral to basic media. Stable with most metals and inorganic anions forming insoluble silicate, carbonate, hydroxide, oxide, fluoride, sulfate, oxalate, chromate, arsenate and tungstate in neutral aqueous media.

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

Ca Containing Samples (Preparation and Solution) - Metal (best dissolved in diluted HNO_3); Ores (Carbonate fusion in Pt* followed by HCl dissolution); Organic Matrices (dry ash and dissolution in dilute HCl. Do not heat when dissolving to avoid precipitation of SiO_2) .The oxide, hydroxide, carbonate, phosphate, and fluoride of calcium are soluble in % levels of HCl or HNO_3. The sulfates (gypsum, anhydrite, etc.), certain silicates and complex compounds require fusion with Na_2CO_3 followed by HCl / water dissolution. Contamination is a very real problem when analyzing for trace levels.

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

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at* concs.)
ICP-OES	393.366 nm	0.0002 / 0.00004 µg/mL	1	ion	U, Ce
ICP-OES	396.847 nm	0.0005 / 0.00006 µg/mL	1	ion	Th
ICP-OES	422.673 nm	0.01 / 0.001 µg/mL	1	atom	Ge
ICP-MS	44 amu	1200 ppt	n/a	M+	$^{16}O_2$, ^{12}C, $^{28}Si^{16}O$, $^{44}Sr^{+}$

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

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

10.0 QUALITY STANDARD DOCUMENTATION

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

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

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

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

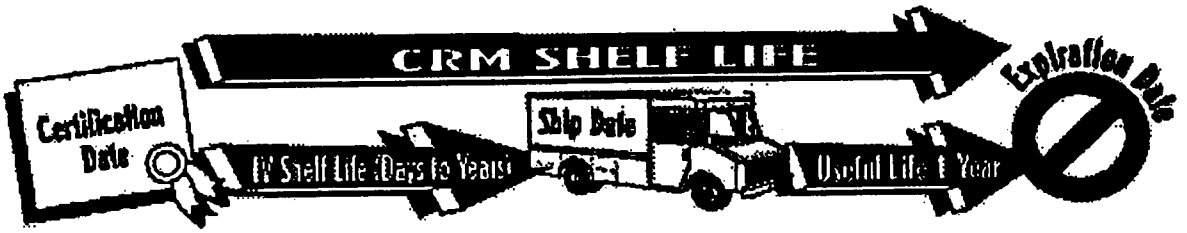
10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

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

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 01/09/03
DATE EXPIRED: 02/01/2004
DATE OPENED: 01/10/03
INORG: 3900 PO: E52071

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010142



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: August 26, 2002

Expiration Date: EXPIRES 1 FEB 2004

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Debbie Newman, QA Administrator	Debbie Newman
Certificate Approved By:	Katalin Le, QC Supervisor	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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inorganic ventures / iv labs

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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 3.5% (abs) HNO_3**

Catalog Number:	CGFE10-1 and CGFE10-5
Lot Number:	**T-FE03028**
Starting Material:	Fe metal
Starting Material Purity (%):	99.9992
Starting Material Lot No	23024
Matrix:	3.5% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 2/28/03
DATE EXPIRED: 3/01/2004
DATE OPENED: 2/28/03
INORG: 3963 PO: E52064

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 9920 ± 22 µg/mL

Certified Density: 1.037 g/mL (measured at 22° C)

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

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

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

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

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

- "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)
- This IV product is Traceable to NIST via direct comparison to NIST SRMs. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors.

4.1 **Assay Method #1** **9920 ± 22 µg/mL**
ICP Assay NIST SRM 3126a Lot Number: 000606

Assay Method #2 **9962 ± 41 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

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

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

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

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

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

O	Al	< 0.00270	M	Dy	< 0.02421	O	Li	< 0.00003	M	Pr	< 0.00121	M	Te	< 0.12103
M	Sb	< 0.00202	M	Er	< 0.02017	M	Lu	< 0.00161	M	Re	< 0.00403	M	Tb	< 0.00121
M	As	< 0.04034	M	Eu	< 0.01210	O	Mg	< 0.00006	M	Rh	< 0.00403	M	Tl	< 0.00403
M	Ba	< 0.04034	M	Gd	< 0.00403	O	Mn	< 0.05000	M	Rb	< 0.00403	M	Th	< 0.00403
O	Be	< 0.00005	M	Ga	0.00394	O	Hg	< 0.01100	M	Ru	< 0.00807	M	Tm	< 0.00161
M	Bi	< 0.00161	i	Ge		M	Mo	< 0.00807	M	Sm	< 0.00403	M	Sn	0.04920
O	B	< 0.00090	M	Au	< 0.01210	M	Nd	< 0.00807	M	Sc	< 0.04034	M	Ti	< 0.20172
M	Cd	< 0.01210	M	Hf	< 0.00807	O	Ni	< 0.00230	M	Se	< 0.03228	M	W	< 0.04034
O	Ca	0.00707	M	Ho	< 0.00202	M	Nb	< 0.00202	O	Si	0.00781	M	U	< 0.00807
M	Ce	< 0.02017	M	In	< 0.04034	n	Os		M	Ag	< 0.00807	M	V	< 0.00807
M	Cs	< 0.00121	M	Ir	< 0.02017	M	Pd	< 0.02017	O	Na	0.00756	M	Yb	< 0.00403
M	Cr	0.00541	s	Fe		i	P		M	Sr	< 0.00202	M	Y	< 0.16138
O	Co	< 0.00110	M	La	< 0.00202	M	Pt	< 0.00807	O	S	< 0.07200	M	Zn	0.03739
M	Cu	< 0.02421	M	Pb	< 0.01210	O	K	< 0.00170	M	Ta	< 0.02824	M	Zr	< 0.02017

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

010145

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

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

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

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

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

Fe Containing Samples (Preparation and Solution) - Metal (Soluble in HCl); Oxides (If the oxide has been at a high temperature then Na_2CO_3 fusion in Pt^0 followed by HCl dissolution otherwise dissolve in dilute HCl); Ores (See Oxides above using only the fusion approach).

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

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES	238.204 nm	0.005 / 0.001 µg/mL	1	ion	Ru, Co
ICP-OES	239.562 nm	0.005 / 0.001 µg/mL	1	ion	Co, W, Cr
ICP-OES	259.940 nm	0.006 / 0.001 µg/mL	1	ion	Hf, Nb
ICP-MS	56 amu	970 ppt	n/a	M^+	$^{40}Ar^{15}N^1H$, $^{40}Ar^{16}O$, $^{36}Ar^{17}O^1H$, $^{38}Ar^{18}O$, $^{37}Cl^{16}O^1H$, $^{40}Ca^{16}O$

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

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

10.0 QUALITY STANDARD DOCUMENTATION

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

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

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

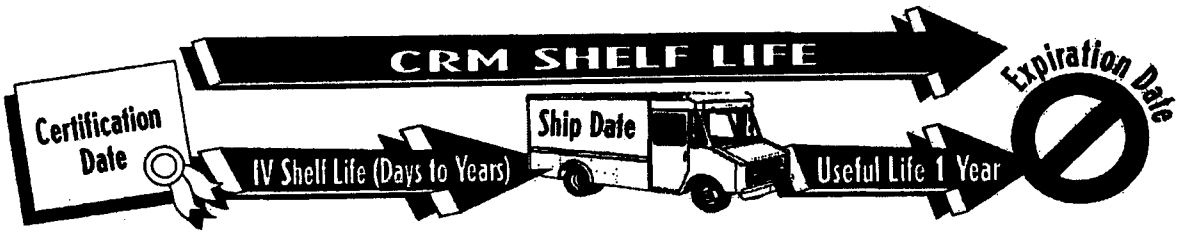
10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

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

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

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 2/28/03
DATE EXPIRED: 3/01/2004
DATE OPENED: 2/28/03
INORG: 3963 PO: F52064

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: October 11, 2002

Expiration Date: EXPIRES 1 MAR 2004

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Debbie Newman, QA Administrator	Debbie Newman
Certificate Approved By:	Katalin Le, QC Supervisor	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010147

inorganic ventures / iv labs

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phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

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

2.0 **DESCRIPTION OF CRM** Custom-Grade **10000 µg/mL Potassium in 1.4% (abs) HNO_3**

Catalog Number:	CGK10-1, CGK10-2, and CGK10-5
Lot Number:	**W-K02111**
Starting Material:	KNO3
Starting Material Purity (%):	99.997230
Starting Material Lot No	K18J19
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS 1 of 2
DATE RECEIVED: 11/5/03
DATE EXPIRED: 12/1/2004 DP
DATE OPENED: 11/5/03
INORG: 4320 PO: FS2256

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

Certified Concentration: 9930 ± 9 µg/mL

Certified Density: 1.024 g/mL (measured at 22° C)

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

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

Uncertainty (±) = $\frac{2[(\Sigma s_i)^2]^{1/2}}{(n)^{1/2}}$

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

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

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

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

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

4.1 **Assay Method #1** **9926 ± 62 µg/mL**
ICP Assay NIST SRM 3141a Lot Number: 891312

Assay Method #2 **9930 ± 9 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

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

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

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

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

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

O Al < 0.00090	M Dy < 0.02400	O Li < 0.00003	M Pr < 0.00120	M Te < 0.11998
M Sb < 0.00200	M Er < 0.02000	M Lu < 0.00160	M Re < 0.00400	M Tb < 0.00120
M As < 0.03999	M Eu < 0.01200	O Mg 0.00100	M Rh < 0.00400	M Tl < 0.00400
M Ba < 0.03999	M Gd < 0.00400	O Mn < 0.00003	M Rb 0.49948	M Th < 0.00400
O Be < 0.00020	M Ga < 0.00400	O Hg < 0.01500	M Ru < 0.00800	M Tm < 0.00160
M Bi < 0.00160	O Ge < 0.00150	M Mo < 0.00800	M Sm < 0.00400	M Sn < 0.02000
O B < 0.00060	O Au < 0.00300	M Nd < 0.00800	O Sc < 0.00002	O Ti < 0.00070
M Cd < 0.01200	M Hf < 0.00800	O Ni < 0.00230	O Se < 0.05000	M W < 0.03999
O Ca 0.00075	M Ho < 0.00200	M Nb < 0.00200	O Si < 0.00340	M U < 0.00800
M Ce < 0.02000	M In < 0.03999	n Os	M Ag < 0.00800	O V < 0.00090
M Cs < 0.00120	M Ir < 0.02000	M Pd < 0.02000	O Na 0.21730	M Yb < 0.00400
M Cr < 0.02000	O Fe 0.00212	O P < 0.00250	M Sr < 0.00200	M Y < 0.15998
M Co < 0.01200	M La < 0.00200	M Pt < 0.00800	O S < 0.07200	O Zn 0.00050
M Cu < 0.02400	M Pb < 0.01200	S K	M Ta < 0.02800	M Zr < 0.02000

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

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.
Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 29.0983; +1; (6); K^+(aq)
(Coordination Number in parentheses is assumed, not certain.)
Chemical Compatibility - Soluble in HCl, HNO_3, H_2SO_4 and HF aqueous matrices. Avoid use of $HClO_4$ due to insolubility of the perchlorate. Stable with all metals and inorganic anions except ClO_4^-.
Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO_3 / LDPE container.
K Containing Samples (Preparation and Solution) - Metal (Dissolves very rapidly in water); Ores (Sodium carbonate fusion in Pt[illegible] followed by HCl dissolution-blank levels of K in sodium carbonate critical); Organic Matrices (Sulfuric/peroxide digestion)
Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at [illegible] concs.)
ICP-OES 766.490 nm	0.4 / 0.001 µg/mL	1	atom	2nd order radiation from R.E.s on some optical designs
ICP-OES 771.531 nm	1.0 / 0.03 µg/mL	1	atom	2nd order radiation from R.E.s on some optical designs
ICP-OES 404.721 nm	1.1 / 0.05 µg/mL	1	atom	U, Ce,
ICP-MS 39 amu	10 ppt	n/a	M'	^{38}ArH, $^{23}Na^{16}O$, $^{78}Se^{+2}$

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

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

10.0 QUALITY STANDARD DOCUMENTATION

010149

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

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

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

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

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

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

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: January 30, 2003

Expiration Date:

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/5/03 2/2
DATE EXPIRED: 12/1/2004 DR
DATE OPENED: 11/5/03
INORG: 4326 PO: E52258

EXPIRES
12/2004

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	JoAnn Struthers, QA Administrative Assistant	JoAnn Struthers
Certificate Approved By:	Katalin Le, QC Supervisor	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

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inorganic ventures / iv labs

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phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

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

2.0 DESCRIPTION OF CRM

Custom-Grade **10000 µg/mL Magnesium in 1.4% (abs) HNO_3**

Catalog Number:	CGMG10-1 and CGMG10-5
Lot Number:	T-MG03006
Starting Material:	Mg metal
Starting Material Purity (%):	99.9968
Starting Material Lot No	RML91191
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 07/31/03
DATE EXPIRED: 08/01/2004
DATE OPENED: 08/01/03
INORG: 4204 PO: F52391

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 9921 ± 20 µg/mL

Certified Density: 1.050 g/mL (measured at 22° C)

The Certified Value is the instrument analysis value. The following equations are used in the calculation of the certified value and the uncertainty:

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

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

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

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

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

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

4.1 **Assay Method #1** **9998 ± 20 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

Assay Method #2 **9921 ± 20 µg/mL**
ICP Assay NIST SRM 3131a Lot Number: 991107

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		0.02454	M	Dy	<	0.02455	O	Li		0.00797	M	Pr	<	0.00123	M	Te	<	0.12275
M	Sb		0.00306	M	Er	<	0.02046	M	Lu	<	0.00164	M	Re	<	0.00409	M	Tb	<	0.00123
M	As	<	0.04092	M	Eu	<	0.01228	S	Mg			M	Rh	<	0.00409	M	Tl	<	0.00409
M	Ba	<	0.04092	M	Gd	<	0.00409	M	Mn	<	0.01637	M	Rb	<	0.00409	M	Th	<	0.00409
O	Be	<	0.00017	M	Ga	<	0.00409	O	Hg	<	0.00900	M	Ru	<	0.00818	M	Tm	<	0.00164
M	Bi	<	0.00164	M	Ge	<	0.02455	M	Mo	<	0.00818	M	Sm	<	0.00409	M	Sn	<	0.02046
O	B		0.00871	M	Au	<	0.01228	M	Nd	<	0.00818	M	Sc	<	0.04092	O	Ti		0.10206
M	Cd	<	0.01228	M	Hf	<	0.00818	O	Ni		0.01404	M	Se	<	0.03273	M	W	<	0.04092
O	Ca		0.01070	M	Ho	<	0.00205	M	Nb	<	0.00205	O	Si		0.03186	M	U	<	0.00818
M	Ce	<	0.02046	M	In	<	0.04092	n	Os			M	Ag	<	0.00818	M	V	<	0.00818
M	Cs	<	0.00123	M	Ir	<	0.02046	M	Pd	<	0.02046	O	Na		0.01817	M	Yb	<	0.00409
O	Cr		0.02315	O	Fe		0.02467	O	P	<	0.01600	M	Sr	<	0.00205	M	Y	<	0.16367
M	Co	<	0.01228	M	La	<	0.00205	M	Pt	<	0.00818	n	S			O	Zn		0.01892
O	Cu		0.00672	O	Pb		0.03236	O	K	<	0.05000	M	Ta	<	0.02864	M	Zr	<	0.02046

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 010153

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

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 24.305; +2; 6; $Mg(H_2O)_6^{+2}$

Chemical Compatibility - Soluble in HCl, HNO_3, and H_2SO_4 avoid HF, H_3PO_4 and neutral to basic media. Stable with most metals and inorganic anions forming insoluble silicates, carbonates, hydroxides, oxides, and tungstates in neutral and slightly acidic media.

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

Mg Containing Samples (Preparation and Solution) - Metal (Best dissolved in diluted HNO_3); Oxide (Readily soluble in above compatible aqueous acidic solutions); Ores (Carbonate fusion in Pt^{0} followed by HCl dissolution); Organic Matrices (Sulfuric / peroxide digestion or nitric / sulfuric / perchloric acid decomposition, or dry ash and dissolution in dilute HCl).

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

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES	279.553 nm	0.0002 / 0.00003 µg/mL	1	ion	Th
ICP-OES	280.270 nm	0.0003 / 0.00005 µg/mL	1	ion	U, V
ICP-OES	285.213 nm	0.002 / 0.00003 µg/mL	1	atom	U, Hf, Cr, Zr
ICP-MS	24 amu	42 ppt	n/a	M'	$^{7}Li^{16}O$, $^{48}Ti^{12}$, $^{48}Ca^{12}$

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

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001:2000 Quality Management System Registration - QMI Certificate Number 010105

Recognized by:
Registrar Accreditation Board (ANSI-RAB)
Standards Council of Canada (SCC)
Dutch Council for Accreditation (RVA)
Entidad Mexicana de Acreditacion, a.c.(EMA)

Members of IQ Net International Certification Network:
Argentina (IRAM), Australia (QAS), Austria (ÖQS), Belgium (Avinter), Brazil (FCAV), Canada (QMI), Hong Kong (HKQAA), Columbia (ICONTEC), Czech Republic (CQS), Denmark (DS), Finland (SFS), France (AFAQ), Germany (DQS), Greece (ELOT), Hungary (MSZT), Ireland (NSAI), Israel (SII), Italy (CISQ), Japan (JQA), Korea (KSA-QA), Netherlands (KEMA), Norway (NCS), Poland(PCBC), Portugal (APCER), Singapore (PSB), Slovenia (SIQ), Spain (AENOR), Switzerland (SQS)

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

10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), Chinese Taipei (CNLA), Czech Republic (NAO), Denmark (DANAK), Finland (FINAS), France (COFRAC), Germany (DAR), Hong Kong (HKAS, Ireland (NAB), Italy (SIT) (SINAL), Japan (JAB) (JNLA), Republic of Korea (KOLAS), The Netherlands (RvA), New Zealand (IANZ), Norway (NA), Portugal (IPQ), Singapore (SAC-SINGLAS), Spain (ENAC), Sweden (SWEDAC), Switzerland (SAS), United Kingdom (UKAS) and United States (NVLAP) (ICBO ES)

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

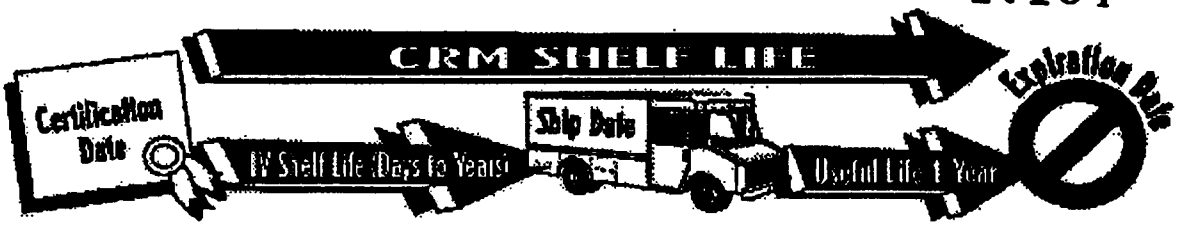
10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

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

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 07/31/03
DATE EXPIRED: 08/01/2004
DATE OPENED: 08/01/03
INORG: 4204 PO: E52391

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010154



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: August 28, 2002

Expiration Date: EXPIRES 01 02 004

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Debbie Newman, QA Administrator	Debbie Newman
Certificate Approved By:	Katalin Le, QC Supervisor	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010155

inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
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certificate of analysis

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

2.0 DESCRIPTION OF CRM

Custom-Grade **10000 µg/mL Sodium in 1.4% (abs) HNO_3**

Catalog Number:	CGNA10-1, CGNA10-2, and CGNA10-5
Lot Number:	**T-NA03006**
Starting Material:	Na2CO3
Starting Material Purity (%):	99.999936
Starting Material Lot No	42095
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Pg 1 of 2
DATE RECEIVED: 07/31/03
DATE EXPIRED: 08/01/2004
DATE OPENED: 08/01/03
INORG: 4205 PO: F52391

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 10,005 ± 7 µg/mL

Certified Density: 1.032 g/mL (measured at 22° C)

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

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

Uncertainty (±) = $\frac{2[(\Sigma s_i)^2]^{1/2}}{(n)^{1/2}}$

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

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

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

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

4.1 **Assay Method #1** **10,067 ± 75 µg/mL**
ICP Assay NIST SRM 3152a Lot Number: 990907

Assay Method #2 **10,005 ± 7 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

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

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

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

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

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

O Al < 0.00090	M Dy < 0.02499	O Li < 0.00003	M Pr < 0.00125	M Te < 0.12494
M Sb < 0.00208	M Er < 0.02082	M Lu < 0.00167	M Re < 0.00417	M Tb < 0.00125
M As < 0.04165	M Eu < 0.01249	O Mg 0.00015	M Rh < 0.00417	M Tl < 0.00417
M Ba < 0.04165	M Gd < 0.00417	O Mn < 0.00003	M Rb < 0.00417	M Th < 0.00417
O Be < 0.00020	M Ga < 0.00417	O Hg < 0.01500	M Ru < 0.00833	M Tm < 0.00167
M Bi < 0.00167	O Ge < 0.00150	M Mo < 0.00833	M Sm < 0.00417	M Sn < 0.02082
O B < 0.00060	O Au < 0.00300	M Nd < 0.00833	O Sc < 0.00002	O Ti < 0.00070
M Cd < 0.01249	M Hf < 0.00833	O Ni < 0.00230	O Se < 0.05000	M W < 0.04165
O Ca 0.00160	M Ho < 0.00208	M Nb < 0.00208	O Si < 0.00340	M U < 0.00833
M Ce < 0.02082	M In < 0.04165	n Os	M Ag < 0.00833	O V < 0.00090
M Cs 0.00104	M Ir < 0.02082	M Pd < 0.02082	S Na	M Yb < 0.00417
M Cr < 0.02082	O Fe < 0.00110	O P < 0.04000	M Sr < 0.00208	M Y < 0.16658
M Co < 0.01249	M La < 0.00208	M Pt < 0.00833	O S < 0.07200	O Zn 0.00130
O Cu < 0.00140	M Pb < 0.01249	O K 0.00873	M Ta < 0.02915	M Zr < 0.02082

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

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

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

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 22.98977; +1; (6); $Na^{+}(aq)$ largely ionic in nature (Coordination Number in parentheses is assumed, not certain.)

Chemical Compatibility - Soluble in HCl, HNO_3, H_2SO_4 and HF aqueous matrices. Stable with all metals and inorganic anions.

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

Na Containing Samples (Preparation and Solution) - Metal (Dissolves very rapidly in water); Ores (Lithium carbonate fusion in graphite crucible followed by HCl dissolution - blank levels of Na in lithium carbonate critical); Organic Matrices (Sulfuric / peroxide digestion or nitric/sulfuric/perchloric acid decomposition).

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

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≤ppm conc.)
ICP-OES	589.595 nm	0.07 / 0.00009 µg/mL	1	atom	2nd order radiation from R.E.s on some optical designs
ICP-OES	588.995 nm	0.03 / 0.006 µg/mL	1	atom	2nd order radiation from R.E.s on some optical designs
ICP-OES	330.237 nm	2.0 / 0.09 µg/mL	1	atom	Pd, Zn
ICP-MS	23 amu	310 ppt	n/a	M+	$^{46}Ti^{+2}$, $^{46}Ca^{+2}$

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

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

10.0 QUALITY STANDARD DOCUMENTATION

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

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

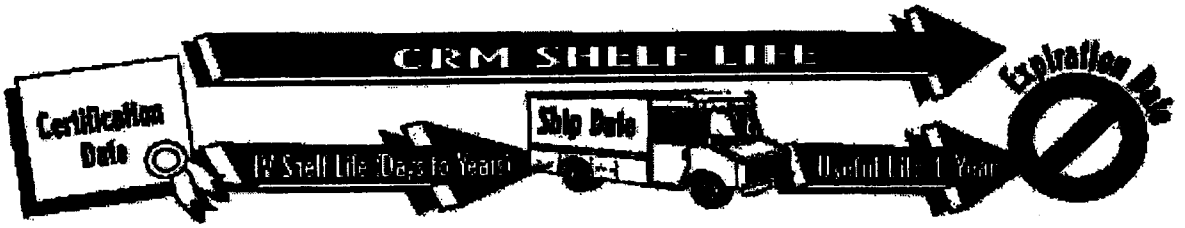
10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC),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

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

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

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

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



11.1 IV Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies (P-SP01020) of chemically-stable solutions performed at Inorganic Ventures / IV Labs indicate a CRM shelf-life of four years for solutions packaged in 500-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life.
Inorganic Ventures / IV Labs concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

Certification Date: January 24, 2003
Expiration Date: EXPIRES 01/2004

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 07/31/03
DATE EXPIRED: 08/01/2004
DATE OPENED: 08/01/03
INORG: 4205 PO: F52391

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Debbie Newman, LIMS Administrator	Debbie Newman
Certificate Approved By:	Katalin Le, QC Supervisor	Katalin Le
Certifying Officer:	Paul Gaines, Chemist, Senior Technical Director	Paul R Gaines

010159

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Lithium in 0.1% HNO_3 (abs)

Catalog Number: CGLI1-1, CGLI1-2 and CGLI1-5

Lot Number: **W-LI02066**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 06/20/03
DATE EXPIRED: 07/01/2004
DATE OPENED: 06/23/03
INORG: 4149 PO: E52370

Starting Material:	Li_2CO_3
Starting Material Purity:	99.999%
Starting Material Lot No:	1053

CERTIFIED CONCENTRATION: 998 ± 2 μg/mL

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

$$\text{Certified Value } (\bar{x}) = \frac{\sum x_i}{n} \qquad \text{Uncertainty } (\pm) = \frac{2[(\sum s_i)^2]^{1/2}}{(n)^{1/2}}$$

$(\bar{x})$ = mean x_i = individual results n = number of measurements $\sum S_i$ = The summation of all significant estimated errors.

Classical Wet Assay: 998 ± 2 μg/mL
Method: Gravimetric as the Sulfate vs NIST weights #822/254143-94.

Instrument Analysis: 1000 ± 4 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3129a.

The independent samples t-test was used to determine if there is agreement between the above assay methods at the 95% confidence interval. Both methods were compared and showed agreement within the stated uncertainties. This agreement is a confirmation of the accuracy of this CRM.

TRACE METALLIC IMPURITIES DETERMINED BY ICP-MS AND ICP-OES IN μg/mL:

Custom Grade solutions tested for trace metallic impurities by ICP-MS were analyzed in an ULPA-Filtered Clean Room.
An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 μm.

O	Al	<0.010	M	Dy	<0.00060	s	Li		M	Pr	<0.000030	O	Te	<0.0090
M	Sb	<0.000050	M	Er	<0.00050	M	Lu	<0.000040	M	Re	<0.00010	M	Tb	<0.000030
O	As	<0.044	M	Eu	<0.00030	O	Mg	<0.00010	M	Rh	<0.00010	M	Tl	<0.00010
M	Ba	<0.0010	M	Gd	<0.00010	O	Mn	<0.00020	M	Rb	<0.00010	M	Th	<0.00010
O	Be	<0.000050	M	Ga	<0.00010	O	Hg	<0.0070	M	Ru	<0.00020	M	Tm	<0.000040
M	Bi	<0.000040	M	Ge	<0.00060	M	Mo	<0.00020	M	Sm	<0.00010	M	Sn	<0.00050
O	B	<0.0060	O	Au	<0.010	M	Nd	<0.00020	M	Sc	<0.0010	O	Ti	<0.00030
O	Cd	<0.0018	M	Hf	<0.00020	O	Ni	<0.0040	O	Se	<0.020	M	W	<0.0010
O	Ca	0.051	M	Ho	<0.000050	M	Nb	<0.000050	O	Si	0.023	M	U	<0.00020
M	Ce	<0.00050	O	In	<0.030	n	Os		O	Ag	<0.0040	O	V	<0.0010
M	Cs	0.0018	M	Ir	<0.00050	M	Pd	<0.00050	O	Na	<0.10	M	Yb	<0.00010
O	Cr	<0.0020	O	Fe	<0.0020	O	P	<0.030	O	Sr	<0.0010	M	Y	<0.0040
M	Co	<0.00030	M	La	<0.000050	M	Pt	<0.00020	O	S	<0.050	O	Zn	<0.030
M	Cu	<0.00060	M	Pb	<0.00030	O	K	0.0070	M	Ta	<0.00070	M	Zr	<0.00050

M - checked by ICP-MS O - checked by ICP-OES i - spectral interference n - not checked for s - solution standard element

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 1.004 g/mL (over)

QA:KL Rev.022403DN

Inorganic Ventures, Inc.
195 Lehigh Avenue • Suite 4 • Lakewood, NJ 08701
Orders: 800-669-6799 • FAX (732) 901-1903
Technical Support: 800-569-6799

Quality Assurance Manager

EXPIRES 01/2004

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 040112-2
SRR: 25389
SDG: 239636
CASE: CNWRA
VTSR: January 09, 2004
PROJECT#: 06002.01.081

Pipette Calibrations

Book/Page: 03 023

G10160

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

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

William A. Naegeli 01/02/04

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	Not Found			0.000	0.00
TMA1	1000	1.0000	1.0004	1.0006	1.000	100.03
TMA2	1000	1.0137	1.0112	1.0095	1.011	101.15
TMA3	1000	Out of Service				
TMA6	1000	0.9999	1.0021	0.9990	1.000	100.03
TMB1	900	0.8956	0.8973	0.8935	0.895	99.50
TMC1	800	0.7990	0.7994	0.7946	0.798	99.71
TMDD1	750	0.7553	0.7530	0.7530	0.754	100.50
TMD1	700	0.6985	0.6988	0.6973	0.698	99.74
TMD2	700	0.7048	0.7029	0.7008	0.703	100.40
TME1	600	0.6017	0.6004	0.5994	0.601	100.08
TMF2	500	0.5007	0.5015	0.4989	0.500	100.07
TMF5	500	0.5044	0.5039	0.5029	0.504	100.75
ICF1	500	0.4963	0.4949	0.4959	0.496	99.14
L30-500	500	0.5016	0.5019	0.5025	0.502	100.40
TMG3	400	0.3924	0.3961	0.3971	0.395	98.80
TMH1	300	Out of Service				
TMH2	300	0.2950	0.3001	0.3000	0.298	99.46
TMJ1	250	0.2453	0.2466	0.2476	0.247	98.60
TMJ2	250	0.2458	0.2464	0.2464	0.246	98.48
TMJ3	250	0.2472	0.2529	0.2497	0.250	99.97
TMK2	200	0.1978	0.1989	0.1983	0.198	99.17
TML1	150	0.1472	0.1475	0.1487	0.148	98.53
TMM1	120	0.1190	0.1207	0.1209	0.120	100.17
TMN3	100	0.0989	0.0984	0.0985	0.099	98.60
ICN1	100	0.0996	0.0993	0.0991	0.099	99.33
TMQ1	80	0.0798	0.0801	0.0795	0.080	99.75
TMR1	70	Out of Service				
TMS1	60	Out of Service				
LAB-30A	50	0.0494	0.0494	0.0496	0.049	98.93
TMU1	40	0.0396	0.0394	0.0393	0.039	98.58
TMU2	40	0.0396	0.0398	0.0395	0.040	99.08
TMV1	30	0.0294	0.0294	0.0296	0.029	98.22
L30-20	20	0.0201	0.0199	0.0196	0.020	99.33
TMW1	25	0.0245	0.0245	0.0245	0.025	98.00
TMY1	15	Out of Service				

FRM-246 (Rev 1/Mar 03)

010161 Book/Page 03 024

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

Balance #: 16 Thermometer #: 6011 diH20 Temperature (°C): 22°C

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
Lab30	1000	Not found		
TMA1	1000	1.0000	1.0004	1.0006
TMA2	1000	1.0137	1.0112	1.0095
TMA3	1000	out of service		
TMA6	1000	0.9999	1.0021	0.9990
TMB1	900	0.8956	0.8973	0.8935
TMC1	800	0.7990	0.7994	0.7946
TMDD1	750	0.7553	0.7530	0.7530
TMD1	700	0.6985	0.6988	0.6973
TMD2	700	0.7048	0.7029	0.7008
TME1	600	0.6017	0.6004	0.5994
TMF2	500	0.5007	0.5015	0.4989
TMF5	500	0.5044	0.5039	0.5029
ICF1	500	0.4963	0.4949	0.4959
L30-500	500	0.5016	0.5019	0.5025
TMG3	400	0.3924	0.3961	0.3971
TMH1	300	out of service		
TMH2	300	0.2950	0.3001	0.3000
TMJ1	250	0.2453	0.2466	0.2476
TMJ2	250	0.2458	0.2464	0.2464
TMJ3	250	0.2472	0.2529	0.2497
TMK2	200	0.1978	0.1989	0.1983
TML1	150	0.1472	0.1475	0.1487
TMM1	120	0.1190	0.1207	0.1209
TMN3	100	0.0989	0.0984	0.0985
ICN1	100	0.0996	0.0993	0.0991
TMQ1	80	0.0798	0.0801	0.0795
TMR1	70	out of service		
TMS1	60	out of service		
LAB-30A	50	0.0494	0.0494	0.0496
TMU1	40	0.0396	0.0394	0.0393
TMU2	40	0.0396	0.0398	0.0395
TMV1	30	0.0294	0.0294	0.0296
L30-20	20	0.0201	0.0199	0.0196
TMW1	25	0.0245	0.0245	0.0245
TMY1	15	out of service		

Analyst: Wooren A. Naegeli Date: 01/02/04

Reviewed by: RSpurs Date: 1/2/04

FRM-243b (Rev 3/Mar 03)

Book/page: 05 005

010162

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

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

1-15-04

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

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	20	0.0203	0.0202	0.0201	0.020	101.00
ADJ200-A	100	0.0992	0.0995	0.0995	0.099	99.40
	200	0.1993	0.1992	0.1994	0.199	99.65
	20	0.0203	0.0203	0.0204	0.020	101.67
ADJ200-C	100	0.0995	0.0997	0.0996	0.100	99.60
	200	0.1994	0.2003	0.1992	0.200	99.82
	20	0.0204	0.0204	0.0202	0.020	101.67
ADJ200-D	100	0.1005	0.0985	0.0999	0.100	99.63
	200	0.1991	0.1992	0.1992	0.199	99.58
	20					
ADJ200-G	100					
	200					
	20					
ADJ200-H	100					
	200					
	20					
ADJ200-J	100					
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					

FRM-247a (Rev 3/Oct 03)

10163

Book/page: 05 006

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 34 Thermometer #: G011 diH20 Temperature (° C) 22

20 µL – 200 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	20	.0203	.0202	.0201
ADJ200-A	100	.0992	.0995	.0995
	200	.1993	.1992	.1994
	20	.0203	.0203	.0204
ADJ200-C	100	.0995	.0997	.0996
	200	.1994	.2003	.1992
	20	.0204	.0204	.0202
ADJ200-D	100	.1005	.0985	.0999
	200	.1991	.1992	.1992
	20			
ADJ200-G	100			
	200			
	20			
ADJ200-H	100			
	200			
	20			
ADJ200-J	100			
	200			
	20			
ADJ200	100			
	200			
	20			
ADJ200	100			
	200			

JW 1-15-04

Analyst: John Wills Date: 1-15-04

Reviewed by: [illegible] Date: 01/20/04

Book/page: 05 007 010164

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

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

Warren G. Naegeli 01/16/04

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

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	20				0.000	0.00
ADJ200-A	100				0.000	0.00
	200				0.000	0.00
	20				0.000	0.00
ADJ200-C	100				0.000	0.00
	200				0.000	0.00
	20				0.000	0.00
ADJ200-D	100				0.000	0.00
	200				0.000	0.00
	20	0.0200	0.0204	0.0203	0.020	101.17
ADJ200-G	100	0.0998	0.0997	0.0998	0.100	99.77
	200	0.1990	0.1982	0.1973	0.198	99.08
	20	0.0202	0.0204	0.0204	0.020	101.67
ADJ200-H	100	0.0997	0.0994	0.0995	0.100	99.53
	200	0.2001	0.2001	0.1998	0.200	100.00
	20	0.0203	0.0202	0.0200	0.020	100.83
ADJ200-J	100	0.0997	0.0993	0.0994	0.099	99.47
	200	0.2034	0.2014	0.2009	0.202	100.95
	20				0.000	0.00
ADJ200	100				0.000	0.00
	200				0.000	0.00
	20				0.000	0.00
ADJ200	100				0.000	0.00
	200				0.000	0.00
	20				0.000	0.00
ADJ200	100				0.000	0.00
	200				0.000	0.00

FRM-247a (Rev 3/Oct 03)

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Book/page: 05 008

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 16 Thermometer #: 6011 diH20 Temperature (° C) 22°C

	Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
20 µL – 200 µL		20			
	ADJ200-A	100			
		200			
		20			
	ADJ200-C	100			
		200			
		20			
	ADJ200-D	100			
		200			
		20	0.0200	0.0204	0.0203
	ADJ200-G	100	0.0998	0.0997	0.0998
		200	0.1990	0.1982	0.1973
		20	0.0202	0.0204	0.0204
	ADJ200-H	100	0.0997	0.0994	0.0995
		200	0.2001	0.2001	0.1998
		20	0.0203	0.0202	0.0200
	ADJ200-J	100	0.0997	0.0993	0.0994
		200	0.2034	0.2014	0.2009
		20			
	ADJ200	100			
		200			
		20			
	ADJ200	100			
		200			

WAN 01/16/04

WAN 01/16/04

Analyst: Warren A. Naegeli Date: 01/16/04

Reviewed by: [illegible] Date: 01/20/04

Book/page: 05 059

010166

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

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

1-15-04

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	0.1006	0.1006	0.1009	0.101	100.70
ADJ1000-C	500	0.4938	0.4939	0.4945	0.494	98.81
	1000	1.0044	1.0008	1.0003	1.002	100.18
	100	0.1016	0.1016	0.1018	0.102	101.67
ADJ1000-D	500	0.4932	0.4934	0.4940	0.494	98.71
	1000	1.0005	0.9982	0.9978	0.999	99.88
	100	0.0994	0.0995	0.0998	0.100	99.57
ADJ1000-E	500	0.4934	0.4934	0.4952	0.494	98.80
	1000	0.9935	0.9918	0.9946	0.993	99.33
	100	0.0995	0.1012	0.0992	0.100	99.97
ADJ1000-F	500	0.4944	0.4928	0.4965	0.495	98.91
	1000	0.9938	0.9956	0.9958	0.995	99.51
	100					
ADJ1000-G	500					
	1000					
	100					
ADJ1000-H	500					
	1000					
	100					
ADJ1000-J	500					
	1000					
	100					
ADJ1000	500					
	1000					
	100					
ADJ1000	500					
	1000					

FRM-247b (Rev 2/Oct 03)

010167

Book/page: 05 060

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 34 Thermometer #: G011 diH20 Temperature (° C) 22

100 µL – 1000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	100	.1006	.1006	.1009
ADJ1000-C	500	.4938	.4939	.4945
	1000	1.0044	1.0008	1.0003
	100	.1016	.1016	.1018
ADJ1000-D	500	.4932	.4934	.4940
	1000	1.0005	.9982	.9978
	100	.0994	.0995	.0998
ADJ1000-E	500	.4934	.4934	.4952
	1000	.9935	.9918	.9946
	100	.0995	.1012	.0992
ADJ1000-F	500	.4944	.4928	.4965
	1000	.9938	.9956	.9958
	100			
ADJ1000-G	500			
	1000			
	100			
ADJ1000-H	500			
	1000			
	100			
ADJ1000-J	500			
	1000			
	100			
ADJ1000	500			
	1000			
	100			
ADJ1000	500			
	1000			

JW 1-15-04

Analyst: John Willy Date: 1-15-04

Reviewed by: [illegible] Date: 01/20/~~03~~ 04

#3 01/20/04

FRM-244 (b) (Rev 3/Oct 03)

Book/page: 05 061

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

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

Warren A. Naegeli 01/16/04

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	0.1001	0.1010	0.1018	0.101	100.97
ADJ1000-G	500	0.4904	0.4949	0.4932	0.493	98.57
	1000	1.0006	0.9977	0.9899	0.996	99.61
	100	0.1018	0.1018	0.1006	0.101	101.40
ADJ1000-H	500	0.4940	0.4972	0.4979	0.496	99.27
	1000	0.9842	0.9906	0.9931	0.989	98.93
	100	0.1018	0.1019	0.1017	0.102	101.80
ADJ1000-J	500	0.4997	0.5000	0.4992	0.500	99.93
	1000	1.0030	1.0026	1.0009	1.002	100.22
	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)

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Book/page: 05 062

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 16 Thermometer #: 6011 diH20 Temperature (° C) 22°C

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	0.1001	0.1010	0.1018
ADJ1000-G	500	0.4904	0.4949	0.4932
	1000	1.0006	0.9977	0.9899
	100	0.1018	0.1018	0.1006
ADJ1000-H	500	0.4940	0.4972	0.4979
	1000	0.9842	0.9906	0.9931
	100	WRN 01/16/04 ~~1.0~~ 0.1018	0.1019	0.1017
ADJ1000-J	500	0.4997	0.5000	0.4992
	1000	1.0030	1.0026	1.0009
	100			
ADJ1000	500			
	1000			
	100			
ADJ1000	500			
	1000			

WRN 01/16/04

Analyst: Warren A. Naegeli Date: 01/16/04

Reviewed by: [illegible] Date: 01/20/04

Book/page: 05 113 010170

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

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

1-15-04 1-15-04

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
ADJ5000-C	500	0.5011	0.5078	0.5083	0.506	101.15
	2500	2.5158	2.5072	2.5068	2.510	100.40
	5000	5.0151	5.0043	5.0036	5.008	100.15
ADJ5000-G	500					
	2500	OUT	OF	SERVICE		
	5000					
ADJ5000-H	500					
	2500	OUT	OF	SERVICE		
	5000		.5095 1-15-04		-7	101.75
ADJ5000-I	500	0.5080	~~0.8095~~	0.5087	0.609	~~121.75~~
	2500	2.5152	2.5150	2.5148	2.515	100.60
	5000	5.0010	4.9923	4.9918	4.995	99.90
ADJ5000-J	500					
	2500					
	5000					
ADJ5000-K	500					
	2500					
	5000					
ADJ5000-L	500					
	2500					
	5000					
ADJ5000	500					
	2500					
	5000					
ADJ5000	500					
	2500					
	5000					
ADJ5000	500					
	2500					
	5000					
ADJ5000	500					
	2500					
	5000					

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Book/page: 05 114

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 34 Thermometer #: G011 diH20 Temperature (° C) 22

500 µL – 5000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	500	.5011	.5078	.5083
ADJ5000-C	2500	2.5158	2.5072	2.5068
	5000	5.0151	5.0043	5.0036
	500			
ADJ5000-G	2500	OUT	OF	SERVICE
	5000			
	500			
ADJ5000-H	2500	OUT	OF	SERVICE
	5000			
	500	.5080	.5095	.5087
ADJ5000-I	2500	2.5152	2.5150	2.5148
	5000	5.0010	4.9923	4.9918
	500			
ADJ5000-J	2500			
	5000			
	500			
ADJ5000-K	2500			
	5000			
	500			
ADJ5000-L	2500			
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ8000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			

1-15-04

Analyst: [signature] Date: 1-15-04

Reviewed by: [signature] Date: 01/20/04

FRM-244 (c) (Rev 3/Mar 03)

Book/page: 05 115

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

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

Warren A. Naegeli 01/16/04

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	0.4987	0.4979	0.4963	0.498	99.53
ADJ5000-J	2500	2.4978	2.4941	2.4890	2.494	99.75
	5000	5.0516	5.0032	4.9980	5.018	100.35
	500	0.5042	0.5013	0.5035	0.503	100.60
ADJ5000-K	2500	2.5049	2.5044	2.5074	2.506	100.22
	5000	5.0680	5.0316	5.0238	5.041	100.82
	500	0.5027	0.5016	0.5008	0.502	100.34
ADJ5000-L	2500	2.4940	2.4883	2.4853	2.489	99.57
	5000	4.9970	5.0012	4.9966	4.998	99.97
	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)

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Book/page: 05 116

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 16 Thermometer #: 6011 diH20 Temperature (° C) 22°C

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	0.4987	0.4979	0.4963
ADJ5000-J	2500	2.4978	2.4941	2.4990
	5000	5.0516	5.0032	4.9980
	500	0.5042	0.5013	0.5035
ADJ5000-K	2500	2.5049	2.5044	2.5074
	5000	5.0680	5.0316	5.0238
	500	0.5027	0.5016	0.5008
ADJ5000-L	2500	2.4940	2.4883	2.4853
	5000	4.9970	5.0012	4.9966
	500			
ADJ5000	2500			
	5000			
	500			
ADJ8000	2500			
	8000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			

WAN 01/16/04

WAN 01/16/04

Analyst: Walter A. Naegeli Date: 01/16/04

Reviewed by: [signature] Date: 01/20/04

FRM-244 (c) (Rev 3/Mar 03)

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 040112-2
SRR: 25389
SDG: 239636
CASE: CNWRA
VTSR: January 09, 2004
PROJECT#: 06002.01.081

Balance Calibrations

010174

Southwest Research Institute
Division 01

BALANCE VERIFICATION LOG

BALANCE #	LAB #:	SERIAL #:	TOLERANCE:	COMMENTS:
16	28	P37987	±0.0005	
Date	Std Wt (g)	Recorded Wt (g)	Operator	
1-15-04	2.0000	2.0000	KE	SN: J50526-15
1-16-04	2.0000	2.0000	[illegible]	"
1-17-04	2.0000	1.9999	JR	"
1-19-04	2.0000	1.9999	KE	"
1-20-04	2.0000	2.0000	KE	"
1-21-04	2.0000	2.0000	[illegible]	"
1-22-04	2.0000	2.0000	[illegible]	"
1-23-04	2.0000	1.9999	KE	"
1-26-04	2.0000	1.9999	KE	"
1-27-04	2.0000	1.9999	KE	"

If balance is out of limits, clean the balance and re-calibrate using Class "S" weights.
If balance is still out of limits, place a "DO NOT USE" sign on it and call (x5896) for service.

FRM-112 (Rev 1/Dec 99)

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Southwest Research Institute
Division 01

BALANCE VERIFICATION LOG

BALANCE #	LAB #:	SERIAL #:	TOLERANCE:	COMMENTS:
19	27	0068597	±0.05	
Date	Std Wt (g)	Recorded Wt (g)	Operator	
1-13-04	10.00	10.00	KE	SN: J50624-5
1-14-04	10.00	10.00	KE	"
1-15-04	10.00	10.00	KE	"
1-16-04	10.00	10.01	[illegible]	"
1-19-04	10.00	10.00	KE	"
1-20-04	10.00	10.00	KE	"
1-21-04	10.00	10.00	KE	"
1-22-04	10.00	10.00	[illegible]	"
1-23-04	10.00	10.00	KE	"
1-26-04	10.00	10.00	KE	"

If balance is out of limits, clean the balance and re-calibrate using Class "S" weights.
If balance is still out of limits, place a "DO NOT USE" sign on it and call (x5896) for service.

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FRM-112 (Rev 1/Dec 99)

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Southwest Research Institute
Division 01

BALANCE VERIFICATION LOG

BALANCE #	LAB #:	SERIAL #:	TOLERANCE:	COMMENTS:
34	28	1116031935	±0.0005	
Date	Std Wt (g)	Recorded Wt (g)	Operator	
1-12-04	2.0000	2.0000	KE	SN: J50526-15
1-13-04	2.0000	2.0000	KE	"
1-14-04	2.0000	2.0000	KE	"
1-15-04	2.0000	2.0000	KE	"
1-16-04	2.0000	1.9999	JW	"
1-19-04	2.0000	1.9999	KE	"
1-20-04	2.0000	2.0001	KE	"
1-21-04	2.0000	2.0000	KE	"
1-22-04	2.0000	1.9999	JW	"
1-22-04	2.0000	2.0000	KE	"

If balance is out of limits, clean the balance and re-calibrate using Class "S" weights.
If balance is still out of limits, place a "DO NOT USE" sign on it and call (x5896) for service.

FRM-112 (Rev 1/Dec 99)

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 040112-2
SRR: 25389
SDG: 239636
CASE: CNWRA
VTSR: January 09, 2004
PROJECT#: 06002.01.081

DI Water Verification

D.I. WATER SYSTEM NOTEBOOK 01 030
METALS LAB
SOUTHWEST RESEARCH INSTITUTE

010177

DATE	INITIALS	READING (M OHMS)	SET PT./ QC LT. Green=OK	CALL FOR Service LT. Green=OK	USAGE (GALS)	COMMENTS
12/31/03	DR	18.0	✓	✓	51711.0	5:52 pm
01/02/04	DR	18.0	✓	✓	51717.9	5:12 pm
01/05/04	DR	18.0	✓	✓	51724.6	6 pm
01/06/04	DR	18.0	✓	✓	51728.1	6:35 pm
01/07/04	DR	18.0	✓	✓	51732.2	6:00 pm
01/08/04	DR	18.0	✓	✓	51739.5	7:32 pm
01/09/04	DR	18.0	✓	✓	51742.9	9:50 pm
01/12/04	DR	18.0	✓	✓	51750.4	5:36 pm
01/13/04	DR	18.0	✓	✓	51755.2	5:40 pm
01/14/04	DR	18.0	✓	✓	51760.9	7:20 pm
01/15/04	DR	18.0	✓	✓	51768.9	5:40 pm
01/16/04	DR	18.0	✓	✓	51770.5	1:30 pm
01/17/04	RSS	18.0	✓	✓	51774.4	9:42 PM
01/19/04	DR	18.0	✓	✓	51778.6	7:28 pm
01/20/04	DR	18.0	✓	✓	51782.5	6:45 pm
01/21/04	DR	18.0	✓	✓	51786.4	6:09 pm
01/22/04	DR	18.0	✓	✓	51789.8	5:20 pm
01/23/04	DR	18.0	✓	✓	51791.8	8:46 pm
01/26/04	DR	18.0	✓	✓	51792.1	5:44 pm
01/27/04	DR	18.0	✓	✓	51793.7	5:32 pm
			VDS 01/28/04			

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 040112-2
SRR: 25389
SDG: 239636
CASE: CNWRA
VTSR: January 09, 2004
PROJECT#: 06002.01.081

SURVEILLANCE REPORTS
From Division 30

010178

Institute Quality Assurance Surveillance Report

Project Number: 20-06002	**Report Number:** 2004-SR-0034	**Page 1 of 1**

Surveillance Scope: Monitor the Tests for Trace Metal Analysis by ICP in Division 01. The client is NRC High Level Waste Program. This is a QA Nuclear surveillance.

Reference Documents: Task Orders, 040121-~~1~~ 3 gmb 2/5/04, 040112-2, 040115-4, TAP 01-0406-038 Inductively Coupled Plasma/Atomic Emission Spectrometric Method for Trace Elemental Analysis, and QPP Rev. 4.

Starting Date: 2004-01-04 **Ending Date:** 2004-02-04

Institute QA Representative: Charles S. Butcher

Person(s) Conducting Test/Exam/Procedure: K. Edrisi, D. Harris

Satisfactory Findings: Work requests were provided to Division 01 for work performed. The work orders were logged in by Receiving and labeled with PO number, QA Nuclear requirements, project number, tests required, and test revisions. The samples were labeled with PO number, QA label, ID number, and work order number. The analyst's training records were on file as required. Copies of the work orders, methods, and PQP were available. The instruments were calibrated with NIST traceable standards and the samples run. Data run was recorded, signed and reviewed by project personnel prior to transmittal to the client.

Unsatisfactory Findings: N/A

Nonconformance Report Number: N/A **CAR/SCAR Number:** N/A

Attachments: None

Recommendations/Actions: N/A

Equipment Calibration: Equipment was calibrated before running samples. All standards were NIST traceable.

Approved: "/s/ R. Weber"
Institute Quality Assurance

Date: 2/4/04

Distribution: Original – IQS Records
c: C. S. Butcher (30)
PM – L.T. Yang (20)
J. Boyd (01)
R. Brient (20)

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