SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Div. 20
TASK ORDER: 030918-4
SRR: 24974
SDG: 234759
CASE: CNWRA
VTSR: September 18, 2003
PROJECT#: 06002.01.141

FINAL REPORT

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010001

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 09/18/03

Matrix: Water

Project No.: 06002.01.141

SRR: 24974

TO: 030918-4

Sample ID	Lab System ID	Calcium Results (mg/L)	Magnesium Results (mg/L)	Manganese Results (mg/L)	Potassium Results (mg/L)	Sodium Results (mg/L)	Strontium Results (mg/L)
Prep Blank - 54 203	----	<0.05	<0.05	<0.005	<0.1	<0.25	<0.005
Lab Control - J23W1	----	19.3	19.2	0.486	16.4	17.3	4.03
True Value	----	20.0	20.0	0.500	20.0	20.0	4.00
Recovery	----	96.5%	96.0%	97.2%	82.0%	86.5%	101%
Prep Blank - 54 204	----	<0.05	<0.05	<0.005	<0.1	<0.25	<0.005
Lab Control - J23W2	----	19.4	19.3	0.490	16.3	17.1	3.97
True Value	----	20.0	20.0	0.500	20.0	20.0	4.00
Recovery	----	97.0%	96.5%	98.0%	81.5%	85.5%	99.3%
13 C1	234759	277	<0.05	<0.005	4.03	47.1	0.048
Duplicate result	234759	274	<0.05	<0.005	4.08	47.0	0.048
RPD	234759	1.09%	0.00%	0.00%	1.23%	0.21%	0.00%
13 C2	234760	274	<0.05	<0.005	2.52	46.4	0.048
Spike result	234760	471	19.9	0.487	26.4	70.1	4.08
Spike added	234760	200	20.0	0.500	20.0	20.0	4.00
Recovery	234760	98.5%	99.5%	97.4%	119%	119%	101%
13 D1	234761	74.8	<0.05	<0.005	2.16	51.5	0.022
13 D2	234762	73.8	<0.05	<0.005	2.15	53.1	0.022
13 E1	234763	21.3	<0.05	<0.005	2.07	69.0	0.014
13 E2	234764	21.5	<0.05	<0.005	2.38	67.6	0.013
13 F1	234765	7.09	<0.05	<0.005	2.65	103	0.010
13 F2	234766	6.93	<0.05	<0.005	2.18	99.1	0.010
13 Q1	234767	92.4	<0.05	<0.005	23.0	101	19.8
13 Q2	234768	92.1	<0.05	<0.005	22.6	100	20.2
14 C1	234769	277	<0.05	<0.005	2.52	47.3	0.048
14 C2	234770	271	<0.05	<0.005	2.28	47.0	0.048
14 D1	234771	73.8	<0.05	<0.005	2.61	52.7	0.022
14 D2	234772	73.7	<0.05	<0.005	3.00	52.7	0.022
14 E1	234773	21.6	<0.05	<0.005	2.99	68.6	0.014
14 E2	234774	21.5	<0.05	<0.005	2.05	68.9	0.014
14 F1	234775	6.94	<0.05	<0.005	3.10	102	0.010
14 F2	234776	6.95	<0.05	<0.005	2.52	104	0.010
NPCA1314 Ref C	234777	282	<0.05	<0.005	0.222	11.9	0.048
NPCA1314 Ref D	234778	75.5	<0.05	<0.005	0.160	18.8	0.022
NPCA1314 Ref E	234779	22.7	<0.05	<0.005	0.177	33.7	0.012
Duplicate result	234779	22.2	<0.05	<0.005	0.163	33.5	0.011
RPD	234779	2.23%	0.00%	0.00%	8.24%	0.60%	8.70%
NPCA1314 Ref F	234780	7.74	<0.05	<0.005	0.158	64.7	0.008
Spike result	234780	27.2	19.8	0.489	23.0	91.5	4.05
Spike added	234780	20.0	20.0	0.500	20.0	20.0	4.00
Recovery	234780	97.3%	99.0%	97.8%	114%	134%	101%
Reporting Limit:		0.05 mg/L	0.05 mg/L	0.005 mg/L	0.1 mg/L	0.25 mg/L	0.005 mg/L

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SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Div. 20
TASK ORDER: 030918-4
SRR: 24974
SDG: 234759
CASE: CNWRA
VTSR: September 18, 2003
PROJECT#: 06002.01.141

Task Orders/01-QPP-015

Southwest Research Institute

Laboratory Task Order

TO #: 030918-4 Revision: 2

010002

SDG: 234759
VTSR: 09/18/03
CASE: CNWRA - BRADLEY

SRR #'s: 24974
Client(s): DIV 20

Project(s): 06002.01.141
Manager(s): DAMMANN, MIKE
To PM: 10/30/03
To QA: 12/10/03
To Client: 12/10/03

Instructions

DIVISION 20 - CNWRA. 4-week TAT listed on COC. Point of Contact is Bradley Werling. Work is 10 CFR 50, Part 21, Appendix B. Contact Charlie Butcher (ext. 5928, pager 271-5172) before starting ANY work. ICP analysis is for calcium, magnesium, sodium, potassium, manganese and strontium. CONTACT PM WITH ANY QUESTIONS.
REVISION 1: Changing due to 10/30/03, as per email from J. Ranger. (dr101603)
REVISION 2: Changing due dates to allow time for copies of C of As. (Dr120203)

Documents Related to this task order: 6328

Test: DIL-DILUTION
Section: METALPREP

Holding: 28 days from CED

Prep, Dilution Cnt: 22

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
234759		1	Water	13 C1	17 Sep 03	15 Oct 03
234760		1	Water	13 C2	17 Sep 03	15 Oct 03
234761		1	Water	13 D1	17 Sep 03	15 Oct 03
234762		1	Water	13 D2	17 Sep 03	15 Oct 03
234763		1	Water	13 E1	17 Sep 03	15 Oct 03
234764		1	Water	13 E2	17 Sep 03	15 Oct 03
234765		1	Water	13 F1	17 Sep 03	15 Oct 03
234766		1	Water	13 F2	17 Sep 03	15 Oct 03
234767		1	Water	13 Q1	13 Sep 03	11 Oct 03
234768		1	Water	13 Q2	13 Sep 03	11 Oct 03
234769		1	Water	14 C1	17 Sep 03	15 Oct 03
234770		1	Water	14 C2	17 Sep 03	15 Oct 03
234771		1	Water	14 D1	17 Sep 03	15 Oct 03
234772		1	Water	14 D2	17 Sep 03	15 Oct 03
234773		1	Water	14 E1	17 Sep 03	15 Oct 03
234774		1	Water	14 E2	17 Sep 03	15 Oct 03
234775		1	Water	14 F1	17 Sep 03	15 Oct 03
234776		1	Water	14 F2	17 Sep 03	15 Oct 03
234777		1	Water	NPCA1314 Ref C	11 Sep 03	09 Oct 03
234778		1	Water	NPCA1314 Ref D	11 Sep 03	09 Oct 03
234779		1	Water	NPCA1314 Ref E	11 Sep 03	09 Oct 03
234780		1	Water	NPCA1314 Ref F	11 Sep 03	09 Oct 03

Test: ICP-SWRI
Section: METALS

Holding: 180 days from CED

ICP Analysis by SwRI Method Cnt: 22

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
234759		1	Water	13 C1	17 Sep 03	15 Mar 04
234760		1	Water	13 C2	17 Sep 03	15 Mar 04
234761		1	Water	13 D1	17 Sep 03	15 Mar 04
234762		1	Water	13 D2	17 Sep 03	15 Mar 04
234763		1	Water	13 E1	17 Sep 03	15 Mar 04
234764		1	Water	13 E2	17 Sep 03	15 Mar 04
234765		1	Water	13 F1	17 Sep 03	15 Mar 04
234766		1	Water	13 F2	17 Sep 03	15 Mar 04
234767		1	Water	13 Q1	13 Sep 03	11 Mar 04
234768		1	Water	13 Q2	13 Sep 03	11 Mar 04
234769		1	Water	14 C1	17 Sep 03	15 Mar 04

Southwest Research Institute

Laboratory Task Order

TO #: 030918-4 Revision: 2

010003

Project(s): 06002.01.141
Manager(s): DAMMANN, MIKE
To PM: 10/30/03
To QA: 12/10/03
To Client: 12/10/03

SDG: 234759
VTSR: 09/18/03
CASE: CNWRA - BRADLEY

SRR #'s: 24974
Client(s): DIV 20

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
234770		1	Water	14 C2	17 Sep 03	15 Mar 04
234771		1	Water	14 D1	17 Sep 03	15 Mar 04
234772		1	Water	14 D2	17 Sep 03	15 Mar 04
234773		1	Water	14 E1	17 Sep 03	15 Mar 04
234774		1	Water	14 E2	17 Sep 03	15 Mar 04
234775		1	Water	14 F1	17 Sep 03	15 Mar 04
234776		1	Water	14 F2	17 Sep 03	15 Mar 04
234777		1	Water	NPCA1314 Ref C	11 Sep 03	09 Mar 04
234778		1	Water	NPCA1314 Ref D	11 Sep 03	09 Mar 04
234779		1	Water	NPCA1314 Ref E	11 Sep 03	09 Mar 04
234780		1	Water	NPCA1314 Ref F	11 Sep 03	09 Mar 04

010004

01-QPP-015
Division 01
Revision 4
November 2002

Document No._____

Division 01

Chemistry and Chemical
Engineering Division

QUALITY PROJECT PLAN FOR

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

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

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

SwRI AUTHORIZATION SIGNATORIES

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

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

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

1.0 INTRODUCTION

This Quality Project Plan (QPP) defines the Quality Assurance (QA) program requirements for personnel providing the chemical analyses for commercial nuclear power plants. Southwest Research Institute (SwRI) ***Program Quality Plan (PQP-Nuclear)***, *Nuclear Services* shall implement the QA requirements. Project activities controlled by the PQP-Nuclear shall be accomplished as specified by the appropriate sections of **01-QAP-004**, *Quality Assurance Plan for Analytical and Environmental Services* and/or nationally recognized testing methods as specified on individual purchase orders. This QPP shall be applied to all projects initiated for nuclear utilities in the Department of Analytical and Environmental Chemistry. If, as a result of complexity, duration, or other factors, it is determined that a unique, project-specific quality plan is required, the project QAE shall notify the Project Manager and a project-specific quality plan shall be generated in accordance with **SOP-01-5.2**, *Preparation and Revision of Plans*.

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-01-18.1**, *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-01-18.1**, *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 procedures under **SOP-01-5.0**, *Document and Data Control*, depending on the type of document supplied. 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-01-6.1**, *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-01-10.1**, *Inspection and Test Conduct*. 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 and Login*, and **TAP-01-0407-035**, *Sample/Extract Storage and Custody*.

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-01-8.1**, *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-01-10.1**, *Inspection and Test Conduct*.

4.9.3 Controls for measuring and test equipment shall be as specified in **SOP-01-11.1**, *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-01-13.1**, *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-01-15.1**, *Handling, Storage, Packaging, Preservation, 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-01-16.1**, *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-01-16.1**, *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*.

Daniel Ramirez

From: Daniel Ramirez [daniel.ramirez@swri.org]
Sent: Wednesday, October 22, 2003 3:52 PM
To: Bradley A. Werling
Cc: Jackie Ranger
Subject: preliminary results - 24974

030918-4.xls 030918-4.pdf

Bradley

Attached are the preliminary results for the 22 samples received on 09/18/03, our Sample Receipt Report # 24974.

The report, for Ca, Mg, Na, K, Mn and Sr, is attached as an Excel (030918-4.xls) and PDF (030918-4.pdf) file.

A hard copy of the report will follow shortly.

If you have any questions, please contact Jackie Ranger (522.3320) or myself.

Daniel Ramirez
Southwest Research Institute
Department of Analytical and Environmental Chemistry
Division 01
6220 Culebra Road
San Antonio, Texas 78238
Phone (210) 522.3867
Fax (210) 522.5938

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Div. 20
TASK ORDER: 030918-4
SRR: 24974
SDG: 234759
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VTSR: September 18, 2003
PROJECT#: 06002.01.141

Chain of Custody/Login Paperwork

6328

SAMPLE LIST/CHAIN OF CUSTODY

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

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

Client:

Client Purchase Order/Other ID:

Site/Zone ID:

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

SwRI Contact: Mike Dammann

Analyses Requested

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers	Ca, Na, K, Mn, Mg, Sr by ICP									
13C1	~~9-17-03~~ 9-17-03	BW	W		1	X							Intact	40cpm	
13C2		9-17-03				X									
13D1						X									
13D2						X									
13E1						X									
13E2						X									
13F1						X									
13F2						X									
13Q1	9-13-03	BW				X									
13Q2		9-17-03				X									

REMARKS

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

Nuclear Safety related - use appropriate QA procedures

POC - Brad Werling x6565

20.06002.01.141

SwRI Project#:

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°C

Therm #: 626

Comments: RADIOACTIVE - max Np237 at 8.5×10⁻⁷ M or 1.4×10⁻⁴ MCi/mL
SN 610/8

	Date	Time
Relinquished by (Print/Signature): Brad Werling / Brad Werling	9/18/03	1050
Received by (Print/Signature):		
Relinquished by (Print/Signature):		
Received by (Print/Signature):		
Relinquished by (Print/Signature):		

Received by SwRI Lab: (Signature)

Date: 9/18/03 Time: 1050

Samples Disposed: Date: Time:

Samples Disposed by:

010014

6328

SAMPLE LIST/CHAIN OF CUSTODY

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

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

Client:

Client Purchase Order/Other ID:

Site/Zone ID:

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

SwRI Contact: Mike Dammann

Analyses Requested: Ca, Na, K, Mn, Mg, Sr by ICP

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

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers	Ca, Na, K, Mn, Mg, Sr by ICP								Intact		REMARKS
14C1	9-17-03	8:45	W		1	X									40cfm	Nuclear Safety Related - use appropriate QA procedures
14C2		9-17-03				X										
14D1						X										
14D2						X										
14E1						X										
14E2						X										POC - Brad Werling X 6565
14F1						X										
14F2						X										
NPCA1314RefC	9-11-03					X										
NPCA1314RefD						X										20.06002.01.141

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°C Therm #: 026

Comments: RADIOACTIVE - max Np-237 at 8.5×10^{-7} M or 1.4×10^{-4} μCi/mL
SV 6/10/8

Relinquished by (Print/Signature)	Date	Time
Brad Werling / Brad Werling	9/18/03	1050
Received by (Print/Signature)	Date	Time
Relinquished by (Print/Signature)	Date	Time
Received by (Print/Signature)	Date	Time
Relinquished by (Print/Signature)	Date	Time

SwRI Project#:

Received by SwRI Lab: (Signature) [signature]
Date 9/18/03 Time 1050

Samples Disposed: Date Time

Samples Disposed by:

010015

Lo 328

SAMPLE LIST/CHAIN OF CUSTODY

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

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

Client:

Client Purchase Order/Other ID:

Site/Zone ID:

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

SwRI Contact: Mike Dammann

Analyses Requested

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers	Ca, Na, K, Mn, Mg, Sr by ICP								40cpm	intact
NPCA1314RefE	9-11-03		W		1	X								↓	↓
NPCA1314RefF	"		↓		↓	X								↓	↓

REMARKS

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

Nuclear Safety Related - use appropriate QA procedures

POC - Brad Werling X 6565

20.06002.01.141

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°C

Therm #: 026

Comments: Radioactive - max Np 237 at 8.5×10^{-7} M or 1.4×10^{-4} µCi/mL
SN 610/8

Relinquished by (Print/Signature)	Date	Time
Brad Werling / Brad Werling	9/18/03	1050
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#: 1

Received by SwRI Lab: (Signature)

Date: 9/18/03 Time: 1050

Samples Disposed: Date: Time:

Samples Disposed by:

010016

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

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Div. 20
TASK ORDER: 030918-4
SRR: 24974
SDG: 234759
CASE: CNWRA
VTSR: September 18, 2003
PROJECT#: 06002.01.141

Copies of Login Book

Sample Login Book

Sep 18, 2003

010017

SwRI Login Area
Division 1

Sample Receipt: 24973	Project: 03162.12.10X	Client: HEB
VTSR Date: Sep 18, 2003	VTSR Time: 08:09:00	Manager: SCHATTENBERG, HERB

System ID	Customer Sample ID	Matrix
234748	(T4-A)Bell Peppers, Red	PRODUCE
234749	(AIO-A)GRAPE TOMATOES	PRODUCE
234750	(W8-A)green bell peppers	PRODUCE
234751	(AEG-A)vine ripe tomatoes	PRODUCE
234752	(S8-A)Colorado Sweet Onions	PRODUCE
234753	(J5-A)collard greens	PRODUCE
234754	(9W-A)Mustard Green, Package	PRODUCE
234755	(CF-A)Carrots, Cello 5 Lb.	PRODUCE
234756	(WG-A)Grapes, White (Chilean)	PRODUCE
234757	(3G-A)Broccoli Crowns	PRODUCE

Sample Receipt: 24974	Project: 06002.01.141	Client: DIV 20
VTSR Date: Sep 18, 2003	VTSR Time: 10:50:00	Manager: DAMMANN, MIKE

System ID	Customer Sample ID	Matrix
234759	13 C1	Water
234760	13 C2	Water
234761	13 D1	Water
234762	13 D2	Water
234763	13 E1	Water
234764	13 E2	Water
234765	13 F1	Water
234766	13 F2	Water
234767	13 Q1	Water
234768	13 Q2	Water
234769	14 C1	Water
234770	14 C2	Water
234771	14 D1	Water
234772	14 D2	Water
234773	14 E1	Water
234774	14 E2	Water
234775	14 F1	Water

Sample Login Book

Sep 18, 2003

SwRI Login Area
Division 1

Sample Receipt: 24974 | Project: 06002.01.141 | Client: DIV 20
VTSR Date: Sep 18, 2003 | VTSR Time: 10:50:00 | Manager: DAMMANN, MIKE

System ID	Customer Sample ID	Matrix
234776	14 F2	Water
234777	NPCA1314 Ref C	Water
234778	NPCA1314 Ref D	Water
234779	NPCA1314 Ref E	Water
234780	NPCA1314 Ref F	Water

Sample Receipt: 24975 | Project: 08.OHD08.110 | Client: Div. 08 (Walter)
VTSR Date: Sep 18, 2003 | VTSR Time: 12:46:00 | Manager: QUARDERER, SHRADDHA

System ID	Customer Sample ID	Matrix
234781	459	Water
234782	460	Water

Sample Receipt: 24976 | Project: 01.01608.20X | Client: ALLIED SIGNAL
VTSR Date: Sep 18, 2003 | VTSR Time: 14:00:00 | Manager: SUN, GANG

System ID	Customer Sample ID	Matrix
234783	0309160701	Water
234784	0309160904	Water
234785	0309160920	Water
234786	0309161020	Water
234787	0309161231	Water
234788	0309161304	Water
234789	0309161354	Water
234790	0309161411	Water

Sample Receipt: 24977 | Project: 08.OHD08.110 | Client: Div. 08 (Walter)
VTSR Date: Sep 18, 2003 | VTSR Time: 14:50:00 | Manager: QUARDERER, SHRADDHA

System ID	Customer Sample ID	Matrix
234793	461 Before	Water

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Div. 20
TASK ORDER: 030918-4
SRR: 24974
SDG: 234759
CASE: CNWRA
VTSR: September 18, 2003
PROJECT#: 06002.01.141

RAW DATA

Div 20
to#030918-4
06002.01.141

JRamsey 10/22/03 SDmc03 12/10/03

system id	elem	result	qual	units	rl	tv	rec		ug/ml	rl	date	time	df	mg/L
234759	Ca3179	277		mg/L	0.5				27.73684	0.05	09/25/03	13:10	10	277.3684
234759	K_7664	4.03		mg/L	0.1				4.03257	0.1	09/26/03	14:24	1	4.03257
234759	Mg2790	0.05	U	mg/L	0.05				0.03141	0.05	09/26/03	14:24	1	0.03141
234759	Mn2576	0.005	U	mg/L	0.005				0.00146	0.005	09/26/03	14:24	1	0.00146
234759	Na3302	47.1		mg/L	0.25				47.14432	0.25	09/26/03	14:24	1	47.14432
234759	Sr4215	0.048		mg/L	0.005				0.04829	0.005	09/26/03	14:24	1	0.04829
234759d	Ca3179	274		mg/L	0.5				27.42073	0.05	09/25/03	13:16	10	274.2073
234759d	K_7664	4.08		mg/L	0.1				4.07916	0.1	09/26/03	14:29	1	4.07916
234759d	Mg2790	0.05	U	mg/L	0.05				0.02751	0.05	09/26/03	14:29	1	0.02751
234759d	Mn2576	0.005	U	mg/L	0.005				0.00137	0.005	09/26/03	14:29	1	0.00137
234759d	Na3302	47.0		mg/L	0.25				47.02685	0.25	09/26/03	14:29	1	47.02685
234759d	Sr4215	0.048		mg/L	0.005				0.04834	0.005	09/26/03	14:29	1	0.04834
234760	Ca3179	274		mg/L	0.5				27.36058	0.05	09/25/03	13:35	10	273.6058
234760	K_7664	2.52		mg/L	0.1				2.52163	0.1	09/26/03	14:48	1	2.52163
234760	Mg2790	0.05	U	mg/L	0.05				0.02549	0.05	09/26/03	14:48	1	0.02549
234760	Mn2576	0.005	U	mg/L	0.005				0.00147	0.005	09/26/03	14:48	1	0.00147
234760	Na3302	46.4		mg/L	0.25				46.41109	0.25	09/26/03	14:48	1	46.41109
234760	Sr4215	0.048		mg/L	0.005				0.04800	0.005	09/26/03	14:48	1	0.048
234760s	Ca3179	471		mg/L	0.5	200	98.5%		47.10469	0.05	09/25/03	13:40	10	471.0469
234760s	K_7664	26.4		mg/L	0.1	20	119.5%		26.42620	0.1	09/26/03	14:54	1	26.4262
234760s	Mg2790	19.9		mg/L	0.05	20	99.6%		19.92657	0.05	09/26/03	14:54	1	19.92657
234760s	Mn2576	0.487		mg/L	0.005	0.5	97.3%		0.48660	0.005	09/26/03	14:54	1	0.4866
234760s	Na3302	70.1		mg/L	0.25	20	118.4%		70.08168	0.25	09/26/03	14:54	1	70.08168
234760s	Sr4215	4.08		mg/L	0.005	4	100.7%		4.07788	0.005	09/26/03	14:54	1	4.07788
234761	Ca3179	74.8		mg/L	0.05				74.76805	0.05	09/26/03	14:59	1	74.76805
234761	K_7664	2.16		mg/L	0.1				2.15772	0.1	09/26/03	14:59	1	2.15772
234761	Mg2790	0.05	U	mg/L	0.05				0.02920	0.05	09/26/03	14:59	1	0.0292
234761	Mn2576	0.005	U	mg/L	0.005				0.00240	0.005	10/21/03	16:25	1	0.0024
234761	Na3302	51.5		mg/L	0.25				51.53809	0.25	09/26/03	14:59	1	51.53809
234761	Sr4215	0.022		mg/L	0.005				0.02194	0.005	09/26/03	14:59	1	0.02194
234762	Ca3179	73.8		mg/L	0.05				73.75051	0.05	09/26/03	15:04	1	73.75051
234762	K_7664	2.15		mg/L	0.1				2.14976	0.1	09/26/03	15:04	1	2.14976
234762	Mg2790	0.05	U	mg/L	0.05				0.02236	0.05	09/26/03	15:04	1	0.02236
234762	Mn2576	0.005	U	mg/L	0.005				0.00067	0.005	09/26/03	15:04	1	0.00067
234762	Na3302	53.1		mg/L	0.25				53.05467	0.25	09/26/03	15:04	1	53.05467
234762	Sr4215	0.022		mg/L	0.005				0.02197	0.005	09/26/03	15:04	1	0.02197
234763	Ca3179	21.3		mg/L	0.05				21.27186	0.05	09/26/03	15:10	1	21.27186
234763	K_7664	2.07		mg/L	0.1				2.07449	0.1	09/26/03	15:10	1	2.07449
234763	Mg2790	0.05	U	mg/L	0.05				0.02191	0.05	09/26/03	15:10	1	0.02191

010019

Div 20
to#030918-4
06002.01.141

system id	elem	result	qual	units	rl	tv	rec		ug/ml	rl	date	time	df	mg/L
234763	Mn2576	0.005	U	mg/L	0.005				0.00023	0.005	09/26/03	15:10	1	0.00023
234763	Na3302	69.0		mg/L	0.25				68.99356	0.25	09/26/03	15:10	1	68.99356
234763	Sr4215	0.014		mg/L	0.005				0.01368	0.005	09/26/03	15:10	1	0.01368
234764	Ca3179	21.5		mg/L	0.05				21.46062	0.05	09/26/03	15:15	1	21.46062
234764	K 7664	2.38		mg/L	0.1				2.37553	0.1	09/26/03	15:15	1	2.37553
234764	Mg2790	0.05	U	mg/L	0.05				0.01992	0.05	09/26/03	15:15	1	0.01992
234764	Mn2576	0.005	U	mg/L	0.005				0.00050	0.005	09/26/03	15:15	1	0.0005
234764	Na3302	67.6		mg/L	0.25				67.62754	0.25	09/26/03	15:15	1	67.62754
234764	Sr4215	0.013		mg/L	0.005				0.01348	0.005	09/26/03	15:15	1	0.01348
234765	Ca3179	7.09		mg/L	0.05				7.09387	0.05	09/26/03	15:20	1	7.09387
234765	K 7664	2.65		mg/L	0.1				2.65000	0.1	09/26/03	15:20	1	2.65
234765	Mg2790	0.05	U	mg/L	0.05				0.02178	0.05	09/26/03	15:20	1	0.02178
234765	Mn2576	0.005	U	mg/L	0.005				0.00021	0.005	09/26/03	15:20	1	0.00021
234765	Na3302	103		mg/L	0.25				102.97874	0.25	09/26/03	15:20	1	102.97874
234765	Sr4215	0.010		mg/L	0.005				0.01015	0.005	09/26/03	15:20	1	0.01015
234766	Ca3179	6.93		mg/L	0.05				6.93034	0.05	09/26/03	15:25	1	6.93034
234766	K 7664	2.18		mg/L	0.1				2.17552	0.1	09/26/03	15:25	1	2.17552
234766	Mg2790	0.05	U	mg/L	0.05				0.02418	0.05	09/26/03	15:25	1	0.02418
234766	Mn2576	0.005	U	mg/L	0.005				0.00014	0.005	09/26/03	15:25	1	0.00014
234766	Na3302	99.1		mg/L	0.25				99.08099	0.25	09/26/03	15:25	1	99.08099
234766	Sr4215	0.010		mg/L	0.005				0.00983	0.005	09/26/03	15:25	1	0.00983
234767	Ca3179	92.4		mg/L	0.05				92.41753	0.05	09/26/03	15:30	1	92.41753
234767	K 7664	23.0		mg/L	0.1				22.97628	0.1	09/26/03	15:30	1	22.97628
234767	Mg2790	0.05	U	mg/L	0.05				0.01082	0.05	09/26/03	15:30	1	0.01082
234767	Mn2576	0.005	U	mg/L	0.005				0.00016	0.005	09/26/03	15:30	1	0.00016
234767	Na3302	101		mg/L	0.25				101.49422	0.25	09/26/03	15:30	1	101.49422
234767	Sr4215	19.8		mg/L	0.05				1.98202	0.005	09/25/03	14:19	10	19.8202
234768	Ca3179	92.1		mg/L	0.05				92.13763	0.05	09/26/03	15:35	1	92.13763
234768	K 7664	22.6		mg/L	0.1				22.56357	0.1	09/26/03	15:35	1	22.56357
234768	Mg2790	0.05	U	mg/L	0.05				0.01625	0.05	09/26/03	15:35	1	0.01625
234768	Mn2576	0.005	U	mg/L	0.005				0.00035	0.005	09/26/03	15:35	1	0.00035
234768	Na3302	100		mg/L	0.25				100.08978	0.25	09/26/03	15:35	1	100.08978
234768	Sr4215	20.2		mg/L	0.05				2.01659	0.005	09/25/03	14:24	10	20.1659
234769	Ca3179	277		mg/L	0.5				27.70309	0.05	09/25/03	14:49	10	277.0309
234769	K 7664	2.52		mg/L	0.1				2.52339	0.1	09/26/03	15:59	1	2.52339
234769	Mg2790	0.05	U	mg/L	0.05				0.01269	0.05	09/26/03	15:59	1	0.01269
234769	Mn2576	0.005	U	mg/L	0.005				0.00128	0.005	09/26/03	15:59	1	0.00128
234769	Na3302	47.3		mg/L	0.25				47.25681	0.25	09/26/03	15:59	1	47.25681
234769	Sr4215	0.048		mg/L	0.005				0.04838	0.005	09/26/03	15:59	1	0.04838

010020

Div 20
to#030918-4
06002.01.141

system id	elem	result	qual	units	rl	tv	rec		ug/ml	rl	date	time	df	mg/L
234770	Ca3179	271		mg/L	0.5				27.13863	0.05	09/25/03	14:54	10	271.3863
234770	K_7664	2.28		mg/L	0.1				2.27863	0.1	09/26/03	16:04	1	2.27863
234770	Mg2790	0.05	U	mg/L	0.05				0.02619	0.05	09/26/03	16:04	1	0.02619
234770	Mn2576	0.005	U	mg/L	0.005				0.00140	0.005	09/26/03	16:04	1	0.0014
234770	Na3302	47.0		mg/L	0.25				46.97355	0.25	09/26/03	16:04	1	46.97355
234770	Sr4215	0.048		mg/L	0.005				0.04791	0.005	09/26/03	16:04	1	0.04791
234771	Ca3179	73.8		mg/L	0.05				73.83141	0.05	09/26/03	16:09	1	73.83141
234771	K_7664	2.61		mg/L	0.1				2.61309	0.1	09/26/03	16:09	1	2.61309
234771	Mg2790	0.05	U	mg/L	0.05				0.02250	0.05	09/26/03	16:09	1	0.0225
234771	Mn2576	0.005	U	mg/L	0.005				0.00026	0.005	09/26/03	16:09	1	0.00026
234771	Na3302	52.7		mg/L	0.25				52.73527	0.25	09/26/03	16:09	1	52.73527
234771	Sr4215	0.022		mg/L	0.005				0.02175	0.005	09/26/03	16:09	1	0.02175
234772	Ca3179	73.7		mg/L	0.05				73.69799	0.05	09/26/03	16:15	1	73.69799
234772	K_7664	3.00		mg/L	0.1				2.99897	0.1	09/26/03	16:15	1	2.99897
234772	Mg2790	0.05	U	mg/L	0.05				0.02277	0.05	09/26/03	16:15	1	0.02277
234772	Mn2576	0.005	U	mg/L	0.005				0.00041	0.005	09/26/03	16:15	1	0.00041
234772	Na3302	52.7		mg/L	0.25				52.71705	0.25	09/26/03	16:15	1	52.71705
234772	Sr4215	0.022		mg/L	0.005				0.02182	0.005	09/26/03	16:15	1	0.02182
234773	Ca3179	21.6		mg/L	0.05				21.58535	0.05	09/26/03	16:20	1	21.58535
234773	K_7664	2.99		mg/L	0.1				2.98927	0.1	09/26/03	16:20	1	2.98927
234773	Mg2790	0.05	U	mg/L	0.05				0.02338	0.05	09/26/03	16:20	1	0.02338
234773	Mn2576	0.005	U	mg/L	0.005				0.00223	0.005	09/26/03	16:20	1	0.00223
234773	Na3302	68.6		mg/L	0.25				68.60285	0.25	09/26/03	16:20	1	68.60285
234773	Sr4215	0.014		mg/L	0.005				0.01373	0.005	09/26/03	16:20	1	0.01373
234774	Ca3179	21.5		mg/L	0.05				21.48078	0.05	09/26/03	16:25	1	21.48078
234774	K_7664	2.05		mg/L	0.1				2.05103	0.1	09/26/03	16:25	1	2.05103
234774	Mg2790	0.05	U	mg/L	0.05				0.02521	0.05	09/26/03	16:25	1	0.02521
234774	Mn2576	0.005	U	mg/L	0.005				0.00030	0.005	09/26/03	16:25	1	0.0003
234774	Na3302	68.9		mg/L	0.25				68.92198	0.25	09/26/03	16:25	1	68.92198
234774	Sr4215	0.014		mg/L	0.005				0.01368	0.005	09/26/03	16:25	1	0.01368
234775	Ca3179	6.94		mg/L	0.05				6.94349	0.05	09/26/03	16:31	1	6.94349
234775	K_7664	3.10		mg/L	0.1				3.10491	0.1	09/26/03	16:31	1	3.10491
234775	Mg2790	0.05	U	mg/L	0.05				0.02283	0.05	09/26/03	16:31	1	0.02283
234775	Mn2576	0.005	U	mg/L	0.005				0.00015	0.005	09/26/03	16:31	1	0.00015
234775	Na3302	102		mg/L	0.25				102.11936	0.25	09/26/03	16:31	1	102.11936
234775	Sr4215	0.010		mg/L	0.005				0.01032	0.005	09/26/03	16:31	1	0.01032
234776	Ca3179	6.95		mg/L	0.05				6.94953	0.05	09/26/03	16:36	1	6.94953
234776	K_7664	2.52		mg/L	0.1				2.52368	0.1	09/26/03	16:36	1	2.52368
234776	Mg2790	0.05	U	mg/L	0.05				0.02392	0.05	09/26/03	16:36	1	0.02392

010021

Div 20
to#030918-4
06002.01.141

system id	elem	result	qual	units	rl	tv	rec		ug/ml	rl	date	time	df	mg/L
234776	Mn2576	0.005	U	mg/L	0.005				0.00015	0.005	09/26/03	16:36	1	0.00015
234776	Na3302	104		mg/L	0.25				103.61779	0.25	09/26/03	16:36	1	103.61779
234776	Sr4215	0.010		mg/L	0.005				0.01030	0.005	09/26/03	16:36	1	0.0103
234777	Ca3179	282		mg/L	0.5				28.19336	0.05	09/25/03	15:32	10	281.9336
234777	K_7664	0.222		mg/L	0.1				0.22167	0.1	09/26/03	16:41	1	0.22167
234777	Mg2790	0.05	U	mg/L	0.05				0.01217	0.05	09/26/03	16:41	1	0.01217
234777	Mn2576	0.005	U	mg/L	0.005				0.00148	0.005	09/26/03	16:41	1	0.00148
234777	Na3302	11.9		mg/L	0.25				11.92752	0.25	09/26/03	16:41	1	11.92752
234777	Sr4215	0.048		mg/L	0.005				0.04837	0.005	09/26/03	16:41	1	0.04837
234778	Ca3179	75.5		mg/L	0.05				75.53152	0.05	09/26/03	16:46	1	75.53152
234778	K_7664	0.160		mg/L	0.1				0.16044	0.1	09/26/03	16:46	1	0.16044
234778	Mg2790	0.05	U	mg/L	0.05				0.00944	0.05	09/26/03	16:46	1	0.00944
234778	Mn2576	0.005	U	mg/L	0.005				0.00026	0.005	09/26/03	16:46	1	0.00026
234778	Na3302	18.8		mg/L	0.25				18.84841	0.25	09/26/03	16:46	1	18.84841
234778	Sr4215	0.022		mg/L	0.005				0.02242	0.005	09/26/03	16:46	1	0.02242
234779	Ca3179	22.7		mg/L	0.05				22.65360	0.05	09/26/03	14:02	1	22.6536
234779	K_7664	0.177		mg/L	0.1				0.17682	0.1	09/26/03	14:02	1	0.17682
234779	Mg2790	0.05	U	mg/L	0.05				0.01725	0.05	09/26/03	14:02	1	0.01725
234779	Mn2576	0.005	U	mg/L	0.005				0.00020	0.005	09/26/03	14:02	1	0.0002
234779	Na3302	33.7		mg/L	0.25				33.70095	0.25	09/26/03	14:02	1	33.70095
234779	Sr4215	0.012		mg/L	0.005				0.01227	0.005	09/26/03	14:02	1	0.01227
234779d	Ca3179	22.2		mg/L	0.05				22.15576	0.05	09/26/03	14:07	1	22.15576
234779d	K_7664	0.163		mg/L	0.1				0.16299	0.1	09/26/03	14:07	1	0.16299
234779d	Mg2790	0.05	U	mg/L	0.05				0.01043	0.05	09/26/03	14:07	1	0.01043
234779d	Mn2576	0.005	U	mg/L	0.005				0.00008	0.005	09/26/03	14:07	1	8E-05
234779d	Na3302	33.5		mg/L	0.25				33.51842	0.25	09/26/03	14:07	1	33.51842
234779d	Sr4215	0.011		mg/L	0.005				0.01142	0.005	09/26/03	14:07	1	0.01142
234780	Ca3179	7.74		mg/L	0.05				7.74293	0.05	09/26/03	14:13	1	7.74293
234780	K_7664	0.158		mg/L	0.1				0.15778	0.1	09/26/03	14:13	1	0.15778
234780	Mg2790	0.05	U	mg/L	0.05				0.01093	0.05	09/26/03	14:13	1	0.01093
234780	Mn2576	0.005	U	mg/L	0.005				0.00009	0.005	09/26/03	14:13	1	9E-05
234780	Na3302	64.7		mg/L	0.25				64.66610	0.25	09/26/03	14:13	1	64.6661
234780	Sr4215	0.008		mg/L	0.005				0.00834	0.005	09/26/03	14:13	1	0.00834
234780s	Ca3179	27.2		mg/L	0.05	20	97.3%		27.20413	0.05	09/26/03	14:18	1	27.20413
234780s	K_7664	23.0		mg/L	0.1	20	114.0%		22.96316	0.1	09/26/03	14:18	1	22.96316
234780s	Mg2790	19.8		mg/L	0.05	20	98.9%		19.77821	0.05	09/26/03	14:18	1	19.77821
234780s	Mn2576	0.489		mg/L	0.005	0.5	97.7%		0.48863	0.005	09/26/03	14:18	1	0.48863
234780s	Na3302	91.5		mg/L	0.25	20	133.9%		91.47685	0.25	09/26/03	14:18	1	91.47685
234780s	Sr4215	4.05		mg/L	0.005	4	101.0%		4.04949	0.005	09/26/03	14:18	1	4.04949

010022

Div 20
to#030918-4
06002.01.141

system id	elem	result	qual	units	rl	tv	rec		ug/ml	rl	date	time	df	mg/L
lcsw-J23W1	Ca3179	19.3		mg/L	0.05	20	96.6%		19.31865	0.05	09/26/03	13:52	1	19.31865
lcsw-J23W1	K 7664	16.4		mg/L	0.1	20	82.2%		16.43735	0.1	09/26/03	13:52	1	16.43735
lcsw-J23W1	Mg2790	19.2		mg/L	0.05	20	96.2%		19.23427	0.05	09/26/03	13:52	1	19.23427
lcsw-J23W1	Mn2576	0.486		mg/L	0.005	0.5	97.2%		0.48617	0.005	09/26/03	13:52	1	0.48617
lcsw-J23W1	Na3302	17.3		mg/L	0.25	20	86.6%		17.32314	0.25	09/26/03	13:52	1	17.32314
lcsw-J23W1	Sr4215	4.03		mg/L	0.005	4	100.8%		4.03207	0.005	09/26/03	13:52	1	4.03207
lcsw-J23W2	Ca3179	19.4		mg/L	0.05	20	97.1%		19.42649	0.05	09/26/03	13:57	1	19.42649
lcsw-J23W2	K 7664	16.3		mg/L	0.1	20	81.7%		16.33261	0.1	09/26/03	13:57	1	16.33261
lcsw-J23W2	Mg2790	19.3		mg/L	0.05	20	96.6%		19.32294	0.05	09/26/03	13:57	1	19.32294
lcsw-J23W2	Mn2576	0.490		mg/L	0.005	0.5	98.0%		0.48991	0.005	09/26/03	13:57	1	0.48991
lcsw-J23W2	Na3302	17.1		mg/L	0.25	20	85.6%		17.11777	0.25	09/26/03	13:57	1	17.11777
lcsw-J23W2	Sr4215	3.97		mg/L	0.005	4	99.1%		3.96514	0.005	09/26/03	13:57	1	3.96514
pbw-J23W1 pg54-203	Ca3179	0.05	U	mg/L	0.05				0.02939	0.05	09/26/03	13:41	1	0.02939
pbw-J23W1 pg54-203	K 7664	0.1	U	mg/L	0.1				0.00097	0.1	09/26/03	13:41	1	0.00097
pbw-J23W1 pg54-203	Mg2790	0.05	U	mg/L	0.05				0.01012	0.05	09/26/03	13:41	1	0.01012
pbw-J23W1 pg54-203	Mn2576	0.005	U	mg/L	0.005				0.00037	0.005	09/26/03	13:41	1	0.00037
pbw-J23W1 pg54-203	Na3302	0.25	U	mg/L	0.25				0.02450	0.25	09/26/03	13:41	1	0.0245
pbw-J23W1 pg54-203	Sr4215	0.005	U	mg/L	0.005				0.00009	0.005	09/26/03	13:41	1	9E-05
pbw-J23W2 pg54-204	Ca3179	0.05	U	mg/L	0.05				0.01420	0.05	09/26/03	13:47	1	0.0142
pbw-J23W2 pg54-204	K 7664	0.1	U	mg/L	0.1				0.00500	0.1	09/26/03	13:47	1	0.005
pbw-J23W2 pg54-204	Mg2790	0.05	U	mg/L	0.05				0.00214	0.05	09/26/03	13:47	1	0.00214
pbw-J23W2 pg54-204	Mn2576	0.005	U	mg/L	0.005				0.00009	0.005	09/26/03	13:47	1	9E-05
pbw-J23W2 pg54-204	Na3302	0.25	U	mg/L	0.25				0.09267	0.25	09/26/03	13:47	1	0.09267
pbw-J23W2 pg54-204	Sr4215	0.005	U	mg/L	0.005				0.00006	0.005	09/26/03	13:47	1	6E-05

010023

ICP ANALYSIS

PROJ. NO.	PROJECT	TO#	DATE	MATRIX	LOGBK PG
06002.01.141	Div 20	0309184	9-25-03	water	54 206
06002.01.141	Div 20	0309184	9-25-03	water	54 207

df/0

INSTRUMENT: TRACE 1 FILENAME: A309184

INSTRUMENT DL:

Method: DAILY1 Standard: blk
Run Time: 09/25/03 11:42:54

010024

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Avge	-.00001	.0005	-.0000	.0001	-.0000	-.0001	.0000
SDev	.00000	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	10.294	3.849	24.81	16.29	16.90	6.043	77.55
#1	-.00001	.0004	-.0000	.0000	-.0000	-.0001	.0000
#2	-.00001	.0005	-.0001	.0001	-.0000	-.0001	.0000

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Avge	.0001	.0000	-.0000	.0000	.0003	-.0000	.0017
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	2.487	780.6	221.4	18.10	3.454	17.95	.3134
#1	.0001	.0000	.0000	.0000	.0003	-.0000	.0017
#2	.0001	-.0000	-.0000	.0000	.0003	-.0000	.0017

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Avge	.0005	.0002	-.0000	.0000	-.0000	-.0047	-.0002
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	3.596	3.034	429.0	.5874	12.37	.9283	6.568
#1	.0005	.0002	-.0000	.0000	-.0000	-.0046	-.0002
#2	.0005	.0002	.0000	.0000	-.0000	-.0047	-.0002

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Avge	-.0000	.0001	.0001	-.0000	.0000	.0000	-.0000
SDev	.0000	.0000	.0001	.0001	.0000	.0000	.0000
%RSD	71.15	2.487	118.4	1170.	90.57	26.08	795.4
#1	-.0000	.0001	.0002	-.0001	.0000	.0001	-.0000
#2	-.0000	.0001	.0000	.0001	.0000	.0000	.0000

Elem	Sc3613	1960/1	1960/2	Si2881	Sn1899	Sr4215	Th2837
Avge	79.82	-.0001	.0001	.0011	.0000	.0000	.0000
SDev	.47	.0001	.0000	.0000	.0000	.0000	.0000
%RSD	.5883	110.2	6.294	1.436	419.6	.5874	10.29
#1	80.15	-.0000	.0001	.0011	-.0000	.0000	.0000
#2	79.48	-.0001	.0001	.0012	.0000	.0000	.0000

Elem	Ti3372	Tl1908	U_3859	V_2924	W_2079	Y_3710	Zn2062
Avge	-.0015	-.0000	.0043	-.0000	.0001	-.0000	.0000
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	1.011	107.2	.3599	.5874	35.02	419.6	3.699
#1	-.0015	-.0000	.0043	-.0000	.0001	.0000	.0000
#2	-.0015	-.0000	.0043	-.0000	.0001	-.0000	.0000

Elem	Zr3496
Avge	.0002
SDev	.0000
%RSD	15.60
#1	.0002
#2	.0002

10/2/03

9-25-03

SWRA 54 CA 5Dec03

010025

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	798120	10000	--	--	--	--	--
SDev	4688.118	.0000000	--	--	--	--	--
%RSD	.5873951	.0000000	--	--	--	--	--
#1	801435	10000	--	--	--	--	--
#2	794805	10000	--	--	--	--	--

Method: DAILY1 Standard: clp_std4
Run Time: 09/25/03 11:48:06

010026

Elem	Ag3280	As1890	2203/1	2203/2	Sb2068	1960/1	1960/2
Avge	.05269	.1037	.4129	.4283	.1105	.2193	.3767
SDev	.00016	.0001	.0034	.0144	.0001	.0024	.0120
%RSD	.29811	.1407	.8272	3.355	.0615	1.080	3.173
#1	.05280	.1036	.4153	.4181	.1105	.2210	.3683
#2	.05258	.1038	.4105	.4384	.1106	.2177	.3852

Elem	T11908
Avge	.0291
SDev	.0001
%RSD	.4205
#1	.0292
#2	.0290

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	771960	10000	--	--	--	--	--
SDev	113.8442	.0000000	--	--	--	--	--
%RSD	.0147474	.0000000	--	--	--	--	--
#1	771879	10000	--	--	--	--	--
#2	772040	10000	--	--	--	--	--

Method: DAILY1 Standard: clp_std1
Run Time: 09/25/03 11:52:31

010027

Elem	Al3082	Ca3179	Fe2714	K_7664	Li6707	Mg2790	Na3302
Avge	.1266	.1443	.1006	1.661	3.230	.0531	.0125
SDev	.0002	.0008	.0002	.012	.019	.0002	.0001
%RSD	.1651	.5410	.2435	.7300	.5803	.4048	.4069
#1	.1268	.1449	.1008	1.670	3.243	.0532	.0125
#2	.1265	.1438	.1004	1.652	3.217	.0529	.0125

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	753519	10000	--	--	--	--	--
SDev	1651.801	.0000000	--	--	--	--	--
%RSD	.2192117	.0000000	--	--	--	--	--
#1	752351	10000	--	--	--	--	--
#2	754687	10000	--	--	--	--	--

Method: DAILY1 Standard: clp_std5
Run Time: 09/25/03 11:56:56

010028

Elem	B_2496	Bi2230	Mo2020	P_1782	Si2881	Sn1899	Sr4215
Avge	.3728	.0576	.1508	.0304	.1245	.1765	1.497
SDev	.0024	.0002	.0013	.0005	.0001	.0005	.004
%RSD	.6330	.3356	.8860	1.765	.0649	.2858	.2784
#1	.3711	.0577	.1499	.0308	.1244	.1762	1.500
#2	.3745	.0574	.1518	.0300	.1245	.1769	1.494

Elem	Ti3372
Avge	1.056
SDev	.001
%RSD	.1129
#1	1.057
#2	1.055

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	753782	10000	--	--	--	--	--
SDev	72.83200	.0000000	--	--	--	--	--
%RSD	.0096622	.0000000	--	--	--	--	--
#1	753731	10000	--	--	--	--	--
#2	753834	10000	--	--	--	--	--

Method: DAILY1 Standard: clp_std2
Run Time: 09/25/03 12:00:59

010029

Elem	Ba4934	Be3130	Cr2677	Cu3247	Ni2316
Avge	.6196	.1996	.2974	.3115	.7467
SDev	.0034	.0002	.0012	.0001	.0025
%RSD	.5423	.1091	.4090	.0467	.3323
#1	.6220	.1995	.2983	.3116	.7484
#2	.6173	.1998	.2966	.3114	.7449

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	755324	10000	--	--	--	--	--
SDev	6795.296	.0000000	--	--	--	--	--
%RSD	.8996531	.0000000	--	--	--	--	--
#1	750519	10000	--	--	--	--	--
#2	760129	10000	--	--	--	--	--

Method: DAILY1 Standard: clp_std3
Run Time: 09/25/03 12:04:59

010030

Elem	Cd2265	Co2286	Mn2576	V_2924	Zn2062
Avge	1.140	.2679	.4050	.0737	.0867
SDev	.001	.0026	.0027	.0004	.0009
%RSD	.0900	.9503	.6772	.6075	1.063
#1	1.141	.2697	.4069	.0740	.0874
#2	1.139	.2661	.4031	.0734	.0861

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	764288	10000	--	--	--	--	--
SDev	966.6150	.0000000	--	--	--	--	--
%RSD	.1264727	.0000000	--	--	--	--	--
#1	763604	10000	--	--	--	--	--
#2	764971	10000	--	--	--	--	--

Method: DAILY1 Standard: clp_std6
Run Time: 09/25/03 12:09:24

010031

Elem	La4086	Na5889	Pd3404	S_1820	Th2837	U_3859	W_2079
Avge	.3740	.1461	.1500	.0409	.0574	.0317	.1011
SDev	.0002	.0012	.0004	.0001	.0001	.0001	.0002
%RSD	.0431	.8406	.2922	.1386	.1294	.3480	.1952
#1	.3739	.1453	.1497	.0409	.0573	.0316	.1009
#2	.3741	.1470	.1503	.0408	.0574	.0318	.1012

Elem	Y_3710	Zr3496
Avge	.9922	1.139
SDev	.0014	.001
%RSD	.1402	.0998
#1	.9932	1.140
#2	.9912	1.139

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	770090	10000	--	--	--	--	--
SDev	63.63961	.0000000	--	--	--	--	--
%RSD	.0082639	.0000000	--	--	--	--	--
#1	770045	10000	--	--	--	--	--
#2	770135	10000	--	--	--	--	--

Standardization Report 09/25/03 12:14:23 PM page 1

Method: DAILY1 Slope = Conc(SIR)/IR

010032

Element	Wavelen	High std	Low std	Slope	Y-intercept	Date Standardized
Ag3280	328.068	clp_std4	blk	37.9511	.000309	09/25/03 12:09:24
Al3082	308.215	clp_std1	blk	396.381	-.183034	09/25/03 12:09:24
As1890	189.042	clp_std4	blk	96.3506	.004228	09/25/03 12:09:24
B_2496	249.678	clp_std5	blk	26.8265	-.001362	09/25/03 12:09:24
Ba4934	493.409	clp_std2	blk	16.1377	.000526	09/25/03 12:09:24
Be3130	313.042	clp_std2	blk	25.0379	.002007	09/25/03 12:09:24
Bi2230	223.061	clp_std5	blk	86.2416	-.001191	09/25/03 12:09:24
Ca3179	317.933	clp_std1	blk	346.529	-.019971	09/25/03 12:09:24
Cd2265	226.502	clp_std3	blk	8.76930	-.000027	09/25/03 12:09:24
Co2286	228.616	clp_std3	blk	37.3327	.000165	09/25/03 12:09:24
Cr2677	267.716	clp_std2	blk	33.6253	-.001116	09/25/03 12:09:24
Cu3247	324.753	clp_std2	blk	32.1349	-.009159	09/25/03 12:09:24
Fe2714	271.441	clp_std1	blk	496.742	.017747	09/25/03 12:09:24
K_7664	766.491	clp_std1	blk	30.1337	-.050385	09/25/03 12:09:24
La4086	408.672	clp_std6	blk	25.8809	-.012956	09/25/03 12:09:24
Li6707	670.784	clp_std1	blk	3.09623	-.000561	09/25/03 12:09:24
Mg2790	279.078	clp_std1	blk	470.693	.000874	09/25/03 12:09:24
Mn2576	257.610	clp_std3	blk	24.6910	-.000093	09/25/03 12:09:24
Mo2020	202.030	clp_std5	blk	66.3027	.000997	09/25/03 12:09:24
Na5889	588.995	clp_std6	blk	6.63057	.031022	09/25/03 12:09:24
Na3302	330.232	clp_std1	blk	3948.26	.635561	09/25/03 12:09:24
Ni2316	231.604	clp_std2	blk	13.3925	.000135	09/25/03 12:09:24
P_1782	178.287	clp_std5	blk	329.406	-.018984	09/25/03 12:09:24
2203/1	220.351	clp_std4	blk	24.2268	-.002617	09/25/03 12:09:24
2203/2	220.352	clp_std4	blk	23.3484	.000170	09/25/03 12:09:24
Pd3404	340.458	clp_std6	blk	67.6693	-.001184	09/25/03 12:09:24
S_1820	182.040	clp_std6	blk	245.397	-.010600	09/25/03 12:09:24
Sb2068	206.838	clp_std4	blk	90.4678	.000443	09/25/03 12:09:24
Sc3613	361.384	blk	dark	1.25488	-.158931	09/25/03 12:09:24
1960/1	196.021	clp_std4	blk	45.5843	.002836	09/25/03 12:09:24
1960/2	196.022	clp_std4	blk	26.5556	-.003711	09/25/03 12:09:24
Si2881	288.158	clp_std5	blk	80.8324	-.092826	09/25/03 12:09:24
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	56.6813	-.000503	09/25/03 12:09:24
Sr4215	421.552	clp_std5	blk	6.67848	-.000117	09/25/03 12:09:24
Th2837	283.730	clp_std6	blk	183.092	-.002981	09/25/03 12:09:24
Ti3372	337.280	clp_std5	blk	9.45697	.013846	09/25/03 12:09:24
Tl1908	190.864	clp_std4	blk	343.084	.005356	09/25/03 12:09:24
U_3859	385.958	clp_std6	blk	364.465	-1.56155	09/25/03 12:09:24
V_2924	292.402	clp_std3	blk	135.732	.000850	09/25/03 12:09:24
W_2079	207.910	clp_std6	blk	49.4991	-.003694	09/25/03 12:09:24
Y_3710	371.030	clp_std6	blk	10.0768	.000013	09/25/03 12:09:24
Zn2062	206.200	clp_std3	blk	115.321	-.002384	09/25/03 12:09:24
Zr3496	349.621	clp_std6	blk	9.33762	-.001585	09/25/03 12:09:24

Analysis Report QC Standard 09/25/03 12:19:33 PM page 1

Method: DAILY1 Sample Name: icv/ccv Operator: **010033**
Run Time: 09/25/03 12:14:33
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.0291	10.32	5.231	4.990	10.39	1.070	5.257
SDev	.0026	.00	.010	.024	.01	.006	.000
%RSD	.25442	.0172	.1976	.4890	.0765	.5167	.0030
#1	1.0273	10.32	5.238	4.973	10.39	1.066	5.257
#2	1.0310	10.32	5.224	5.007	10.40	1.074	5.257
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1.0000	10.00	5.000	5.000	10.00	1.000	5.000
Range	10.000	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	20.57	1.023	5.123	2.024	2.122	10.42	18.96
SDev	.06	.007	.028	.010	.011	.05	.07
%RSD	.3025	.6618	.5400	.4959	.5150	.4683	.3664
#1	20.62	1.028	5.143	2.031	2.114	10.45	18.92
#2	20.53	1.018	5.104	2.017	2.130	10.38	19.01
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	5.219	5.086	20.45	1.064	5.218	Q43.71	28.13
SDev	.009	.012	.03	.003	.001	.12	.07
%RSD	.1786	.2398	.1710	.2988	.0174	.2654	.2355
#1	5.212	5.078	20.48	1.066	5.217	Q43.63	28.18
#2	5.226	5.095	20.43	1.062	5.219	Q43.79	28.09
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	4.978	5.417	5.179	5.364	1.035	1.036	1.030
SDev	.022	.031	.020	.001	.001	.002	.001
%RSD	.4425	.5782	.3858	.0155	.0508	.1820	.1439
#1	4.994	5.439	5.193	5.364	1.035	1.038	1.029
#2	4.963	5.394	5.165	5.363	1.035	1.035	1.031
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

010034

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	90.52	5.503	5.600	5.093	5.297	Q5.562	5.156
SDev	.63	.006	.017	.014	.007	.013	.025
%RSD	.6912	.1004	.3059	.2704	.1361	.2382	.4936
#1	90.07	5.499	5.588	5.103	5.302	Q5.552	5.174
#2	90.96	5.507	5.612	5.083	5.292	Q5.571	5.138
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Fail	QC Pass
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	5.389	1.007	5.043	Q5.616	.9868	5.193	Q1.291
SDev	.003	.004	.009	.025	.0203	.014	.003
%RSD	.0624	.3480	.1807	.4416	2.056	.2708	.2490
#1	5.392	1.009	5.036	Q5.598	1.001	5.203	Q1.293
#2	5.387	1.005	5.049	Q5.633	.9725	5.183	Q1.289
Errors	QC Pass	QC Pass	QC Pass	QC Fail	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	5.227	1.018	5.054
SDev	.001	.008	.003
%RSD	.0180	.7598	.0663
#1	5.226	1.024	5.051
#2	5.227	1.013	5.056
Errors	QC Pass	QC Pass	QC Pass
Value	5.000	1.000	5.000
Range	10.00	10.00	10.00

010035

IntStd	1	2	3	4	5	6	
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	722496	10000	--	--	--	--	--
SDev	4933.484	.0000000	--	--	--	--	--
%RSD	.6828384	.0000000	--	--	--	--	--
#1	719008	10000	--	--	--	--	--
#2	725985	10000	--	--	--	--	--

Analysis Report Blank Sample 09/25/03 12:27:02 PM page 1

Method: DAILY1 Sample Name: icb/ccb Operator:
Run Time: 09/25/03 12:22:03
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00007	.0056	.0014	.0081	.0001	-.0000	-.0007
SDev	.00075	.0008	.0001	.0013	.0000	.0001	.0010
%RSD	1149.4	14.64	5.633	15.76	18.84	305.7	150.3
#1	-.00047	.0062	.0013	.0090	.0002	.0000	-.0014
#2	.00060	.0050	.0014	.0072	.0001	-.0001	.0000
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.00500	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.00500	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0046	.0001	.0002	-.0007	.0008	.0030	.0029
SDev	.0005	.0001	.0003	.0002	.0002	.0042	.0000
%RSD	10.98	53.51	166.7	33.52	26.86	139.0	.9498
#1	-.0050	.0001	-.0000	-.0005	.0010	.0001	.0029
#2	-.0042	.0001	.0004	-.0009	.0007	.0060	.0029
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	.0006	-.0001	-.0007	.0000	.0022	-.0046	H.1288
SDev	.0002	.0000	.0031	.0000	.0000	.0011	.0196
%RSD	39.44	5.187	447.8	9.226	.2984	23.55	15.19
#1	.0004	-.0001	-.0029	.0000	.0022	-.0054	H.1150
#2	.0007	-.0001	.0015	.0000	.0022	-.0039	H.1426
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	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	-.0002	H.0185	-.0028	-.0016	-.0002	-.0028	.0022
SDev	.0000	.0160	.0009	.0020	.0013	.0038	.0022
%RSD	15.59	86.71	33.10	129.0	533.7	137.9	96.89
#1	-.0002	H.0298	-.0035	-.0001	-.0012	-.0055	.0038
#2	-.0002	.0071	-.0021	-.0030	.0007	-.0001	.0007
Errors	LC Pass	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

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	96.02	-.0011	.0010	.0018	-.0020	.0003	-.0014
SDev	.50	.0014	.0029	.0001	.0010	.0015	.0003
%RSD	.5218	118.2	281.2	5.646	52.31	466.3	19.27
#1	95.67	-.0021	.0031	.0017	-.0012	.0014	-.0012
#2	96.37	-.0002	-.0010	.0018	-.0027	-.0007	-.0015
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	.0000	.0006	-.0001	-.0040	-.0095	.0005	.0026
SDev	.0000	.0021	.0001	.0114	.0144	.0000	.0013
%RSD	59.19	334.4	93.99	282.3	151.5	1.182	51.05
#1	.0000	.0022	-.0002	.0040	-.0197	.0005	.0035
#2	.0000	-.0009	-.0000	L-.0120	.0007	.0005	.0016
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0001	.0004
SDev	.0000	.0003	.0000
%RSD	29.02	320.3	.2293
#1	.0001	-.0001	.0004
#2	.0001	.0003	.0004
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	766358	10000	--	--	--	--	--
SDev	4007.881	.0000000	--	--	--	--	--
%RSD	.5229776	.0000000	--	--	--	--	--
#1	763524	10000	--	--	--	--	--
#2	769192	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: pbw-J24W1 pg54-206 Operator:
Run Time: 09/25/03 12:27:12
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00018	.0151	-.0004	.0023	.0001	-.0001	-.0012
SDev	.00026	.0087	.0019	.0006	.0000	.0000	.0024
%RSD	148.44	57.60	497.0	24.38	27.69	17.45	198.4
#1	-.00036	.0089	-.0017	.0027	.0001	-.0001	-.0029
#2	.00001	.0212	.0010	.0019	.0000	-.0001	.0005
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.00500	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.00500	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0032	-.0001	.0006	-.0011	.0002	.0048	.0000
SDev	.0003	.0000	.0002	.0002	.0000	.0060	.0049
%RSD	8.912	51.06	37.06	18.93	4.772	123.4	46720.
#1	.0030	-.0001	.0004	-.0012	.0002	.0006	-.0034
#2	.0034	-.0001	.0007	-.0009	.0002	.0090	.0035
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	.0004	-.0001	.0060	.0001	.0008	-.0017	H.1323
SDev	.0006	.0000	.0031	.0000	.0006	.0002	.1107
%RSD	164.5	.3299	50.57	1.856	70.10	12.11	83.68
#1	-.0001	-.0001	.0039	.0001	.0012	-.0015	H.0540
#2	.0008	-.0001	.0082	.0001	.0004	-.0018	H.2106
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	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	.0000	.0022	-.0010	.0001	-.0012	-.0017	.0015
SDev	.0000	.0015	.0011	.0019	.0008	.0144	.0005
%RSD	134.3	70.18	113.4	1341.	68.69	853.9	32.34
#1	.0000	.0011	-.0018	-.0012	-.0018	.0085	.0012
#2	.0000	.0033	-.0002	.0015	-.0006	L-.0119	.0019
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	.0050	.0100			.0050	.0100	.0100
Low	-.0050	-.0100			-.0050	-.0100	-.0100

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

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	96.53	-.0017	.0011	.0039	-.0002	.0002	.0003
SDev	.08	.0014	.0041	.0000	.0016	.0023	.0013
%RSD	.0804	82.16	359.3	.1474	668.1	1147.	372.2
#1	96.59	-.0007	-.0018	.0039	-.0014	-.0014	-.0006
#2	96.48	-.0027	.0040	.0039	.0009	.0018	.0013
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0000	-.0001	-.0078	-.0204	.0004	.0024
SDev	.0000	.0018	.0001	.0116	.0140	.0004	.0022
%RSD	216.3	36980.	184.8	149.4	68.46	90.39	93.27
#1	-.0000	.0013	-.0001	L-.0160	-.0303	.0001	.0039
#2	.0000	-.0012	.0000	.0004	-.0105	.0007	.0008
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	-.0003	-.0002
SDev	.0001	.0002	.0002
%RSD	313.0	71.30	136.2
#1	-.0000	-.0001	-.0003
#2	.0001	-.0004	-.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	770486	10000	--	--	--	--	--
SDev	624.3753	.0000000	--	--	--	--	--
%RSD	.0810365	.0000000	--	--	--	--	--
#1	770928	10000	--	--	--	--	--
#2	770045	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: pbw-J24W2 pg54-207 Operator:
Run Time: 09/25/03 12:32:41
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00015	.0090	-.0024	.0005	.0000	-.0001	-.0008
SDev	.00050	.0072	.0012	.0003	.0000	.0001	.0011
%RSD	339.61	79.82	51.76	52.66	43.30	115.9	147.3
#1	-.00021	.0140	-.0033	.0003	.0000	-.0001	-.0015
#2	.00050	.0039	-.0015	.0007	.0000	-.0000	.0000
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.00500	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.00500	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0044	-.0001	.0008	-.0014	.0001	-.0048	-.0301
SDev	.0005	.0000	.0000	.0000	.0003	.0046	.0406
%RSD	11.51	73.20	.3131	3.125	274.4	96.68	134.9
#1	.0040	-.0001	.0008	-.0013	-.0001	-.0080	-.0589
#2	.0047	-.0000	.0008	-.0014	.0003	-.0015	-.0014
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	.0005	-.0003	.0060	-.0000	.0005	-.0049	L-.1778
SDev	.0002	.0001	.0048	.0000	.0004	.0063	.3021
%RSD	32.21	50.62	79.38	251.6	81.66	129.8	169.9
#1	.0004	-.0003	.0026	-.0000	.0008	-.0094	L-.3914
#2	.0006	-.0002	.0094	.0000	.0002	-.0004	.0359
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	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	-.0007	.0020	.0004	-.0003	-.0015	-.0061	.0019
SDev	.0003	.0049	.0013	.0035	.0003	.0000	.0016
%RSD	36.73	239.7	368.5	1051.	23.16	.0187	81.62
#1	-.0005	.0055	-.0006	.0021	-.0017	-.0061	.0008
#2	-.0009	-.0014	.0013	-.0028	-.0012	-.0061	.0030
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	96.20	-.0013	.0016	.0037	-.0001	.0007	-.0003
SDev	.19	.0046	.0003	.0023	.0019	.0017	.0020
%RSD	.2018	349.6	15.43	62.13	1847.	257.4	566.7
#1	96.07	.0019	.0018	.0021	.0012	.0019	-.0018
#2	96.34	-.0046	.0015	.0054	-.0014	-.0005	.0011
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0001	-.0001	-.0076	-.0304	.0001	.0021
SDev	.0000	.0028	.0002	.0044	.0134	.0004	.0004
%RSD	187.0	2894.	348.8	58.42	43.97	692.6	19.73
#1	-.0000	.0021	-.0002	L-.0108	-.0399	.0003	.0024
#2	.0000	-.0019	.0001	-.0045	-.0210	-.0002	.0018
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0006	-.0005
SDev	.0000	.0000	.0001
%RSD	35.48	.9087	18.36
#1	-.0000	.0006	-.0005
#2	-.0001	.0006	-.0006
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	767798	10000	--	--	--	--	--
SDev	1533.715	.0000000	--	--	--	--	--
%RSD	.1997548	.0000000	--	--	--	--	--
#1	766714	10000	--	--	--	--	--
#2	768883	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 1csw-J24W1 Operator:
Run Time: 09/25/03 12:38:07
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04785	1.840	1.960	.0005	1.958	.0489	.0007
SDev	.00011	.004	.009	.0002	.002	.0002	.0013
%RSD	.22385	.2403	.4363	41.54	.0884	.4932	189.0
#1	.04792	1.843	1.954	.0007	1.959	.0487	-.0002
#2	.04777	1.837	1.967	.0004	1.957	.0490	.0016

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.54	.0485	.4791	.1887	.2420	.9699	16.39
SDev	.12	.0003	.0035	.0027	.0007	.0253	.02
%RSD	.6317	.6025	.7378	1.458	.2850	2.605	.1439
#1	19.63	.0487	.4816	.1907	.2425	.9878	16.37
#2	19.46	.0483	.4766	.1868	.2415	.9521	16.41

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0022	-.0000	19.45	.4902	-.0005	25.78	16.84
SDev	.0001	.0000	.12	.0040	.0007	.02	.01
%RSD	4.838	217.1	.6328	.8121	129.1	.0633	.0833
#1	.0022	.0000	19.54	.4930	-.0010	25.79	16.83
#2	.0023	-.0000	19.37	.4874	-.0000	25.76	16.85

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4738	-.0029	.4884	.4977	.0000	-.0039	.4828
SDev	.0011	.0145	.0021	.0035	.0021	.0050	.0005
%RSD	.2378	492.2	.4317	.7108	9281.	128.1	.1028
#1	.4746	-.0132	.4899	.4952	.0015	-.0004	.4825
#2	.4730	.0073	.4870	.5002	-.0015	-.0074	.4832

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	96.72	2.012	2.060	.0093	.4942	2.042	.0008
SDev	.07	.002	.019	.0001	.0016	.013	.0006
%RSD	.0751	.1015	.9192	.7423	.3347	.6509	74.79
#1	96.67	2.011	2.047	.0093	.4930	2.033	.0012
#2	96.77	2.014	2.074	.0092	.4953	2.052	.0004

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	3.932	-.0051	-.0001	2.036	.0062	.4802	.0008
SDev	.015	.0014	.0001	.020	.0095	.0038	.0013
%RSD	.3872	26.78	71.46	.9983	154.4	.7981	160.1
#1	3.943	-.0041	-.0000	2.050	.0129	.4829	-.0001
#2	3.922	-.0060	-.0001	2.021	-.0006	.4775	.0018

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.4798	.0004
SDev	.0001	.0028	.0009
%RSD	278.4	.5811	256.6
#1	.0000	.4818	.0010
#2	-.0001	.4778	-.0003

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	771998	10000	--	--	--	--	--
SDev	572.0494	.0000000	--	--	--	--	--
%RSD	.0740999	.0000000	--	--	--	--	--
#1	771593	10000	--	--	--	--	--
#2	772402	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 1csw-J24W2 Operator:
Run Time: 09/25/03 12:43:34
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04705	1.876	1.981	-.0001	1.990	.0506	.0012
SDev	.00044	.008	.008	.0001	.008	.0010	.0032
%RSD	.94378	.4126	.3925	65.86	.4016	2.015	257.5
#1	.04674	1.881	1.986	-.0001	1.996	.0513	-.0010
#2	.04737	1.870	1.975	-.0002	1.985	.0499	.0035

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.72	.0491	.4851	.1909	.2460	.9775	16.66
SDev	.03	.0000	.0021	.0009	.0007	.0036	.05
%RSD	.1739	.0634	.4380	.4909	.3018	.3655	.3233
#1	19.74	.0491	.4866	.1916	.2466	.9749	16.70
#2	19.69	.0490	.4836	.1903	.2455	.9800	16.62

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0023	-.0000	19.66	.4963	-.0002	26.12	17.02
SDev	.0002	.0001	.08	.0026	.0001	.19	.17
%RSD	8.684	261.7	.4240	.5279	36.58	.7086	1.019
#1	.0022	-.0001	19.72	.4981	-.0001	26.25	16.90
#2	.0024	.0000	19.60	.4944	-.0002	25.98	17.15

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4816	.0051	.4931	.5066	-.0013	-.0039	.4910
SDev	.0001	.0081	.0007	.0011	.0013	.0004	.0000
%RSD	.0305	159.7	.1420	.2266	102.1	10.76	.0071
#1	.4815	.0108	.4936	.5058	-.0022	-.0036	.4910
#2	.4817	-.0007	.4926	.5074	-.0003	-.0042	.4909

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	96.22	2.039	2.081	.0044	.5016	2.065	.0008
SDev	.40	.004	.013	.0015	.0005	.010	.0009
%RSD	.4201	.2057	.6084	34.50	.1060	.4760	116.8
#1	96.50	2.036	2.072	.0034	.5012	2.058	.0015
#2	95.93	2.042	2.090	.0055	.5020	2.072	.0001

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.034	-.0032	-.0002	2.097	.0067	.4882	-.0006
SDev	.014	.0012	.0000	.013	.0058	.0012	.0069
%RSD	.3564	37.08	15.28	.6240	86.63	.2507	1257.
#1	4.044	-.0040	-.0002	2.106	.0026	.4891	.0043
#2	4.024	-.0023	-.0002	2.088	.0108	.4873	-.0054

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.4864	.0001
SDev	.0000	.0011	.0004
%RSD	659.9	.2360	466.4
#1	-.0000	.4872	-.0002
#2	.0000	.4855	.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	767928	10000	--	--	--	--	--
SDev	3194.709	.0000000	--	--	--	--	--
%RSD	.4160167	.0000000	--	--	--	--	--
#1	770187	10000	--	--	--	--	--
#2	765669	10000	--	--	--	--	--

010048-A

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Method: DAILY1 Sample Name: 234779 df10 Operator:
Run Time: 09/25/03 12:49:04
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00023	.0069	.0024	.0041	.0025	-.0000	-.0005
SDev	.00006	.0005	.0021	.0002	.0000	.0001	.0020
%RSD	26.733	7.513	86.41	4.146	.0989	359.0	416.4
#1	-.00019	.0073	.0009	.0040	.0025	-.0001	-.0019
#2	-.00028	.0065	.0039	.0043	.0025	.0001	.0009

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.285	.0000	.0006	-.0012	.0010	-.0099	.0086
SDev	.009	.0001	.0002	.0004	.0001	.0045	.0072
%RSD	.3858	249.7	40.62	29.72	8.597	45.02	83.08
#1	2.292	.0001	.0004	-.0015	.0011	-.0130	.0036
#2	2.279	-.0000	.0007	-.0010	.0009	-.0067	.0137

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	-.0001	.0048	.0000	.0003	3.657	2.725
SDev	.0000	.0000	.0004	.0000	.0003	.028	.085
%RSD	9.339	12.71	9.309	149.6	81.24	.7681	3.136
#1	.0005	-.0001	.0051	.0000	.0001	3.677	2.665
#2	.0004	-.0001	.0045	-.0000	.0005	3.637	2.785

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0008	.0123	.0014	-.0006	-.0029	-.0031	.0018
SDev	.0001	.0051	.0020	.0016	.0027	.0005	.0001
%RSD	15.58	41.50	143.9	262.3	91.11	16.84	5.293
#1	-.0008	.0087	.0028	-.0018	-.0048	-.0027	.0019
#2	-.0007	.0159	-.0000	.0005	-.0010	-.0034	.0017

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.49	.0017	.0058	.0945	.0000	.0044	-.0022
SDev	.86	.0008	.0004	.0005	.0004	.0005	.0001
%RSD	.8859	49.38	6.645	.5530	875.3	12.16	5.137
#1	96.88	.0011	.0055	.0949	-.0002	.0041	-.0023
#2	98.10	.0023	.0061	.0941	.0003	.0048	-.0022

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0013	-.0003	-.0001	-.0039	.0142	-.0001	.0004
SDev	.0002	.0008	.0005	.0024	.0067	.0001	.0020
%RSD	13.18	225.0	532.0	62.37	47.29	109.2	491.2
#1	.0014	-.0009	-.0004	-.0022	.0095	-.0000	.0018
#2	.0012	.0002	.0003	-.0056	.0190	-.0002	-.0010

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0017	-.0004
SDev	.0001	.0000	.0002
%RSD	141.3	1.963	56.67
#1	-.0001	.0018	-.0006
#2	-.0000	.0017	-.0003

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	778061	10000	--	--	--	--	--
SDev	6815.095	.0000000	--	--	--	--	--
%RSD	.8759075	.0000000	--	--	--	--	--
#1	773242	10000	--	--	--	--	--
#2	782880	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234779d df10 Operator:
Run Time: 09/25/03 12:54:32
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00011	.0082	.0019	.0047	.0024	.0000	-.0029
SDev	.00054	.0024	.0011	.0000	.0000	.0000	.0019
%RSD	507.63	29.85	56.48	.0745	1.604	170.0	67.21
#1	-.00027	.0065	.0027	.0047	.0024	-.0000	-.0043
#2	.00049	.0100	.0011	.0047	.0024	.0001	-.0015

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.259	-.0000	.0009	-.0013	.0009	-.0050	-.0157
SDev	.009	.0000	.0001	.0001	.0000	.0022	.0448
%RSD	.3807	37.99	14.68	10.11	2.382	44.69	284.8
#1	2.253	-.0000	.0008	-.0012	.0010	-.0034	-.0474
#2	2.265	-.0000	.0010	-.0014	.0009	-.0066	.0160

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	-.0002	.0057	-.0000	-.0001	3.678	2.496
SDev	.0000	.0001	.0000	.0000	.0005	.008	.418
%RSD	6.285	60.00	.4783	52.60	419.3	.2101	16.76
#1	.0005	-.0003	.0056	-.0000	.0002	3.684	2.200
#2	.0005	-.0001	.0057	-.0001	-.0005	3.673	2.792

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	.0096	.0021	-.0011	-.0013	-.0100	.0008
SDev	.0004	.0011	.0006	.0004	.0012	.0027	.0000
%RSD	121.9	11.51	30.94	36.65	91.34	26.65	.6258
#1	-.0001	.0104	.0016	-.0008	-.0022	-.0119	.0008
#2	-.0007	.0089	.0025	-.0014	-.0005	-.0081	.0008

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.03	-.0008	-.0002	.0934	-.0000	-.0004	-.0012
SDev	.27	.0015	.0008	.0022	.0001	.0000	.0020
%RSD	.2782	186.4	321.2	2.390	150.6	4.025	168.8
#1	98.22	.0003	-.0008	.0918	.0000	-.0004	.0002
#2	97.84	-.0019	.0003	.0950	-.0001	-.0004	-.0026

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	-.0018	.0000	-.0104	-.0012	-.0001	-.0007
SDev	.0000	.0010	.0004	.0006	.0100	.0006	.0034
%RSD	.8211	54.17	1182.	5.559	813.5	591.8	527.0
#1	.0011	-.0011	-.0002	-.0108	-.0083	.0003	.0018
#2	.0011	-.0024	.0003	-.0100	.0058	-.0005	-.0031

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0020	-.0005
SDev	.0000	.0000	.0001
%RSD	.8153	.7307	11.32
#1	-.0000	.0020	-.0005
#2	-.0000	.0020	-.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	782395	10000	--	--	--	--	--
SDev	2203.345	.0000000	--	--	--	--	--
%RSD	.2816154	.0000000	--	--	--	--	--
#1	783953	10000	--	--	--	--	--
#2	780837	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234780 df10 Operator:
Run Time: 09/25/03 12:59:59
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00042	.0054	.0004	.0033	.0021	-.0001	-.0011
SDev	.00057	.0036	.0013	.0012	.0000	.0000	.0004
%RSD	137.09	66.22	349.0	34.92	.6437	26.37	35.35
#1	.00001	.0029	-.0005	.0025	.0021	-.0001	-.0014
#2	.00083	.0080	.0013	.0042	.0021	-.0001	-.0008

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.7650	-.0000	.0009	-.0009	.0038	.0033	.0133
SDev	.0024	.0001	.0003	.0000	.0003	.0037	.0017
%RSD	.3138	1881.	30.29	5.468	7.569	114.0	12.73
#1	.7633	-.0001	.0007	-.0009	.0036	.0006	.0145
#2	.7667	.0001	.0011	-.0008	.0040	.0059	.0121

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	-.0001	.0036	.0000	.0007	6.895	5.021
SDev	.0009	.0000	.0055	.0000	.0007	.027	.057
%RSD	105.3	8.211	154.3	138.1	109.6	.3888	1.127
#1	.0002	-.0001	-.0003	.0000	.0001	6.914	5.061
#2	.0015	-.0001	.0075	.0001	.0012	6.876	4.981

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0012	.0009	-.0026	-.0009	.0010	.0013
SDev	.0002	.0006	.0020	.0001	.0013	.0097	.0021
%RSD	44.59	50.37	227.0	4.549	146.0	1016.	168.4
#1	.0002	.0007	-.0005	-.0025	-.0019	-.0059	-.0002
#2	.0005	.0016	.0022	-.0027	.0000	.0078	.0028

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.36	.0032	-.0001	.0519	-.0014	.0010	-.0007
SDev	.05	.0065	.0003	.0015	.0006	.0024	.0001
%RSD	.0503	203.8	418.2	2.845	39.68	228.1	21.97
#1	98.33	-.0014	-.0003	.0508	-.0018	-.0006	-.0008
#2	98.40	.0078	.0001	.0529	-.0010	.0027	-.0006

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0008	-.0007	-.0001	-.0047	.0141	.0007	.0021
SDev	.0000	.0002	.0003	.0062	.0129	.0005	.0022
%RSD	5.008	31.87	217.6	131.7	92.00	72.49	106.0
#1	.0008	-.0006	-.0004	-.0091	.0049	.0003	.0005
#2	.0009	-.0009	.0001	-.0003	.0232	.0010	.0036

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0017	.0003
SDev	.0000	.0002	.0001
%RSD	28.31	11.92	36.49
#1	.0001	.0016	.0002
#2	.0001	.0019	.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	785090	10000	--	--	--	--	--
SDev	424.2641	.0000000	--	--	--	--	--
%RSD	.0540402	.0000000	--	--	--	--	--
#1	784790	10000	--	--	--	--	--
#2	785390	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234780s df10 Operator:
Run Time: 09/25/03 13:05:27
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04744	1.855	1.975	.0036	1.969	.0486	-.0013
SDev	.00065	.014	.010	.0001	.010	.0003	.0015
%RSD	1.3798	.7665	.4960	2.124	.4985	.5401	113.4
#1	.04698	1.845	1.968	.0035	1.963	.0484	-.0003
#2	.04790	1.865	1.982	.0037	1.976	.0488	-.0024

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.86	.0481	.4796	.1885	.2452	.9651	16.79
SDev	.12	.0001	.0072	.0016	.0010	.0035	.13
%RSD	.5857	.2661	1.501	.8548	.3946	.3665	.7568
#1	19.78	.0480	.4745	.1874	.2445	.9626	16.70
#2	19.94	.0482	.4847	.1897	.2459	.9676	16.88

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0017	-.0001	19.11	.4899	-.0002	34.58	22.68
SDev	.0003	.0000	.17	.0053	.0008	.25	.03
%RSD	16.11	22.91	.8690	1.072	464.7	.7371	.1527
#1	.0019	-.0001	18.99	.4862	-.0007	34.40	22.70
#2	.0015	-.0001	19.22	.4936	.0004	34.76	22.65

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4738	-.0022	.4847	.4959	-.0016	.0039	.4849
SDev	.0008	.0001	.0002	.0073	.0001	.0008	.0029
%RSD	.1721	5.369	.0451	1.476	3.392	19.93	.6089
#1	.4732	-.0023	.4846	.4907	-.0016	.0045	.4828
#2	.4744	-.0021	.4849	.5010	-.0016	.0034	.4869

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.54	2.012	2.070	.0500	.4917	2.048	-.0003
SDev	.69	.003	.032	.0025	.0050	.020	.0023
%RSD	.7074	.1512	1.556	4.969	1.006	.9980	730.6
#1	98.02	2.014	2.047	.0482	.4882	2.034	.0013
#2	97.05	2.010	2.093	.0518	.4952	2.063	-.0019

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	3.988	-.0029	-.0000	2.062	-.0084	.4813	-.0011
SDev	.025	.0001	.0001	.010	.0117	.0035	.0012
%RSD	.6246	2.988	3260.	.4963	139.6	.7363	106.1
#1	3.970	-.0028	.0001	2.055	-.0166	.4788	-.0003
#2	4.005	-.0030	-.0001	2.069	-.0001	.4838	-.0020

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.4835	.0037
SDev	.0000	.0042	.0049
%RSD	145.0	.8652	135.1
#1	.0000	.4806	.0071
#2	-.0000	.4865	.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	778462	10000	--	--	--	--	--
SDev	5527.454	.0000000	--	--	--	--	--
%RSD	.7100475	.0000000	--	--	--	--	--
#1	782371	10000	--	--	--	--	--
#2	774554	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234759 df10 Operator:
Run Time: 09/25/03 13:10:55
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00030	.0050	.0027	.0081	.0660	.0001	-.0018
SDev	.00020	.0012	.0002	.0001	.0001	.0001	.0007
%RSD	67.640	24.95	8.816	1.376	.0772	73.81	38.94
#1	.00016	.0058	.0029	.0080	.0661	.0002	-.0013
#2	.00045	.0041	.0025	.0081	.0660	.0001	-.0023

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	27.74	-.0001	.0006	-.0015	.0816	.0002	.2198
SDev	.00	.0001	.0002	.0004	.0001	.0007	.0097
%RSD	.0042	121.9	27.72	24.26	.0653	413.4	4.397
#1	27.74	-.0002	.0007	-.0012	.0816	.0006	.2266
#2	27.74	-.0000	.0005	-.0017	.0816	-.0003	.2130

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	-.0002	.0087	.0002	.0003	4.799	3.390
SDev	.0000	.0000	.0026	.0000	.0002	.003	.082
%RSD	2.516	25.13	29.78	8.916	65.73	.0700	2.429
#1	.0006	-.0001	.0105	.0003	.0001	4.797	3.448
#2	.0006	-.0002	.0068	.0002	.0004	4.801	3.332

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0182	-.0018	-.0003	-.0020	.0015	.0029
SDev	.0001	.0092	.0013	.0003	.0014	.0060	.0014
%RSD	108.2	50.50	70.51	112.9	69.73	399.0	47.14
#1	.0000	.0117	-.0027	-.0005	-.0010	.0057	.0039
#2	.0002	.0247	-.0009	-.0001	-.0030	-.0027	.0020

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.15	.0026	-.0002	.0384	-.0008	.0008	.0053
SDev	.04	.0023	.0030	.0013	.0006	.0013	.0001
%RSD	.0393	88.99	1740.	3.392	80.75	162.3	.9380
#1	98.12	.0010	.0020	.0375	-.0013	.0017	.0053
#2	98.18	.0043	-.0023	.0393	-.0003	-.0001	.0052

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0048	-.0013	.0002	-.0032	-.0003	-.0000	.0016
SDev	.0002	.0010	.0006	.0065	.0107	.0002	.0012
%RSD	4.676	74.42	348.7	204.2	3701.	1870.	76.08
#1	.0050	-.0006	.0006	.0014	.0073	.0002	.0024
#2	.0046	-.0020	-.0003	-.0078	-.0079	-.0002	.0007

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0113	-.0003
SDev	.0001	.0001	.0004
%RSD	187.9	.9668	112.4
#1	.0000	.0113	-.0001
#2	-.0001	.0112	-.0006

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	783324	10000	--	--	--	--	--
SDev	260.2153	.0000000	--	--	--	--	--
%RSD	.0332194	.0000000	--	--	--	--	--
#1	783140	10000	--	--	--	--	--
#2	783508	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234759d df10 Operator:
Run Time: 09/25/03 13:16:23
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00089	.0103	.0022	.0071	.0674	.0001	-.0077
SDev	.00066	.0030	.0013	.0008	.0002	.0001	.0070
%RSD	74.553	28.90	59.62	11.37	.3068	132.4	90.72
#1	-.00136	.0082	.0031	.0066	.0673	.0000	-.0126
#2	-.00042	.0124	.0013	.0077	.0676	.0002	-.0028

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	27.42	-.0002	.0011	-.0010	.0010	.0035	.1617
SDev	.23	.0001	.0004	.0003	.0003	.0038	.0778
%RSD	.8554	38.24	39.27	26.07	25.66	107.8	48.09
#1	27.59	-.0003	.0014	-.0008	.0008	.0062	.1067
#2	27.25	-.0002	.0008	-.0012	.0012	.0008	.2167

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	-.0003	.0008	.0002	.0002	4.867	2.862
SDev	.0008	.0002	.0044	.0000	.0001	.005	.590
%RSD	399.3	68.42	546.7	2.767	39.42	.1125	20.62
#1	-.0003	-.0005	-.0023	.0002	.0001	4.863	2.444
#2	.0007	-.0002	.0039	.0002	.0002	4.871	3.279

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.0051	.0013	-.0003	-.0009	-.0000	.0007
SDev	.0000	.0087	.0020	.0003	.0016	.0053	.0012
%RSD	35.56	172.6	157.7	90.89	181.4	12880.	171.1
#1	-.0001	.0112	.0027	-.0001	.0002	-.0038	-.0001
#2	-.0001	-.0011	-.0001	-.0006	-.0020	.0037	.0015

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	96.32	-.0009	-.0006	.0370	.0002	-.0007	-.0026
SDev	.96	.0013	.0003	.0034	.0009	.0006	.0008
%RSD	1.001	146.1	43.57	9.109	454.4	88.83	30.75
#1	95.64	.0000	-.0004	.0346	.0008	-.0002	-.0032
#2	97.00	-.0017	-.0008	.0394	-.0004	-.0011	-.0020

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0046	.0012	-.0007	-.0078	-.0239	.0001	-.0009
SDev	.0000	.0013	.0007	.0014	.0151	.0005	.0006
%RSD	.9475	111.0	111.2	18.37	63.41	341.3	63.04
#1	.0046	.0021	-.0012	-.0068	-.0345	.0005	-.0005
#2	.0046	.0003	-.0001	-.0088	-.0132	-.0002	-.0013

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0106	-.0003
SDev	.0000	.0001	.0001
%RSD	11.47	1.200	22.10
#1	-.0000	.0106	-.0003
#2	-.0000	.0105	-.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	768736	10000	--	--	--	--	--
SDev	7686.958	.0000000	--	--	--	--	--
%RSD	.9999483	.0000000	--	--	--	--	--
#1	763300	10000	--	--	--	--	--
#2	774171	10000	--	--	--	--	--

Analysis Report QC Standard 09/25/03 01:27:09 PM page 1

Method: DAILY1 Sample Name: icv/ccv Operator:
Run Time: 09/25/03 13:21:51
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.0209	10.25	5.298	5.020	10.38	1.073	5.263
SDev	.0011	.01	.014	.017	.04	.026	.009
%RSD	.10768	.1140	.2592	.3341	.3910	2.393	.1673
#1	1.0202	10.24	5.308	5.009	10.41	1.091	5.257
#2	1.0217	10.26	5.288	5.032	10.35	1.055	5.269
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1.0000	10.00	5.000	5.000	10.00	1.000	5.000
Range	10.000	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	20.71	1.043	5.139	2.029	2.110	10.47	18.81
SDev	.02	.000	.014	.003	.000	.01	.02
%RSD	.1010	.0230	.2685	.1514	.0093	.0537	.0896
#1	20.69	1.043	5.129	2.026	2.110	10.46	18.82
#2	20.72	1.044	5.148	2.031	2.110	10.47	18.79
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	5.217	5.051	20.51	1.067	5.275	Q43.36	27.72
SDev	.005	.008	.02	.001	.028	.02	.12
%RSD	.0938	.1531	.0782	.1174	.5276	.0370	.4348
#1	5.214	5.056	20.50	1.067	5.255	Q43.37	27.63
#2	5.220	5.045	20.52	1.068	5.295	Q43.35	27.81
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	5.052	5.439	5.248	5.317	1.037	1.042	1.032
SDev	.007	.092	.085	.030	.001	.004	.005
%RSD	.1401	1.699	1.612	.5733	.0837	.3886	.5215
#1	5.057	5.373	5.189	5.295	1.037	1.039	1.028
#2	5.047	Q5.504	5.308	5.338	1.036	1.045	1.036
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	92.13	5.563	5.554	5.093	5.289	Q5.552	5.211
SDev	.14	.124	.057	.003	.048	.079	.007
%RSD	.1545	2.231	1.024	.0490	.9165	1.427	.1361
#1	92.23	5.476	5.514	5.095	5.254	5.496	5.217
#2	92.02	5.651	5.595	5.092	5.323	Q5.608	5.206
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Fail	QC Pass
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	5.364	1.005	5.047	Q5.659	.9875	5.199	Q1.301
SDev	.012	.001	.005	.006	.0158	.005	.005
%RSD	.2197	.0829	.1078	.1131	1.604	.1009	.3847
#1	5.372	1.004	5.051	Q5.664	.9763	5.195	Q1.297
#2	5.355	1.005	5.044	Q5.655	.9987	5.203	Q1.304
Errors	QC Pass	QC Pass	QC Pass	QC Fail	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	5.249	1.038	5.082
SDev	.006	.001	.004
%RSD	.1076	.0689	.0743
#1	5.245	1.038	5.084
#2	5.253	1.037	5.079
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	735348	10000	--	--	--	--	--
SDev	1142.685	.0000000	--	--	--	--	--
%RSD	.1553937	.0000000	--	--	--	--	--
#1	736156	10000	--	--	--	--	--
#2	734540	10000	--	--	--	--	--

Analysis Report Blank Sample 09/25/03 01:35:15 PM page 1

Method: DAILY1 Sample Name: icb/ccb Operator:
Run Time: 09/25/03 13:29:55
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00018	.0041	.0040	.0058	.0000	-.0000	-.0013
SDev	.00055	.0019	.0004	.0013	.0000	.0001	.0001
%RSD	306.57	47.23	10.47	21.65	248.3	426.0	6.757
#1	.00021	.0028	.0042	.0067	-.0000	-.0001	-.0012
#2	-.00057	.0055	.0037	.0049	.0000	.0000	-.0013
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.00500	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.00500	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0036	.0000	-.0004	-.0013	.0003	.0018	-.0137
SDev	.0006	.0001	.0004	.0005	.0004	.0021	.0069
%RSD	17.31	491.8	96.59	38.96	105.8	116.0	50.77
#1	.0040	.0001	-.0001	-.0016	.0001	.0003	-.0186
#2	.0031	-.0001	-.0006	-.0009	.0006	.0033	-.0088
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	-.0002	-.0002	-.0043	-.0000	.0012	-.0077	-.0388
SDev	.0003	.0000	.0039	.0001	.0004	.0006	.0148
%RSD	153.2	9.550	90.02	586.4	34.84	8.061	38.10
#1	.0000	-.0002	-.0016	-.0001	.0015	-.0082	-.0284
#2	-.0004	-.0001	-.0070	.0000	.0009	-.0073	-.0493
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	.0088	-.0006	-.0007	-.0021	-.0026	.0005
SDev	.0001	.0015	.0029	.0010	.0013	.0038	.0002
%RSD	92.88	16.72	518.0	144.7	62.06	147.7	45.55
#1	-.0001	.0098	.0015	-.0013	-.0012	.0001	.0004
#2	-.0003	.0077	-.0026	.0000	-.0030	-.0052	.0007
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	97.44	.0023	-.0007	.0015	-.0006	.0003	-.0010
SDev	.11	.0033	.0028	.0001	.0003	.0008	.0030
%RSD	.1164	144.6	422.4	9.127	51.75	227.8	295.5
#1	97.52	-.0001	.0013	.0016	-.0004	.0009	.0011
#2	97.36	.0046	-.0026	.0014	-.0009	-.0002	-.0031
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	-.0010	-.0002	-.0061	-.0143	-.0001	-.0004
SDev	.0000	.0003	.0001	.0056	.0078	.0001	.0026
%RSD	53.47	26.13	29.49	92.01	54.43	127.0	624.3
#1	.0000	-.0008	-.0002	-.0021	-.0088	-.0000	.0014
#2	.0000	-.0012	-.0003	L-.0101	-.0198	-.0002	-.0022
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	-.0008	-.0003
SDev	.0001	.0002	.0002
%RSD	36880.	28.34	48.52
#1	-.0001	-.0009	-.0004
#2	.0001	-.0006	-.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	777671	10000	--	--	--	--	--
SDev	933.3810	.0000000	--	--	--	--	--
%RSD	.1200226	.0000000	--	--	--	--	--
#1	778331	10000	--	--	--	--	--
#2	777011	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234760 df10 Operator:
Run Time: 09/25/03 13:35:25
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00174	-.0026	.0005	.0086	.0617	.0001	-.0031
SDev	.00254	.0032	.0001	.0029	.0013	.0001	.0051
%RSD	146.49	125.3	14.11	33.26	2.018	181.8	166.4
#1	.00006	-.0003	.0005	.0107	.0609	-.0000	.0005
#2	-.00353	-.0049	.0004	.0066	.0626	.0002	-.0067

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	27.36	-.0002	.0007	-.0007	.0031	.0113	.0874
SDev	.59	.0005	.0001	.0003	.0004	.0006	.0611
%RSD	2.168	248.7	7.941	38.96	12.61	5.231	69.86
#1	27.78	.0001	.0007	-.0008	.0028	.0117	.1306
#2	26.94	-.0005	.0008	-.0005	.0034	.0109	.0442

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0011	-.0003	-.0048	.0002	.0011	4.745	2.962
SDev	.0026	.0002	.0164	.0000	.0004	.101	.471
%RSD	239.6	79.32	342.3	8.684	36.95	2.136	15.89
#1	.0008	-.0001	.0068	.0002	.0014	4.674	3.295
#2	-.0029	-.0004	-.0163	.0002	.0008	4.817	2.629

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	-.0026	-.0000	-.0015	-.0012	.0016	-.0036
SDev	.0005	.0046	.0001	.0029	.0006	.0016	.0107
%RSD	464.9	175.3	1324.	197.9	48.69	100.3	297.8
#1	-.0004	-.0058	-.0001	-.0036	-.0016	.0005	.0040
#2	.0002	.0006	.0001	.0006	-.0008	.0028	-.0111

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.61	-.0026	.0026	.0283	-.0010	.0009	-.0043
SDev	2.50	.0030	.0020	.0044	.0020	.0003	.0068
%RSD	2.537	113.8	76.50	15.45	200.9	38.35	159.9
#1	100.4	-.0005	.0012	.0313	-.0024	.0006	.0006
#2	96.84	-.0047	.0040	.0252	.0004	.0011	-.0091

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0045	.0004	-.0012	-.0097	-.0291	.0004	-.0037
SDev	.0000	.0014	.0020	.0007	.0666	.0001	.0074
%RSD	.7710	320.2	166.9	7.341	228.8	34.96	198.9
#1	.0045	-.0006	.0002	-.0092	.0180	.0005	.0015
#2	.0045	.0015	-.0026	-.0102	-.0762	.0003	-.0089

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0102	-.0002
SDev	.0001	.0006	.0004
%RSD	86.03	5.825	172.7
#1	.0000	.0106	.0001
#2	.0001	.0097	-.0005

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	787038	10000	--	--	--	--	--
SDev	19945.36	.0000000	--	--	--	--	--
%RSD	2.534229	.0000000	--	--	--	--	--
#1	801142	10000	--	--	--	--	--
#2	772935	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234760s df10 Operator:
Run Time: 09/25/03 13:40:53
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04787	1.860	1.989	.0087	2.020	.0498	-.0018
SDev	.00011	.006	.005	.0000	.009	.0000	.0008
%RSD	.23645	.3338	.2570	.1722	.4628	.0386	43.97
#1	.04779	1.856	1.986	.0087	2.013	.0498	-.0024
#2	.04795	1.865	1.993	.0087	2.027	.0497	-.0012

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	47.10	.0483	.4800	.1891	.2451	1.050	17.15
SDev	.18	.0005	.0027	.0008	.0004	.003	.09
%RSD	.3727	1.055	.5602	.4518	.1694	.2910	.5241
#1	46.98	.0480	.4781	.1885	.2448	1.047	17.09
#2	47.23	.0487	.4819	.1897	.2454	1.052	17.21

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0019	-.0001	19.38	.4922	.0006	32.25	20.73
SDev	.0001	.0000	.07	.0027	.0006	.03	.04
%RSD	4.835	53.38	.3375	.5588	94.47	.0775	.2113
#1	.0018	-.0001	19.34	.4902	.0002	32.24	20.70
#2	.0019	-.0000	19.43	.4941	.0011	32.27	20.76

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4754	.0101	.4901	.4993	-.0005	.0058	.4864
SDev	.0038	.0059	.0032	.0038	.0000	.0012	.0038
%RSD	.8027	58.19	.6431	.7613	7.782	20.42	.7809
#1	.4727	.0059	.4923	.4967	-.0004	.0050	.4837
#2	.4781	.0142	.4879	.5020	-.0005	.0067	.4891

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	96.83	2.044	2.091	.0352	.4958	2.073	-.0015
SDev	.43	.020	.028	.0010	.0015	.012	.0009
%RSD	.4402	.9919	1.363	2.782	.2990	.5897	58.92
#1	97.13	2.059	2.071	.0345	.4947	2.065	-.0009
#2	96.52	2.030	2.111	.0359	.4968	2.082	-.0021

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	3.952	-.0057	-.0004	2.056	-.0091	.4821	-.0018
SDev	.015	.0021	.0001	.012	.0132	.0016	.0008
%RSD	.3714	36.79	17.84	.5913	144.6	.3369	44.61
#1	3.942	-.0072	-.0003	2.047	-.0184	.4810	-.0023
#2	3.963	-.0042	-.0004	2.064	.0002	.4833	-.0012

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.4914	.0000
SDev	.0001	.0058	.0002
%RSD	139.1	1.172	484.0
#1	-.0001	.4873	-.0001
#2	-.0000	.4954	.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	772801	10000	--	--	--	--	--
SDev	3396.941	.0000000	--	--	--	--	--
%RSD	.4395622	.0000000	--	--	--	--	--
#1	775203	10000	--	--	--	--	--
#2	770399	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234761 df10 Operator:
Run Time: 09/25/03 13:46:24
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00019	.0057	.0029	.0095	.0683	.0001	-.0006
SDev	.00011	.0032	.0003	.0006	.0002	.0001	.0001
%RSD	56.438	56.18	8.551	6.074	.3105	164.3	12.45
#1	-.00011	.0035	.0030	.0099	.0684	.0001	-.0005
#2	-.00026	.0080	.0027	.0091	.0681	-.0000	-.0006

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	7.485	-.0002	.0009	-.0012	.0066	.0075	.1167
SDev	.055	.0000	.0001	.0004	.0000	.0005	.0046
%RSD	.7305	14.17	10.77	36.73	.5233	6.566	3.957
#1	7.523	-.0001	.0010	-.0015	.0066	.0071	.1134
#2	7.446	-.0002	.0008	-.0009	.0066	.0078	.1200

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	-.0001	.0049	.0001	.0004	5.298	3.780
SDev	.0004	.0000	.0016	.0000	.0002	.018	.025
%RSD	164.8	13.88	33.08	21.83	55.59	.3343	.6587
#1	.0005	-.0001	.0061	.0001	.0003	5.285	3.798
#2	-.0000	-.0002	.0038	.0001	.0006	5.310	3.762

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	.0096	-.0021	-.0002	-.0009	.0082	.0012
SDev	.0004	.0058	.0012	.0017	.0000	.0129	.0029
%RSD	114.6	60.25	53.95	947.5	1.193	157.8	247.4
#1	-.0001	.0055	-.0013	-.0014	-.0009	-.0009	.0033
#2	-.0006	.0137	-.0030	.0010	-.0009	.0173	-.0009

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.2	.0006	.0014	.0420	-.0008	.0011	.0025
SDev	.0	.0023	.0037	.0008	.0007	.0016	.0008
%RSD	.0031	412.4	262.1	1.897	87.65	146.7	33.96
#1	101.2	.0022	-.0012	.0425	-.0013	-.0000	.0019
#2	101.2	-.0011	.0040	.0414	-.0003	.0023	.0031

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0024	-.0003	-.0004	-.0076	-.0006	.0003	.0034
SDev	.0001	.0012	.0003	.0057	.0086	.0003	.0005
%RSD	6.392	453.8	71.05	74.95	1454.	132.9	14.28
#1	.0025	.0006	-.0002	-.0036	-.0067	.0005	.0030
#2	.0023	-.0011	-.0006	-.0117	.0055	.0000	.0037

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0082	.0006
SDev	.0000	.0002	.0014
%RSD	15.48	2.450	231.4
#1	-.0001	.0084	.0016
#2	-.0000	.0081	-.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	807295	10000	--	--	--	--	--
SDev	1.414214	.0000000	--	--	--	--	--
%RSD	.0001752	.0000000	--	--	--	--	--
#1	807294	10000	--	--	--	--	--
#2	807296	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234762 df10 Operator:
Run Time: 09/25/03 13:51:53
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00051	.0124	.0014	.0095	.0619	.0000	-.0004
SDev	.00055	.0028	.0017	.0001	.0001	.0000	.0020
%RSD	108.43	22.36	123.6	.8393	.2144	71.05	545.9
#1	.00012	.0104	.0002	.0095	.0620	.0001	-.0018
#2	.00090	.0143	.0026	.0096	.0618	.0000	.0010

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	7.383	.0001	.0009	-.0012	.0018	.0030	.1192
SDev	.011	.0001	.0003	.0005	.0001	.0022	.0002
%RSD	.1460	183.5	37.04	40.02	4.443	74.21	.1936
#1	7.391	-.0000	.0007	-.0015	.0017	.0014	.1191
#2	7.376	.0001	.0011	-.0008	.0019	.0046	.1194

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0012	-.0002	.0078	.0000	.0003	5.458	3.939
SDev	.0008	.0000	.0039	.0000	.0007	.025	.040
%RSD	62.58	5.486	50.23	6.543	229.5	.4543	1.005
#1	.0007	-.0002	.0050	.0000	.0008	5.476	3.911
#2	.0017	-.0002	.0105	.0000	-.0002	5.441	3.967

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	.0042	.0012	.0005	-.0004	.0050	.0012
SDev	.0001	.0126	.0021	.0023	.0001	.0036	.0001
%RSD	41.03	302.3	167.3	438.1	39.54	71.98	7.281
#1	-.0002	-.0047	.0027	-.0011	-.0005	.0024	.0013
#2	-.0004	.0130	-.0002	.0022	-.0003	.0075	.0011

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.19	.0014	-.0020	.0460	.0008	-.0008	-.0018
SDev	.36	.0030	.0009	.0017	.0008	.0004	.0022
%RSD	.3715	208.3	46.04	3.646	110.3	49.42	124.4
#1	98.45	.0036	-.0026	.0448	.0002	-.0005	-.0033
#2	97.94	-.0007	-.0013	.0472	.0014	-.0011	-.0002

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0022	.0004	-.0000	-.0130	-.0074	.0003	.0035
SDev	.0001	.0021	.0004	.0019	.0246	.0002	.0035
%RSD	3.191	513.6	4346.	14.73	331.4	72.17	100.0
#1	.0021	-.0011	-.0003	-.0117	-.0248	.0002	.0010
#2	.0022	.0019	.0003	-.0144	.0100	.0005	.0059

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0069	-.0004
SDev	.0001	.0002	.0003
%RSD	1611.	2.505	72.85
#1	-.0001	.0070	-.0006
#2	.0001	.0068	-.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	783664	10000	--	--	--	--	--
SDev	2950.757	.0000000	--	--	--	--	--
%RSD	.3765336	.0000000	--	--	--	--	--
#1	785750	10000	--	--	--	--	--
#2	781577	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234763 df10 Operator:
Run Time: 09/25/03 13:57:21
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00014	.0090	-.0011	.0107	.0565	.0001	-.0043
SDev	.00003	.0014	.0014	.0002	.0001	.0001	.0050
%RSD	19.102	15.23	120.2	1.953	.0892	60.74	116.6
#1	-.00016	.0080	-.0002	.0109	.0565	.0002	-.0008
#2	-.00012	.0100	-.0021	.0106	.0565	.0001	-.0078

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.177	.0000	.0007	-.0013	.0010	-.0011	.1132
SDev	.016	.0001	.0004	.0000	.0002	.0036	.0005
%RSD	.7218	960.8	52.85	.0316	20.70	313.8	.4589
#1	2.166	.0000	.0010	-.0013	.0009	.0014	.1136
#2	2.188	-.0000	.0005	-.0013	.0012	-.0037	.1129

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	-.0001	.0058	-.0000	.0000	7.038	5.061
SDev	.0003	.0000	.0004	.0000	.0003	.015	.042
%RSD	88.53	16.45	7.063	15.33	647.4	.2199	.8231
#1	.0006	-.0001	.0061	-.0000	-.0002	7.027	5.032
#2	.0001	-.0001	.0055	-.0000	.0002	7.049	5.091

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	.0124	-.0006	.0016	-.0010	.0100	.0024
SDev	.0002	.0098	.0032	.0007	.0002	.0082	.0004
%RSD	51.52	79.45	524.9	43.19	16.86	81.69	16.20
#1	-.0004	.0054	-.0029	.0020	-.0009	.0042	.0027
#2	-.0002	.0194	.0017	.0011	-.0011	.0158	.0021

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.3	.0019	-.0004	.0903	.0008	.0004	-.0016
SDev	.2	.0021	.0030	.0024	.0006	.0013	.0012
%RSD	.1646	110.7	827.8	2.720	74.88	316.7	78.15
#1	101.4	.0004	.0018	.0885	.0004	.0013	-.0025
#2	101.2	.0034	-.0025	.0920	.0013	-.0005	-.0007

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0014	.0004	-.0003	-.0033	.0119	.0001	.0044
SDev	.0001	.0011	.0001	.0087	.0004	.0003	.0026
%RSD	5.234	279.0	45.27	261.0	3.059	366.3	58.72
#1	.0013	.0012	-.0002	-.0095	.0116	.0003	.0062
#2	.0014	-.0004	-.0004	.0028	.0121	-.0002	.0026

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0047	-.0003
SDev	.0000	.0002	.0004
%RSD	54.30	4.070	126.2
#1	-.0001	.0048	-.0000
#2	-.0000	.0046	-.0006

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	808541	10000	--	--	--	--	--
SDev	1339.260	.0000000	--	--	--	--	--
%RSD	.1656391	.0000000	--	--	--	--	--
#1	809488	10000	--	--	--	--	--
#2	807594	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234764 df10 Operator:
Run Time: 09/25/03 14:02:49
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00002	.0095	.0010	.0104	.0546	.0000	-.0007
SDev	.00002	.0038	.0011	.0001	.0003	.0000	.0018
%RSD	80.747	39.60	116.0	1.404	.4843	170.4	251.6
#1	-.00004	.0122	.0018	.0105	.0544	-.0000	.0005
#2	-.00001	.0068	.0002	.0103	.0548	.0001	-.0019

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.150	.0000	.0012	-.0009	.0023	.0067	.1267
SDev	.000	.0001	.0001	.0001	.0001	.0013	.0041
%RSD	.0137	119.9	4.789	14.96	2.437	19.47	3.250
#1	2.150	.0001	.0011	-.0009	.0024	.0076	.1296
#2	2.150	.0000	.0012	-.0008	.0023	.0058	.1238

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0006	-.0001	.0067	.0001	.0001	7.091	5.044
SDev	.0001	.0000	.0001	.0000	.0003	.030	.087
%RSD	9.981	14.22	1.369	45.82	232.4	.4183	1.730
#1	.0006	-.0001	.0068	.0001	.0003	7.070	5.106
#2	.0006	-.0001	.0066	.0001	-.0001	7.112	4.982

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0005	.0008	-.0018	.0002	.0232	.0027
SDev	.0005	.0024	.0025	.0008	.0008	.0011	.0027
%RSD	201.1	482.1	301.9	47.95	340.5	4.858	99.74
#1	.0006	-.0012	.0026	-.0024	.0008	.0224	.0008
#2	-.0001	.0022	-.0009	-.0012	-.0003	.0240	.0046

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.6	-.0033	-.0019	.0945	-.0009	-.0024	-.0018
SDev	1.1	.0021	.0033	.0020	.0003	.0029	.0019
%RSD	1.143	64.21	168.9	2.153	29.23	121.3	107.8
#1	99.76	-.0048	-.0042	.0931	-.0007	-.0044	-.0004
#2	101.4	-.0018	.0004	.0960	-.0011	-.0003	-.0032

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	-.0006	-.0001	-.0113	-.0078	.0005	.0017
SDev	.0001	.0016	.0000	.0095	.0155	.0000	.0042
%RSD	4.784	264.2	16.03	84.12	198.1	.5653	253.0
#1	.0014	-.0017	-.0001	-.0046	.0031	.0005	-.0013
#2	.0015	.0005	-.0001	-.0180	-.0187	.0005	.0046

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0042	.0000
SDev	.0001	.0001	.0001
%RSD	84.82	2.993	13650.
#1	.0001	.0041	-.0001
#2	.0000	.0043	.0001

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	802644	10000	--	--	--	--	--
SDev	9159.154	.0000000	--	--	--	--	--
%RSD	1.141123	.0000000	--	--	--	--	--
#1	796167	10000	--	--	--	--	--
#2	809120	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234765 df10 Operator:
Run Time: 09/25/03 14:08:18
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00193	.0061	.0018	.0086	.0768	-.0000	-.0064
SDev	.00249	.0173	.0014	.0016	.0005	.0000	.0077
%RSD	128.65	281.4	78.23	19.09	.6485	109.3	119.8
#1	-.00369	-.0061	.0027	.0075	.0765	-.0001	-.0118
#2	-.00017	.0183	.0008	.0098	.0772	-.0000	-.0010

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.7293	-.0005	.0007	-.0012	.0050	.0021	.0890
SDev	.0217	.0005	.0004	.0000	.0001	.0082	.0680
%RSD	2.979	103.9	54.71	3.604	1.332	387.0	76.39
#1	.7139	-.0008	.0004	-.0012	.0051	.0079	.0409
#2	.7447	-.0001	.0009	-.0012	.0050	-.0037	.1371

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0011	-.0003	-.0051	.0002	.0004	10.72	7.062
SDev	.0028	.0002	.0143	.0000	.0003	.09	.551
%RSD	250.4	69.86	280.6	1.863	61.29	.7971	7.804
#1	-.0031	-.0004	-.0152	.0002	.0006	10.66	6.672
#2	.0009	-.0001	.0050	.0002	.0002	10.78	7.452

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0005	.0070	.0005	-.0003	-.0016	.0392	-.0029
SDev	.0001	.0141	.0009	.0002	.0003	.0126	.0072
%RSD	23.16	202.1	170.0	51.19	17.16	32.06	247.0
#1	-.0004	.0169	.0012	-.0002	-.0018	.0303	-.0081
#2	-.0006	-.0030	-.0001	-.0004	-.0014	.0480	.0022

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.02	.0026	.0001	.0531	-.0000	.0010	-.0060
SDev	1.35	.0036	.0040	.0105	.0004	.0015	.0071
%RSD	1.365	136.7	2692.	19.83	1438.	148.1	118.0
#1	99.97	.0052	-.0027	.0457	.0003	-.0000	-.0111
#2	98.06	.0001	.0030	.0606	-.0003	.0020	-.0010

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	.0002	-.0014	-.0128	-.0517	.0002	-.0035
SDev	.0002	.0019	.0015	.0127	.0429	.0004	.0055
%RSD	20.17	930.6	106.9	98.88	82.92	151.8	156.5
#1	.0010	.0016	-.0025	-.0218	-.0821	.0005	-.0075
#2	.0013	-.0012	-.0003	-.0039	-.0214	-.0000	.0004

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0033	-.0006
SDev	.0000	.0003	.0001
%RSD	142.3	8.629	9.053
#1	.0000	.0031	-.0006
#2	-.0001	.0035	-.0005

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	790246	10000	--	--	--	--	--
SDev	10838.53	.0000000	--	--	--	--	--
%RSD	1.371539	.0000000	--	--	--	--	--
#1	797910	10000	--	--	--	--	--
#2	782582	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234766 df10 Operator:
Run Time: 09/25/03 14:13:47
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00004	.0175	-.0004	.0100	.0738	-.0000	-.0012
SDev	.00052	.0055	.0019	.0001	.0001	.0000	.0012
%RSD	1211.2	31.51	475.9	1.315	.0812	76.09	93.92
#1	.00041	.0136	.0009	.0101	.0739	-.0000	-.0004
#2	-.00033	.0214	-.0017	.0099	.0738	-.0001	-.0021

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.7174	.0000	.0011	-.0015	.0036	-.0025	.1179
SDev	.0086	.0001	.0005	.0007	.0005	.0101	.0112
%RSD	1.198	249.2	43.95	49.02	14.79	412.3	9.536
#1	.7114	-.0000	.0014	-.0010	.0039	.0047	.1258
#2	.7235	.0001	.0007	-.0020	.0032	-.0096	.1099

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	-.0001	.0068	-.0000	.0003	10.45	7.396
SDev	.0004	.0000	.0026	.0000	.0004	.09	.030
%RSD	68.83	29.32	37.55	143.3	148.8	.8700	.3996
#1	.0008	-.0001	.0086	.0000	.0006	10.39	7.417
#2	.0003	-.0001	.0050	-.0001	-.0000	10.52	7.375

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0104	.0005	-.0003	-.0010	.0187	.0009
SDev	.0005	.0162	.0018	.0014	.0017	.0055	.0005
%RSD	1908.	156.5	340.2	434.0	164.6	29.51	53.17
#1	.0003	-.0011	.0018	-.0013	.0002	.0148	.0013
#2	-.0004	.0218	-.0008	.0007	-.0022	.0226	.0006

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.18	-.0003	-.0005	.0555	-.0000	-.0004	-.0000
SDev	.14	.0024	.0013	.0013	.0003	.0016	.0010
%RSD	.1424	797.2	285.4	2.301	866.3	423.7	2872.
#1	99.28	-.0020	-.0014	.0564	-.0003	-.0016	.0006
#2	99.08	.0014	.0005	.0546	.0002	.0008	-.0007

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	-.0005	-.0005	-.0057	-.0009	-.0000	-.0011
SDev	.0000	.0031	.0003	.0022	.0093	.0005	.0020
%RSD	3.384	606.3	69.28	37.74	1048.	11160.	186.6
#1	.0011	.0017	-.0002	-.0042	.0057	.0003	.0003
#2	.0011	-.0027	-.0007	-.0072	-.0075	-.0003	-.0025

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0025	-.0005
SDev	.0001	.0001	.0006
%RSD	113.8	3.907	120.3
#1	-.0000	.0026	-.0001
#2	-.0001	.0024	-.0009

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	791554	10000	--	--	--	--	--
SDev	1065.610	.0000000	--	--	--	--	--
%RSD	.1346224	.0000000	--	--	--	--	--
#1	792308	10000	--	--	--	--	--
#2	790801	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234767 df10 Operator:
Run Time: 09/25/03 14:19:15
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00020	.0081	.0015	-.0008	.0001	.0000	.0005
SDev	.00045	.0023	.0017	.0000	.0000	.0001	.0044
%RSD	230.55	28.16	119.7	1.819	3.181	329.2	873.5
#1	-.00012	.0065	.0027	-.0008	.0001	.0001	-.0026
#2	.00052	.0098	.0002	-.0008	.0001	-.0000	.0036

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	9.240	.0002	.0007	-.0009	.0011	.0136	1.254
SDev	.004	.0001	.0002	.0000	.0001	.0001	.014
%RSD	.0425	25.35	27.80	.5570	11.54	.6179	1.105
#1	9.243	.0002	.0006	-.0009	.0010	.0137	1.244
#2	9.238	.0002	.0009	-.0009	.0012	.0136	1.264

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0012	-.0001	.0056	.0001	.0011	10.03	6.913
SDev	.0004	.0001	.0016	.0000	.0006	.00	.163
%RSD	31.27	41.10	28.53	71.95	54.25	.0149	2.353
#1	.0010	-.0002	.0067	.0000	.0007	10.03	6.798
#2	.0015	-.0001	.0044	.0001	.0015	10.03	7.028

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	.0004	-.0003	-.0002	-.0021	.0116	.0007
SDev	.0003	.0068	.0028	.0007	.0001	.0102	.0001
%RSD	167.2	1908.	1037.	420.1	5.690	88.07	9.641
#1	-.0004	.0052	-.0023	-.0006	-.0022	.0044	.0008
#2	.0000	-.0045	.0017	.0003	-.0021	.0188	.0007

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.1	-.0061	-.0011	.0077	-.0002	-.0028	-.0009
SDev	1.0	.0038	.0012	.0018	.0014	.0020	.0001
%RSD	.9887	61.75	105.6	22.86	704.6	73.56	10.96
#1	100.8	-.0088	-.0019	.0065	-.0012	-.0042	-.0009
#2	99.43	-.0035	-.0003	.0090	.0008	-.0013	-.0008

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.982	.0004	-.0003	-.0108	-.0037	.0003	-.0039
SDev	.001	.0033	.0003	.0014	.0092	.0001	.0007
%RSD	.0356	939.0	109.5	12.67	248.2	44.64	16.88
#1	1.983	-.0020	-.0005	-.0117	-.0102	.0002	-.0034
#2	1.982	.0027	-.0001	-.0098	.0028	.0003	-.0043

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0008	-.0003
SDev	.0000	.0006	.0001
%RSD	26.27	72.62	54.09
#1	.0000	.0012	-.0004
#2	.0000	.0004	-.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	799084	10000	--	--	--	--	--
SDev	7851.006	.0000000	--	--	--	--	--
%RSD	.9825002	.0000000	--	--	--	--	--
#1	804636	10000	--	--	--	--	--
#2	793533	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234768 df10 Operator:
Run Time: 09/25/03 14:24:47
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00017	.0204	.0029	-.0011	.0001	-.0001	.0005
SDev	.00005	.0057	.0024	.0002	.0000	.0000	.0023
%RSD	31.150	27.81	81.83	18.91	11.27	14.42	505.2
#1	-.00021	.0163	.0046	-.0009	.0001	-.0001	.0021
#2	-.00014	.0244	.0012	-.0012	.0001	-.0001	-.0012

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	9.064	.0001	.0003	-.0012	.0012	-.0018	1.302
SDev	.005	.0001	.0000	.0002	.0003	.0061	.015
%RSD	.0530	67.23	10.92	17.49	23.99	344.6	1.121
#1	9.067	.0001	.0003	-.0010	.0010	.0026	1.292
#2	9.060	.0002	.0003	-.0013	.0014	-.0061	1.312

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	-.0001	.0051	.0001	.0004	10.32	6.961
SDev	.0007	.0000	.0001	.0000	.0000	.01	.071
%RSD	45.30	3.519	1.104	4.266	.6187	.0895	1.018
#1	.0010	-.0001	.0050	.0001	.0004	10.31	6.911
#2	.0019	-.0001	.0051	.0001	.0004	10.32	7.011

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0005	.0080	-.0010	.0008	-.0022	.0076	.0016
SDev	.0005	.0142	.0032	.0004	.0007	.0029	.0023
%RSD	111.0	177.6	316.2	54.40	30.45	37.56	142.5
#1	-.0009	-.0020	-.0033	.0011	-.0026	.0096	-.0000
#2	-.0001	.0180	.0013	.0005	-.0017	.0056	.0033

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.22	.0017	.0003	.0096	.0002	.0008	.0007
SDev	.34	.0027	.0015	.0002	.0008	.0001	.0033
%RSD	.3495	163.1	461.2	2.343	363.6	12.75	497.0
#1	97.46	-.0003	.0014	.0097	-.0003	.0008	.0030
#2	96.98	.0036	-.0007	.0094	.0008	.0007	-.0017

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.017	-.0002	-.0002	-.0097	-.0185	.0002	-.0000
SDev	.004	.0009	.0001	.0013	.0233	.0001	.0026
%RSD	.1864	490.8	76.32	13.30	126.4	50.94	8787.
#1	2.014	.0004	-.0003	-.0088	-.0350	.0003	-.0019
#2	2.019	-.0008	-.0001	-.0106	-.0020	.0002	.0018

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0006	-.0004
SDev	.0001	.0002	.0000
%RSD	280.5	33.80	10.26
#1	.0000	.0007	-.0004
#2	-.0001	.0005	-.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	775922	10000	--	--	--	--	--
SDev	2717.411	.0000000	--	--	--	--	--
%RSD	.3502173	.0000000	--	--	--	--	--
#1	777843	10000	--	--	--	--	--
#2	774000	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: icv/ccv Operator:
Run Time: 09/25/03 14:35:29
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.0240	10.28	5.307	5.025	10.44	1.034	5.290
SDev	.0006	.02	.012	.026	.02	.006	.018
%RSD	.06060	.1999	.2337	.5214	.2001	.5472	.3326
#1	1.0244	10.30	5.299	5.007	10.43	1.038	5.277
#2	1.0235	10.27	5.316	5.044	10.46	1.030	5.302
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1.0000	10.00	5.000	5.000	10.00	1.000	5.000
Range	10.000	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	20.83	1.041	5.140	2.031	2.119	10.48	18.88
SDev	.04	.002	.006	.004	.001	.02	.01
%RSD	.1857	.1843	.1169	.1760	.0429	.1652	.0299
#1	20.85	1.039	5.144	2.034	2.120	10.49	18.88
#2	20.80	1.042	5.135	2.028	2.118	10.46	18.89
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	5.244	5.047	20.54	1.071	5.280	Q43.37	27.87
SDev	.020	.008	.00	.001	.033	.05	.09
%RSD	.3876	.1588	.0128	.0755	.6161	.1244	.3345
#1	5.229	5.041	20.54	1.071	5.257	Q43.41	27.93
#2	5.258	5.053	20.54	1.070	5.303	Q43.33	27.80
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	5.037	Q6.016	5.256	5.373	1.038	Q1.200	1.040
SDev	.016	.024	.024	.044	.001	.028	.003
%RSD	.3130	.4010	.4634	.8124	.0810	2.308	.2432
#1	5.026	Q6.033	5.274	5.342	1.039	Q1.181	1.038
#2	5.049	Q5.999	5.239	5.404	1.038	Q1.220	1.041
Errors	QC Pass	QC Fail	NOCHECK	NOCHECK	QC Pass	QC Fail	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	92.41	5.625	5.681	5.113	5.329	Q5.657	5.194
SDev	.32	.001	.081	.012	.021	.054	.029
%RSD	.3436	.0187	1.424	.2306	.3933	.9590	.5528
#1	92.64	5.624	5.624	5.121	5.314	Q5.618	5.214
#2	92.19	5.626	5.738	5.104	5.343	Q5.695	5.173
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Fail	QC Pass
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	5.374	1.011	5.057	Q5.665	1.009	5.205	Q1.299
SDev	.014	.001	.005	.005	.001	.008	.006
%RSD	.2617	.0942	.1058	.0842	.1059	.1594	.4975
#1	5.364	1.012	5.061	Q5.662	1.010	5.211	Q1.294
#2	5.384	1.010	5.054	Q5.669	1.008	5.200	Q1.303
Errors	QC Pass	QC Pass	QC Pass	QC Fail	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	5.249	1.031	5.081
SDev	.002	.003	.002
%RSD	.0362	.2629	.0348
#1	5.248	1.033	5.083
#2	5.251	1.029	5.080
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	737589	10000	--	--	--	--	--
SDev	2493.258	.0000000	--	--	--	--	--
%RSD	.3380282	.0000000	--	--	--	--	--
#1	739352	10000	--	--	--	--	--
#2	735826	10000	--	--	--	--	--

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	96.18	-.0055	.0020	.0049	.0002	-.0004	-.0014
SDev	.17	.0005	.0024	.0012	.0006	.0014	.0007
%RSD	.1748	8.638	116.1	23.78	399.8	316.4	47.69
#1	96.06	-.0051	.0004	.0041	-.0003	-.0015	-.0019
#2	96.30	-.0058	.0037	.0057	.0006	.0006	-.0009
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	.0011	.0007	-.0002	-.0000	-.0223	.0002	.0014
SDev	.0000	.0002	.0000	.0114	.0107	.0001	.0016
%RSD	1.818	23.54	9.295	60840.	48.09	53.72	110.9
#1	.0012	.0008	-.0002	-.0081	-.0299	.0001	.0025
#2	.0011	.0006	-.0002	.0080	-.0147	.0003	.0003
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	-.0007	-.0002
SDev	.0000	.0002	.0002
%RSD	46.93	28.54	67.55
#1	-.0000	-.0009	-.0004
#2	-.0000	-.0006	-.0001
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	767638	10000	--	--	--	--	--
SDev	1350.574	.0000000	--	--	--	--	--
%RSD	.1759389	.0000000	--	--	--	--	--
#1	766683	10000	--	--	--	--	--
#2	768593	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234769 df10 Operator:
Run Time: 09/25/03 14:49:10
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00047	.0121	.0032	.0101	.0610	.0001	-.0020
SDev	.00002	.0066	.0043	.0002	.0002	.0002	.0025
%RSD	4.4885	54.48	134.5	1.565	.3671	168.8	124.8
#1	-.00048	.0075	.0063	.0100	.0611	.0003	-.0037
#2	-.00045	.0168	.0002	.0102	.0608	-.0000	-.0002

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	27.70	-.0001	.0004	-.0015	.0023	-.0137	.1201
SDev	.31	.0000	.0004	.0000	.0001	.0000	.0163
%RSD	1.110	41.71	80.77	1.762	5.117	.2368	13.55
#1	27.49	-.0001	.0002	-.0015	.0022	-.0137	.1086
#2	27.92	-.0001	.0007	-.0015	.0024	-.0138	.1316

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	-.0002	.0029	.0001	.0006	4.791	3.266
SDev	.0005	.0001	.0012	.0001	.0007	.004	.165
%RSD	138.1	33.05	42.62	37.19	117.6	.0807	5.044
#1	.0000	-.0002	.0037	.0001	.0001	4.794	3.150
#2	.0007	-.0001	.0020	.0002	.0011	4.788	3.383

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0118	.0006	-.0010	-.0028	.0155	-.0001
SDev	.0001	.0007	.0019	.0005	.0006	.0074	.0015
%RSD	2409.	5.744	306.0	49.75	21.09	48.03	2774.
#1	.0001	.0113	.0020	-.0013	-.0032	.0102	.0010
#2	-.0001	.0123	-.0007	-.0006	-.0023	.0207	-.0011

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.2	.0001	.0016	.0353	-.0004	.0011	.0002
SDev	1.3	.0010	.0025	.0016	.0003	.0020	.0015
%RSD	1.269	1146.	156.5	4.482	78.09	180.7	693.0
#1	102.1	-.0006	-.0002	.0342	-.0002	-.0003	-.0008
#2	100.3	.0008	.0033	.0365	-.0007	.0025	.0013

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0047	-.0018	-.0004	-.0106	-.0174	-.0003	-.0001
SDev	.0000	.0003	.0003	.0017	.0012	.0005	.0023
%RSD	.1707	15.94	75.20	16.13	6.860	146.1	1608.
#1	.0047	-.0016	-.0002	-.0094	-.0166	-.0006	.0015
#2	.0047	-.0020	-.0006	-.0118	-.0183	.0000	-.0018

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0102	-.0007
SDev	.0000	.0004	.0003
%RSD	18.81	4.353	45.78
#1	-.0001	.0105	-.0009
#2	-.0001	.0099	-.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	807826	10000	--	--	--	--	--
SDev	10223.35	.0000000	--	--	--	--	--
%RSD	1.265539	.0000000	--	--	--	--	--
#1	815055	10000	--	--	--	--	--
#2	800597	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234770 df10 Operator:
Run Time: 09/25/03 14:54:39
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00014	.0138	.0016	.0087	.0628	-.0002	-.0002
SDev	.00063	.0056	.0007	.0003	.0005	.0001	.0011
%RSD	463.24	40.90	43.95	3.889	.7399	47.32	514.8
#1	-.00058	.0178	.0021	.0084	.0631	-.0001	-.0010
#2	.00031	.0098	.0011	.0089	.0624	-.0002	.0006

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	27.14	.0001	.0012	-.0009	.0021	.0029	.1141
SDev	.20	.0000	.0004	.0003	.0005	.0044	.0016
%RSD	.7223	14.66	31.95	36.00	21.83	152.6	1.378
#1	27.28	.0001	.0010	-.0011	.0018	-.0002	.1152
#2	27.00	.0001	.0015	-.0007	.0025	.0060	.1130

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0013	-.0002	.0047	.0002	.0001	4.859	3.188
SDev	.0004	.0000	.0030	.0000	.0003	.025	.006
%RSD	30.45	8.781	62.87	2.124	560.3	.5170	.1981
#1	.0010	-.0002	.0026	.0002	.0003	4.877	3.183
#2	.0016	-.0002	.0068	.0002	-.0002	4.842	3.192

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0147	.0007	-.0002	-.0010	.0158	.0021
SDev	.0007	.0192	.0033	.0004	.0020	.0077	.0036
%RSD	4381.	130.7	487.3	184.1	196.7	48.59	174.1
#1	-.0005	.0283	-.0016	-.0005	-.0024	.0212	-.0005
#2	.0005	.0011	.0030	.0001	.0004	.0104	.0046

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.16	.0006	-.0019	.0411	.0001	-.0011	-.0024
SDev	.55	.0027	.0004	.0023	.0014	.0012	.0008
%RSD	.5631	425.2	22.99	5.560	1830.	111.1	34.81
#1	97.77	-.0013	-.0022	.0395	-.0009	-.0019	-.0030
#2	98.55	.0025	-.0016	.0428	.0010	-.0002	-.0018

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0047	.0014	-.0005	.0010	-.0208	.0003	-.0020
SDev	.0001	.0032	.0001	.0012	.0078	.0003	.0012
%RSD	.9707	231.4	14.34	126.0	37.69	76.29	58.44
#1	.0047	.0037	-.0005	.0018	-.0264	.0002	-.0028
#2	.0048	-.0009	-.0004	.0001	-.0153	.0005	-.0012

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0101	-.0004
SDev	.0001	.0002	.0002
%RSD	1251.	1.712	41.47
#1	-.0001	.0102	-.0005
#2	.0001	.0100	-.0003

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	783453	10000	--	--	--	--	--
SDev	4379.819	.0000000	--	--	--	--	--
%RSD	.5590405	.0000000	--	--	--	--	--
#1	780356	10000	--	--	--	--	--
#2	786550	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234771 df10 Operator:
Run Time: 09/25/03 15:00:07
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00033	.0167	.0006	.0097	.0594	.0000	.0002
SDev	.00084	.0049	.0004	.0007	.0001	.0000	.0028
%RSD	251.93	29.21	69.37	7.508	.1108	404.9	1222.
#1	-.00026	.0133	.0003	.0092	.0594	-.0000	-.0017
#2	.00093	.0202	.0009	.0102	.0595	.0000	.0022

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	7.557	.0000	.0011	-.0008	.0016	.0049	.1474
SDev	.030	.0001	.0004	.0004	.0008	.0084	.0199
%RSD	.4001	304.7	34.66	46.65	49.45	173.6	13.54
#1	7.535	-.0000	.0008	-.0011	.0010	-.0011	.1333
#2	7.578	.0001	.0013	-.0006	.0021	.0108	.1615

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0008	-.0001	.0062	.0001	.0006	5.415	3.895
SDev	.0013	.0001	.0051	.0001	.0004	.005	.133
%RSD	156.2	42.27	82.29	83.12	65.34	.0948	3.414
#1	-.0001	-.0002	.0026	.0000	.0003	5.419	3.801
#2	.0017	-.0001	.0098	.0001	.0009	5.411	3.989

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	-.0036	.0001	-.0021	.0001	.0123	-.0000
SDev	.0006	.0048	.0009	.0017	.0027	.0019	.0015
%RSD	160.1	134.8	613.0	83.76	1975.	15.41	3291.
#1	-.0008	-.0002	.0007	-.0033	-.0017	.0110	-.0011
#2	.0000	-.0070	-.0005	-.0008	.0020	.0137	.0010

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.4	.0013	-.0024	.0448	-.0013	-.0012	.0001
SDev	.7	.0028	.0016	.0042	.0009	.0020	.0013
%RSD	.7143	209.1	65.65	9.339	64.98	173.2	1202.
#1	100.9	-.0006	-.0035	.0418	-.0019	-.0026	-.0008
#2	99.89	.0033	-.0013	.0477	-.0007	.0003	.0010

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0022	.0001	-.0004	-.0013	.0107	.0004	.0030
SDev	.0001	.0023	.0002	.0003	.0319	.0005	.0031
%RSD	4.424	1740.	45.61	19.87	297.3	137.6	104.3
#1	.0022	-.0015	-.0005	-.0015	-.0118	.0000	.0008
#2	.0023	.0017	-.0003	-.0011	.0332	.0007	.0052

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0065	-.0001
SDev	.0000	.0008	.0007
%RSD	141.0	11.94	694.6
#1	.0000	.0059	-.0006
#2	.0001	.0070	.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	801198	10000	--	--	--	--	--
SDev	5735.343	.0000000	--	--	--	--	--
%RSD	.7158455	.0000000	--	--	--	--	--
#1	805254	10000	--	--	--	--	--
#2	797143	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234772 df10 Operator:
Run Time: 09/25/03 15:05:34
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00047	.0166	-.0026	.0099	.0594	-.0000	.0002
SDev	.00011	.0023	.0016	.0000	.0000	.0000	.0008
%RSD	23.315	13.98	62.86	.3972	.0334	52.55	344.1
#1	-.00055	.0150	-.0014	.0099	.0594	-.0001	.0008
#2	-.00039	.0183	-.0037	.0098	.0594	-.0000	-.0003

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	7.546	-.0000	.0009	-.0012	.0041	-.0073	.1612
SDev	.008	.0000	.0003	.0000	.0004	.0127	.0032
%RSD	.1017	41.29	37.17	1.539	8.989	174.3	2.018
#1	7.552	-.0000	.0006	-.0012	.0044	.0017	.1589
#2	7.541	-.0000	.0011	-.0012	.0038	-.0162	.1635

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	-.0002	.0009	.0000	.0001	5.391	3.839
SDev	.0003	.0000	.0008	.0001	.0006	.039	.026
%RSD	99.90	6.834	93.57	458.2	466.7	.7247	.6796
#1	.0001	-.0001	.0003	.0001	.0006	5.364	3.857
#2	.0005	-.0002	.0014	-.0000	-.0003	5.419	3.821

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	.0059	-.0004	-.0004	-.0025	.0071	-.0002
SDev	.0006	.0054	.0002	.0003	.0003	.0094	.0005
%RSD	377.3	91.61	59.42	93.21	10.78	131.6	223.1
#1	.0003	.0098	-.0002	-.0001	-.0027	.0005	.0001
#2	-.0006	.0021	-.0006	-.0006	-.0023	.0138	-.0006

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.8	.0014	.0015	.0442	-.0004	.0015	.0012
SDev	.0	.0007	.0041	.0012	.0003	.0030	.0003
%RSD	.0133	53.32	268.3	2.774	80.73	200.7	20.65
#1	101.9	.0008	-.0014	.0434	-.0002	-.0006	.0010
#2	101.8	.0019	.0044	.0451	-.0006	.0036	.0014

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0023	-.0018	-.0002	-.0043	-.0038	-.0001	.0021
SDev	.0000	.0009	.0004	.0012	.0118	.0005	.0003
%RSD	.2172	46.31	156.8	27.24	315.5	320.5	12.42
#1	.0023	-.0024	.0000	-.0035	.0046	.0002	.0019
#2	.0023	-.0012	-.0005	-.0052	-.0121	-.0005	.0023

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0070	-.0006
SDev	.0001	.0000	.0004
%RSD	182.4	.0187	66.20
#1	.0000	.0070	-.0003
#2	-.0001	.0070	-.0009

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	812790	10000	--	--	--	--	--
SDev	113.8442	.0000000	--	--	--	--	--
%RSD	.0140066	.0000000	--	--	--	--	--
#1	812870	10000	--	--	--	--	--
#2	812709	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234773 df10 Operator:
Run Time: 09/25/03 15:11:02
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00015	.0241	-.0012	.0102	.0688	.0000	-.0009
SDev	.00004	.0064	.0010	.0002	.0002	.0001	.0010
%RSD	24.679	26.52	85.99	2.091	.2361	1100.	107.7
#1	-.00012	.0286	-.0019	.0104	.0689	.0000	-.0016
#2	-.00017	.0196	-.0005	.0101	.0687	-.0000	-.0002

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.233	-.0000	.0007	-.0012	.0017	-.0025	.1594
SDev	.005	.0000	.0000	.0002	.0001	.0014	.0044
%RSD	.2260	1145.	.3479	19.09	4.731	56.72	2.790
#1	2.230	-.0000	.0007	-.0010	.0016	-.0015	.1625
#2	2.237	.0000	.0007	-.0014	.0018	-.0035	.1562

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	-.0002	.0092	.0001	.0003	7.204	5.107
SDev	.0004	.0000	.0007	.0000	.0008	.006	.047
%RSD	62.82	15.99	8.078	19.46	255.5	.0889	.9248
#1	.0010	-.0001	.0086	.0001	.0009	7.209	5.140
#2	.0004	-.0002	.0097	.0001	-.0003	7.200	5.073

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	.0162	.0010	-.0005	-.0013	.0172	.0010
SDev	.0001	.0115	.0005	.0004	.0006	.0007	.0009
%RSD	38.54	70.48	50.18	72.60	48.57	3.923	90.76
#1	-.0002	.0081	.0014	-.0008	-.0009	.0177	.0003
#2	-.0001	.0243	.0007	-.0002	-.0018	.0167	.0016

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.46	.0047	.0019	.1008	.0000	.0029	.0000
SDev	.83	.0019	.0012	.0006	.0001	.0001	.0015
%RSD	.8298	41.12	61.39	.6170	546.5	5.121	4532.
#1	98.88	.0061	.0011	.1013	-.0000	.0028	-.0010
#2	100.0	.0034	.0028	.1004	.0001	.0030	.0011

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	-.0001	-.0003	.0008	.0090	-.0001	-.0022
SDev	.0000	.0015	.0001	.0040	.0088	.0001	.0027
%RSD	.7255	1326.	31.08	498.0	97.46	142.2	123.0
#1	.0014	.0010	-.0004	-.0020	.0152	-.0002	-.0003
#2	.0015	-.0012	-.0003	.0036	.0028	.0000	-.0042

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0044	-.0005
SDev	.0001	.0001	.0002
%RSD	80.45	1.243	44.96
#1	-.0000	.0044	-.0004
#2	-.0001	.0044	-.0007

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	793779	10000	--	--	--	--	--
SDev	6567.608	.0000000	--	--	--	--	--
%RSD	.8273850	.0000000	--	--	--	--	--
#1	789135	10000	--	--	--	--	--
#2	798423	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234774 df10 Operator:
Run Time: 09/25/03 15:16:30
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00007	.0208	-.0016	.0112	.0686	-.0002	-.0008
SDev	.00014	.0027	.0026	.0003	.0001	.0001	.0058
%RSD	199.94	13.18	157.4	2.219	.1322	38.95	717.3
#1	-.00017	.0227	.0002	.0114	.0685	-.0002	-.0049
#2	.00003	.0188	-.0035	.0110	.0686	-.0001	.0033

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.128	-.0000	.0011	-.0016	.0038	-.0103	.1140
SDev	.011	.0001	.0001	.0004	.0004	.0028	.0004
%RSD	.4973	433.8	11.71	26.54	9.848	27.48	.3708
#1	2.120	.0001	.0011	-.0019	.0040	-.0123	.1137
#2	2.135	-.0001	.0012	-.0013	.0035	-.0083	.1143

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	-.0002	.0044	-.0000	.0003	7.157	5.047
SDev	.0001	.0000	.0008	.0000	.0008	.011	.074
%RSD	16.34	19.50	18.91	49.21	286.6	.1511	1.462
#1	.0010	-.0002	.0050	-.0001	.0008	7.165	5.100
#2	.0008	-.0002	.0038	-.0000	-.0003	7.150	4.995

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0010	.0080	.0015	-.0014	-.0015	.0117	-.0001
SDev	.0000	.0039	.0025	.0029	.0008	.0011	.0005
%RSD	1.227	48.13	167.3	215.1	54.30	9.428	423.9
#1	-.0010	.0053	.0033	-.0035	-.0009	.0124	.0002
#2	-.0011	.0107	-.0003	.0007	-.0021	.0109	-.0005

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.63	-.0019	.0000	.1018	-.0004	-.0006	-.0004
SDev	.03	.0011	.0024	.0017	.0011	.0012	.0013
%RSD	.0291	57.94	19280.	1.698	272.1	205.4	315.6
#1	98.65	-.0011	-.0017	.1006	-.0012	-.0015	-.0014
#2	98.61	-.0027	.0017	.1031	.0004	.0003	.0005

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	-.0001	-.0006	-.0029	-.0141	-.0003	.0008
SDev	.0000	.0010	.0001	.0006	.0063	.0004	.0014
%RSD	2.874	1057.	19.98	20.97	44.80	133.1	164.5
#1	.0014	-.0008	-.0005	-.0034	-.0185	-.0005	.0018
#2	.0015	.0006	-.0007	-.0025	-.0096	-.0000	-.0001

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0259	-.0009
SDev	.0000	.0004	.0002
%RSD	9.505	1.647	20.15
#1	-.0001	.0256	-.0010
#2	-.0001	.0262	-.0008

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	787116	10000	--	--	--	--	--
SDev	209.3036	.0000000	--	--	--	--	--
%RSD	.0265912	.0000000	--	--	--	--	--
#1	787264	10000	--	--	--	--	--
#2	786968	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234775 df10 Operator:
Run Time: 09/25/03 15:21:58
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00013	.0219	.0014	.0107	.0571	-.0000	-.0024
SDev	.00041	.0013	.0017	.0013	.0006	.0000	.0011
%RSD	324.14	5.903	121.1	12.10	.9622	8.380	44.96
#1	.00016	.0210	.0002	.0116	.0567	-.0000	-.0032
#2	-.00042	.0228	.0025	.0098	.0575	-.0000	-.0016

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.7188	.0001	.0004	-.0013	.0018	.0020	.1611
SDev	.0051	.0002	.0003	.0003	.0002	.0039	.0024
%RSD	.7148	209.1	89.02	19.53	9.042	193.4	1.494
#1	.7151	.0002	.0006	-.0015	.0019	-.0007	.1594
#2	.7224	-.0000	.0001	-.0011	.0017	.0047	.1628

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0008	-.0002	.0050	-.0000	.0001	10.70	7.461
SDev	.0002	.0000	.0034	.0001	.0008	.05	.071
%RSD	29.24	2.261	67.62	316.4	759.6	.4549	.9538
#1	.0009	-.0002	.0074	-.0001	.0007	10.67	7.411
#2	.0006	-.0002	.0026	.0000	-.0004	10.74	7.512

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0006	.0104	-.0008	-.0009	-.0026	.0122	.0013
SDev	.0005	.0053	.0008	.0005	.0004	.0093	.0009
%RSD	86.12	50.89	100.0	59.21	16.02	75.68	68.74
#1	-.0010	.0142	-.0002	-.0013	-.0023	.0188	.0020
#2	-.0002	.0067	-.0014	-.0005	-.0029	.0057	.0007

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.23	-.0012	.0005	.0591	-.0009	-.0000	-.0010
SDev	.15	.0032	.0023	.0006	.0001	.0005	.0004
%RSD	.1506	273.5	441.1	.9803	8.405	1364.	34.60
#1	98.34	.0011	-.0011	.0595	-.0009	-.0004	-.0013
#2	98.13	-.0035	.0022	.0587	-.0008	.0003	-.0008

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	-.0008	-.0005	-.0058	-.0098	-.0002	.0007
SDev	.0000	.0004	.0000	.0065	.0082	.0005	.0008
%RSD	1.266	52.05	2.221	111.6	83.60	255.2	115.8
#1	.0011	-.0005	-.0005	-.0104	-.0040	-.0005	.0001
#2	.0011	-.0011	-.0005	-.0012	-.0156	.0002	.0013

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0024	-.0006
SDev	.0001	.0001	.0004
%RSD	211.6	4.037	63.11
#1	-.0001	.0025	-.0008
#2	.0000	.0023	-.0003

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	784014	10000	--	--	--	--	--
SDev	1164.605	.0000000	--	--	--	--	--
%RSD	.1485440	.0000000	--	--	--	--	--
#1	784837	10000	--	--	--	--	--
#2	783190	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234776 df10 Operator:
Run Time: 09/25/03 15:27:26
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00001	.0242	-.0003	.0097	.0740	-.0001	-.0011
SDev	.00017	.0062	.0005	.0003	.0006	.0000	.0011
%RSD	1254.5	25.65	156.6	2.761	.7422	.2823	101.2
#1	.00013	.0198	.0000	.0099	.0736	-.0001	-.0019
#2	-.00011	.0286	-.0007	.0095	.0744	-.0001	-.0003

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.6951	.0000	.0009	-.0011	.0020	-.0022	.1317
SDev	.0033	.0000	.0001	.0002	.0001	.0115	.0006
%RSD	.4787	114.1	10.66	20.48	6.043	528.1	.4823
#1	.6974	.0000	.0009	-.0009	.0019	.0060	.1322
#2	.6927	.0001	.0010	-.0012	.0021	-.0103	.1313

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	-.0002	.0032	-.0000	-.0000	10.63	7.442
SDev	.0006	.0000	.0009	.0000	.0006	.01	.232
%RSD	52.96	9.178	26.91	54.43	2144.	.1054	3.116
#1	.0015	-.0002	.0026	-.0000	.0004	10.64	7.606
#2	.0007	-.0002	.0039	-.0001	-.0005	10.63	7.278

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	.0021	.0011	.0002	-.0019	.0141	.0010
SDev	.0005	.0072	.0006	.0010	.0004	.0082	.0015
%RSD	193.9	338.5	55.34	455.7	20.54	58.52	160.2
#1	.0001	.0072	.0015	.0009	-.0022	.0082	-.0001
#2	-.0007	-.0029	.0006	-.0005	-.0017	.0199	.0021

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	97.80	-.0011	-.0008	.0573	.0005	-.0009	.0002
SDev	.01	.0037	.0006	.0014	.0008	.0017	.0031
%RSD	.0121	339.0	79.12	2.501	168.7	186.3	1600.
#1	97.80	.0015	-.0004	.0584	.0011	.0003	.0024
#2	97.79	-.0037	-.0013	.0563	-.0001	-.0021	-.0020

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0012	.0019	-.0004	-.0076	-.0199	.0001	-.0013
SDev	.0002	.0008	.0003	.0009	.0065	.0005	.0038
%RSD	16.08	43.69	73.74	12.45	32.41	331.2	286.8
#1	.0011	.0013	-.0002	-.0083	-.0245	.0005	-.0040
#2	.0014	.0024	-.0006	-.0069	-.0153	-.0002	.0014

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0028	-.0006
SDev	.0000	.0004	.0002
%RSD	85.00	15.09	29.33
#1	-.0000	.0031	-.0005
#2	-.0001	.0025	-.0007

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	780513	10000	--	--	--	--	--
SDev	84.85281	.0000000	--	--	--	--	--
%RSD	.0108714	.0000000	--	--	--	--	--
#1	780573	10000	--	--	--	--	--
#2	780453	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234777 df10 Operator:
Run Time: 09/25/03 15:32:55
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00019	.0177	-.0000	.0018	.0047	-.0000	.0003
SDev	.00057	.0060	.0014	.0003	.0001	.0001	.0038
%RSD	301.08	33.84	3145.	16.01	1.206	389.8	1209.
#1	-.00059	.0134	.0010	.0016	.0047	-.0001	-.0024
#2	.00021	.0219	-.0011	.0020	.0047	.0000	.0030

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	28.19	-.0000	.0010	-.0011	.0103	.0033	.0106
SDev	.09	.0001	.0001	.0001	.0002	.0008	.0010
%RSD	.3059	292.9	10.50	8.163	2.211	24.84	9.908
#1	28.25	-.0001	.0010	-.0011	.0102	.0028	.0114
#2	28.13	.0001	.0011	-.0010	.0105	.0039	.0099

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0008	-.0002	.0041	.0003	.0004	1.220	.8124
SDev	.0002	.0000	.0004	.0000	.0002	.007	.0582
%RSD	29.76	3.420	10.95	1.069	41.05	.5408	7.164
#1	.0006	-.0002	.0038	.0002	.0006	1.215	.8536
#2	.0010	-.0002	.0045	.0003	.0003	1.225	.7713

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	.0030	-.0003	-.0013	-.0006	.0092	.0007
SDev	.0001	.0211	.0014	.0005	.0002	.0144	.0004
%RSD	41.36	709.0	424.1	37.50	28.73	156.9	54.84
#1	-.0002	-.0120	.0007	-.0016	-.0005	-.0010	.0010
#2	-.0001	.0179	-.0013	-.0009	-.0008	.0194	.0005

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.13	.0018	-.0010	.0372	-.0010	-.0000	.0001
SDev	1.01	.0012	.0018	.0033	.0001	.0016	.0001
%RSD	1.014	67.30	182.0	8.837	15.60	4428.	42.46
#1	99.84	.0010	-.0023	.0349	-.0009	-.0012	.0001
#2	98.42	.0027	.0003	.0395	-.0011	.0011	.0001

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0045	.0006	-.0003	-.0051	.0035	.0006	.0005
SDev	.0001	.0002	.0002	.0011	.0051	.0001	.0022
%RSD	1.208	35.21	72.78	22.20	143.3	19.80	451.4
#1	.0045	.0005	-.0001	-.0058	-.0000	.0005	.0021
#2	.0045	.0008	-.0004	-.0043	.0071	.0007	-.0011

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0047	.0002
SDev	.0000	.0004	.0000
%RSD	28.82	9.268	18.47
#1	.0000	.0050	.0003
#2	.0000	.0044	.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	791200	10000	--	--	--	--	--
SDev	8003.035	.0000000	--	--	--	--	--
%RSD	1.011506	.0000000	--	--	--	--	--
#1	796859	10000	--	--	--	--	--
#2	785541	10000	--	--	--	--	--

Analysis Report 09/25/03 03:43:41 PM page 1

Method: DAILY1 Sample Name: 234778 df10 Operator:
Run Time: 09/25/03 15:38:23
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00016	.0163	-.0012	.0140	.0022	-.0002	-.0022
SDev	.00021	.0003	.0022	.0007	.0000	.0001	.0035
%RSD	129.15	1.877	178.6	5.198	1.745	45.33	162.1
#1	.00031	.0160	.0003	.0145	.0022	-.0002	-.0047
#2	.00001	.0165	-.0028	.0134	.0022	-.0001	.0003

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	7.653	.0000	.0009	-.0011	.0012	-.0007	.0059
SDev	.059	.0001	.0003	.0004	.0001	.0083	.0035
%RSD	.7652	268.3	33.76	37.75	9.667	1247.	59.38
#1	7.694	-.0000	.0011	-.0008	.0012	.0052	.0084
#2	7.611	.0001	.0007	-.0014	.0011	-.0066	.0034

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	.0024	.0059	.0001	.0004	1.993	1.441
SDev	.0007	.0000	.0029	.0000	.0006	.004	.082
%RSD	73.01	.5985	50.10	17.51	176.9	.1872	5.704
#1	.0015	.0025	.0080	.0002	-.0001	1.991	1.499
#2	.0005	.0024	.0038	.0001	.0008	1.996	1.383

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	.0097	.0013	-.0004	-.0001	.0224	.0022
SDev	.0003	.0054	.0017	.0017	.0001	.0008	.0023
%RSD	77.00	55.48	125.6	412.8	45.78	3.771	104.9
#1	.0006	.0059	.0002	.0008	-.0001	.0230	.0039
#2	.0002	.0135	.0025	-.0016	-.0002	.0218	.0006

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.93	.0016	.0004	.0399	.0002	.0008	-.0019
SDev	.58	.0032	.0059	.0012	.0006	.0029	.0013
%RSD	.5817	197.9	1402.	2.989	324.3	347.0	66.88
#1	99.52	.0038	-.0037	.0407	.0006	-.0012	-.0028
#2	100.3	-.0006	.0046	.0390	-.0002	.0028	-.0010

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0022	-.0003	-.0001	-.0095	.0013	.0005	-.0007
SDev	.0000	.0017	.0001	.0020	.0039	.0002	.0007
%RSD	1.003	670.7	158.7	21.44	302.4	44.91	98.40
#1	.0022	.0010	.0000	-.0080	-.0015	.0007	-.0002
#2	.0022	-.0015	-.0002	-.0109	.0040	.0004	-.0012

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0018	.0000
SDev	.0000	.0001	.0003
%RSD	94.61	4.538	5248.
#1	.0001	.0017	.0002
#2	.0000	.0018	-.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	---	--	--	--	--	--
Wavlen	361.384	---	--	--	--	--	--
Avge	797568	10000	--	--	--	--	--
SDev	4611.751	.0000000	--	--	--	--	--
%RSD	.5782266	.0000000	--	--	--	--	--
#1	794307	10000	--	--	--	--	--
#2	800829	10000	--	--	--	--	--

Analysis Report QC Standard 09/25/03 03:54:25 PM page 1

Method: DAILY1 Sample Name: icv/ccv Operator:
Run Time: 09/25/03 15:49:03
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.0269	10.39	5.288	5.033	10.55	1.028	5.308
SDev	.0143	.14	.026	.040	.11	.021	.012
%RSD	1.3887	1.344	.4894	.7910	1.087	2.081	.2323
#1	1.0369	10.49	5.269	5.005	10.63	1.013	5.316
#2	1.0168	10.29	5.306	5.061	10.47	1.043	5.299
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1.0000	10.00	5.000	5.000	10.00	1.000	5.000
Range	10.000	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	20.51	1.021	5.087	2.010	2.145	10.35	19.21
SDev	.18	.019	.030	.010	.021	.05	.22
%RSD	.8858	1.899	.5938	.4814	.9644	.5191	1.139
#1	20.38	1.008	5.066	2.003	2.160	10.31	19.37
#2	20.63	1.035	5.109	2.017	2.131	10.39	19.06
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	5.291	5.122	20.50	1.062	5.255	Q43.99	28.47
SDev	.018	.054	.06	.006	.060	.41	.03
%RSD	.3395	1.060	.2852	.6084	1.139	.9220	.1090
#1	5.304	5.160	20.45	1.058	5.213	Q44.28	28.49
#2	5.279	5.083	20.54	1.067	5.298	Q43.71	28.45
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	4.981	Q5.666	5.179	5.278	1.044	Q1.285	1.042
SDev	.059	.158	.015	.074	.009	.008	.002
%RSD	1.185	2.782	.2937	1.404	.8447	.6185	.1481
#1	4.939	Q5.554	5.168	5.226	1.050	Q1.290	1.040
#2	5.023	Q5.777	5.190	5.330	1.038	Q1.279	1.043
Errors	QC Pass	QC Fail	NOCHECK	NOCHECK	QC Pass	QC Fail	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	90.58	5.585	5.614	5.118	5.240	Q5.599	5.127
SDev	1.69	.028	.023	.016	.054	.006	.066
%RSD	1.861	.5060	.4153	.3156	1.039	.1092	1.279
#1	89.39	5.605	5.597	5.129	5.201	Q5.594	5.080
#2	91.78	5.565	5.630	5.106	5.278	Q5.603	5.173
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Fail	QC Pass
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	5.434	1.009	5.056	Q5.621	1.007	5.181	Q1.291
SDev	.033	.006	.015	.002	.026	.002	.024
%RSD	.5997	.5510	.2991	.0323	2.604	.0346	1.825
#1	5.457	1.013	5.067	Q5.622	.9888	5.183	Q1.275
#2	5.411	1.005	5.045	Q5.619	1.026	5.180	Q1.308
Errors	QC Pass	QC Pass	QC Pass	QC Fail	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	5.265	1.003	5.085
SDev	.006	.021	.010
%RSD	.1107	2.143	.2021
#1	5.261	.9878	5.092
#2	5.269	1.018	5.077
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	723066	10000	--	--	--	--	--
SDev	13464.73	.0000000	--	--	--	--	--
%RSD	1.862171	.0000000	--	--	--	--	--
#1	713545	10000	--	--	--	--	--
#2	732587	10000	--	--	--	--	--

Analysis Report Blank Sample 09/25/03 04:02:16 PM page 1

Method: DAILY1 Sample Name: icb/ccb Operator:
Run Time: 09/25/03 15:57:11
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00067	.0198	.0026	.0052	.0003	-.0000	-.0023
SDev	.00009	.0003	.0012	.0013	.0001	.0001	.0015
%RSD	13.684	1.435	45.11	24.56	34.81	127.1	66.29
#1	-.00074	.0196	.0018	.0061	.0003	-.0001	-.0034
#2	-.00061	.0200	.0034	.0043	.0002	-.0000	-.0012
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.00500	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.00500	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	H.1767	-.0001	-.0006	-.0017	-.0001	-.0142	-.0174
SDev	.0000	.0001	.0003	.0001	.0001	.0027	.0024
%RSD	.0057	102.0	45.52	5.446	112.2	18.70	13.94
#1	H.1767	-.0000	-.0008	-.0016	-.0000	-.0160	-.0157
#2	H.1767	-.0002	-.0004	-.0018	-.0002	-.0123	-.0191
Errors	LC High	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	-.0000	-.0003	-.0053	-.0000	.0013	-.0121	L-.1129
SDev	.0000	.0000	.0018	.0000	.0001	.0009	.0960
%RSD	125.2	.2391	33.09	58.09	9.132	7.655	85.01
#1	-.0000	-.0003	-.0066	-.0001	.0014	-.0114	-.0450
#2	-.0001	-.0003	-.0041	-.0000	.0013	-.0127	L-.1807
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	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	-.0007	.0052	-.0008	-.0008	-.0044	H.1421	-.0003
SDev	.0002	.0112	.0008	.0002	.0013	.0066	.0002
%RSD	22.80	216.8	100.1	20.68	29.06	4.675	83.87
#1	-.0008	H.0131	-.0002	-.0007	-.0035	H.1374	-.0001
#2	-.0006	-.0028	-.0013	-.0010	L-.0053	H.1468	-.0005
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	96.53	-.0009	.0019	.0023	-.0008	.0009	-.0005
SDev	.22	.0045	.0045	.0003	.0004	.0045	.0031
%RSD	.2269	485.7	245.1	12.85	45.73	481.2	638.9
#1	96.38	-.0041	-.0014	.0021	-.0006	-.0023	.0017
#2	96.69	.0022	.0051	.0025	-.0011	.0041	-.0027
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	.0012	-.0016	-.0008	L-.0107	-.0384	-.0004	-.0018
SDev	.0000	.0033	.0001	.0089	.0033	.0000	.0007
%RSD	.2528	208.3	14.22	82.90	8.520	.0520	37.91
#1	.0012	-.0039	-.0007	L-.0169	-.0407	-.0004	-.0023
#2	.0012	.0007	-.0008	-.0044	-.0360	-.0004	-.0013
Errors	LC Pass	LC Pass	LC Pass	LC Low	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	-.0007	-.0008
SDev	.0000	.0003	.0000
%RSD	6.879	48.17	.7036
#1	-.0001	-.0004	-.0008
#2	-.0001	-.0009	-.0008
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	770472	10000	--	--	--	--	--
SDev	1727.462	.0000000	--	--	--	--	--
%RSD	.2242084	.0000000	--	--	--	--	--
#1	769250	10000	--	--	--	--	--
#2	771693	10000	--	--	--	--	--

010119

Analysis Report 09/25/03 04:12:06 PM page 1

Method: DAILY1 Sample Name: Na 3ppm Operator:
Run Time: 09/25/03 16:07:06
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00033	.0251	-.0009	.0006	-.0001	-.0001	-.0018
SDev	.00071	.0005	.0013	.0001	.0001	.0001	.0003
%RSD	214.84	2.031	141.3	21.05	48.91	43.10	18.50
#1	-.00083	.0247	-.0019	.0005	-.0002	-.0002	-.0020
#2	.00017	.0255	-.0000	.0007	-.0001	-.0001	-.0015

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0339	-.0001	.0011	-.0018	.0001	-.0123	-.0079
SDev	.0129	.0000	.0002	.0000	.0003	.0052	.0117
%RSD	38.23	30.65	16.40	2.815	300.6	42.51	148.1
#1	.0247	-.0001	.0010	-.0018	.0003	-.0160	-.0162
#2	.0430	-.0002	.0012	-.0017	-.0001	-.0086	.0004

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	-.0002	-.0001	-.0001	.0004	2.806	2.091
SDev	.0005	.0000	.0022	.0000	.0004	.011	.004
%RSD	182.3	12.51	1627.	20.67	98.22	.3906	.2134
#1	-.0001	-.0003	-.0017	-.0001	.0001	2.813	2.088
#2	.0006	-.0002	.0014	-.0001	.0006	2.798	2.094

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0006	.0004	-.0014	.0006	-.0026	.0177	.0019
SDev	.0003	.0131	.0008	.0004	.0006	.0110	.0015
%RSD	50.69	3594.	53.93	58.72	24.03	61.88	80.84
#1	-.0004	-.0089	-.0019	.0009	-.0031	.0100	.0008
#2	-.0008	.0096	-.0009	.0004	-.0022	.0255	.0030

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	93.96	.0021	.0036	.0069	-.0000	.0031	-.0002
SDev	.35	.0017	.0044	.0039	.0000	.0024	.0035
%RSD	.3693	81.62	121.4	55.67	13.87	76.00	1561.
#1	94.21	.0009	.0067	.0042	-.0001	.0048	-.0027
#2	93.72	.0033	.0005	.0097	-.0000	.0014	.0022

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	.0004	-.0003	-.0070	-.0358	-.0002	.0006
SDev	.0001	.0001	.0000	.0116	.0121	.0003	.0006
%RSD	56.60	34.11	16.67	166.3	33.96	107.7	92.98
#1	.0001	.0003	-.0003	-.0152	-.0443	-.0004	.0011
#2	.0003	.0005	-.0003	.0012	-.0272	-.0001	.0002

~~010120~~ 010120
~~010~~ NA 12-10-03

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0002	-.0012	-.0009
SDev	.0001	.0003	.0004
%RSD	61.70	26.78	41.23
#1	-.0002	-.0015	-.0011
#2	-.0001	-.0010	-.0006

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	749942	10000	--	--	--	--	--
SDev	2758.424	.0000000	--	--	--	--	--
%RSD	.3678185	.0000000	--	--	--	--	--
#1	751892	10000	--	--	--	--	--
#2	747991	10000	--	--	--	--	--

✓

ICP ANALYSIS

PROJ. NO.	PROJECT	TO#	DATE	MATRIX	LOGBK PG
06002.01.141	Div 20	030918 4	9-26-03	water	S4 204
06002.01.141	Div 20	030918-4	9-26-03	water	S4 203

STR.

INSTRUMENT: TRACE 1 FILENAME: A 309184A

INSTRUMENT DL:

010121

Standardization Rpt. 09/26/03 12:56:27 PM page 1

Method: DAILY1 Standard: blk
Run Time: 09/26/03 12:51:27

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Avge	-.00001	.0005	-.0000	.0001	-.0000	-.0001	-.0000
SDev	.00001	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	100.43	2.630	79.39	18.67	9.690	.1919	508.8
#1	-.00000	.0005	-.0000	.0001	-.0000	-.0001	.0000
#2	-.00002	.0005	-.0000	.0001	-.0000	-.0001	-.0000

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Avge	.0000	-.0000	-.0000	.0000	.0003	-.0001	.0016
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0004
%RSD	8.634	16.50	69.81	414.9	3.813	39.84	22.81
#1	.0000	-.0000	-.0000	.0000	.0003	-.0000	.0018
#2	.0000	-.0000	-.0000	-.0000	.0003	-.0001	.0013

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Avge	.0005	.0001	-.0000	.0000	-.0000	-.0030	-.0002
SDev	.0000	.0001	.0000	.0000	.0000	.0017	.0000
%RSD	2.749	50.84	189.5	414.9	71.60	56.45	1.645
#1	.0005	.0001	.0000	.0000	-.0000	-.0041	-.0002
#2	.0005	.0002	-.0000	-.0000	-.0000	-.0018	-.0002

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Avge	-.0001	.0001	.0001	-.0000	-.0000	.0000	.0000
SDev	.0000	.0000	.0001	.0000	.0000	.0000	.0000
%RSD	25.70	44.93	88.60	584.2	737.0	33.76	75.73
#1	-.0000	.0000	.0000	.0000	.0000	.0000	.0000
#2	-.0001	.0001	.0002	-.0000	-.0000	.0000	.0000

Elem	Sc3613	1960/1	1960/2	Si2881	Sn1899	Sr4215	Th2837
Avge	73.72	-.0002	.0002	.0012	-.0000	.0000	.0000
SDev	.88	.0001	.0001	.0000	.0000	.0000	.0000
%RSD	1.198	45.31	31.97	3.547	78.39	29.43	64.35
#1	73.10	-.0002	.0002	.0012	-.0001	.0000	.0000
#2	74.35	-.0001	.0003	.0012	-.0000	.0000	.0000

Elem	Ti3372	Tl1908	U_3859	V_2924	W_2079	Y_3710	Zn2062
Avge	-.0015	-.0000	.0043	-.0000	.0001	-.0000	.0000
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	2.628	57.53	1.015	34.23	1.653	193.9	59.63
#1	-.0015	-.0000	.0043	-.0000	.0001	.0000	.0000
#2	-.0015	-.0001	.0042	-.0000	.0001	-.0000	.0000

Elem	Zr3496
Avge	.0001
SDev	.0000
%RSD	34.58
#1	.0002
#2	.0001

10/21/03

9-26-03

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	737172	10000	--	--	--	--	--
SDev	8808.429	.0000000	--	--	--	--	--
%RSD	1.194896	.0000000	--	--	--	--	--
#1	730943	10000	--	--	--	--	--
#2	743400	10000	--	--	--	--	--

Standardization Rpt. 09/26/03 01:00:52 PM page 1

Method: DAILY1 Standard: clp_std4
Run Time: 09/26/03 12:56:37

Elem	Ag3280	As1890	2203/1	2203/2	Sb2068	1960/1	1960/2
Avge	.05248	.1065	.4269	.4455	.1125	.2215	.3861
SDev	.00021	.0006	.0095	.0010	.0003	.0019	.0036
%RSD	.39276	.5739	2.237	.2230	.2344	.8474	.9250
#1	.05233	.1060	.4336	.4448	.1127	.2228	.3836
#2	.05262	.1069	.4201	.4462	.1123	.2202	.3886

Elem	Tl1908
Avge	.0296
SDev	.0001
%RSD	.2423
#1	.0296
#2	.0297

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	751760	10000	--	--	--	--	--
SDev	8365.780	.0000000	--	--	--	--	--
%RSD	1.112825	.0000000	--	--	--	--	--
#1	745845	10000	--	--	--	--	--
#2	757676	10000	--	--	--	--	--

Standardization Rpt. 09/26/03 01:05:17 PM page 1

Method: DAILYi Standard: clp_std1
Run Time: 09/26/03 13:01:02

Elem	Al3082	Ca3179	Fe2714	K_7664	Li6707	Mg2790	Na3302
Avge	.1251	.1475	.1028	1.629	3.221	.0544	.0121
SDev	.0016	.0000	.0005	.030	.055	.0004	.0002
%RSD	1.247	.0109	.4743	1.864	1.721	.8073	1.451
#1	.1240	.1475	.1025	1.608	3.182	.0541	.0120
#2	.1262	.1475	.1032	1.651	3.260	.0547	.0122

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	736352	10000	--	--	--	--	--
SDev	5658.976	.0000000	--	--	--	--	--
%RSD	.7685155	.0000000	--	--	--	--	--
#1	740353	10000	--	--	--	--	--
#2	732350	10000	--	--	--	--	--

Standardization Rpt. 09/26/03 01:09:22 PM page 1

Method: DAILYi Standard: clp_std5
Run Time: 09/26/03 13:05:27

Elem	B_2496	Bi2230	Mo2020	P_1782	Si2881	Sn1899	Sr4215
Avge	.3766	.0585	.1552	.0331	.1264	.1828	1.496
SDev	.0011	.0004	.0008	.0001	.0008	.0006	.010
%RSD	.2818	.6631	.4852	.3438	.6490	.3475	.6917
#1	.3773	.0588	.1547	.0331	.1270	.1833	1.504
#2	.3758	.0583	.1557	.0330	.1258	.1824	1.489

Elem	Ti3372
Avge	1.061
SDev	.003
%RSD	.3117
#1	1.063
#2	1.059

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	723438	10000	--	--	--	--	--
SDev	12454.27	.0000000	--	--	--	--	--
%RSD	1.721538	.0000000	--	--	--	--	--
#1	714632	10000	--	--	--	--	--
#2	732245	10000	--	--	--	--	--

Standardization Rpt. 09/26/03 01:13:04 PM page 1

Method: DAILY1 Standard: clp_std2
Run Time: 09/26/03 13:09:32

Elem	Ba4934	Be3130	Cr2677	Cu3247	Ni2316
Avge	.6127	.2271	.3056	.3111	.7735
SDev	.0001	.0014	.0000	.0003	.0019
%RSD	.0132	.6190	.0111	.0831	.2420
#1	.6128	.2261	.3056	.3109	.7722
#2	.6127	.2281	.3056	.3112	.7748

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	728300	10000	--	--	--	--	--
SDev	6566.901	.0000000	--	--	--	--	--
%RSD	.9016758	.0000000	--	--	--	--	--
#1	723656	10000	--	--	--	--	--
#2	732943	10000	--	--	--	--	--

Standardization Rpt. 09/26/03 01:17:29 PM page 1

Method: DAILY1 Standard: clp_std3
Run Time: 09/26/03 13:13:14

Elem	Cd2265	Co2286	Mn2576	V_2924	Zn2062
Avge	1.183	.2742	.4142	.0752	.0900
SDev	.002	.0011	.0012	.0003	.0004
%RSD	.1799	.3969	.2803	.3716	.4622
#1	1.185	.2749	.4150	.0754	.0902
#2	1.182	.2734	.4134	.0750	.0897

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	742620	10000	--	--	--	--	--
SDev	7520.081	.0000000	--	--	--	--	--
%RSD	1.012642	.0000000	--	--	--	--	--
#1	737302	10000	--	--	--	--	--
#2	747937	10000	--	--	--	--	--

Standardization Rpt. 09/26/03 01:22:39 PM page 1

Method: DAILY1 Standard: clp_std6
Run Time: 09/26/03 13:17:39

Elem	La4086	Na5889	Pd3404	S_1820	Th2837	U_3859	W_2079
Avge	-.3695	-.1096	.0397	.0053	.0565	.0092	.0312
SDev	1.0494	.3591	.1554	.0529	.0015	.0321	.0767
%RSD	284.0	327.7	391.8	1007.	2.671	348.9	246.0
#1	.3726	.1444	.1495	.0427	.0576	.0319	.0854
#2	-1.112	-.3635	-.0702	-.0322	.0554	-.0135	-.0230

Elem	Y_3710	Zr3496
Avge	.9608	1.094
SDev	.0417	.067
%RSD	4.338	6.123
#1	.9902	1.142
#2	.9313	1.047

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	372726	10000	--	--	--	--	--
SDev	514104.8	.0000000	--	--	--	--	--
%RSD	137.9310	.0000000	--	--	--	--	--
#1	736253	10000	--	--	--	--	--
#2	9199	10000	--	--	--	--	--

Standardization Rpt. 09/26/03 01:29:10 PM page 1

Method: DAILY1 Standard: clp_std6
Run Time: 09/26/03 13:24:11

Elem	La4086	Na5889	Pd3404	S_1820	Th2837	U_3859	W_2079
Avge	.3719	.1413	.1496	.0421	.0575	.0317	.1172
SDev	.0012	.0011	.0005	.0002	.0001	.0001	.0000
%RSD	.3299	.7486	.3147	.5654	.0812	.4828	.0150
#1	.3710	.1405	.1493	.0419	.0574	.0316	.1172
#2	.3728	.1420	.1500	.0423	.0575	.0318	.1172

Elem	Y_3710	Zr3496
Avge	.9908	1.139
SDev	.0000	.001
%RSD	.0012	.1221
#1	.9908	1.138
#2	.9908	1.140

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	734937	10000	--	--	--	--	--
SDev	18540.34	.0000000	--	--	--	--	--
%RSD	2.522712	.0000000	--	--	--	--	--
#1	721827	10000	--	--	--	--	--
#2	748047	10000	--	--	--	--	--

Standardization Report 09/26/03 01:29:10 PM page 1

Method: DAILY1 Slope = Conc(SIR)/IR

Element	Wavelen	High std	Low std	Slope	Y-intercept	Date Standardized
Ag3280	328.068	clp_std4	blk	38.1041	.000360	09/26/03 01:24:11
Al3082	308.215	clp_std1	blk	401.250	-.214492	09/26/03 01:24:11
As1890	189.042	clp_std4	blk	93.9253	.001152	09/26/03 01:24:11
B_2496	249.678	clp_std5	blk	26.5648	-.003499	09/26/03 01:24:11
Ba4934	493.409	clp_std2	blk	16.3193	.000575	09/26/03 01:24:11
Be3130	313.042	clp_std2	blk	22.0075	.002105	09/26/03 01:24:11
Bi2230	223.061	clp_std5	blk	84.7577	.000223	09/26/03 01:24:11
Ca3179	317.933	clp_std1	blk	339.097	-.008744	09/26/03 01:24:11
Cd2265	226.502	clp_std3	blk	8.44776	.000092	09/26/03 01:24:11
Co2286	228.616	clp_std3	blk	36.4741	.000394	09/26/03 01:24:11
Cr2677	267.716	clp_std2	blk	32.7242	-.000068	09/26/03 01:24:11
Cu3247	324.753	clp_std2	blk	32.1781	-.009431	09/26/03 01:24:11
Fe2714	271.441	clp_std1	blk	486.100	.024998	09/26/03 01:24:11
K_7664	766.491	clp_std1	blk	30.7210	-.047845	09/26/03 01:24:11
La4086	408.672	clp_std6	blk	26.0261	-.012853	09/26/03 01:24:11
Li6707	670.784	clp_std1	blk	3.10493	-.000418	09/26/03 01:24:11
Mg2790	279.078	clp_std1	blk	459.187	.001848	09/26/03 01:24:11
Mn2576	257.610	clp_std3	blk	24.1415	-.000017	09/26/03 01:24:11
Mo2020	202.030	clp_std5	blk	64.4362	.000527	09/26/03 01:24:11
Na5889	588.995	clp_std6	blk	6.93370	.020522	09/26/03 01:24:11
Na3302	330.232	clp_std1	blk	4073.47	.687895	09/26/03 01:24:11
Ni2316	231.604	clp_std2	blk	12.9270	.000692	09/26/03 01:24:11
P_1782	178.287	clp_std5	blk	302.984	-.017011	09/26/03 01:24:11
2203/1	220.351	clp_std4	blk	23.4313	-.002403	09/26/03 01:24:11
2203/2	220.352	clp_std4	blk	22.4458	.000059	09/26/03 01:24:11
Pd3404	340.458	clp_std6	blk	67.8356	.000132	09/26/03 01:24:11
S_1820	182.040	clp_std6	blk	237.996	-.002103	09/26/03 01:24:11
Sb2068	206.838	clp_std4	blk	88.8722	-.001029	09/26/03 01:24:11
Sc3613	361.384	blk	dark	1.35874	-.172084	09/26/03 01:24:11
1960/1	196.021	clp_std4	blk	45.1163	.006965	09/26/03 01:24:11
1960/2	196.022	clp_std4	blk	25.9169	-.005772	09/26/03 01:24:11
Si2881	288.158	clp_std5	blk	79.6096	-.094136	09/26/03 01:24:11
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	54.7185	.002312	09/26/03 01:24:11
Sr4215	421.552	clp_std5	blk	6.68271	-.000045	09/26/03 01:24:11
Th2837	283.730	clp_std6	blk	182.802	-.003610	09/26/03 01:24:11
Ti3372	337.280	clp_std5	blk	9.41295	.014171	09/26/03 01:24:11
Tl1908	190.864	clp_std4	blk	336.876	.013207	09/26/03 01:24:11
U_3859	385.958	clp_std6	blk	364.768	-1.55482	09/26/03 01:24:11
V_2924	292.402	clp_std3	blk	133.038	.000720	09/26/03 01:24:11
W_2079	207.910	clp_std6	blk	42.6863	-.004314	09/26/03 01:24:11
Y_3710	371.030	clp_std6	blk	10.0907	.000074	09/26/03 01:24:11
Zn2062	206.200	clp_std3	blk	111.179	-.000526	09/26/03 01:24:11
Zr3496	349.621	clp_std6	blk	9.33890	-.001181	09/26/03 01:24:11

Analysis Report QC Standard 09/26/03 01:34:20 PM page 1

Method: DAILY1 Sample Name: icv/ccv Operator:
Run Time: 09/26/03 13:29:20
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.0342	10.29	5.236	4.952	10.47	1.086	5.209
SDev	.0032	.02	.031	.007	.00	.012	.006
%RSD	.30645	.1477	.5911	.1459	.0126	1.122	.1174
#1	1.0364	10.30	5.258	4.947	10.47	1.095	5.213
#2	1.0320	10.28	5.214	4.957	10.48	1.078	5.205
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1.0000	10.00	5.000	5.000	10.00	1.000	5.000
Range	10.000	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	20.51	1.023	5.080	2.000	2.120	10.45	18.97
SDev	.20	.009	.057	.025	.001	.16	.11
%RSD	.9728	.9218	1.127	1.240	.0307	1.508	.5705
#1	20.65	1.029	5.121	2.018	2.119	10.56	18.90
#2	20.37	1.016	5.040	1.983	2.120	10.34	19.05
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	5.226	5.067	20.31	1.056	5.204	Q44.14	28.09
SDev	.016	.024	.12	.009	.007	.15	.17
%RSD	.3084	.4707	.6058	.8814	.1367	.3394	.5918
#1	5.215	5.050	20.39	1.062	5.199	Q44.03	27.97
#2	5.238	5.084	20.22	1.049	5.209	Q44.24	28.21
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	4.931	5.153	5.086	5.209	1.047	1.056	1.027
SDev	.040	.025	.070	.026	.001	.002	.006
%RSD	.8033	.4780	1.368	.4999	.1113	.1718	.5988
#1	4.959	5.170	5.037	5.191	1.047	1.057	1.022
#2	4.903	5.135	5.136	5.228	1.046	1.054	1.031
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	98.07	5.515	5.519	5.082	5.163	Q5.512	5.124
SDev	.22	.051	.065	.024	.041	.060	.054
%RSD	.2262	.9189	1.175	.4786	.7848	1.090	1.052
#1	98.23	5.479	5.473	5.099	5.134	5.470	5.162
#2	97.91	5.551	5.565	5.065	5.192	Q5.555	5.086
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Fail	QC Pass
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	5.365	1.012	5.036	Q5.615	1.006	5.151	Q1.136
SDev	.006	.018	.013	.018	.003	.042	.004
%RSD	.1079	1.764	.2554	.3164	.3320	.8072	.3688
#1	5.361	1.025	5.045	Q5.628	1.008	5.180	Q1.139
#2	5.369	.9995	5.027	Q5.603	1.003	5.121	Q1.133
Errors	QC Pass	QC Pass	QC Pass	QC Fail	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	5.233	1.022	5.039
SDev	.003	.014	.000
%RSD	.0521	1.382	.0021
#1	5.231	1.032	5.039
#2	5.234	1.012	5.039
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	722968	10000	--	--	--	--	--
SDev	1653.216	.0000000	--	--	--	--	--
%RSD	.2286707	.0000000	--	--	--	--	--
#1	724137	10000	--	--	--	--	--
#2	721799	10000	--	--	--	--	--

010134

Analysis Report Blank Sample 09/26/03 01:41:49 PM page 1

Method: DAILY1 Sample Name: icb/ccb Operator:
Run Time: 09/26/03 13:36:50
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00055	-.0036	-.0007	.0079	.0002	-.0001	.0016
SDev	.00094	.0032	.0031	.0023	.0001	.0000	.0020
%RSD	169.65	90.06	438.5	29.43	35.57	28.34	122.4
#1	.00121	-.0013	.0015	.0095	.0003	-.0001	.0030
#2	-.00011	-.0058	-.0029	.0063	.0002	-.0001	.0002
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.00500	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.00500	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0012	.0000	.0003	-.0003	.0003	.0009	.0175
SDev	.0012	.0002	.0009	.0001	.0003	.0004	.0119
%RSD	102.3	506.3	343.1	39.73	111.6	42.94	67.85
#1	.0020	.0002	.0009	-.0004	.0005	.0007	.0259
#2	.0003	-.0001	-.0004	-.0002	.0001	.0012	.0091
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	.0010	.0001	.0022	.0000	.0012	.0013	H.2136
SDev	.0008	.0000	.0022	.0000	.0008	.0025	.1676
%RSD	84.75	23.49	102.6	6248.	68.29	191.5	78.43
#1	.0015	.0001	.0037	.0000	.0018	-.0005	H.3321
#2	.0004	.0002	.0006	-.0000	.0006	.0030	H.0952
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	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	.0003	.0042	.0008	-.0009	.0002	.0050	.0008
SDev	.0001	.0040	.0014	.0019	.0026	.0031	.0022
%RSD	47.65	95.33	188.7	216.7	1105.	63.05	278.8
#1	.0003	.0070	.0018	.0005	.0020	.0028	.0024
#2	.0002	.0014	-.0003	-.0022	-.0016	.0072	-.0008
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	.0050	.0100			.0050	.0100	.0100
Low	-.0050	-.0100			-.0050	-.0100	-.0100

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

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.98	.0010	-.0014	.0041	-.0003	-.0006	.0039
SDev	.97	.0039	.0047	.0009	.0017	.0018	.0005
%RSD	.9720	392.8	333.6	22.84	537.5	308.0	12.98
#1	99.30	.0037	-.0047	.0048	.0009	-.0019	.0036
#2	100.7	-.0017	.0019	.0035	-.0015	.0007	.0043
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	.0009	.0004	.0020	-.0024	.0000	.0009
SDev	.0001	.0034	.0006	.0011	.0052	.0000	.0001
%RSD	89.89	361.0	149.4	53.77	218.3	36.03	8.134
#1	.0002	.0033	.0008	.0012	.0013	.0000	.0008
#2	.0000	-.0015	-.0000	.0028	-.0061	.0000	.0009
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0007	.0000
SDev	.0000	.0002	.0001
%RSD	.7306	29.57	288.9
#1	.0001	.0005	-.0000
#2	.0001	.0008	.0001
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	737098	10000	--	--	--	--	--
SDev	7128.343	.0000000	--	--	--	--	--
%RSD	.9670829	.0000000	--	--	--	--	--
#1	732057	10000	--	--	--	--	--
#2	742138	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: pbw-J23W1 pg54-203 Operator:
Run Time: 09/26/03 13:41:59
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00019	-.0006	-.0024	.0014	.0003	.0001	.0032
SDev	.00069	.0002	.0006	.0015	.0000	.0001	.0015
%RSD	372.31	37.67	23.47	114.3	.4569	167.1	46.20
#1	.00067	-.0004	-.0020	.0024	.0003	.0002	.0042
#2	-.00030	-.0007	-.0029	.0003	.0003	-.0000	.0021
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.00500	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.00500	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0294	.0000	.0008	-.0003	.0002	.0045	.0010
SDev	.0002	.0000	.0001	.0001	.0000	.0018	.0002
%RSD	.6745	67.02	8.761	33.54	8.086	38.82	18.42
#1	.0295	.0000	.0008	-.0002	.0002	.0033	.0011
#2	.0293	.0000	.0007	-.0003	.0002	.0057	.0008
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	.0004	.0000	.0101	.0004	.0005	.0095	.0245
SDev	.0005	.0001	.0022	.0000	.0001	.0019	.0069
%RSD	126.2	688.4	21.98	11.95	23.29	20.35	28.06
#1	.0008	-.0000	.0117	.0003	.0004	.0081	.0196
#2	.0000	.0000	.0086	.0004	.0006	.0109	.0294
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0001	.0086	.0019	-.0018	.0001	.0014	-.0008
SDev	.0001	.0133	.0005	.0004	.0016	.0068	.0017
%RSD	96.73	154.8	26.36	20.90	1401.	488.4	215.7
#1	-.0002	H.0180	.0015	-.0021	.0012	-.0034	.0004
#2	-.0000	-.0008	.0022	-.0015	-.0010	.0062	-.0020
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	.0050	.0100			.0050	.0100	.0100
Low	-.0050	-.0100			-.0050	-.0100	-.0100

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

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.2	.0042	-.0023	H.0156	-.0006	-.0001	.0013
SDev	.4	.0052	.0012	.0001	.0004	.0009	.0008
%RSD	.4173	123.2	51.54	.7659	70.92	675.0	62.69
#1	100.9	.0005	-.0015	H.0157	-.0009	-.0008	.0007
#2	101.5	.0079	-.0032	H.0155	-.0003	.0005	.0018
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	.0001	-.0004	.0002	-.0030	-.0142	.0001	-.0011
SDev	.0000	.0010	.0003	.0082	.0066	.0004	.0026
%RSD	26.40	285.8	147.4	270.6	46.13	392.0	244.2
#1	.0001	.0004	.0004	.0028	-.0096	-.0002	.0008
#2	.0001	-.0011	-.0000	-.0089	-.0189	.0004	-.0030
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	H.0060	-.0002
SDev	.0000	.0002	.0001
%RSD	17.76	3.042	55.89
#1	.0001	H.0059	-.0003
#2	.0000	H.0062	-.0001
Errors	LC Pass	LC High	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	746072	10000	--	--	--	--	--
SDev	3178.445	.0000000	--	--	--	--	--
%RSD	.4260236	.0000000	--	--	--	--	--
#1	743825	10000	--	--	--	--	--
#2	748320	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: pbw-J23W2 pg54-204 Operator:
Run Time: 09/26/03 13:47:08
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00009	-.0085	-.0008	.0003	.0000	.0001	.0013
SDev	.00024	.0007	.0035	.0004	.0000	.0000	.0017
%RSD	266.63	8.461	433.2	140.7	6.571	15.08	129.5
#1	-.00026	-.0080	-.0033	.0000	.0000	.0000	.0001
#2	.00008	-.0090	.0017	.0005	.0000	.0001	.0025
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.00500	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.00500	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0142	.0002	.0009	-.0001	.0002	.0050	.0050
SDev	.0005	.0000	.0007	.0001	.0004	.0042	.0027
%RSD	3.559	9.156	76.47	109.8	170.7	83.96	53.34
#1	.0138	.0002	.0013	-.0000	-.0001	.0020	.0031
#2	.0146	.0002	.0004	-.0002	.0005	.0080	.0069
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	.0006	-.0000	.0021	.0001	.0001	-.0030	H.0927
SDev	.0001	.0001	.0030	.0000	.0002	.0043	.0713
%RSD	21.92	1269.	141.7	22.44	254.8	145.8	76.93
#1	.0005	-.0001	-.0000	.0001	-.0001	-.0060	H.1431
#2	.0007	.0000	.0043	.0001	.0003	.0001	.0423
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	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	H.0145	-.0000	-.0001	-.0001	.0001	-.0006
SDev	.0002	.0018	.0035	.0030	.0017	.0049	.0035
%RSD	219.5	12.64	8309.	2235.	3233.	4828.	627.9
#1	.0002	H.0158	.0024	-.0022	.0012	-.0034	-.0030
#2	-.0000	H.0132	-.0025	.0020	-.0013	.0036	.0019
Errors	LC Pass	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

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.8	.0049	-.0017	.0077	-.0001	.0006	.0029
SDev	.4	.0019	.0047	.0020	.0008	.0025	.0006
%RSD	.3785	38.87	284.7	26.17	778.5	450.7	19.45
#1	101.5	.0036	.0017	.0063	-.0007	.0023	.0033
#2	102.0	.0063	-.0050	.0092	.0005	-.0012	.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	.0001	-.0026	.0001	.0094	.0032	.0000	.0001
SDev	.0000	.0014	.0001	.0060	.0045	.0000	.0010
%RSD	28.02	51.72	179.6	64.54	138.6	45.70	831.9
#1	.0001	-.0017	-.0000	.0051	.0001	.0000	.0008
#2	.0001	-.0036	.0002	H.0136	.0064	.0000	-.0006
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0009	.0001
SDev	.0001	.0001	.0002
%RSD	169.4	12.35	290.0
#1	-.0000	.0010	-.0001
#2	.0001	.0008	.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	750115	10000	--	--	--	--	--
SDev	2814.285	.0000000	--	--	--	--	--
%RSD	.3751805	.0000000	--	--	--	--	--
#1	748125	10000	--	--	--	--	--
#2	752105	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: lcsw-J23W1 Operator:
Run Time: 09/26/03 13:52:18
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04912	1.865	1.945	.0014	1.990	.0503	.0006
SDev	.00007	.006	.040	.0002	.026	.0012	.0039
%RSD	.13863	.3260	2.032	14.08	1.318	2.381	643.8
#1	.04907	1.860	1.973	.0012	1.971	.0511	.0034
#2	.04917	1.869	1.917	.0015	2.009	.0495	-.0022

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.32	.0478	.4749	.1895	.2443	1.013	16.44
SDev	.56	.0020	.0140	.0082	.0012	.071	.29
%RSD	2.912	4.203	2.956	4.322	.4750	6.966	1.766
#1	19.72	.0493	.4848	.1953	.2435	1.063	16.23
#2	18.92	.0464	.4650	.1837	.2451	.9634	16.64

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0038	.0002	19.23	.4862	.0011	26.49	17.32
SDev	.0011	.0000	.35	.0126	.0016	.24	.23
%RSD	28.86	1.267	1.809	2.596	154.5	.9085	1.334
#1	.0046	.0002	19.48	.4951	.0022	26.32	17.16
#2	.0030	.0002	18.99	.4773	-.0001	26.66	17.49

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4666	.0101	.4519	.4892	.0012	.0038	.4814
SDev	.0134	.0031	.0202	.0243	.0010	.0074	.0007
%RSD	2.878	30.53	4.478	4.970	85.57	191.8	.1420
#1	.4761	.0123	.4375	.5064	.0019	.0091	.4810
#2	.4572	.0079	.4662	.4720	.0005	-.0014	.4819

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.9	1.953	2.028	.0123	.4763	2.001	.0021
SDev	1.4	.024	.035	.0003	.0095	.016	.0009
%RSD	1.368	1.237	1.746	2.640	1.985	.7763	43.71
#1	101.9	1.936	2.053	.0121	.4830	2.012	.0028
#2	99.93	1.970	2.003	.0126	.4696	1.990	.0015

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.032	.0063	.0006	2.029	.0308	.4802	.0015
SDev	.036	.0126	.0001	.014	.0393	.0086	.0001
%RSD	.9002	201.0	16.27	.6794	127.7	1.792	7.628
#1	4.006	.0152	.0005	2.039	.0586	.4863	.0016
#2	4.058	-.0026	.0007	2.020	.0030	.4741	.0014

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0005	.4754	.0025
SDev	.0006	.0252	.0027
%RSD	122.7	5.294	109.0
#1	.0009	.4932	.0044
#2	.0001	.4576	.0006

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	743830	10000	--	--	--	--	--
SDev	10217.69	.0000000	--	--	--	--	--
%RSD	1.373660	.0000000	--	--	--	--	--
#1	751055	10000	--	--	--	--	--
#2	736605	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: lcsw-J23W2 Operator:
Run Time: 09/26/03 13:57:27
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04856	1.854	1.960	-.0003	1.981	.0504	.0007
SDev	.00009	.008	.007	.0009	.002	.0002	.0006
%RSD	.19076	.4233	.3381	356.8	.1054	.4468	83.45
#1	.04849	1.849	1.955	.0004	1.982	.0503	.0011
#2	.04862	1.860	1.965	-.0009	1.979	.0506	.0003

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.43	.0483	.4789	.1888	.2429	.9824	16.33
SDev	.05	.0001	.0011	.0011	.0002	.0139	.14
%RSD	.2447	.2263	.2237	.5993	.0744	1.417	.8533
#1	19.39	.0484	.4782	.1880	.2427	.9923	16.23
#2	19.46	.0483	.4797	.1896	.2430	.9726	16.43

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0028	.0001	19.32	.4899	-.0001	26.43	17.12
SDev	.0007	.0001	.09	.0018	.0002	.14	.18
%RSD	23.85	104.2	.4584	.3606	150.0	.5455	1.047
#1	.0033	.0000	19.26	.4887	-.0002	26.33	16.99
#2	.0023	.0002	19.39	.4912	.0000	26.53	17.24

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4687	.0131	.4837	.4883	.0006	.0076	.4820
SDev	.0014	.0035	.0027	.0077	.0006	.0058	.0008
%RSD	.2982	26.47	.5579	1.581	105.5	75.58	.1601
#1	.4697	.0156	.4818	.4938	.0001	.0117	.4826
#2	.4677	.0106	.4856	.4828	.0010	.0036	.4815

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	103.2	2.013	2.032	.0024	.4863	2.024	.0018
SDev	.3	.014	.013	.0002	.0042	.004	.0010
%RSD	.2948	.7054	.6180	7.830	.8722	.1797	52.67
#1	103.0	2.003	2.041	.0025	.4893	2.026	.0025
#2	103.4	2.023	2.023	.0023	.4833	2.021	.0011

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	3.965	-.0073	.0001	2.048	.0280	.4813	.0006
SDev	.007	.0032	.0004	.006	.0165	.0022	.0002
%RSD	.1688	43.84	340.3	.2730	58.87	.4516	42.38
#1	3.970	-.0051	.0004	2.044	.0397	.4798	.0007
#2	3.960	-.0096	-.0002	2.052	.0164	.4828	.0004

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.4827	.0006
SDev	.0001	.0005	.0008
%RSD	126.1	.1120	144.6
#1	.0001	.4823	.0012
#2	.0000	.4831	-.0000

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	760643	10000	--	--	--	--	--
SDev	2241.529	.0000000	--	--	--	--	--
%RSD	.2946886	.0000000	--	--	--	--	--
#1	759058	10000	--	--	--	--	--
#2	762228	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234779 Operator:
Run Time: 09/26/03 14:02:35
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00057	-.0189	-.0009	.0437	.0247	.0000	.0029
SDev	.00069	.0007	.0009	.0002	.0004	.0000	.0010
%RSD	120.59	3.599	109.6	.4543	1.580	.6563	35.59
#1	.00008	-.0185	-.0015	.0439	.0250	.0000	.0022
#2	.00106	-.0194	-.0002	.0436	.0244	.0000	.0037

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	22.65	.0003	.0016	.0002	.0084	.0126	.1768
SDev	.03	.0002	.0001	.0001	.0001	.0100	.0047
%RSD	.1148	77.01	8.871	90.31	1.804	79.53	2.648
#1	22.67	.0001	.0017	.0001	.0083	.0055	.1735
#2	22.64	.0004	.0015	.0002	.0085	.0197	.1801

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0019	-.0001	.0173	.0002	-.0006	49.02	33.70
SDev	.0007	.0000	.0047	.0001	.0001	.48	.15
%RSD	35.28	22.34	26.98	54.36	22.74	.9808	.4570
#1	.0015	-.0002	.0205	.0003	-.0006	49.36	33.59
#2	.0024	-.0001	.0140	.0001	-.0005	48.68	33.81

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0013	.0151	.0011	.0003	.0006	.0293	.0022
SDev	.0001	.0033	.0065	.0023	.0008	.0012	.0009
%RSD	5.583	21.79	570.8	771.4	117.3	4.119	41.60
#1	.0013	.0175	.0057	-.0013	.0012	.0284	.0028
#2	.0014	.0128	-.0035	.0019	.0001	.0301	.0015

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	106.8	.0074	-.0023	.8694	.0006	.0009	.0030
SDev	1.0	.0017	.0030	.0033	.0007	.0014	.0003
%RSD	.9518	22.60	126.8	.3792	114.3	153.7	8.629
#1	106.1	.0086	-.0044	.8717	.0010	-.0001	.0031
#2	107.5	.0062	-.0002	.8670	.0001	.0019	.0028

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0123	-.0011	.0002	.0061	.0549	.0004	-.0009
SDev	.0007	.0016	.0003	.0008	.0103	.0002	.0005
%RSD	5.632	144.4	160.6	13.82	18.70	62.85	57.50
#1	.0128	-.0023	-.0000	.0067	.0476	.0002	-.0005
#2	.0118	.0000	.0004	.0055	.0622	.0006	-.0012

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0224	.0007
SDev	.0000	.0001	.0003
%RSD	20.26	.5354	50.35
#1	.0001	.0225	.0004
#2	.0002	.0223	.0009

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	787192	10000	--	--	--	--	--
SDev	7476.947	.0000000	--	--	--	--	--
%RSD	.9498251	.0000000	--	--	--	--	--
#1	781905	10000	--	--	--	--	--
#2	792479	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234779d Operator:
Run Time: 09/26/03 14:07:45
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00010	-.0174	-.0027	.0431	.0243	.0001	.0008
SDev	.00074	.0048	.0009	.0013	.0001	.0001	.0029
%RSD	756.19	27.39	31.56	3.007	.2995	36.96	358.4
#1	-.00062	-.0208	-.0033	.0422	.0244	.0002	.0029
#2	.00043	-.0140	-.0021	.0440	.0243	.0001	-.0013

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	22.16	.0002	.0010	.0001	.0085	.0048	.1630
SDev	.04	.0000	.0002	.0002	.0001	.0000	.0051
%RSD	.1746	14.44	15.90	363.9	1.178	.0785	3.126
#1	22.13	.0002	.0009	-.0001	.0085	.0048	.1594
#2	22.18	.0001	.0012	.0002	.0086	.0048	.1666

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0014	-.0002	.0104	.0001	.0004	48.99	33.52
SDev	.0006	.0000	.0033	.0000	.0005	.11	.20
%RSD	38.21	6.649	31.96	26.72	106.1	.2153	.5879
#1	.0010	-.0002	.0081	.0001	.0001	48.91	33.38
#2	.0018	-.0003	.0128	.0001	.0008	49.06	33.66

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0008	.0046	.0002	-.0012	.0000	.0292	-.0011
SDev	.0002	.0110	.0039	.0012	.0021	.0029	.0006
%RSD	30.37	237.9	2057.	106.6	6913.	9.906	56.01
#1	.0010	.0124	-.0026	-.0003	-.0015	.0271	-.0016
#2	.0006	-.0032	.0029	-.0020	.0015	.0312	-.0007

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	107.2	.0065	-.0044	.8622	-.0007	-.0007	.0029
SDev	.4	.0013	.0018	.0066	.0005	.0016	.0008
%RSD	.3650	19.51	40.29	.7701	64.95	219.2	26.80
#1	107.5	.0074	-.0031	.8575	-.0010	.0004	.0035
#2	106.9	.0056	-.0056	.8669	-.0004	-.0019	.0024

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0114	-.0025	-.0002	.0062	.0241	.0001	-.0017
SDev	.0000	.0006	.0001	.0003	.0088	.0000	.0045
%RSD	.1147	23.27	35.30	4.486	36.25	6.826	263.4
#1	.0114	-.0021	-.0002	.0060	.0179	.0001	.0015
#2	.0114	-.0029	-.0003	.0064	.0303	.0001	-.0049

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0224	.0003
SDev	.0001	.0000	.0000
%RSD	81.70	.0599	14.26
#1	.0000	.0224	.0002
#2	.0001	.0224	.0003

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	789974	10000	--	--	--	--	--
SDev	2914.694	.0000000	--	--	--	--	--
%RSD	.3689608	.0000000	--	--	--	--	--
#1	792035	10000	--	--	--	--	--
#2	787913	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234780 Operator:
Run Time: 09/26/03 14:13:14
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00038	-.0097	-.0042	.0364	.0242	.0001	.0013
SDev	.00034	.0021	.0006	.0003	.0001	.0000	.0014
%RSD	88.040	21.69	15.46	.8310	.2874	32.61	114.0
#1	-.00014	-.0082	-.0046	.0366	.0241	.0002	.0023
#2	-.00062	-.0112	-.0037	.0362	.0242	.0001	.0002

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	7.743	.0001	.0011	-.0004	.0076	-.0037	.1578
SDev	.085	.0002	.0004	.0003	.0001	.0024	.0153
%RSD	1.093	178.1	37.41	72.66	1.147	66.40	9.710
#1	7.803	.0003	.0014	-.0002	.0077	-.0019	.1469
#2	7.683	-.0000	.0008	-.0006	.0076	-.0054	.1686

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	-.0003	.0109	.0001	.0004	93.27	64.67
SDev	.0002	.0001	.0001	.0000	.0007	.14	.52
%RSD	23.29	21.01	.7486	45.62	170.1	.1498	.8099
#1	.0011	-.0003	.0110	.0001	-.0001	93.37	65.04
#2	.0008	-.0002	.0109	.0001	.0010	93.17	64.30

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0004	.0079	-.0016	-.0010	-.0004	.0375	-.0001
SDev	.0000	.0151	.0027	.0007	.0012	.0078	.0008
%RSD	10.43	192.1	176.6	72.45	326.4	20.86	561.0
#1	.0004	.0185	.0004	-.0015	.0005	.0320	.0004
#2	.0004	-.0028	-.0035	-.0005	-.0012	.0430	-.0007

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	109.4	.0073	-.0049	.4708	-.0012	-.0008	.0038
SDev	.9	.0042	.0027	.0002	.0004	.0032	.0018
%RSD	.8625	57.40	55.19	.0456	36.97	383.8	48.26
#1	108.7	.0102	-.0030	.4706	-.0009	.0014	.0025
#2	110.0	.0043	-.0068	.4709	-.0015	-.0031	.0050

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0083	-.0034	-.0001	.0080	.0407	-.0001	-.0029
SDev	.0000	.0017	.0002	.0073	.0012	.0000	.0021
%RSD	.1958	51.59	184.6	91.43	2.961	16.14	70.79
#1	.0083	-.0021	.0000	.0132	.0416	-.0001	-.0015
#2	.0084	-.0046	-.0003	.0028	.0399	-.0001	-.0044

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0174	.0001
SDev	.0001	.0003	.0004
%RSD	208.1	1.443	403.9
#1	.0000	.0175	.0004
#2	-.0001	.0172	-.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	806214	10000	--	--	--	--	--
SDev	6911.969	.0000000	--	--	--	--	--
%RSD	.8573362	.0000000	--	--	--	--	--
#1	801327	10000	--	--	--	--	--
#2	811102	10000	--	--	--	--	--

Analysis Report 09/26/03 02:24:00 PM

Method: DAILY1 Sample Name: 234780s Operator:
Run Time: 09/26/03 14:18:41
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04971	2.061	1.968	.0372	2.073	.0487	.0005
SDev	.00052	.001	.019	.0005	.006	.0000	.0005
%RSD	1.0449	.0457	.9633	1.285	.2846	.0150	87.36
#1	.05008	2.060	1.955	.0375	2.078	.0487	.0002
#2	.04935	2.061	1.982	.0369	2.069	.0487	.0008

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	27.20	.0478	.4807	.1891	.2575	.9773	22.96
SDev	.10	.0003	.0023	.0005	.0001	.0123	.10
%RSD	.3593	.5887	.4751	.2750	.0293	1.254	.4218
#1	27.27	.0480	.4823	.1894	.2575	.9860	22.89
#2	27.14	.0476	.4791	.1887	.2576	.9686	23.03

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0028	-.0002	19.78	.4886	.0002	134.6	91.48
SDev	.0001	.0000	.01	.0023	.0003	.7	.15
%RSD	4.863	8.245	.0736	.4785	172.6	.5254	.1682
#1	.0029	-.0002	19.79	.4903	.0004	134.1	91.59
#2	.0027	-.0002	19.77	.4870	-.0000	135.1	91.37

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4689	.0113	.4958	.4962	-.0006	.0599	.4858
SDev	.0021	.0031	.0040	.0023	.0012	.0080	.0117
%RSD	.4481	27.31	.8019	.4726	193.0	13.38	2.407
#1	.4704	.0134	.4930	.4978	-.0015	.0542	.4776
#2	.4674	.0091	.4986	.4945	.0002	.0656	.4941

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	104.8	2.180	2.142	.4767	.4955	2.152	.0004
SDev	.1	.020	.019	.0098	.0002	.020	.0004
%RSD	.0726	.9061	.9092	2.061	.0480	.9081	83.51
#1	104.7	2.166	2.128	.4698	.4957	2.139	.0002
#2	104.8	2.194	2.156	.4837	.4954	2.166	.0007

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.049	-.0070	-.0001	2.139	.0144	.4860	-.0025
SDev	.008	.0016	.0001	.005	.0042	.0016	.0014
%RSD	.2067	22.95	87.87	.2141	28.82	.3222	56.86
#1	4.055	-.0059	-.0001	2.142	.0173	.4871	-.0015
#2	4.044	-.0082	-.0002	2.136	.0115	.4848	-.0035

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.4954	.0276
SDev	.0001	.0031	.0045
%RSD	336.2	.6259	16.21
#1	.0001	.4976	.0308
#2	-.0000	.4932	.0245

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	772156	10000	--	--	--	--	--
SDev	550.8362	.0000000	--	--	--	--	--
%RSD	.0713374	.0000000	--	--	--	--	--
#1	771767	10000	--	--	--	--	--
#2	772546	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234759 Operator:
Run Time: 09/26/03 14:24:09
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00056	-.0045	-.0020	.0885	.6920	-.0001	-.0008
SDev	.00026	.0057	.0018	.0002	.0050	.0001	.0006
%RSD	46.631	127.1	89.41	.2410	.7238	86.82	67.28
#1	-.00037	-.0086	-.0007	.0886	.6885	-.0000	-.0004
#2	-.00074	-.0005	-.0032	.0883	.6956	-.0002	-.0012

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	265.5	.0000	.0013	.0009	.0089	.0261	4.033
SDev	.2	.0001	.0003	.0002	.0003	.0032	.042
%RSD	.0669	820.3	25.15	18.61	3.664	12.34	1.053
#1	265.4	.0001	.0015	.0008	.0087	.0284	4.003
#2	265.6	-.0000	.0011	.0010	.0092	.0238	4.063

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0023	-.0000	.0314	.0015	.0000	74.43	47.14
SDev	.0002	.0000	.0035	.0001	.0001	.76	.20
%RSD	7.479	56.90	11.27	5.078	209.6	1.024	.4149
#1	.0024	-.0000	.0339	.0015	.0001	73.89	47.01
#2	.0022	-.0000	.0289	.0014	-.0000	74.96	47.28

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0020	.0208	.0011	-.0002	-.0005	.0670	.0008
SDev	.0003	.0023	.0013	.0002	.0006	.0205	.0007
%RSD	17.01	11.19	117.7	149.3	120.5	30.59	95.02
#1	.0018	.0192	.0002	.0000	-.0001	.0525	.0013
#2	.0023	.0224	.0020	-.0003	-.0010	.0814	.0002

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	103.8	.0083	-.0034	.3051	.0003	.0005	.0037
SDev	1.0	.0013	.0041	.0067	.0003	.0031	.0015
%RSD	.9685	15.19	118.6	2.190	104.3	658.9	41.31
#1	104.6	.0091	-.0006	.3004	.0001	.0027	.0026
#2	103.1	.0074	-.0063	.3099	.0005	-.0017	.0048

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0483	-.0006	-.0003	.0048	-.0227	.0005	.0004
SDev	.0004	.0009	.0002	.0051	.0029	.0004	.0008
%RSD	.7851	160.2	66.11	105.9	12.87	81.81	169.7
#1	.0486	.0001	-.0002	.0084	-.0206	.0007	-.0001
#2	.0480	-.0012	-.0005	.0012	-.0247	.0002	.0010

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.1078	-.0002
SDev	.0001	.0006	.0000
%RSD	1266.	.5369	6.184
#1	-.0000	.1074	-.0002
#2	.0000	.1082	-.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	765516	10000	--	--	--	--	--
SDev	7464.926	.0000000	--	--	--	--	--
%RSD	.9751490	.0000000	--	--	--	--	--
#1	770795	10000	--	--	--	--	--
#2	760238	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234759d Operator:
Run Time: 09/26/03 14:29:38
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00024	.0007	-.0006	.0884	.7001	.0000	.0001
SDev	.00022	.0001	.0003	.0000	.0020	.0001	.0018
%RSD	88.118	6.409	44.32	.0117	.2857	854.1	1960.
#1	-.00040	.0008	-.0004	.0884	.6987	-.0001	.0013
#2	-.00009	.0007	-.0008	.0884	.7015	.0001	-.0012

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	260.4	.0002	.0010	.0011	.0096	.0212	4.079
SDev	1.1	.0001	.0004	.0000	.0004	.0032	.070
%RSD	.4212	33.13	42.02	.3834	4.499	14.89	1.727
#1	261.2	.0003	.0013	.0011	.0093	.0235	4.029
#2	259.6	.0002	.0007	.0011	.0099	.0190	4.129

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0022	-.0002	.0275	.0014	-.0002	75.40	47.03
SDev	.0000	.0001	.0001	.0000	.0007	.04	.34
%RSD	.5668	67.69	.4724	2.809	371.6	.0538	.7186
#1	.0022	-.0003	.0274	.0014	.0003	75.37	46.79
#2	.0023	-.0001	.0276	.0014	-.0007	75.43	47.27

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0022	-.0008	.0009	-.0025	.0009	.0717	.0015
SDev	.0003	.0012	.0010	.0006	.0004	.0087	.0004
%RSD	14.70	156.7	120.5	22.65	42.01	12.16	27.30
#1	.0020	-.0017	.0016	-.0029	.0012	.0656	.0018
#2	.0024	.0001	.0001	-.0021	.0007	.0779	.0012

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.3	.0104	-.0016	.3099	-.0014	.0024	.0014
SDev	.5	.0007	.0001	.0024	.0000	.0003	.0034
%RSD	.5009	7.176	5.661	.7645	2.278	12.63	247.0
#1	101.7	.0098	-.0016	.3082	-.0014	.0022	.0038
#2	101.0	.0109	-.0015	.3115	-.0013	.0026	-.0010

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0483	-.0011	-.0004	.0080	-.0432	.0005	.0019
SDev	.0001	.0003	.0003	.0080	.0010	.0000	.0013
%RSD	.2253	29.45	84.89	100.4	2.321	1.286	68.76
#1	.0483	-.0013	-.0002	.0136	-.0439	.0005	.0010
#2	.0484	-.0009	-.0006	.0023	-.0425	.0005	.0029

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.1050	-.0001
SDev	.0000	.0002	.0000
%RSD	43.39	.1660	16.17
#1	.0001	.1052	-.0001
#2	.0001	.1049	-.0001

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	746994	10000	--	--	--	--	--
SDev	3735.645	.0000000	--	--	--	--	--
%RSD	.5000907	.0000000	--	--	--	--	--
#1	749635	10000	--	--	--	--	--
#2	744352	10000	--	--	--	--	--

Analysis Report QC Standard 09/26/03 02:40:24 PM page 1

Method: DAILY1 Sample Name: icv/ccv Operator:
Run Time: 09/26/03 14:35:06
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.0321	10.48	5.185	4.905	10.69	1.053	5.233
SDev	.0050	.02	.000	.029	.03	.002	.017
%RSD	.48423	.1786	.0093	.5850	.2485	.1575	.3259
#1	1.0285	10.47	5.185	4.884	10.70	1.054	5.245
#2	1.0356	10.50	5.186	4.925	10.67	1.052	5.221
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1.0000	10.00	5.000	5.000	10.00	1.000	5.000
Range	10.000	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	20.04	.9981	4.995	1.975	2.147	10.27	19.72
SDev	.09	.0055	.031	.010	.007	.04	.09
%RSD	.4444	.5479	.6183	.4902	.3048	.4257	.4383
#1	20.10	1.002	5.017	1.982	2.142	10.30	19.66
#2	19.97	.9943	4.973	1.968	2.152	10.23	19.78
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	5.314	5.210	20.18	1.046	5.129	Q45.94	28.81
SDev	.021	.015	.06	.005	.003	.29	.13
%RSD	.4024	.2917	.2955	.4713	.0594	.6318	.4341
#1	5.329	5.199	20.23	1.050	5.127	Q45.74	28.72
#2	5.299	5.221	20.14	1.043	5.132	Q46.15	28.90
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	4.844	5.093	5.051	5.096	1.054	1.022	1.029
SDev	.020	.003	.014	.029	.003	.014	.001
%RSD	.4173	.0673	.2809	.5654	.2483	1.372	.0790
#1	4.858	5.096	5.061	5.075	1.052	1.032	1.029
#2	4.830	5.091	5.041	5.116	1.056	1.012	1.030
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	96.49	5.598	5.499	5.069	5.076	Q5.527	5.046
SDev	.00	.016	.017	.006	.014	.006	.028
%RSD	.0013	.2797	.3019	.1195	.2849	.1057	.5492
#1	96.49	5.610	5.488	5.065	5.065	Q5.523	5.066
#2	96.48	5.587	5.511	5.073	5.086	Q5.531	5.027
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Fail	QC Pass
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	5.428	1.019	5.050	Q5.561	1.020	5.128	Q1.123
SDev	.033	.005	.000	.006	.012	.011	.002
%RSD	.6136	.4575	.0016	.1030	1.133	.2112	.1827
#1	5.451	1.022	5.050	Q5.557	1.028	5.136	Q1.125
#2	5.404	1.015	5.050	Q5.566	1.012	5.120	Q1.122
Errors	QC Pass	QC Pass	QC Pass	QC Fail	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	5.267	.9842	5.078
SDev	.011	.0073	.003
%RSD	.2039	.7398	.0522
#1	5.274	.9894	5.076
#2	5.259	.9791	5.080
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	711318	10000	--	--	--	--	--
SDev	57.27565	.0000000	--	--	--	--	--
%RSD	.0080520	.0000000	--	--	--	--	--
#1	711277	10000	--	--	--	--	--
#2	711358	10000	--	--	--	--	--

Analysis Report Blank Sample 09/26/03 02:48:30 PM page 1

Method: DAILY1 Sample Name: icb/ccb Operator:
Run Time: 09/26/03 14:43:09
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00007	.0083	-.0042	.0059	.0001	.0000	.0030
SDev	.00055	.0064	.0012	.0008	.0002	.0001	.0003
%RSD	765.40	77.30	27.49	14.45	164.6	390.1	11.69
#1	-.00032	.0038	-.0034	.0065	.0002	-.0001	.0032
#2	.00046	.0129	L-.0050	.0053	-.0000	.0001	.0027
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.00500	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.00500	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0027	.0000	-.0000	-.0001	.0003	.0050	.0207
SDev	.0006	.0001	.0005	.0004	.0005	.0059	.0167
%RSD	21.23	1463.	2543.	411.0	190.7	119.3	80.82
#1	.0023	-.0000	.0003	.0002	.0007	.0091	.0089
#2	.0031	.0001	-.0004	-.0004	-.0001	.0008	.0325
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	.0010	.0002	.0012	.0000	.0009	.0045	H.1996
SDev	.0004	.0001	.0018	.0001	.0003	.0008	.1877
%RSD	41.61	24.66	153.0	271.1	34.02	18.19	94.03
#1	.0007	.0002	-.0001	.0001	.0011	.0051	H.0669
#2	.0013	.0003	.0024	-.0000	.0007	.0039	H.3323
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	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	-.0000	H.0111	.0008	-.0007	.0013	-.0051	.0013
SDev	.0003	.0063	.0021	.0035	.0026	.0043	.0001
%RSD	1240.	57.41	249.3	500.7	193.9	83.54	4.297
#1	.0002	.0066	.0023	-.0032	.0032	-.0021	.0013
#2	-.0002	H.0155	-.0006	.0018	-.0005	-.0082	.0014
Errors	LC Pass	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

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.2	.0052	-.0026	.0062	-.0002	.0000	.0014
SDev	1.2	.0048	.0008	.0011	.0016	.0021	.0028
%RSD	1.161	92.69	30.63	17.89	881.3	7929.	201.0
#1	99.36	.0086	-.0020	.0070	-.0013	.0015	-.0006
#2	101.0	.0018	-.0031	.0054	.0010	-.0015	.0034
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	.0001	-.0010	.0001	.0052	-.0162	-.0002	-.0026
SDev	.0000	.0007	.0001	.0002	.0174	.0005	.0001
%RSD	20.07	67.15	69.18	4.130	107.4	290.1	2.337
#1	.0001	-.0015	.0001	.0054	-.0285	.0002	-.0026
#2	.0001	-.0005	.0002	.0051	-.0039	-.0005	-.0027
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0005	-.0001
SDev	.0002	.0002	.0003
%RSD	267.4	37.66	322.7
#1	.0002	.0004	.0001
#2	-.0001	.0007	-.0003
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	738558	10000	--	--	--	--	--
SDev	8565.892	.0000000	--	--	--	--	--
%RSD	1.159813	.0000000	--	--	--	--	--
#1	732501	10000	--	--	--	--	--
#2	744615	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234760 Operator:
Run Time: 09/26/03 14:48:40
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00062	.0010	-.0021	.0856	.6526	-.0001	-.0006
SDev	.00139	.0028	.0008	.0002	.0008	.0001	.0046
%RSD	225.19	279.0	38.09	.2036	.1245	115.9	746.4
#1	-.00160	-.0010	-.0027	.0855	.6532	-.0000	-.0039
#2	.00037	.0030	-.0016	.0858	.6520	-.0001	.0026

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	263.9	.0002	.0007	.0013	.0095	.0237	2.522
SDev	1.2	.0001	.0001	.0003	.0005	.0124	.031
%RSD	.4617	47.70	19.29	26.92	5.566	52.37	1.237
#1	264.8	.0001	.0006	.0015	.0099	.0325	2.500
#2	263.1	.0003	.0008	.0010	.0091	.0149	2.544

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0017	.0001	.0255	.0015	.0006	74.05	46.41
SDev	.0010	.0001	.0041	.0001	.0010	.27	.26
%RSD	61.70	89.77	16.09	5.669	169.6	.3674	.5610
#1	.0009	.0001	.0226	.0015	.0013	73.85	46.23
#2	.0024	.0000	.0284	.0014	-.0001	74.24	46.60

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0030	.0205	-.0057	.0011	-.0015	.0659	-.0010
SDev	.0004	.0141	.0069	.0050	.0026	.0143	.0017
%RSD	13.43	68.75	120.4	462.6	174.7	21.65	164.0
#1	.0033	.0105	-.0106	.0046	-.0033	.0558	-.0022
#2	.0027	.0304	-.0008	-.0025	.0003	.0760	.0002

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.0	.0034	-.0004	.3055	-.0012	.0009	.0026
SDev	.7	.0034	.0019	.0077	.0010	.0001	.0014
%RSD	.6892	99.48	479.7	2.524	88.28	14.84	51.16
#1	101.5	.0010	.0009	.3000	-.0004	.0010	.0017
#2	100.6	.0058	-.0017	.3109	-.0019	.0008	.0036

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0480	.0016	-.0006	.0096	-.0218	.0007	.0036
SDev	.0000	.0019	.0005	.0000	.0138	.0000	.0024
%RSD	.0860	124.1	91.55	.0510	63.19	.6011	67.65
#1	.0480	.0029	-.0010	.0096	-.0315	.0007	.0019
#2	.0480	.0002	-.0002	.0095	-.0120	.0007	.0053

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0002	.1045	.0002
SDev	.0002	.0004	.0005
%RSD	110.7	.3702	210.5
#1	.0003	.1048	.0005
#2	.0000	.1043	-.0001

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	744882	10000	--	--	--	--	--
SDev	5159.758	.0000000	--	--	--	--	--
%RSD	.6926952	.0000000	--	--	--	--	--
#1	748530	10000	--	--	--	--	--
#2	741233	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234760s Operator:
Run Time: 09/26/03 14:54:08
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04422	2.051	2.020	.0860	2.683	.0476	.0028
SDev	.00010	.019	.001	.0002	.020	.0005	.0008
%RSD	.22783	.9227	.0478	.2503	.7556	.9703	29.59
#1	.04429	2.037	2.019	.0858	2.669	.0479	.0022
#2	.04415	2.064	2.021	.0861	2.698	.0473	.0034

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	281.7	.0474	.4750	.1881	.2651	.9912	26.43
SDev	3.9	.0006	.0040	.0014	.0016	.0173	.44
%RSD	1.395	1.307	.8391	.7723	.5884	1.741	1.651
#1	284.5	.0478	.4779	.1891	.2640	1.003	26.12
#2	278.9	.0469	.4722	.1871	.2662	.9790	26.73

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0039	.0002	19.93	.4866	.0007	110.0	70.08
SDev	.0008	.0001	.03	.0027	.0003	1.2	.32
%RSD	20.58	69.15	.1408	.5581	44.32	1.058	.4629
#1	.0033	.0002	19.95	.4885	.0009	109.2	69.85
#2	.0044	.0001	19.91	.4847	.0005	110.8	70.31

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.4659	.0196	.5008	.4986	.0017	.0784	.4919
SDev	.0052	.0133	.0027	.0051	.0019	.0043	.0107
%RSD	1.108	67.88	.5297	1.019	110.6	5.544	2.175
#1	.4695	.0102	.5027	.5022	.0030	.0814	.4844
#2	.4622	.0290	.4990	.4950	.0004	.0753	.4995

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.48	2.181	2.167	.3029	.4989	2.169	.0011
SDev	.86	.027	.006	.0009	.0043	.013	.0022
%RSD	.8711	1.237	.2570	.2871	.8555	.5851	199.4
#1	99.09	2.162	2.163	.3023	.5019	2.160	-.0005
#2	97.88	2.200	2.171	.3035	.4958	2.178	.0027

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.078	-.0066	-.0002	2.153	-.0204	.4819	.0032
SDev	.024	.0009	.0005	.022	.0105	.0031	.0024
%RSD	.5804	13.99	249.1	1.032	51.73	.6411	74.37
#1	4.061	-.0059	-.0005	2.138	-.0129	.4841	.0015
#2	4.095	-.0073	.0001	2.169	-.0279	.4798	.0049

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0002	.5724	.0006
SDev	.0002	.0113	.0008
%RSD	101.7	1.973	122.3
#1	.0003	.5803	.0012
#2	.0000	.5644	.0001

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	726024	10000	--	--	--	--	--
SDev	6295.372	.0000000	--	--	--	--	--
%RSD	.8671018	.0000000	--	--	--	--	--
#1	730476	10000	--	--	--	--	--
#2	721573	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: icb/ccb Operator:
Run Time: 09/25/03 14:43:37
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00007	.0186	.0010	.0061	.0001	.0001	-.0001
SDev	.00028	.0032	.0031	.0021	.0000	.0002	.0004
%RSD	371.00	17.01	297.8	33.86	27.41	196.2	298.3
#1	-.00012	.0209	.0032	.0075	.0001	.0003	-.0004
#2	.00027	.0164	-.0012	.0046	.0001	-.0000	.0001
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.00500	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.00500	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	H.1577	.0000	-.0001	-.0012	.0004	-.0019	.0011
SDev	.0045	.0000	.0000	.0003	.0003	.0026	.0104
%RSD	2.829	107.0	66.38	22.99	68.94	132.2	924.3
#1	H.1608	.0000	-.0000	-.0010	.0002	-.0001	-.0062
#2	H.1545	.0001	-.0001	-.0015	.0006	-.0037	.0085
Errors	LC High	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	.0011	-.0001	-.0004	-.0000	.0014	-.0040	.0353
SDev	.0005	.0000	.0008	.0000	.0001	.0008	.0657
%RSD	44.11	5.951	212.3	174.8	4.479	19.79	186.3
#1	.0007	-.0001	.0002	-.0001	.0014	-.0045	-.0112
#2	.0014	-.0001	-.0010	.0000	.0013	-.0034	H.0817
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	H.0113	-.0021	.0013	-.0022	H.1155	.0038
SDev	.0001	.0131	.0008	.0014	.0002	.0109	.0003
%RSD	27.25	116.2	39.20	104.9	10.84	9.409	8.993
#1	-.0003	H.0205	-.0015	.0003	-.0024	H.1078	.0040
#2	-.0002	.0020	-.0027	.0023	-.0021	H.1232	.0035
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

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Method: DAILY1 Sample Name: 234761 Operator:
Run Time: 09/26/03 14:59:36
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00022	.0088	-.0004	.1023	.7072	.0001	.0024
SDev	.00060	.0063	.0004	.0009	.0076	.0000	.0031
%RSD	271.85	71.08	97.92	.8877	1.071	18.02	127.4
#1	.00064	.0044	-.0007	.1029	.7019	.0001	.0046
#2	-.00020	.0133	-.0001	.1016	.7126	.0002	.0002

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	74.77	.0002	.0014	.0017	.0094	1.521	2.158
SDev	1.44	.0000	.0002	.0002	.0000	.042	.051
%RSD	1.928	11.66	15.77	11.85	.1711	2.756	2.374
#1	75.79	.0002	.0012	.0018	.0094	1.551	2.121
#2	73.75	.0002	.0015	.0015	.0093	1.492	2.194

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0022	.0001	.0292	.0067	.0004	76.87	51.54
SDev	.0007	.0001	.0075	.0002	.0001	.97	.05
%RSD	32.45	94.71	25.80	2.489	29.98	1.257	.0937
#1	.0027	.0001	.0345	.0068	.0003	76.18	51.50
#2	.0017	.0000	.0239	.0065	.0005	77.55	51.57

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0024	.0070	-.0026	.0003	.0002	.0928	.0043
SDev	.0006	.0046	.0030	.0005	.0010	.0061	.0033
%RSD	23.01	65.34	115.4	157.9	518.5	6.554	76.81
#1	.0028	.0103	-.0047	-.0000	-.0005	.0885	.0067
#2	.0020	.0038	-.0005	.0006	.0009	.0971	.0020

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	103.4	.0090	-.0015	.3858	-.0007	.0020	.0018
SDev	.8	.0048	.0041	.0049	.0013	.0011	.0009
%RSD	.7967	53.22	279.5	1.272	196.7	57.00	49.75
#1	104.0	.0123	-.0044	.3893	-.0016	.0012	.0025
#2	102.8	.0056	.0014	.3824	.0003	.0028	.0012

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0219	.0004	.0000	.0030	.0360	.0009	.0030
SDev	.0003	.0015	.0004	.0047	.0360	.0007	.0010
%RSD	1.486	423.9	3433.	155.2	99.93	86.19	31.82
#1	.0222	.0015	.0003	.0064	.0615	.0014	.0023
#2	.0217	-.0007	-.0003	-.0003	.0106	.0003	.0037

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0743	.0006
SDev	.0001	.0027	.0005
%RSD	49.15	3.596	84.28
#1	.0002	.0762	.0010
#2	.0001	.0724	.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	762209	10000	--	--	--	--	--
SDev	6092.432	.0000000	--	--	--	--	--
%RSD	.7993125	.0000000	--	--	--	--	--
#1	766517	10000	--	--	--	--	--
#2	757901	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234762 Operator:
Run Time: 09/26/03 15:04:58
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00038	.0045	-.0022	.0997	.6485	.0000	.0005
SDev	.00011	.0031	.0006	.0007	.0051	.0001	.0003
%RSD	28.212	69.25	24.96	.6636	.7801	254.5	70.62
#1	-.00031	.0023	-.0026	.1001	.6450	.0001	.0002
#2	-.00046	.0067	-.0018	.0992	.6521	-.0000	.0007

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	73.75	.0001	.0010	.0007	.0086	.0174	2.150
SDev	.13	.0001	.0000	.0004	.0004	.0038	.015
%RSD	.1798	97.27	.7678	58.87	4.278	21.79	.6783
#1	73.84	.0000	.0010	.0010	.0089	.0201	2.139
#2	73.66	.0001	.0010	.0004	.0084	.0148	2.160

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	.0000	.0224	.0007	-.0007	78.70	53.05
SDev	.0002	.0001	.0026	.0006	.0001	.66	.10
%RSD	15.46	458.6	11.56	89.66	8.153	.8429	.1898
#1	.0017	.0001	.0242	.0002	-.0007	78.23	52.98
#2	.0014	-.0000	.0205	.0011	-.0007	79.17	53.13

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0013	.0139	.0011	-.0004	.0004	.0813	-.0016
SDev	.0006	.0075	.0003	.0005	.0012	.0029	.0003
%RSD	45.56	53.64	26.95	129.7	271.7	3.501	16.25
#1	.0017	.0192	.0008	-.0000	.0013	.0793	-.0014
#2	.0008	.0086	.0013	-.0007	-.0004	.0833	-.0018

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.59	.0099	-.0049	.3843	.0001	.0000	.0019
SDev	.37	.0048	.0045	.0061	.0002	.0046	.0005
%RSD	.3696	48.69	91.89	1.582	246.2	55890.	25.50
#1	99.85	.0065	-.0081	.3800	.0003	-.0033	.0022
#2	99.33	.0133	-.0017	.3886	-.0001	.0033	.0015

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0220	.0008	-.0000	.0035	-.0174	.0003	.0017
SDev	.0001	.0003	.0003	.0013	.0044	.0004	.0041
%RSD	.5065	44.65	1197.	35.67	25.25	150.4	242.4
#1	.0219	.0005	.0002	.0026	-.0143	.0005	.0046
#2	.0221	.0010	-.0002	.0044	-.0205	-.0000	-.0012

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0706	-.0001
SDev	.0002	.0012	.0005
%RSD	12510.	1.731	360.5
#1	.0001	.0715	.0002
#2	-.0001	.0697	-.0005

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	734201	10000	--	--	--	--	--
SDev	2776.101	.0000000	--	--	--	--	--
%RSD	.3781119	.0000000	--	--	--	--	--
#1	736164	10000	--	--	--	--	--
#2	732238	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234763 Operator:
Run Time: 09/26/03 15:10:07
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00011	.0092	-.0024	.1118	.5979	.0001	.0000
SDev	.00072	.0037	.0022	.0002	.0001	.0002	.0021
%RSD	661.10	40.28	89.87	.1941	.0218	281.3	15210.
#1	-.00040	.0066	-.0040	.1116	.5979	-.0001	-.0015
#2	.00062	.0119	-.0009	.1120	.5978	.0002	.0015

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	21.27	.0001	.0011	.0011	.0111	.0187	2.074
SDev	.01	.0000	.0003	.0002	.0002	.0016	.018
%RSD	.0680	39.12	31.01	14.33	1.436	8.732	.8484
#1	21.28	.0001	.0009	.0012	.0110	.0198	2.062
#2	21.26	.0001	.0013	.0010	.0112	.0175	2.087

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	.0001	.0219	.0002	.0002	101.4	68.99
SDev	.0002	.0000	.0044	.0000	.0002	.4	.40
%RSD	10.29	36.67	20.22	.7381	139.5	.4020	.5753
#1	.0014	.0001	.0188	.0002	.0000	101.1	68.71
#2	.0017	.0001	.0250	.0002	.0003	101.7	69.27

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	.0127	.0014	-.0014	-.0001	.0848	-.0009
SDev	.0004	.0116	.0022	.0017	.0004	.0120	.0005
%RSD	27.45	91.42	165.1	123.2	292.1	14.22	54.28
#1	.0018	.0209	-.0002	-.0026	-.0004	.0762	-.0006
#2	.0012	.0045	.0029	-.0002	.0001	.0933	-.0013

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.6	.0086	-.0033	.8892	-.0005	.0006	.0028
SDev	.4	.0014	.0018	.0070	.0019	.0016	.0010
%RSD	.4219	15.92	53.45	.7907	388.5	256.3	34.41
#1	101.9	.0095	-.0021	.8843	-.0018	.0018	.0035
#2	101.3	.0076	-.0046	.8942	.0009	-.0005	.0022

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0137	-.0028	-.0003	.0074	.0117	.0008	.0008
SDev	.0000	.0045	.0001	.0140	.0110	.0001	.0020
%RSD	.1988	161.1	51.96	189.6	93.96	16.33	232.7
#1	.0137	.0004	-.0003	-.0025	.0039	.0007	-.0005
#2	.0137	-.0059	-.0002	.0172	.0194	.0009	.0022

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0458	.0004
SDev	.0000	.0003	.0002
%RSD	26.82	.7235	35.58
#1	.0001	.0461	.0003
#2	.0001	.0456	.0006

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	749227	10000	--	--	--	--	--
SDev	3101.370	.0000000	--	--	--	--	--
%RSD	.4139427	.0000000	--	--	--	--	--
#1	751420	10000	--	--	--	--	--
#2	747034	10000	--	--	--	--	--

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Analysis Report 09/26/03 03:20:15 PM page 1

Method: DAILY1 Sample Name: 234764 Operator:
Run Time: 09/26/03 15:15:16
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00157	-.0014	-.0033	.1091	.5672	.0001	-.0030
SDev	.00279	.0112	.0004	.0016	.0035	.0001	.0068
%RSD	177.23	823.7	12.66	1.441	.6103	55.05	225.8
#1	-.00354	-.0093	-.0036	.1080	.5697	.0001	-.0078
#2	.00040	.0066	-.0030	.1103	.5648	.0002	.0018

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	21.46	-.0001	.0009	.0008	.0104	.0230	2.376
SDev	.04	.0003	.0004	.0000	.0001	.0039	.050
%RSD	.1650	484.7	42.15	5.060	1.368	16.89	2.120
#1	21.49	-.0003	.0006	.0009	.0105	.0258	2.340
#2	21.44	.0002	.0011	.0008	.0103	.0203	2.411

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	-.0000	.0199	.0005	-.0004	99.17	67.63
SDev	.0024	.0001	.0123	.0001	.0003	.44	.55
%RSD	898.5	203.5	61.57	14.91	79.65	.4417	.8165
#1	-.0020	-.0001	.0113	.0006	-.0002	99.48	67.24
#2	.0014	.0000	.0286	.0005	-.0006	98.86	68.02

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0014	.0089	-.0053	.0023	-.0028	.0746	-.0025
SDev	.0003	.0055	.0003	.0007	.0007	.0257	.0034
%RSD	21.06	61.43	5.619	30.94	23.77	34.41	134.9
#1	.0016	.0128	-.0055	.0028	-.0033	.0564	-.0049
#2	.0012	.0051	-.0051	.0018	-.0023	.0927	-.0001

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	103.8	.0026	-.0019	.8854	-.0003	-.0004	-.0009
SDev	.7	.0031	.0019	.0003	.0004	.0023	.0045
%RSD	.6649	118.3	99.91	.0316	140.7	575.8	507.2
#1	103.3	.0048	-.0006	.8852	-.0000	.0012	-.0041
#2	104.3	.0004	-.0033	.8856	-.0005	-.0020	.0023

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0135	-.0007	-.0010	.0037	.0026	.0005	-.0020
SDev	.0001	.0007	.0015	.0160	.0366	.0001	.0072
%RSD	.6871	101.6	144.8	436.4	1431.	25.97	360.3
#1	.0134	-.0012	-.0020	-.0076	-.0233	.0005	-.0071
#2	.0136	-.0002	.0000	.0149	.0284	.0004	.0031

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0451	.0002
SDev	.0000	.0005	.0002
%RSD	21.52	1.131	121.3
#1	.0000	.0454	.0003
#2	.0000	.0447	.0000

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	765249	10000	--	--	--	--	--
SDev	5062.885	.0000000	--	--	--	--	--
%RSD	.6615996	.0000000	--	--	--	--	--
#1	761669	10000	--	--	--	--	--
#2	768829	10000	--	--	--	--	--

010177

Analysis Report 09/26/03 03:25:24 PM page 1

Method: DAILY1 Sample Name: 234765 Operator:
Run Time: 09/26/03 15:20:25
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00018	.0138	-.0031	.1077	.7954	.0000	.0001
SDev	.00010	.0023	.0038	.0003	.0041	.0000	.0006
%RSD	53.043	16.62	125.7	.2939	.5161	147.4	787.2
#1	-.00011	.0155	-.0003	.1075	.7925	-.0000	-.0003
#2	-.00025	.0122	-.0058	.1080	.7983	.0001	.0005

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	7.094	.0001	.0007	.0007	.0096	.0172	2.650
SDev	.020	.0000	.0002	.0003	.0003	.0056	.015
%RSD	.2864	17.93	26.26	37.42	2.661	32.67	.5832
#1	7.108	.0001	.0006	.0009	.0094	.0211	2.639
#2	7.080	.0001	.0008	.0005	.0098	.0132	2.661

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0012	.0001	.0218	.0002	.0000	148.6	103.0
SDev	.0004	.0001	.0002	.0000	.0001	.4	.4
%RSD	32.97	56.20	.7224	11.52	2052.	.2974	.3529
#1	.0010	.0002	.0219	.0002	.0000	148.9	103.2
#2	.0015	.0001	.0217	.0002	-.0000	148.3	102.7

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0014	.0180	-.0027	.0006	-.0007	.0924	-.0013
SDev	.0002	.0056	.0007	.0016	.0009	.0121	.0009
%RSD	14.55	31.35	24.26	252.0	132.5	13.05	68.68
#1	.0012	.0140	-.0032	.0018	-.0014	.0839	-.0007
#2	.0015	.0220	-.0023	-.0005	-.0000	.1009	-.0020

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	102.7	.0069	-.0044	.5170	-.0005	-.0006	.0004
SDev	.9	.0028	.0025	.0014	.0008	.0026	.0023
%RSD	.8765	40.34	58.08	.2688	171.1	416.5	575.7
#1	102.1	.0049	-.0062	.5160	.0001	-.0025	.0021
#2	103.3	.0088	-.0026	.5180	-.0011	.0012	-.0012

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0102	-.0008	-.0001	.0022	.0185	.0005	.0018
SDev	.0000	.0014	.0000	.0105	.0080	.0001	.0010
%RSD	.0931	176.8	8.094	467.7	43.36	27.50	53.16
#1	.0102	-.0018	-.0001	-.0052	.0128	.0004	.0011
#2	.0102	.0002	-.0001	.0097	.0242	.0005	.0025

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0305	.0002
SDev	.0000	.0001	.0001
%RSD	56.44	.4667	26.80
#1	.0000	.0304	.0002
#2	.0000	.0306	.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	757186	10000	--	--	--	--	--
SDev	6629.126	.0000000	--	--	--	--	--
%RSD	.8754945	.0000000	--	--	--	--	--
#1	752499	10000	--	--	--	--	--
#2	761874	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234766 Operator:
Run Time: 09/26/03 15:25:34
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00021	.0019	-.0028	.1038	.7417	-.0000	-.0014
SDev	.00023	.0027	.0028	.0004	.0033	.0001	.0026
%RSD	109.75	143.3	97.04	.3766	.4444	558.7	190.2
#1	.00005	-.0000	-.0009	.1035	.7440	-.0001	-.0032
#2	.00037	.0039	-.0048	.1040	.7393	.0001	.0005

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	6.930	.0001	.0012	.0009	.0094	.0230	2.176
SDev	.028	.0000	.0004	.0001	.0003	.0036	.008
%RSD	.4091	17.06	36.47	7.022	2.652	15.81	.3702
#1	6.910	.0001	.0009	.0008	.0096	.0205	2.170
#2	6.950	.0001	.0015	.0009	.0092	.0256	2.181

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0019	.0001	.0242	.0001	.0001	142.9	99.08
SDev	.0006	.0001	.0028	.0000	.0002	.6	.32
%RSD	30.54	67.19	11.39	15.35	158.9	.3985	.3274
#1	.0015	.0001	.0222	.0001	-.0000	143.3	99.31
#2	.0023	.0001	.0261	.0002	.0003	142.5	98.85

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0011	.0110	-.0002	-.0021	-.0005	.1017	.0007
SDev	.0001	.0096	.0048	.0014	.0002	.0122	.0009
%RSD	12.15	87.77	2652.	65.01	41.11	12.03	122.5
#1	.0011	.0042	.0032	-.0031	-.0004	.0931	.0001
#2	.0010	.0178	-.0036	-.0011	-.0007	.1104	.0013

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	107.2	.0052	-.0018	.4902	-.0015	.0006	.0036
SDev	.6	.0040	.0026	.0006	.0007	.0004	.0034
%RSD	.5188	75.98	147.8	.1296	46.96	70.90	95.62
#1	106.8	.0080	-.0036	.4907	-.0010	.0003	.0012
#2	107.6	.0024	.0001	.4898	-.0019	.0009	.0060

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0098	.0010	-.0001	.0010	.0349	.0006	.0010
SDev	.0001	.0033	.0004	.0003	.0059	.0000	.0014
%RSD	.5912	333.6	541.9	23.72	16.99	.1744	139.7
#1	.0099	-.0013	-.0004	.0012	.0391	.0006	.0021
#2	.0098	.0033	.0002	.0009	.0307	.0006	.0000

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0285	.0003
SDev	.0001	.0003	.0000
%RSD	66.90	.8760	14.03
#1	.0000	.0283	.0003
#2	.0001	.0287	.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	790149	10000	--	--	--	--	--
SDev	4074.349	.0000000	--	--	--	--	--
%RSD	.5156432	.0000000	--	--	--	--	--
#1	787268	10000	--	--	--	--	--
#2	793030	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234767 Operator:
Run Time: 09/26/03 15:30:45
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00053	.0267	-.0006	-.0004	.0008	-.0001	-.0016
SDev	.00037	.0045	.0003	.0003	.0001	.0001	.0024
%RSD	68.758	16.93	55.27	62.24	9.838	135.1	150.2
#1	-.00079	.0299	-.0004	-.0002	.0009	-.0001	-.0033
#2	-.00027	.0235	-.0008	-.0006	.0008	-.0000	.0001

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	92.42	.0014	.0005	-.0005	.0009	-.0061	22.98
SDev	.29	.0001	.0001	.0003	.0000	.0053	.19
%RSD	.3147	5.147	25.06	49.52	3.442	87.46	.8220
#1	92.62	.0013	.0004	-.0003	.0009	-.0099	23.11
#2	92.21	.0014	.0006	-.0007	.0009	-.0023	22.84

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0070	.0002	.0108	.0002	-.0006	150.2	101.5
SDev	.0001	.0001	.0021	.0000	.0002	1.9	.8
%RSD	.8933	23.39	19.68	10.44	37.99	1.266	.7709
#1	.0069	.0003	.0093	.0002	-.0004	151.5	102.0
#2	.0070	.0002	.0123	.0002	-.0008	148.8	100.9

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0045	.0028	-.0009	-.0022	.0016	-.0014
SDev	.0001	.0050	.0027	.0026	.0004	.0034	.0003
%RSD	57400.	110.8	97.11	295.2	19.53	208.9	24.33
#1	.0001	.0080	.0047	-.0027	-.0019	-.0008	-.0012
#2	-.0001	.0010	.0009	.0009	-.0025	.0040	-.0016

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.65	.0074	-.0037	.0256	.0003	.0000	.0016
SDev	1.32	.0002	.0038	.0003	.0008	.0025	.0005
%RSD	1.329	2.372	104.2	1.224	239.7	7750.	29.07
#1	98.71	.0073	-.0010	.0254	-.0002	.0018	.0019
#2	100.6	.0076	-.0064	.0258	.0009	-.0017	.0013

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	17.51	-.0027	-.0002	.0068	-.0249	-.0005	-.0001
SDev	.10	.0008	.0002	.0064	.0215	.0001	.0014
%RSD	.5552	30.57	88.08	93.78	86.14	31.43	1256.
#1	17.57	-.0021	-.0004	.0114	-.0401	-.0006	.0009
#2	17.44	-.0033	-.0001	.0023	-.0097	-.0004	-.0011

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0072	-.0008
SDev	.0000	.0001	.0002
%RSD	2.014	1.607	21.55
#1	-.0001	.0072	-.0009
#2	-.0001	.0071	-.0007

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	734638	10000	--	--	--	--	--
SDev	9754.538	.0000000	--	--	--	--	--
%RSD	1.327803	.0000000	--	--	--	--	--
#1	727740	10000	--	--	--	--	--
#2	741535	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234768 Operator:
Run Time: 09/26/03 15:35:56
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00011	.0215	-.0015	-.0005	.0008	-.0000	.0030
SDev	.00001	.0057	.0018	.0000	.0000	.0000	.0010
%RSD	6.3228	26.62	117.2	6.108	.0438	105.6	34.55
#1	-.00011	.0174	-.0003	-.0005	.0008	-.0000	.0037
#2	-.00012	.0255	-.0028	-.0006	.0008	-.0001	.0023

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	92.14	.0008	.0012	-.0002	.0007	.0049	22.56
SDev	.19	.0000	.0000	.0001	.0001	.0051	.08
%RSD	.2028	5.064	2.933	22.83	16.71	103.4	.3671
#1	92.01	.0008	.0012	-.0003	.0006	.0013	22.50
#2	92.27	.0007	.0012	-.0002	.0007	.0085	22.62

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0071	.0003	.0163	.0004	-.0002	148.6	100.1
SDev	.0003	.0001	.0022	.0001	.0004	.4	.0
%RSD	4.334	29.07	13.54	19.17	220.8	.2627	.0257
#1	.0073	.0003	.0147	.0003	-.0004	148.4	100.1
#2	.0069	.0002	.0178	.0004	.0001	148.9	100.1

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	.0140	.0048	-.0023	.0007	-.0002	-.0027
SDev	.0002	.0078	.0003	.0006	.0006	.0023	.0010
%RSD	76.83	55.65	6.443	24.00	89.09	1092.	37.38
#1	.0001	.0085	.0046	-.0019	.0012	-.0018	-.0020
#2	.0004	.0195	.0051	-.0027	.0003	.0014	-.0034

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.5	.0083	-.0063	.0274	.0001	-.0014	.0034
SDev	.1	.0024	.0015	.0014	.0003	.0002	.0019
%RSD	.1392	29.18	23.50	5.054	503.2	12.72	56.72
#1	101.6	.0066	-.0053	.0264	.0002	-.0013	.0047
#2	101.4	.0100	-.0074	.0284	-.0001	-.0016	.0020

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	17.24	-.0024	.0001	.0037	-.0005	-.0003	-.0027
SDev	.02	.0006	.0002	.0083	.0067	.0002	.0015
%RSD	.1137	23.25	109.1	220.5	1392.	71.67	55.37
#1	17.25	-.0020	.0000	-.0021	-.0052	-.0002	-.0016
#2	17.22	-.0028	.0003	.0096	.0042	-.0005	-.0038

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0063	-.0000
SDev	.0000	.0004	.0002
%RSD	96.86	6.845	3030.
#1	-.0000	.0060	-.0002
#2	-.0000	.0066	.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	748263	10000	--	--	--	--	--
SDev	1062.074	.0000000	--	--	--	--	--
%RSD	.1419386	.0000000	--	--	--	--	--
#1	749014	10000	--	--	--	--	--
#2	747512	10000	--	--	--	--	--

Analysis Report QC Standard 09/26/03 03:50:58 PM page 1

Method: DAILY1 Sample Name: icv/ccv Operator:
Run Time: 09/26/03 15:45:45
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.0431	10.45	5.187	4.919	10.52	1.067	5.218
SDev	.0012	.06	.013	.067	.10	.002	.060
%RSD	.11682	.5593	.2517	1.369	.9444	.2297	1.147
#1	1.0440	10.41	5.178	4.871	10.45	1.065	5.175
#2	1.0423	10.49	5.196	4.966	10.59	1.069	5.260
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1.0000	10.00	5.000	5.000	10.00	1.000	5.000
Range	10.000	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	20.39	1.016	5.075	2.004	2.127	10.43	19.39
SDev	.02	.006	.003	.002	.017	.01	.26
%RSD	.0924	.5721	.0540	.1162	.7915	.0886	1.319
#1	20.41	1.012	5.073	2.002	2.115	10.42	19.21
#2	20.38	1.020	5.077	2.005	2.139	10.44	19.57
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	5.248	5.160	20.35	1.058	5.181	Q45.75	28.75
SDev	.046	.055	.12	.002	.036	.54	.09
%RSD	.8784	1.063	.5992	.2277	.6883	1.182	.3126
#1	5.216	5.121	20.26	1.057	5.156	Q45.37	28.69
#2	5.281	5.199	20.43	1.060	5.207	Q46.14	28.81
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	4.898	5.131	5.127	5.252	1.045	1.025	1.032
SDev	.024	.005	.031	.040	.006	.006	.005
%RSD	.4904	.0984	.6003	.7532	.5300	.5816	.4802
#1	4.881	5.127	5.106	5.225	1.042	1.029	1.029
#2	4.915	5.134	5.149	5.280	1.049	1.021	1.036
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	96.37	5.601	5.582	5.097	5.206	Q5.583	5.124
SDev	.32	.073	.091	.028	.037	.085	.026
%RSD	.3290	1.304	1.632	.5439	.7030	1.522	.5092
#1	96.59	5.550	5.518	5.078	5.180	Q5.523	5.105
#2	96.14	5.653	5.647	5.117	5.231	Q5.643	5.142
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Fail	QC Pass
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	5.322	1.015	5.056	Q5.581	1.030	5.158	Q1.134
SDev	.050	.004	.001	.011	.001	.014	.002
%RSD	.9366	.3444	.0181	.1891	.1283	.2674	.1441
#1	5.287	1.013	5.057	Q5.573	1.029	5.149	Q1.135
#2	5.357	1.018	5.055	Q5.588	1.031	5.168	Q1.132
Errors	QC Pass	QC Pass	QC Pass	QC Fail	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	5.250	1.014	5.067
SDev	.015	.001	.008
%RSD	.2791	.0613	.1615
#1	5.239	1.014	5.062
#2	5.260	1.015	5.073
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	710462	10000	--	--	--	--	--
SDev	2279.005	.0000000	--	--	--	--	--
%RSD	.3207781	.0000000	--	--	--	--	--
#1	712073	10000	--	--	--	--	--
#2	708850	10000	--	--	--	--	--

010188

Analysis Report Blank Sample 09/26/03 03:59:07 PM page 1

Method: DAILY1 Sample Name: icb/ccb Operator:
Run Time: 09/26/03 15:53:45
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00001	-.0045	-.0001	.0050	.0001	.0001	-.0007
SDev	.00017	.0059	.0041	.0013	.0000	.0001	.0015
%RSD	1268.1	132.4	3396.	25.10	17.43	62.49	205.6
#1	-.00013	-.0087	.0028	.0059	.0001	.0001	-.0018
#2	.00010	-.0003	-.0030	.0041	.0001	.0002	.0003
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.00500	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.00500	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0014	.0000	.0001	-.0003	.0003	.0058	-.0005
SDev	.0001	.0000	.0002	.0001	.0006	.0039	.0037
%RSD	9.537	420.4	195.7	34.93	200.4	67.10	724.5
#1	.0015	.0000	-.0000	-.0002	-.0001	.0030	.0021
#2	.0013	-.0000	.0003	-.0003	.0008	.0085	-.0031
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	.0005	.0002	-.0016	.0000	.0010	-.0082	-.0090
SDev	.0000	.0000	.0004	.0000	.0006	.0010	.0980
%RSD	7.622	13.09	27.49	2.716	58.79	11.94	1086.
#1	.0005	.0002	-.0019	.0000	.0006	-.0076	L-.0783
#2	.0005	.0001	-.0013	.0000	.0015	-.0089	H.0602
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0500	.0050	.0050	.0500	.0500
Low	-.0050	-.0050	-.0500	-.0050	-.0050	-.0500	-.0500

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0003	.0073	-.0001	-.0018	-.0007	.0010	.0004
SDev	.0005	.0044	.0048	.0004	.0004	.0080	.0008
%RSD	188.2	61.03	7207.	23.67	52.81	826.0	213.7
#1	.0007	.0041	.0033	-.0015	-.0004	-.0047	-.0002
#2	-.0001	H.0104	-.0034	-.0022	-.0010	.0066	.0009
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass
High	.0050	.0100			.0050	.0100	.0100
Low	-.0050	-.0100			-.0050	-.0100	-.0100

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

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.7	.0024	-.0024	.0032	-.0013	-.0008	.0023
SDev	.5	.0066	.0022	.0019	.0019	.0007	.0022
%RSD	.4856	277.8	90.97	59.52	150.6	90.28	98.16
#1	101.1	.0070	-.0040	.0046	.0001	-.0003	.0007
#2	100.4	-.0023	-.0009	.0019	-.0026	-.0013	.0039
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	.0001	-.0022	.0002	H.0116	-.0020	-.0001	.0008
SDev	.0000	.0037	.0001	.0016	.0001	.0004	.0024
%RSD	46.62	166.9	52.87	13.71	5.153	500.2	283.9
#1	.0001	-.0048	.0003	H.0105	-.0020	-.0003	.0026
#2	.0000	.0004	.0001	H.0127	-.0021	.0002	-.0009
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	.0001	.0006	.0001
SDev	.0000	.0003	.0003
%RSD	38.42	52.16	281.3
#1	.0001	.0008	-.0001
#2	.0001	.0004	.0003
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	742326	10000	--	--	--	--	--
SDev	3609.780	.0000000	--	--	--	--	--
%RSD	.4862793	.0000000	--	--	--	--	--
#1	744879	10000	--	--	--	--	--
#2	739774	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234769 Operator:
Run Time: 09/26/03 15:59:17
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00151	-.0070	-.0057	.0949	.6504	.0000	-.0032
SDev	.00306	.0112	.0014	.0019	.0004	.0001	.0061
%RSD	201.99	159.6	24.70	1.961	.0556	163.0	186.9
#1	-.00368	-.0149	-.0047	.0936	.6506	.0001	-.0075
#2	.00065	.0009	-.0067	.0962	.6501	-.0000	.0010

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	265.4	-.0002	.0005	.0011	.0098	.0214	2.523
SDev	.9	.0005	.0013	.0001	.0001	.0001	.067
%RSD	.3239	285.7	270.1	4.549	.6365	.5258	2.654
#1	264.8	-.0005	-.0004	.0011	.0098	.0214	2.476
#2	266.0	.0002	.0014	.0010	.0097	.0215	2.571

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	-.0000	.0127	.0013	.0010	75.78	47.26
SDev	.0033	.0001	.0175	.0000	.0008	.21	.72
%RSD	371.9	562.2	137.6	2.843	82.85	.2793	1.519
#1	-.0015	-.0001	.0003	.0013	.0004	75.93	46.75
#2	.0032	.0001	.0250	.0013	.0016	75.63	47.76

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0037	.0180	-.0046	.0032	-.0027	.0607	-.0064
SDev	.0003	.0028	.0084	.0050	.0053	.0211	.0084
%RSD	8.767	15.81	183.6	156.0	197.8	34.68	132.3
#1	.0040	.0159	-.0106	.0067	-.0064	.0458	-.0123
#2	.0035	.0200	.0014	-.0003	.0011	.0756	-.0004

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.73	.0026	.0008	.3269	.0006	.0014	-.0006
SDev	.29	.0086	.0048	.0115	.0005	.0003	.0057
%RSD	.2911	333.5	623.9	3.505	85.84	23.61	1029.
#1	98.53	-.0035	.0041	.3188	.0010	.0016	-.0046
#2	98.93	.0086	-.0026	.3350	.0002	.0011	.0035

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0484	.0035	-.0013	-.0000	-.0539	.0005	-.0019
SDev	.0001	.0004	.0019	.0089	.0467	.0003	.0053
%RSD	.1440	10.44	146.4	20520.	86.55	51.14	274.2
#1	.0483	.0038	-.0027	-.0063	-.0869	.0003	-.0057
#2	.0484	.0033	.0000	.0062	-.0209	.0007	.0018

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.1052	-.0001
SDev	.0000	.0012	.0004
%RSD	21.99	1.120	252.6
#1	.0001	.1043	-.0004
#2	.0001	.1060	.0001

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	727840	10000	--	--	--	--	--
SDev	2128.391	.0000000	--	--	--	--	--
%RSD	.2924257	.0000000	--	--	--	--	--
#1	726335	10000	--	--	--	--	--
#2	729345	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234770 Operator:
Run Time: 09/26/03 16:04:43
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00043	.0052	-.0012	.0859	.6488	.0001	.0005
SDev	.00062	.0014	.0029	.0005	.0057	.0000	.0007
%RSD	143.49	27.44	240.6	.6338	.8811	66.75	145.3
#1	-.00086	.0062	-.0032	.0855	.6448	.0000	-.0000
#2	.00001	.0042	.0008	.0863	.6529	.0001	.0010

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	262.3	.0000	.0012	.0009	.0097	.0158	2.279
SDev	.7	.0001	.0006	.0009	.0005	.0119	.018
%RSD	.2695	736.6	50.07	93.46	5.114	75.20	.8009
#1	261.8	-.0001	.0008	.0003	.0094	.0074	2.266
#2	262.8	.0001	.0016	.0015	.0101	.0242	2.292

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0021	.0001	.0262	.0014	-.0000	75.09	46.97
SDev	.0003	.0000	.0023	.0001	.0005	.07	.01
%RSD	13.41	28.47	8.654	4.901	1783.	.0942	.0206
#1	.0019	.0001	.0246	.0014	-.0004	75.04	46.97
#2	.0023	.0001	.0278	.0015	.0003	75.14	46.98

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	.0007	.0005	-.0009	.0014	.0693	.0005
SDev	.0007	.0112	.0016	.0001	.0000	.0076	.0016
%RSD	44.17	1509.	310.9	8.885	.6512	10.96	348.2
#1	.0011	.0087	.0016	-.0010	.0014	.0640	-.0007
#2	.0020	-.0072	-.0006	-.0009	.0014	.0747	.0016

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	100.6	.0081	-.0061	.3124	-.0004	-.0013	.0026
SDev	.1	.0007	.0010	.0081	.0005	.0004	.0012
%RSD	.1469	9.146	16.10	2.603	105.6	30.19	45.99
#1	100.7	.0086	-.0068	.3067	-.0001	-.0016	.0018
#2	100.5	.0075	-.0054	.3182	-.0008	-.0011	.0034

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0479	.0000	-.0002	.0077	-.0191	.0002	-.0001
SDev	.0004	.0010	.0003	.0032	.0179	.0003	.0028
%RSD	.7869	2774.	131.2	41.82	93.84	144.9	1946.
#1	.0477	-.0007	-.0005	.0100	-.0318	-.0000	.0018
#2	.0482	.0008	-.0000	.0054	-.0064	.0004	-.0021

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.1077	-.0001
SDev	.0001	.0011	.0004
%RSD	124.4	1.034	331.7
#1	.0000	.1069	-.0004
#2	.0001	.1085	.0001

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	741912	10000	--	--	--	--	--
SDev	1113.693	.0000000	--	--	--	--	--
%RSD	.1501111	.0000000	--	--	--	--	--
#1	742700	10000	--	--	--	--	--
#2	741125	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234771 Operator:
Run Time: 09/26/03 16:09:53
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00014	.0041	-.0037	.0959	.6142	.0002	-.0011
SDev	.00036	.0062	.0009	.0014	.0017	.0001	.0014
%RSD	264.77	152.4	24.27	1.474	.2748	65.03	129.2
#1	-.00040	-.0003	-.0031	.0949	.6130	.0002	-.0001
#2	.00012	.0084	-.0044	.0969	.6154	.0001	-.0021

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	73.83	.0002	.0010	.0010	.0090	.0193	2.613
SDev	.23	.0000	.0001	.0003	.0006	.0016	.019
%RSD	.3080	18.70	10.88	30.05	7.246	8.548	.7087
#1	73.67	.0002	.0009	.0008	.0085	.0181	2.600
#2	73.99	.0002	.0010	.0012	.0094	.0205	2.626

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0018	.0001	.0225	.0003	-.0001	79.04	52.74
SDev	.0006	.0001	.0018	.0000	.0001	.41	.18
%RSD	36.65	84.49	7.843	.7498	85.93	.5205	.3476
#1	.0013	.0001	.0213	.0003	-.0001	78.75	52.86
#2	.0022	.0000	.0238	.0003	-.0000	79.33	52.61

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	.0045	.0001	-.0005	-.0004	.0764	.0020
SDev	.0001	.0106	.0007	.0009	.0002	.0104	.0018
%RSD	7.062	235.2	692.6	163.6	45.21	13.63	88.98
#1	.0015	-.0030	-.0004	.0001	-.0005	.0690	.0007
#2	.0016	.0119	.0006	-.0012	-.0003	.0837	.0032

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	102.3	.0073	-.0027	.3672	-.0003	.0006	.0028
SDev	.2	.0009	.0040	.0034	.0004	.0024	.0001
%RSD	.1915	11.95	147.4	.9145	110.7	374.1	3.735
#1	102.5	.0067	.0001	.3648	-.0001	.0023	.0028
#2	102.2	.0079	-.0055	.3696	-.0006	-.0010	.0027

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0218	-.0017	-.0003	.0067	.0198	.0005	.0027
SDev	.0001	.0035	.0002	.0129	.0095	.0003	.0019
%RSD	.2128	210.6	77.06	192.4	48.22	46.34	71.25
#1	.0217	.0008	-.0004	-.0024	.0130	.0004	.0040
#2	.0218	-.0042	-.0001	.0159	.0265	.0007	.0013

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0676	.0001
SDev	.0001	.0008	.0004
%RSD	269.6	1.196	417.9
#1	-.0000	.0681	-.0002
#2	.0001	.0670	.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	754406	10000	--	--	--	--	--
SDev	1454.519	.0000000	--	--	--	--	--
%RSD	.1928030	.0000000	--	--	--	--	--
#1	755435	10000	--	--	--	--	--
#2	753378	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234772 Operator:
Run Time: 09/26/03 16:15:35
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00021	-.0022	-.0019	.0929	.6208	.0001	.0024
SDev	.00000	.0024	.0014	.0001	.0048	.0000	.0027
%RSD	.44310	110.0	75.36	.1066	.7742	33.76	113.8
#1	-.00021	-.0039	-.0009	.0929	.6242	.0001	.0005
#2	-.00021	-.0005	-.0028	.0930	.6174	.0000	.0043

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	73.70	.0002	.0013	.0007	.0108	.0165	2.999
SDev	.06	.0001	.0001	.0006	.0001	.0107	.014
%RSD	.0783	71.09	10.12	89.03	.8819	65.05	.4627
#1	73.66	.0001	.0012	.0003	.0107	.0089	3.009
#2	73.74	.0003	.0014	.0012	.0109	.0241	2.989

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0017	.0000	.0228	.0004	.0003	78.82	52.72
SDev	.0003	.0000	.0030	.0001	.0005	.44	.41
%RSD	19.43	160.3	13.21	15.95	198.8	.5620	.7713
#1	.0015	.0001	.0206	.0004	-.0001	79.13	53.00
#2	.0019	-.0000	.0249	.0005	.0007	78.51	52.43

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0014	.0127	-.0009	.0006	.0000	.0737	-.0007
SDev	.0004	.0086	.0007	.0001	.0004	.0043	.0004
%RSD	30.87	67.55	71.92	7.065	2106.	5.892	56.52
#1	.0011	.0187	-.0014	.0006	.0003	.0706	-.0010
#2	.0017	.0066	-.0005	.0007	-.0003	.0768	-.0004

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	102.6	.0018	-.0062	.3724	.0001	-.0035	.0028
SDev	.2	.0001	.0009	.0048	.0003	.0006	.0015
%RSD	.1494	4.133	14.47	1.288	213.4	16.29	55.32
#1	102.4	.0017	-.0055	.3690	-.0001	-.0031	.0017
#2	102.7	.0019	-.0068	.3758	.0003	-.0039	.0039

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0218	-.0012	-.0003	.0063	.0242	.0002	.0027
SDev	.0001	.0010	.0003	.0016	.0130	.0005	.0002
%RSD	.2823	78.84	86.63	25.06	53.76	253.1	7.624
#1	.0219	-.0019	-.0005	.0074	.0150	-.0002	.0029
#2	.0218	-.0005	-.0001	.0052	.0333	.0006	.0026

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0720	-.0001
SDev	.0001	.0001	.0006
%RSD	2277.	.1516	639.6
#1	-.0001	.0721	-.0005
#2	.0001	.0720	.0003

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	755995	10000	--	--	--	--	--
SDev	1132.785	.0000000	--	--	--	--	--
%RSD	.1498403	.0000000	--	--	--	--	--
#1	755194	10000	--	--	--	--	--
#2	756796	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234773 Operator:
Run Time: 09/26/03 16:20:44
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00003	.0036	-.0030	.1080	.6926	.0001	.0036
SDev	.00024	.0037	.0009	.0006	.0038	.0001	.0045
%RSD	751.08	101.1	30.17	.5738	.5470	148.2	126.8
#1	-.00020	.0062	-.0036	.1084	.6953	.0002	.0004
#2	.00014	.0010	-.0024	.1075	.6899	-.0000	.0067

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	21.59	.0000	.0009	.0010	.0111	.4762	2.989
SDev	.12	.0001	.0004	.0005	.0002	.0049	.001
%RSD	.5444	143.0	40.12	51.73	2.135	1.027	.0380
#1	21.67	-.0000	.0012	.0014	.0109	.4797	2.990
#2	21.50	.0001	.0007	.0007	.0112	.4728	2.988

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	.0001	.0234	.0022	.0003	100.8	68.60
SDev	.0003	.0001	.0010	.0001	.0003	.6	.23
%RSD	32.47	50.82	4.190	4.035	102.4	.5862	.3312
#1	.0008	.0002	.0227	.0023	.0001	101.2	68.44
#2	.0013	.0001	.0241	.0022	.0006	100.4	68.76

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0018	.0179	-.0006	-.0027	.0008	.0810	-.0007
SDev	.0003	.0060	.0019	.0018	.0006	.0077	.0014
%RSD	14.91	33.33	347.2	65.48	77.88	9.549	183.4
#1	.0016	.0137	-.0019	-.0015	.0013	.0755	.0002
#2	.0020	.0221	.0008	-.0040	.0004	.0864	-.0017

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	105.4	.0051	-.0032	.8899	-.0020	-.0004	.0026
SDev	1.2	.0045	.0016	.0039	.0005	.0026	.0008
%RSD	1.118	87.64	48.90	.4330	27.22	573.2	33.14
#1	104.5	.0019	-.0044	.8926	-.0016	-.0023	.0031
#2	106.2	.0083	-.0021	.8872	-.0024	.0014	.0020

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0137	-.0015	-.0000	-.0035	.0341	.0007	.0027
SDev	.0001	.0017	.0002	.0057	.0121	.0000	.0029
%RSD	.3416	113.1	1181.	163.7	35.59	.3171	111.0
#1	.0138	-.0003	-.0002	-.0075	.0427	.0007	.0048
#2	.0137	-.0026	.0001	.0005	.0255	.0007	.0006

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0486	.0004
SDev	.0000	.0006	.0003
%RSD	42.35	1.335	78.28
#1	.0001	.0491	.0007
#2	.0001	.0481	.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	776757	10000	--	--	--	--	--
SDev	8687.514	.0000000	--	--	--	--	--
%RSD	1.118434	.0000000	--	--	--	--	--
#1	770614	10000	--	--	--	--	--
#2	782900	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234774 Operator:
Run Time: 09/26/03 16:25:53
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00033	.0069	-.0018	.1135	.6973	.0001	.0008
SDev	.00033	.0009	.0013	.0004	.0039	.0002	.0016
%RSD	97.386	13.76	71.90	.3640	.5656	122.3	193.0
#1	-.00056	.0062	-.0028	.1132	.7000	.0000	-.0003
#2	-.00010	.0076	-.0009	.1138	.6945	.0003	.0020

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	21.48	.0000	.0008	.0008	.0107	.0171	2.051
SDev	.04	.0000	.0004	.0001	.0006	.0067	.004
%RSD	.1760	108.8	48.19	6.344	5.955	39.15	.1872
#1	21.45	.0001	.0011	.0009	.0111	.0219	2.048
#2	21.51	.0000	.0006	.0008	.0102	.0124	2.054

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0015	.0001	.0252	.0003	-.0001	100.7	68.92
SDev	.0005	.0000	.0037	.0000	.0001	.2	.16
%RSD	31.74	52.28	14.78	6.845	162.5	.1557	.2361
#1	.0012	.0001	.0226	.0003	-.0002	100.8	69.04
#2	.0018	.0001	.0279	.0003	.0000	100.6	68.81

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0014	.0087	-.0027	.0009	-.0019	.0759	-.0002
SDev	.0003	.0024	.0023	.0000	.0016	.0012	.0011
%RSD	21.20	28.10	84.62	1.232	82.91	1.634	497.8
#1	.0012	.0070	-.0011	.0009	-.0008	.0768	-.0010
#2	.0016	.0105	-.0043	.0009	-.0030	.0751	.0006

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	104.6	.0047	-.0017	.9095	-.0003	.0004	.0029
SDev	.2	.0017	.0009	.0006	.0008	.0011	.0011
%RSD	.1940	35.62	49.76	.0631	248.3	271.8	37.43
#1	104.5	.0059	-.0011	.9090	.0002	.0012	.0037
#2	104.8	.0035	-.0024	.9099	-.0008	-.0004	.0022

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0137	-.0030	-.0002	-.0034	.0215	.0004	.0024
SDev	.0000	.0008	.0004	.0019	.0094	.0000	.0011
%RSD	.1565	26.82	206.9	55.45	43.39	.2295	46.16
#1	.0137	-.0035	-.0005	-.0048	.0282	.0004	.0016
#2	.0137	-.0024	.0001	-.0021	.0149	.0004	.0031

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0498	.0001
SDev	.0001	.0004	.0006
%RSD	2169.	.8071	591.8
#1	.0001	.0501	.0005
#2	-.0001	.0495	-.0003

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	771143	10000	--	--	--	--	--
SDev	1466.539	.0000000	--	--	--	--	--
%RSD	.1901774	.0000000	--	--	--	--	--
#1	770106	10000	--	--	--	--	--
#2	772180	10000	--	--	--	--	--

010203

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Method: DAILY1 Sample Name: 234775 Operator:
Run Time: 09/26/03 16:31:08
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00046	.0019	-.0008	.1092	.5788	.0001	-.0014
SDev	.00052	.0058	.0026	.0003	.0022	.0002	.0014
%RSD	114.94	302.2	319.8	.2995	.3863	130.3	100.7
#1	.00009	.0060	.0010	.1089	.5804	.0003	-.0024
#2	.00083	-.0022	-.0026	.1094	.5772	.0000	-.0004

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	6.943	.0002	.0010	.0013	.0105	.0248	3.105
SDev	.013	.0001	.0002	.0002	.0000	.0015	.011
%RSD	.1825	46.16	20.00	17.80	.1111	6.071	.3698
#1	6.952	.0003	.0008	.0011	.0105	.0238	3.113
#2	6.935	.0001	.0011	.0014	.0105	.0259	3.097

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0019	.0001	.0228	.0002	-.0001	147.8	102.1
SDev	.0004	.0001	.0020	.0000	.0002	1.4	.4
%RSD	22.38	78.68	8.626	15.97	216.0	.9666	.3806
#1	.0016	.0001	.0214	.0002	-.0003	148.8	102.4
#2	.0022	.0000	.0242	.0001	.0001	146.8	101.8

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0012	.0229	-.0009	-.0009	-.0006	.0940	.0013
SDev	.0003	.0036	.0012	.0016	.0000	.0159	.0014
%RSD	20.97	15.69	143.0	182.3	1.696	16.87	104.2
#1	.0010	.0255	.0000	-.0020	-.0006	.0828	.0003
#2	.0014	.0204	-.0017	.0003	-.0006	.1052	.0023

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	105.0	.0071	-.0046	.4958	-.0009	-.0007	.0037
SDev	.7	.0028	.0000	.0017	.0007	.0009	.0007
%RSD	.6857	39.26	.3688	.3353	76.13	137.4	18.09
#1	104.5	.0051	-.0046	.4947	-.0013	-.0013	.0041
#2	105.5	.0091	-.0046	.4970	-.0004	-.0000	.0032

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0103	-.0022	.0001	.0012	.0267	.0004	.0015
SDev	.0000	.0009	.0003	.0035	.0071	.0002	.0004
%RSD	.0658	42.74	306.1	288.4	26.38	62.31	28.31
#1	.0103	-.0029	-.0001	-.0012	.0218	.0006	.0018
#2	.0103	-.0015	.0004	.0037	.0317	.0002	.0012

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0275	.0003
SDev	.0000	.0002	.0001
%RSD	18.32	.7018	23.87
#1	.0001	.0277	.0003
#2	.0001	.0274	.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	774239	10000	--	--	--	--	--
SDev	5348.556	.0000000	--	--	--	--	--
%RSD	.6908146	.0000000	--	--	--	--	--
#1	770457	10000	--	--	--	--	--
#2	778021	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234776 Operator:
Run Time: 09/26/03 16:36:17
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00014	-.0057	.0009	.1054	.7538	.0001	.0027
SDev	.00029	.0030	.0023	.0008	.0020	.0000	.0019
%RSD	198.52	53.10	250.7	.7415	.2603	23.00	70.41
#1	.00035	-.0035	.0026	.1049	.7525	.0001	.0040
#2	-.00006	-.0078	-.0007	.1060	.7552	.0000	.0013

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	6.950	.0001	.0011	.0008	.0118	.0150	2.524
SDev	.022	.0001	.0000	.0000	.0002	.0018	.004
%RSD	.3177	42.07	2.757	.4447	1.831	11.81	.1425
#1	6.965	.0002	.0011	.0008	.0117	.0137	2.526
#2	6.934	.0001	.0011	.0008	.0120	.0162	2.521

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0018	.0001	.0239	.0002	-.0002	S108.8	103.6
SDev	.0007	.0001	.0018	.0000	.0004	56.2	.0
%RSD	37.02	94.10	7.433	13.83	262.6	51.64	.0305
#1	.0023	.0001	.0252	.0001	.0001	S69.09	103.6
#2	.0013	.0000	.0227	.0002	-.0004	148.6	103.6

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0014	.0067	.0021	-.0013	.0014	.0915	.0012
SDev	.0005	.0051	.0000	.0001	.0010	.0008	.0004
%RSD	37.89	76.51	.0208	8.099	73.04	.8673	32.38
#1	.0010	.0103	.0021	-.0014	.0022	.0920	.0009
#2	.0017	.0031	.0021	-.0012	.0007	.0909	.0015

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	104.1	.0049	-.0061	.5070	-.0002	-.0024	.0041
SDev	.4	.0029	.0020	.0016	.0001	.0004	.0006
%RSD	.3884	59.86	33.47	.3095	41.56	15.86	13.40
#1	103.8	.0028	-.0047	.5081	-.0002	-.0022	.0037
#2	104.4	.0070	-.0076	.5059	-.0001	-.0027	.0045

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0103	-.0015	.0002	.0053	.0199	.0005	.0038
SDev	.0000	.0009	.0004	.0069	.0007	.0002	.0009
%RSD	.0908	59.03	188.7	129.9	3.390	44.35	24.60
#1	.0103	-.0009	.0005	.0004	.0194	.0004	.0044
#2	.0103	-.0021	-.0001	.0101	.0203	.0007	.0031

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0311	.0003
SDev	.0001	.0005	.0002
%RSD	116.3	1.710	85.55
#1	.0000	.0315	.0001
#2	.0001	.0307	.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	767452	10000	--	--	--	--	--
SDev	2948.635	.0000000	--	--	--	--	--
%RSD	.3842110	.0000000	--	--	--	--	--
#1	765367	10000	--	--	--	--	--
#2	769537	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 234777 Operator:
Run Time: 09/26/03 16:41:27
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00002	.0133	-.0036	.0262	.0519	-.0000	.0007
SDev	.00081	.0027	.0034	.0001	.0005	.0000	.0007
%RSD	4807.2	20.48	95.14	.4786	1.041	1523.	98.93
#1	-.00055	.0152	-.0012	.0262	.0522	-.0000	.0002
#2	.00059	.0113	-.0060	.0261	.0515	.0000	.0012

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	273.0	.0000	.0012	-.0000	.0165	.0064	.2217
SDev	.4	.0001	.0004	.0000	.0003	.0035	.0185
%RSD	.1445	150.5	28.83	92.02	1.984	54.41	8.338
#1	272.7	.0001	.0010	-.0000	.0167	.0039	.2086
#2	273.2	-.0000	.0015	-.0000	.0162	.0088	.2347

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0028	-.0000	.0122	.0015	.0002	20.69	11.93
SDev	.0008	.0000	.0055	.0000	.0009	.12	.06
%RSD	29.03	18.37	45.32	.5107	432.7	.5806	.4763
#1	.0023	-.0001	.0083	.0015	-.0004	20.78	11.89
#2	.0034	-.0000	.0161	.0015	.0009	20.61	11.97

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0010	.0115	.0008	-.0017	.0006	.0237	.0009
SDev	.0002	.0003	.0005	.0014	.0020	.0019	.0025
%RSD	16.04	3.007	60.48	83.51	319.9	8.002	289.8
#1	.0009	.0113	.0004	-.0027	-.0008	.0223	-.0009
#2	.0012	.0118	.0011	-.0007	.0021	.0250	.0026

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	94.97	.0105	-.0053	.3329	-.0009	-.0000	.0027
SDev	.88	.0017	.0037	.0031	.0011	.0019	.0003
%RSD	.9222	16.00	69.54	.9239	125.4	4972.	11.78
#1	94.35	.0093	-.0027	.3307	-.0017	.0013	.0025
#2	95.58	.0117	-.0079	.3351	-.0001	-.0014	.0030

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0484	.0004	-.0001	.0033	-.0351	-.0001	-.0008
SDev	.0001	.0006	.0005	.0057	.0221	.0007	.0016
%RSD	.2160	134.0	396.2	170.1	62.85	482.8	209.5
#1	.0484	.0000	-.0005	.0074	-.0507	-.0006	-.0019
#2	.0483	.0009	.0002	-.0007	-.0195	.0003	.0004

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	.0266	-.0000
SDev	.0000	.0002	.0003
%RSD	27.61	.6890	1405.
#1	.0000	.0267	-.0002
#2	.0000	.0265	.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	700102	10000	--	--	--	--	--
SDev	6472.855	.0000000	--	--	--	--	--
%RSD	.9245589	.0000000	--	--	--	--	--
#1	695525	10000	--	--	--	--	--
#2	704679	10000	--	--	--	--	--

010209

Analysis Report 09/26/03 04:51:35 PM page 1

Method: DAILY1 Sample Name: 234778 Operator:
Run Time: 09/26/03 16:46:36
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00017	.0052	-.0030	.0290	.0222	.0001	.0024
SDev	.00009	.0011	.0016	.0006	.0000	.0000	.0014
%RSD	50.018	21.01	52.55	2.142	.0536	.6681	55.38
#1	-.00023	.0060	-.0041	.0294	.0222	.0001	.0034
#2	-.00011	.0044	-.0019	.0286	.0222	.0001	.0015

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	75.53	.0002	.0009	.0002	.0083	.0112	.1604
SDev	.30	.0001	.0006	.0001	.0001	.0034	.0492
%RSD	.3941	53.12	74.08	71.82	.7250	30.12	30.65
#1	75.74	.0001	.0004	.0003	.0084	.0088	.1257
#2	75.32	.0003	.0013	.0001	.0083	.0136	.1952

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0019	-.0001	.0094	.0003	-.0003	29.32	18.85
SDev	.0001	.0001	.0021	.0001	.0004	.19	.36
%RSD	6.902	68.10	22.70	16.81	129.1	.6485	1.886
#1	.0018	-.0002	.0110	.0003	-.0000	29.45	18.60
#2	.0020	-.0001	.0079	.0002	-.0005	29.18	19.10

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	.0122	-.0004	-.0029	-.0007	.0256	.0012
SDev	.0000	.0145	.0015	.0000	.0009	.0009	.0004
%RSD	1.413	119.2	399.0	.5612	116.4	3.553	35.95
#1	.0008	.0225	.0007	-.0029	-.0014	.0250	.0009
#2	.0007	.0019	-.0014	-.0029	-.0001	.0263	.0014

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	102.1	.0073	-.0047	.3432	-.0021	-.0007	.0018
SDev	.0	.0027	.0014	.0004	.0005	.0018	.0011
%RSD	.0199	37.08	29.65	.1137	22.84	262.6	60.35
#1	102.1	.0054	-.0057	.3429	-.0017	-.0020	.0010
#2	102.0	.0092	-.0037	.3434	-.0024	.0006	.0025

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0224	-.0024	-.0001	.0067	.0231	.0002	-.0013
SDev	.0000	.0023	.0001	.0048	.0020	.0003	.0021
%RSD	.0953	98.65	74.07	70.94	8.482	127.0	154.9
#1	.0224	-.0040	-.0001	.0101	.0217	.0000	.0001
#2	.0224	-.0007	-.0002	.0033	.0244	.0004	-.0028

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0198	.0005
SDev	.0001	.0001	.0001
%RSD	61.34	.4863	20.91
#1	.0002	.0199	.0004
#2	.0001	.0198	.0006

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	752364	10000	--	--	--	--	--
SDev	119.5011	.0000000	--	--	--	--	--
%RSD	.0158834	.0000000	--	--	--	--	--
#1	752449	10000	--	--	--	--	--
#2	752280	10000	--	--	--	--	--

Analysis Report QC Standard 09/26/03 05:01:32 PM page 1

Method: DAILY1 Sample Name: icv/ccv Operator:
Run Time: 09/26/03 16:56:25
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.0394	10.49	5.156	4.905	10.58	1.068	5.216
SDev	.0045	.00	.016	.019	.00	.002	.002
%RSD	.42867	.0285	.3094	.3921	.0212	.1961	.0395
#1	1.0426	10.49	5.144	4.892	10.58	1.070	5.214
#2	1.0363	10.48	5.167	4.919	10.59	1.067	5.217
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1.0000	10.00	5.000	5.000	10.00	1.000	5.000
Range	10.000	10.00	10.00	10.00	10.00	10.00	10.00

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	20.12	1.005	5.034	1.983	2.132	10.30	19.53
SDev	.04	.001	.008	.007	.002	.02	.11
%RSD	.2041	.1119	.1588	.3604	.0760	.2107	.5856
#1	20.15	1.005	5.040	1.988	2.131	10.31	19.45
#2	20.10	1.004	5.029	1.978	2.133	10.28	19.61
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	5.281	5.187	20.22	1.051	5.159	Q46.10	29.07
SDev	.023	.010	.04	.002	.018	.22	.01
%RSD	.4326	.2007	.1917	.1936	.3401	.4792	.0250
#1	5.265	5.180	20.25	1.052	5.146	Q45.94	29.07
#2	5.298	5.195	20.19	1.049	5.171	Q46.25	29.06
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	4.858	5.230	5.168	5.167	1.052	.9696	1.026
SDev	.002	.109	.020	.006	.001	.0198	.002
%RSD	.0379	2.079	.3962	.1207	.1059	2.042	.1998
#1	4.856	5.153	5.182	5.163	1.051	.9556	1.024
#2	4.859	5.307	5.153	5.171	1.053	.9836	1.027
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	95.47	5.638	5.506	5.078	5.162	Q5.544	5.058
SDev	.23	.000	.018	.006	.003	.012	.023
%RSD	.2427	.0059	.3204	.1147	.0516	.2099	.4466
#1	95.31	5.638	5.494	5.074	5.164	Q5.536	5.074
#2	95.63	5.637	5.519	5.082	5.160	Q5.553	5.042
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Fail	QC Pass
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	5.390	1.011	5.043	Q5.554	1.015	5.128	Q1.128
SDev	.015	.000	.006	.016	.001	.013	.002
%RSD	.2796	.0027	.1184	.2883	.1051	.2453	.2132
#1	5.380	1.011	5.047	Q5.543	1.016	5.137	Q1.127
#2	5.401	1.011	5.039	Q5.566	1.014	5.119	Q1.130
Errors	QC Pass	QC Pass	QC Pass	QC Fail	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	5.261	.9987	5.065
SDev	.009	.0026	.001
%RSD	.1780	.2645	.0181
#1	5.254	1.001	5.065
#2	5.267	.9968	5.066
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	703819	10000	--	--	--	--	--
SDev	1704.127	.0000000	--	--	--	--	--
%RSD	.2421258	.0000000	--	--	--	--	--
#1	702614	10000	--	--	--	--	--
#2	705024	10000	--	--	--	--	--

010214

Analysis Report Blank Sample 09/26/03 05:09:42 PM page 1

Method: DAILY1 Sample Name: icb/ccb Operator:
Run Time: 09/26/03 17:04:19
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00025	-.0006	-.0041	.0049	.0001	-.0000	.0027
SDev	.00019	.0087	.0023	.0011	.0002	.0000	.0025
%RSD	75.182	1417.	55.50	22.87	156.3	44.99	93.21
#1	-.00038	-.0068	-.0025	.0057	.0002	-.0000	.0044
#2	-.00012	.0055	L-.0057	.0041	-.0000	-.0000	.0009
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.00500	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.00500	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0012	-.0000	.0000	.0000	.0004	.0050	-.0023
SDev	.0003	.0000	.0005	.0005	.0008	.0077	.0098
%RSD	25.05	18.81	2883.	1111.	190.9	154.7	422.7
#1	.0014	-.0000	.0004	.0004	.0010	.0104	.0046
#2	.0010	-.0000	-.0004	-.0003	-.0001	-.0005	-.0093
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	.0001	-.0020	.0000	.0009	-.0120	.0210
SDev	.0004	.0001	.0027	.0001	.0011	.0020	.0582
%RSD	55.41	79.13	132.1	321.8	115.4	16.88	277.6
#1	.0005	.0002	-.0039	.0001	.0017	-.0106	H.0621
#2	.0011	.0000	-.0001	-.0000	.0002	-.0135	-.0202
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.0146	.0017	-.0009	.0001	.0000	.0022
SDev	.0006	.0075	.0021	.0028	.0021	.0012	.0002
%RSD	385.0	51.66	127.6	314.3	1532.	6634.	8.264
#1	.0006	.0092	.0032	-.0029	.0016	.0008	.0020
#2	-.0003	H.0199	.0002	.0011	-.0013	-.0008	.0023
Errors	LC Pass	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

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.36	.0056	-.0004	.0040	-.0000	.0016	.0016
SDev	.40	.0011	.0015	.0013	.0012	.0014	.0004
%RSD	.4102	18.74	348.9	33.71	3072.	86.77	23.25
#1	98.65	.0064	.0007	.0030	-.0009	.0026	.0013
#2	98.08	.0049	-.0015	.0049	.0008	.0006	.0019
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High				.0100	.0030	.0050	.0050
Low				-.0100	-.0030	-.0050	-.0050

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0001	-.0018	-.0000	.0025	-.0276	.0001	-.0009
SDev	.0000	.0002	.0004	.0019	.0043	.0004	.0006
%RSD	36.67	11.41	4752.	77.13	15.59	493.4	66.35
#1	.0001	-.0016	.0003	.0011	-.0246	.0004	-.0013
#2	.0000	-.0019	-.0003	.0039	-.0307	-.0002	-.0005
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0000	.0001
SDev	.0001	.0001	.0007
%RSD	135.2	835.1	522.1
#1	.0002	.0001	.0007
#2	.0000	-.0001	-.0004
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	725143	10000	--	--	--	--	--
SDev	3022.174	.0000000	--	--	--	--	--
%RSD	.4167694	.0000000	--	--	--	--	--
#1	727280	10000	--	--	--	--	--
#2	723006	10000	--	--	--	--	--

Analysis Report 09/26/03 05:20:38 PM page 1

Method: DAILY1 Sample Name: Na 3ppm Operator:
Run Time: 09/26/03 17:15:12
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00018	.0086	-.0032	-.0011	-.0000	-.0001	.0008
SDev	.00023	.0029	.0010	.0003	.0000	.0000	.0015
%RSD	130.01	34.23	32.50	29.54	91.26	24.54	189.2
#1	-.00001	.0065	-.0025	-.0009	-.0000	-.0001	.0018
#2	-.00034	.0107	-.0040	-.0014	-.0000	-.0001	-.0003

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0053	.0000	.0015	.0001	.0007	.0037	.0003
SDev	.0007	.0000	.0001	.0001	.0001	.0063	.0043
%RSD	12.58	52.69	5.062	185.1	15.56	168.7	1257.
#1	-.0049	.0000	.0014	.0001	.0008	-.0007	-.0027
#2	-.0058	.0000	.0015	-.0000	.0006	.0082	.0034

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0007	-.0000	.0015	.0001	-.0008	3.058	2.214
SDev	.0001	.0001	.0005	.0000	.0008	.011	.045
%RSD	9.505	9661.	30.87	33.12	102.6	.3753	2.047
#1	.0008	.0000	.0012	.0001	-.0002	3.050	2.182
#2	.0007	-.0000	.0018	.0001	-.0013	3.067	2.246

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0150	.0012	.0010	-.0008	-.0006	-.0002
SDev	.0004	.0116	.0004	.0015	.0004	.0080	.0003
%RSD	2525.	76.92	35.49	145.3	48.01	1376.	125.5
#1	.0003	.0232	.0015	.0021	-.0006	-.0062	-.0004
#2	-.0003	.0069	.0009	-.0000	-.0011	.0050	-.0000

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	94.88	.0035	-.0009	.0077	.0011	.0006	.0023
SDev	.24	.0031	.0002	.0001	.0011	.0009	.0016
%RSD	.2549	87.21	22.91	.8082	104.1	147.2	70.53
#1	95.05	.0057	-.0010	.0077	.0019	.0012	.0011
#2	94.71	.0014	-.0007	.0076	.0003	-.0000	.0034

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0010	.0003	-.0085	-.0045	-.0000	-.0009
SDev	.0000	.0001	.0002	.0088	.0035	.0005	.0057
%RSD	37.56	11.19	59.09	103.9	78.55	1106.	616.8
#1	-.0000	.0009	.0005	-.0147	-.0020	-.0004	-.0049
#2	-.0000	.0010	.0002	-.0022	-.0069	.0003	.0031

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0000	-.0002	-.0001
SDev	.0001	.0000	.0001
%RSD	383.7	1.356	61.53
#1	.0001	-.0002	-.0001
#2	-.0000	-.0002	-.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	699480	10000	--	--	--	--	--
SDev	1734.533	.0000000	--	--	--	--	--
%RSD	.2479745	.0000000	--	--	--	--	--
#1	700707	10000	--	--	--	--	--
#2	698254	10000	--	--	--	--	--

ICP ANALYSIS

Mn only.

PROJ. NO.	PROJECT	TO#	DATE	MATRIX	LOGBK PG
06002.01.141	Div 20	630918.4	10-21-03	~~Soil~~ Water	S4 243

INSTRUMENT: Jrace1 FILENAME: A031021

INSTRUMENT DL:

010219

Standardization Rpt. 10/21/03 02:15:51 PM page 1

Method: DAILY1 Standard: blk
Run Time: 10/21/03 14:11:23

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Avge	-.00000	.0005	-.0000	.0003	-.0000	-.0001	.0000
SDev	.00002	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	2711.5	3.146	26.02	.9316	18.18	8.628	76.32
#1	.00001	.0005	-.0000	.0003	-.0000	-.0001	.0000
#2	-.00001	.0005	-.0000	.0003	-.0000	-.0001	.0000

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Avge	.0001	.0002	.0000	.0001	.0004	-.0000	.0018
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0001
%RSD	4.985	6.894	205.3	10.27	1.476	38.72	8.486
#1	.0001	.0002	-.0000	.0002	.0004	-.0000	.0017
#2	.0000	.0002	.0000	.0001	.0004	-.0000	.0019

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Avge	.0005	.0000	-.0000	.0000	.0000	-.0092	-.0002
SDev	.0000	.0000	.0000	.0000	.0000	.0004	.0000
%RSD	8.626	55.77	141.4	21.13	211.0	4.689	5.405
#1	.0005	.0000	.0000	.0000	.0000	-.0095	-.0002
#2	.0005	.0000	-.0000	.0000	-.0000	-.0089	-.0002

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Avge	-.0000	.0001	.0003	.0001	.0000	.0001	.0000
SDev	.0000	.0000	.0002	.0000	.0000	.0000	.0000
%RSD	751.1	11.82	77.31	57.68	67.97	16.27	29.84
#1	-.0000	.0001	.0001	.0001	.0000	.0001	.0000
#2	.0000	.0001	.0004	.0000	.0000	.0001	.0000

Elem	Sc3613	1960/1	1960/2	Si2881	Sn1899	Sr4215	Th2837
Avge	69.72	-.0000	.0001	.0014	-.0000	.0000	.0000
SDev	.66	.0000	.0001	.0000	.0000	.0000	.0000
%RSD	.9525	237.4	103.0	.2359	7.376	71.42	25.27
#1	69.25	.0000	.0002	.0014	-.0000	.0000	.0000
#2	70.19	-.0000	.0000	.0014	-.0000	.0000	.0000

Elem	Ti3372	Tl1908	U_3859	V_2924	W_2079	Y_3710	Zn2062
Avge	-.0014	-.0001	.0043	-.0000	.0001	-.0000	.0000
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	2.370	4.234	.0360	27.38	3.276	2013.	.9458
#1	-.0014	-.0001	.0043	-.0000	.0001	.0000	.0000
#2	-.0014	-.0001	.0043	-.0000	.0001	-.0000	.0000

Elem	Zr3496
Avge	.0002
SDev	.0000
%RSD	24.49
#1	.0002
#2	.0001

10/22/03

SWRU 54 CA 5 Dec 03

10-21-03

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	697168	10000	--	--	--	--	--
SDev	6593.770	.0000000	--	--	--	--	--
%RSD	.9457930	.0000000	--	--	--	--	--
#1	692506	10000	--	--	--	--	--
#2	701831	10000	--	--	--	--	--

Standardization Rpt. 10/21/03 02:19:43 PM page 1

Method: DAILY1 Standard: clp_std4
Run Time: 10/21/03 14:16:01

Elem	Ag3280	As1890	2203/1	2203/2	Sb2068	1960/1	1960/2
Avge	.05359	.1093	.4337	.4384	.1140	.2282	.4024
SDev	.00005	.0006	.0027	.0000	.0006	.0003	.0041
%RSD	.08393	.5815	.6142	.0061	.5491	.1308	1.022
#1	.05355	.1089	.4356	.4384	.1136	.2280	.3995
#2	.05362	.1098	.4319	.4385	.1144	.2284	.4053

Elem	T11908
Avge	.0297
SDev	.0002
%RSD	.7074
#1	.0295
#2	.0298

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	712988	10000	--	--	--	--	--
SDev	8123.950	.0000000	--	--	--	--	--
%RSD	1.139422	.0000000	--	--	--	--	--
#1	707244	10000	--	--	--	--	--
#2	718733	10000	--	--	--	--	--

Standardization Rpt. 10/21/03 02:23:36 PM

Method: DAILY1 Standard: clp_std1
Run Time: 10/21/03 14:19:53

Elem	Al3082	Ca3179	Fe2714	K_7664	Li6707	Mg2790	Na3302
Avge	.1278	.1460	.1037	1.618	3.188	.0550	.0117
SDev	.0001	.0003	.0002	.001	.007	.0001	.0001
%RSD	.0453	.1815	.1991	.0736	.2054	.1803	.5482
#1	.1279	.1459	.1039	1.618	3.192	.0551	.0117
#2	.1278	.1462	.1036	1.617	3.183	.0549	.0118

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	700915	10000	--	--	--	--	--
SDev	6058.491	.0000000	--	--	--	--	--
%RSD	.8643689	.0000000	--	--	--	--	--
#1	696631	10000	--	--	--	--	--
#2	705199	10000	--	--	--	--	--

Method: DAILY1 Standard: clp_std5
Run Time: 10/21/03 14:23:45

Elem	B_2496	Bi2230	Mo2020	P_1782	Si2881	Sn1899	Sr4215
Avge	.3992	.0606	.1579	.0347	.1332	.1852	1.507
SDev	.0012	.0001	.0013	.0006	.0000	.0014	.001
%RSD	.3061	.1211	.8130	1.728	.0172	.7629	.0810
#1	.3983	.0606	.1570	.0343	.1333	.1842	1.508
#2	.4001	.0605	.1589	.0351	.1332	.1862	1.506

Elem	Ti3372
Avge	1.075
SDev	.000
%RSD	.0407
#1	1.074
#2	1.075

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	699763	10000	--	--	--	--	--
SDev	3193.294	.0000000	--	--	--	--	--
%RSD	.4563394	.0000000	--	--	--	--	--
#1	697505	10000	--	--	--	--	--
#2	702021	10000	--	--	--	--	--

Standardization Rpt. 10/21/03 02:30:15 PM page 1

Method: DAILY1 Standard: clp_std2
Run Time: 10/21/03 14:27:16

Elem	Ba4934	Be3130	Cr2677	Cu3247	Ni2316
Avge	.6153	.2183	.2931	.3203	.7589
SDev	.0024	.0017	.0009	.0004	.0031
%RSD	.3858	.7921	.3145	.1250	.4061
#1	.6169	.2195	.2938	.3205	.7611
#2	.6136	.2170	.2925	.3200	.7568

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	700688	10000	--	--	--	--	--
SDev	19342.20	.0000000	--	--	--	--	--
%RSD	2.760458	.0000000	--	--	--	--	--
#1	687011	10000	--	--	--	--	--
#2	714365	10000	--	--	--	--	--

Standardization Rpt. 10/21/03 02:34:07 PM page 1

Method: DAILY1 Standard: clp_std3
Run Time: 10/21/03 14:30:25

Elem	Cd2265	Co2286	Mn2576	V_2924	Zn2062
Avge	1.190	.2822	.4033	.0765	.0930
SDev	.004	.0005	.0004	.0000	.0004
%RSD	.3731	.1787	.0927	.0262	.4257
#1	1.187	.2826	.4036	.0765	.0927
#2	1.193	.2819	.4030	.0765	.0933

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	704457	10000	--	--	--	--	--
SDev	4648.520	.0000000	--	--	--	--	--
%RSD	.6598728	.0000000	--	--	--	--	--
#1	701170	10000	--	--	--	--	--
#2	707744	10000	--	--	--	--	--

Standardization Rpt. 10/21/03 02:38:43 PM page 1

Method: DAILY1 Standard: clp_std6
Run Time: 10/21/03 14:34:17

Elem	La4086	Na5889	Pd3404	S_1820	Th2837	U_3859	W_2079
Avge	.3732	.2034	.1544	.0520	.0578	.0316	.1007
SDev	.0014	.0001	.0004	.0002	.0003	.0001	.0003
%RSD	.3663	.0432	.2379	.4195	.4443	.1610	.2769
#1	.3723	.2035	.1541	.0522	.0576	.0316	.1005
#2	.3742	.2034	.1546	.0519	.0580	.0316	.1009

Elem	Y_3710	Zr3496
Avge	1.017	1.190
SDev	.001	.000
%RSD	.0747	.0096
#1	1.016	1.190
#2	1.017	1.189

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	710566	10000	--	--	--	--	--
SDev	1676.550	.0000000	--	--	--	--	--
%RSD	.2359456	.0000000	--	--	--	--	--
#1	709381	10000	--	--	--	--	--
#2	711752	10000	--	--	--	--	--

Standardization Report 10/21/03 02:38:43 PM page 1

Method: DAILY1 Slope = Conc(SIR)/IR

Element	Wavelen	High std	Low std	Slope	Y-intercept	Date Standardized
Ag3280	328.068	clp_std4	blk	37.3226	.000024	10/21/03 02:34:17
Al3082	308.215	clp_std1	blk	392.666	-.199131	10/21/03 02:34:17
As1890	189.042	clp_std4	blk	91.4482	.002751	10/21/03 02:34:17
B_2496	249.678	clp_std5	blk	25.0699	-.008126	10/21/03 02:34:17
Ba4934	493.409	clp_std2	blk	16.2525	.000431	10/21/03 02:34:17
Be3130	313.042	clp_std2	blk	22.8989	.002183	10/21/03 02:34:17
Bi2230	223.061	clp_std5	blk	81.9575	-.002537	10/21/03 02:34:17
Ca3179	317.933	clp_std1	blk	342.478	-.017197	10/21/03 02:34:17
Cd2265	226.502	clp_std3	blk	8.40265	-.001863	10/21/03 02:34:17
Co2286	228.616	clp_std3	blk	35.4304	-.000226	10/21/03 02:34:17
Cr2677	267.716	clp_std2	blk	34.1302	-.004824	10/21/03 02:34:17
Cu3247	324.753	clp_std2	blk	31.2649	-.013094	10/21/03 02:34:17
Fe2714	271.441	clp_std1	blk	481.856	.017247	10/21/03 02:34:17
K_7664	766.491	clp_std1	blk	30.9441	-.055570	10/21/03 02:34:17
La4086	408.672	clp_std6	blk	25.9310	-.012670	10/21/03 02:34:17
Li6707	670.784	clp_std1	blk	3.13712	-.000022	10/21/03 02:34:17
Mg2790	279.078	clp_std1	blk	454.272	.001618	10/21/03 02:34:17
Mn2576	257.610	clp_std3	blk	24.7951	-.000498	10/21/03 02:34:17
Mo2020	202.030	clp_std5	blk	63.3212	-.000183	10/21/03 02:34:17
Na5889	588.995	clp_std6	blk	4.70389	.043083	10/21/03 02:34:17
Na3302	330.232	clp_std1	blk	4205.44	.738752	10/21/03 02:34:17
Ni2316	231.604	clp_std2	blk	13.1761	.000039	10/21/03 02:34:17
P_1782	178.287	clp_std5	blk	288.701	-.018852	10/21/03 02:34:17
2203/1	220.351	clp_std4	blk	23.0695	-.006099	10/21/03 02:34:17
2203/2	220.352	clp_std4	blk	22.8117	-.001427	10/21/03 02:34:17
Pd3404	340.458	clp_std6	blk	65.7741	-.001646	10/21/03 02:34:17
S_1820	182.040	clp_std6	blk	192.701	-.011480	10/21/03 02:34:17
Sb2068	206.838	clp_std4	blk	87.7306	-.001445	10/21/03 02:34:17
Sc3613	361.384	blk	dark	1.43688	-.181981	10/21/03 02:34:17
1960/1	196.021	clp_std4	blk	43.8191	.000653	10/21/03 02:34:17
1960/2	196.022	clp_std4	blk	24.8601	-.002347	10/21/03 02:34:17
Si2881	288.158	clp_std5	blk	75.6246	-.108041	10/21/03 02:34:17
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	54.0102	.001317	10/21/03 02:34:17
Sr4215	421.552	clp_std5	blk	6.63443	-.000076	10/21/03 02:34:17
Th2837	283.730	clp_std6	blk	181.765	-.003516	10/21/03 02:34:17
Ti3372	337.280	clp_std5	blk	9.29302	.013075	10/21/03 02:34:17
Tl1908	190.864	clp_std4	blk	335.977	.020727	10/21/03 02:34:17
U_3859	385.958	clp_std6	blk	366.725	-1.59121	10/21/03 02:34:17
V_2924	292.402	clp_std3	blk	130.680	.000468	10/21/03 02:34:17
W_2079	207.910	clp_std6	blk	49.6910	-.004775	10/21/03 02:34:17
Y_3710	371.030	clp_std6	blk	9.83495	.000006	10/21/03 02:34:17
Zn2062	206.200	clp_std3	blk	107.528	-.001080	10/21/03 02:34:17
Zr3496	349.621	clp_std6	blk	8.94386	-.001387	10/21/03 02:34:17

Analysis Report QC Standard 10/21/03 04:09:56 PM page 1

Method: DAILY1 Sample Name: icv/ccv Operator:
Run Time: 10/21/03 16:05:29
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.0115	9.924	5.030	4.828	10.23	1.091	4.996
SDev	.0032	.033	.006	.034	.01	.005	.008
%RSD	.31713	.3309	.1251	.7003	.0989	.4359	.1586
#1	1.0137	9.948	5.035	4.804	10.24	1.094	5.002
#2	1.0092	9.901	5.026	4.852	10.23	1.088	4.990
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1.0000	10.00	5.000	5.000	10.00	1.000	5.000
Range	10.000	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	20.01	.9735	4.867	1.958	2.095	10.17	18.26
SDev	.16	.0053	.019	.011	.004	.08	.06
%RSD	.8187	.5459	.3990	.5689	.1925	.7546	.3457
#1	20.13	.9773	4.881	1.966	2.092	10.23	18.22
#2	19.90	.9698	4.853	1.950	2.098	10.12	18.31
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	5.118	4.905	19.99	1.018	5.041	28.64	Q26.93
SDev	.018	.010	.03	.003	.017	.00	.09
%RSD	.3453	.2028	.1570	.2761	.3416	.0054	.3271
#1	5.105	4.913	20.02	1.020	5.029	28.63	Q26.99
#2	5.130	4.898	19.97	1.016	5.053	28.64	Q26.87
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Fail
Value	5.000	5.000	20.00	1.000	5.000	30.00	30.00
Range	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.813	5.271	4.969	5.052	1.026	1.021	1.007
SDev	.018	.106	.003	.018	.004	.006	.006
%RSD	.3707	2.014	.0506	.3494	.3451	.6149	.6103
#1	4.825	5.347	4.968	5.039	1.029	1.026	1.003
#2	4.800	5.196	4.971	5.064	1.024	1.017	1.012
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	103.2	5.353	5.355	4.924	5.019	5.349	4.943
SDev	.8	.009	.000	.011	.013	.003	.021
%RSD	.7853	.1747	.0049	.2262	.2509	.0615	.4344
#1	102.7	5.346	5.355	4.932	5.010	5.347	4.958
#2	103.8	5.359	5.355	4.916	5.028	5.351	4.928
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	QC Pass
Value				5.000	5.000	5.000	5.000
Range				10.00	10.00	10.00	10.00

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.255	.9792	4.900	5.335	.9677	4.950	Q1.305
SDev	.005	.0028	.012	.045	.0143	.019	.004
%RSD	.0902	.2859	.2438	.8522	1.483	.3763	.3410
#1	5.258	.9811	4.909	5.303	.9576	4.963	Q1.302
#2	5.251	.9772	4.892	5.367	.9779	4.937	Q1.308
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	5.039	.9809	4.854
SDev	.006	.0083	.000
%RSD	.1280	.8431	.0068
#1	5.035	.9867	4.854
#2	5.044	.9750	4.855
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	719704	10000	--	--	--	--	--
SDev	5685.846	.0000000	--	--	--	--	--
%RSD	.7900250	.0000000	--	--	--	--	--
#1	715684	10000	--	--	--	--	--
#2	723725	10000	--	--	--	--	--

Analysis Report Blank Sample 10/21/03 04:16:19 PM page 1

Method: DAILY1 Sample Name: ICB/CCB Operator:
Run Time: 10/21/03 16:11:53
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00016	.0217	.0002	.0116	.0032	.0004	-.0002
SDev	.00007	.0008	.0056	.0028	.0023	.0003	.0008
%RSD	44.733	3.712	2272.	24.19	70.46	62.95	328.6
#1	-.00011	.0211	.0042	.0136	.0049	.0006	.0003
#2	-.00021	.0222	-.0037	.0097	.0016	.0002	-.0008
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.00500	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.00500	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0027	-.0004	.0010	-.0008	-.0003	-.0141	-.0101
SDev	.0047	.0001	.0009	.0003	.0002	.0022	.0041
%RSD	174.2	29.24	93.65	34.32	55.07	15.34	40.96
#1	.0006	-.0003	.0017	-.0010	-.0005	-.0157	-.0130
#2	-.0060	-.0005	.0003	-.0006	-.0002	-.0126	-.0072
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0016	.0009	.0042	.0002	.0035	.0048	L-.0923
SDev	.0010	.0006	.0046	.0001	.0015	.0029	.1355
%RSD	63.95	72.73	110.6	55.27	42.13	58.76	146.9
#1	.0023	.0014	.0075	.0003	.0046	.0069	L-.1881
#2	.0009	.0004	.0009	.0001	.0025	.0028	.0036
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	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	.0010	H.0129	-.0030	.0008	-.0026	-.0084	-.0011
SDev	.0006	.0041	.0019	.0040	.0002	.0008	.0016
%RSD	57.52	31.79	62.27	535.0	8.213	9.178	141.8
#1	.0014	H.0157	-.0043	.0036	-.0024	-.0079	.0000
#2	.0006	.0100	-.0017	-.0021	-.0027	-.0090	-.0023
Errors	LC Pass	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

Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.24	-.0018	.0014	.0024	-.0005	.0003	.0046
SDev	.14	.0018	.0056	.0011	.0021	.0032	.0019
%RSD	.1401	96.10	401.5	45.49	419.1	935.6	40.69
#1	99.34	-.0031	.0054	.0017	.0010	.0026	H.0059
#2	99.15	-.0006	-.0026	.0032	-.0019	-.0019	.0033
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	.0017	.0003	.0014	H.0188	-.0221	.0008	.0005
SDev	.0013	.0050	.0014	.0117	.0055	.0007	.0020
%RSD	73.37	1736.	100.4	62.07	24.70	87.01	373.1
#1	.0026	.0038	.0024	H.0105	-.0259	.0013	-.0009
#2	.0008	-.0032	.0004	H.0271	-.0182	.0003	.0020
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	.0015	-.0008	.0010
SDev	.0011	.0006	.0005
%RSD	74.33	64.90	46.57
#1	.0023	-.0005	.0013
#2	.0007	-.0012	.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	691908	10000	--	--	--	--	--
SDev	912.8749	.0000000	--	--	--	--	--
%RSD	.1319358	.0000000	--	--	--	--	--
#1	692554	10000	--	--	--	--	--
#2	691263	10000	--	--	--	--	--

010234

Analysis Report 10/21/03 04:20:56 PM page 1

Method: DAILY1 Sample Name: pbw-K21W3 pg54-243 Operator:
Run Time: 10/21/03 16:16:29
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00018	L-.0879	.0015	-.0019	-.0001	.0011	-.0026
SDev	.00056	.0030	.0013	.0002	.0000	.0000	.0032
%RSD	314.99	3.367	87.14	8.308	50.69	.5093	122.0
#1	-.00022	L-.0900	.0024	-.0020	-.0001	.0011	-.0049
#2	.00057	L-.0858	.0006	-.0017	-.0000	.0011	-.0004
Errors	LC Pass	LC Low	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.00500	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.00500	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0046	-.0013	.0005	-.0028	L-.0068	.0048	-.0228
SDev	.0005	.0001	.0006	.0003	.0000	.0055	.0029
%RSD	11.31	3.838	115.0	9.418	.3650	115.9	12.87
#1	-.0050	-.0014	.0001	-.0030	L-.0068	.0009	-.0249
#2	-.0042	-.0013	.0010	-.0026	L-.0068	.0087	-.0207
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Low	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	.0002	.0000	.0051	-.0003	.0003	.0234	H.4048
SDev	.0009	.0000	.0034	.0000	.0003	.0001	.0820
%RSD	381.4	76.87	67.70	3.193	92.91	.5445	20.26
#1	-.0004	.0000	.0027	-.0003	.0001	.0235	H.3468
#2	.0008	.0000	.0075	-.0003	.0005	.0233	H.4628
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	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	.0000	-.0012	-.0036	-.0011	-.0008	L-.0101	-.0003
SDev	.0001	.0074	.0033	.0023	.0031	.0003	.0001
%RSD	297.5	641.8	91.06	221.9	387.6	3.138	34.00
#1	.0001	.0041	-.0060	.0006	-.0030	-.0099	-.0002
#2	-.0000	-.0064	-.0013	-.0027	.0014	L-.0103	-.0004
Errors	LC Pass	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Low	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	188.8	.0009	.0011	L-.0496	-.0019	.0010	.0014
SDev	1.0	.0011	.0006	.0003	.0005	.0001	.0006
%RSD	.5448	111.7	61.85	.6494	23.81	8.030	44.20
#1	188.0	.0002	.0015	L-.0498	-.0016	.0011	.0010
#2	189.5	.0017	.0006	L-.0494	-.0022	.0010	.0019
Errors	NOCHECK	NOCHECK	NOCHECK	LC Low	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	-.0018	-.0007	H.0127	.0113	-.0002	-.0012
SDev	.0000	.0004	.0004	.0046	.0192	.0002	.0015
%RSD	225.7	21.07	62.15	36.01	170.0	127.6	124.5
#1	-.0000	-.0021	-.0010	.0094	-.0023	-.0003	-.0023
#2	.0000	-.0015	-.0004	H.0159	.0249	-.0000	-.0001
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	-.0000	.0001	.0002
SDev	.0000	.0005	.0002
%RSD	128.6	324.0	138.3
#1	-.0000	-.0002	.0000
#2	-.0000	.0005	.0003
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	1314882	10000	--	--	--	--	--
SDev	7203.297	.0000000	--	--	--	--	--
%RSD	.5478282	.0000000	--	--	--	--	--
#1	1309789	10000	--	--	--	--	--
#2	1319976	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: lcsw-K21W1 Operator:
Run Time: 10/21/03 16:21:06
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02597	.8949	1.047	-.0023	1.075	.0294	-.0024
SDev	.00035	.0034	.003	.0004	.007	.0001	.0002
%RSD	1.3528	.3853	.2895	18.54	.6763	.1779	9.261
#1	.02622	.8925	1.045	-.0020	1.070	.0294	-.0023
#2	.02573	.8974	1.049	-.0027	1.080	.0295	-.0026

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	10.18	.0242	.2528	.0990	.1266	.5248	8.319
SDev	.00	.0001	.0003	.0003	.0011	.0059	.053
%RSD	.0410	.4288	.1152	.3207	.8608	1.130	.6381
#1	10.18	.0243	.2526	.0992	.1259	.5290	8.281
#2	10.18	.0242	.2530	.0988	.1274	.5206	8.356

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0012	-.0000	10.26	.2612 x2	-.0003	9.145	8.833
SDev	.0006	.0000	.00	.0000	.0001	.028	.163
%RSD	50.96	24.42	.0391	.0023 =0.5224	41.53	.3076	1.847
#1	.0016	-.0000	10.26	.2612 ✓	-.0002	9.125	8.717
#2	.0008	-.0000	10.27	.2612	-.0004	9.165	8.948

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.2529	-.0044	.2549	.2588	-.0022	-.0076	.2576
SDev	.0011	.0037	.0011	.0014	.0016	.0003	.0002
%RSD	.4255	83.71	.4174	.5326	71.48	3.834	.0614
#1	.2522	-.0071	.2556	.2578	-.0011	-.0078	.2577
#2	.2537	-.0018	.2541	.2597	-.0034	-.0074	.2575

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	185.6	1.083	1.084	-.0491	.2572	1.083	.0016
SDev	1.0	.008	.007	.0004	.0006	.007	.0003
%RSD	.5468	.7080	.6099	.7670	.2191	.6425	19.73
#1	184.9	1.078	1.080	-.0489	.2568	1.078	.0019
#2	186.3	1.088	1.089	-.0494	.2576	1.088	.0014

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.146	-.0064	-.0008	1.099	.0341	.2545	-.0011
SDev	.009	.0012	.0003	.004	.0034	.0009	.0015
%RSD	.4004	18.47	39.51	.3978	9.848	.3580	140.1
#1	2.140	-.0055	-.0006	1.102	.0365	.2538	-.0021
#2	2.152	-.0072	-.0010	1.096	.0318	.2551	-.0000

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.2530	.0004
SDev	.0000	.0004	.0001
%RSD	74.60	.1526	24.41
#1	-.0000	.2527	.0005
#2	-.0001	.2533	.0004

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	1293058	10000	--	--	--	--	--
SDev	7005.307	.0000000	--	--	--	--	--
%RSD	.5417630	.0000000	--	--	--	--	--
#1	1288104	10000	--	--	--	--	--
#2	1298011	10000	--	--	--	--	--

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Analysis Report 10/21/03 04:30:08 PM page 1

Method: DAILY1 Sample Name: 234761 Operator:
Run Time: 10/21/03 16:25:42
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00017	.0233	.0045	.1232	.7474	.0002	-.0007
SDev	.00049	.0005	.0010	.0000	.0029	.0000	.0033
%RSD	292.64	2.183	22.68	.0173	.3815	17.97	441.9
#1	-.00018	.0236	.0052	.1231	.7454	.0002	-.0031
#2	.00051	.0229	.0038	.1232	.7494	.0002	.0016

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	80.46	-.0004	.0021	-.0029	.0094	.0239	2.209
SDev	.54	.0000	.0001	.0003	.0001	.0019	.013
%RSD	.6735	4.380	6.126	11.17	.8514	7.739	.5782
#1	80.84	-.0004	.0022	-.0027	.0094	.0226	2.218
#2	80.08	-.0004	.0020	-.0031	.0095	.0252	2.200

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0009	.0001	.0579	.0024	-.0005	50.72	51.19
SDev	.0000	.0000	.0239	.0006	.0001	.24	.00
%RSD	4.392	79.64	41.22	23.75	13.31	.4827	.0080
#1	.0009	.0001	.0748	.0029	-.0005	50.55	51.19
#2	.0009	.0000	.0411	.0020	-.0004	50.89	51.19

Elem	Ni2316	P_1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0023	.0334	-.0005	-.0012	.0000	.0891	.0028
SDev	.0001	.0058	.0026	.0027	.0010	.0123	.0012
%RSD	2.922	17.43	520.3	222.5	4209.	13.84	43.21
#1	.0023	.0375	-.0024	.0007	-.0007	.0804	.0037
#2	.0022	.0293	.0014	-.0031	.0007	.0978	.0019

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.1	.0063	.0034	.5795	-.0010	.0044	.0026
SDev	.5	.0009	.0061	.0020	.0009	.0038	.0041
%RSD	.5216	14.50	179.7	.3494	94.35	86.45	160.4
#1	101.5	.0056	.0078	.5809	-.0003	.0071	.0055
#2	100.7	.0069	-.0009	.5780	-.0016	.0017	-.0003

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0299	-.0033	-.0005	.0188	.0607	.0010	.0006
SDev	.0047	.0001	.0001	.0020	.0081	.0005	.0027
%RSD	15.91	3.280	23.09	10.84	13.30	50.58	475.0
#1	.0332	-.0032	-.0004	.0202	.0664	.0014	.0025
#2	.0265	-.0034	-.0006	.0174	.0549	.0007	-.0014

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0931	.0002
SDev	.0000	.0022	.0001
%RSD	13.39	2.356	35.48
#1	-.0001	.0947	.0003
#2	-.0001	.0916	.0002

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	704758	10000	--	--	--	--	--
SDev	3628.872	.0000000	--	--	--	--	--
%RSD	.5149103	.0000000	--	--	--	--	--
#1	707324	10000	--	--	--	--	--
#2	702192	10000	--	--	--	--	--

Analysis Report QC Standard 10/21/03 04:38:18 PM page 1

Method: DAILY1 Sample Name: icv/ccv Operator:
Run Time: 10/21/03 16:33:52
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.0219	10.02	5.019	4.870	10.33	Q1.100	5.048
SDev	.0008	.02	.002	.016	.05	.002	.015
%RSD	.08272	.1647	.0393	.3248	.4987	.1668	.2876
#1	1.0213	10.01	5.018	4.859	10.37	Q1.102	5.058
#2	1.0225	10.03	5.021	4.881	10.29	1.099	5.038
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Fail	QC Pass
Value	1.0000	10.00	5.000	5.000	10.00	1.000	5.000
Range	10.000	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	20.24	.9859	4.926	1.983	2.107	10.26	18.40
SDev	.12	.0084	.031	.010	.001	.06	.08
%RSD	.5980	.8521	.6235	.5214	.0333	.5589	.4253
#1	20.33	.9919	4.948	1.991	2.108	10.30	18.34
#2	20.15	.9800	4.904	1.976	2.107	10.22	18.45
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	5.142	4.982	20.25	1.031	5.087	29.19	27.22
SDev	.002	.008	.05	.005	.010	.02	.27
%RSD	.0353	.1657	.2389	.4596	.1987	.0761	.9906
#1	5.143	4.988	20.29	1.035	5.080	29.18	27.03
#2	5.140	4.976	20.22	1.028	5.094	29.21	27.41
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	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	4.872	5.319	5.013	5.118	1.031	1.021	1.018
SDev	.042	.002	.049	.010	.001	.022	.000
%RSD	.8647	.0401	.9705	.2015	.1340	2.145	.0207
#1	4.902	5.318	5.048	5.125	1.030	1.005	1.018
#2	4.842	5.321	4.979	5.111	1.032	1.036	1.018
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	99.95	5.354	5.348	4.984	5.078	5.345	5.017
SDev	1.10	.025	.012	.006	.023	.001	.057
%RSD	1.099	.4728	.2168	.1171	.4543	.0132	1.134
#1	99.17	5.372	5.340	4.988	5.094	5.345	5.057
#2	100.7	5.336	5.356	4.980	5.062	5.344	4.977
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	QC Pass
Value				5.000	5.000	5.000	5.000
Range				10.00	10.00	10.00	10.00

Elem	Sr4215	Th2837	Ti3372	Tl1908	U_3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.287	.9863	4.924	5.380	1.009	4.993	Q1.335
SDev	.009	.0065	.005	.031	.001	.007	.003
%RSD	.1701	.6573	.1110	.5738	.0617	.1401	.2495
#1	5.294	.9909	4.928	5.358	1.010	4.998	Q1.333
#2	5.281	.9817	4.921	5.402	1.009	4.988	Q1.338
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	5.059	.9976	4.875
SDev	.004	.0122	.005
%RSD	.0765	1.226	.0968
#1	5.062	1.006	4.872
#2	5.056	.9890	4.878
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	696786	10000	--	--	--	--	--
SDev	7636.046	.0000000	--	--	--	--	--
%RSD	1.095895	.0000000	--	--	--	--	--
#1	691387	10000	--	--	--	--	--
#2	702186	10000	--	--	--	--	--

Analysis Report Blank Sample 10/21/03 04:44:42 PM page 1

Method: DAILY1 Sample Name: icb/ccb Operator:
Run Time: 10/21/03 16:40:16
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00008	.0106	.0031	.0109	.0035	.0005	-.0022
SDev	.00181	.0070	.0079	.0046	.0026	.0001	.0073
%RSD	2295.0	65.85	255.6	42.57	75.24	27.64	334.8
#1	.00120	.0156	H.0086	.0142	H.0054	.0006	.0030
#2	-.00136	.0057	-.0025	.0076	.0016	.0004	L-.0073
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.00500	.0500	.0050	.0500	.0050	.0050	.0050
Low	-.00500	-.0500	-.0050	-.0500	-.0050	-.0050	-.0050

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0012	-.0005	.0010	.0001	-.0000	-.0066	-.0217
SDev	.0076	.0007	.0018	.0008	.0005	.0106	.0156
%RSD	624.5	144.9	172.1	701.7	6057.	159.3	71.93
#1	.0042	.0000	.0022	.0007	.0003	.0008	-.0107
#2	-.0066	-.0009	-.0002	-.0004	-.0003	-.0141	-.0328
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	.0017	.0009	.0033	.0001	.0049	.0029	L-.1158
SDev	.0027	.0008	.0149	.0003	.0024	.0053	.0861
%RSD	160.2	82.27	452.6	299.4	48.96	187.6	74.30
#1	.0037	.0015	.0138	.0003	H.0066	.0066	L-.0550
#2	-.0002	.0004	-.0072	-.0001	.0032	-.0009	L-.1767
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	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	.0014	H.0120	-.0002	-.0005	-.0012	L-.0116	.0013
SDev	.0016	.0073	.0048	.0007	.0036	.0006	.0051
%RSD	116.8	60.34	2251.	126.6	286.4	5.176	397.9
#1	.0025	.0069	.0032	-.0010	.0013	L-.0112	.0049
#2	.0002	H.0172	-.0036	-.0001	-.0038	L-.0121	-.0023
Errors	LC Pass	LC High	NOCHECK	NOCHECK	LC Pass	LC Low	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	96.55	.0018	.0007	.0009	-.0004	.0011	.0018
SDev	.09	.0025	.0034	.0054	.0012	.0014	.0031
%RSD	.0885	137.7	465.2	623.1	281.9	129.5	176.7
#1	96.49	.0036	-.0017	.0047	.0004	.0001	.0040
#2	96.61	.0000	.0032	-.0030	-.0012	.0021	-.0004
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	.0018	.0010	.0014	H.0187	-.0167	.0013	-.0006
SDev	.0014	.0025	.0022	.0127	.0283	.0014	.0028
%RSD	79.49	250.9	162.9	67.77	169.5	108.9	501.4
#1	.0028	.0028	.0029	H.0277	.0033	.0023	.0014
#2	.0008	-.0008	-.0002	.0098	-.0367	.0003	-.0026
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	.0017	-.0005	.0014
SDev	.0014	.0008	.0018
%RSD	78.22	152.5	121.6
#1	.0027	.0000	.0027
#2	.0008	-.0011	.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	673122	10000	--	--	--	--	--
SDev	549.4220	.0000000	--	--	--	--	--
%RSD	.0816229	.0000000	--	--	--	--	--
#1	672734	10000	--	--	--	--	--
#2	673511	10000	--	--	--	--	--

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Div. 20
TASK ORDER: 030918-4
SRR: 24974
SDG: 234759
CASE: CNWRA
VTSR: September 18, 2003
PROJECT#: 06002.01.141

PREP/DIGESTION SHEETS

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

BOOK / PAGE: 54 203

~~010247~~

CLIENT(S): DIV 20
TASK ORDER(S): 030918-4 SDG(S): 234759
PROJECT NO(S): 06002.01.141
METHOD: 3005A ___ 3050B ___ 3050B-7.5 ___ 3010A ___ 3020A ___ 7760A ___ 7740A ___ $HClO_4$ ___ H_2SO_4 Sb ___
Microwave ___ Fusion ___ Teflon ___ Rock ___ OTHER Aliquots
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# 4157 EXP: 7/04 AMT: 50uL
Oven/Hotplate ID: ___ Temperature (°C): ___

SAMPLE IDENTIFICATION	pH	WT (g)	I.V. (mL)	F.V. (mL)	
PBW-S23W1			5	5	
LCSW-S23W1 *					
234759					
4759d					
4760					
4760② *					
4761					
4762					
4763					
4764					
4765					
4766					
4767					
4768					
4769					
4770					
4771					
4772					
4773					
4774					
4775					
4776					
4777					
4778					
* Spike 50uL Spike 1	Spex#	4074	Exp 5/04		
20uL I-CAL1	Spex#	3748	Exp 10/03		
20uL Sr @ 1kppm	IV#	4154	Exp 7/04		
** - RLB-02-030-04 1%	HNO_3	15% HCL	Exp 12/03		
					LOCATION: N/A

PREPARED BY: John Wilks DATE: 9-23-03
REVIEWED BY: Laura Wright DATE: 9/24/03
DISPOSAL INT/DATE/LOC: ___

FRM-191 (Rev 2/Mar 03)

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

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010248

CLIENT(S): DIV 20
TASK ORDER(S): 030918-4 SDG(S): 234759
PROJECT NO(S): 06005.01.141
METHOD: 3005A___ 3050B___ 3050B-7.5___ 3010A___ 3020A___ 7760A___ 7740A___ $HClO_4$___ H_2SO_4 Sb___
Microwave___ Fusion___ Teflon___ Rock___ OTHER ALiquots
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# 4151 EXP: 7/04 AMT: 50uL
Oven/Hotplate ID: — Temperature (°C): —

SAMPLE IDENTIFICATION	pH	WT (g)	I.V. (mL)	F.V. (mL)	
PBW-J23W2			5	5	
LCSW-J23W2 *			↓	↓	
234779					
4779d					
4780					
4780S *					
*Spike 50uL Spike 1	Spex#	4074	Exp 5/04		
↓ 20uL I-CAL1	Spex#	3748	Exp 10/03		
↓ 20uL Sr @ 1Kppm	IV#	4154	Exp 7/04		
**-RLB-02-030-04 1%	HNO_3	/5% HCL	Exp 12/03		
PBW and LCSW are prepared	as 5mL	— **			
					LOCATION: N/A

JW 9-23-03

PREPARED BY: John Wilks DATE: 9-23-03
REVIEWED BY: Laura Wright DATE: 9/24/03
DISPOSAL INT/DATE/LOC: ___

FRM-191 (Rev 2/Mar 03)

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

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010249

CLIENT(S): DIV 50
TASK ORDER(S): 030918-4 SDG(S): 234759
PROJECT NO(S): 06002.01.141
METHOD: 3005A ___ 3050B ___ 3050B-7.5 ___ 3010A ___ 3020A ___ 7760A ___ 7740A ___ $HClO_4$ ___ H_2SO_4 Sb ___
Microwave ___ Fusion ___ Teflon ___ Rock ___ OTHER df 10 dilutions
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# 4151 EXP: 7/04 AMT: 50 uL
Oven/Hotplate ID: — Temperature (°C): —

SAMPLE IDENTIFICATION	pH	WT (g)	I.V. (mL)	F.V. (mL)	
PBW-J24W1			5	5	
LCSW-J24W1 *			5		
234759 df 10			500 uL		
4759d					
4760					
4760S *					
4761					
4762					
4763					
4764					
4765					
4766					
4767					
4768					
4769					
4770					
4771					
4772					
4773					
4774					
4775					
4776					
4777					
✓ 4778					
* Spike 50 uL Spike1	Spex#	4074	Exp 5/04		
↓ 50 uL I-CAL1	Spex#	3748	Exp 10/03		
↓ 50 uL Sr @ 1Kppm	IV#	4154	Exp 7/04		
** - RLB-02-030-04	1% HNO_3 / 5% HCL			Exp 12/03	
PBW and LCSW are prepared as	5mL	— **			LOCATION:
df 10 dilutions are prepared as	500 uL	Sample:	4.5 mL — **		N/A

PREPARED BY: John Wills DATE: 9-24-03
REVIEWED BY: Lama Wright DATE: 9/24/03
DISPOSAL INT/DATE/LOC: ___

FRM-191 (Rev 2/Mar 03)

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

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010250

CLIENT(S): DIV 30
TASK ORDER(S): 030918-4 SDG(S): 234759
PROJECT NO(S): 06002.01.141
METHOD: 3005A ___ 3050B ___ 3050B-7.5 ___ 3010A ___ 3020A ___ 7760A ___ 7740A ___ $HClO_4$ ___ H_2SO_4 Sb ___
Microwave ___ Fusion ___ Teflon ___ Rock ___ OTHER df 10 dilutions
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# 4151 EXP: 7/04 AMT: 50 uL
Oven/Hotplate ID: — Temperature (°C): —

SAMPLE IDENTIFICATION	pH	WT (g)	I.V. (mL)	F.V. (mL)	
PBW-J24W2			5	5	
LCSW-J24W2 *			5	↓	
234779 df 10			500 uL	↓	
↓ 4779d ↓			↓	↓	
4780			↓	↓	
↓ 4780S * ↓			↓	↓	
* Spike 50 uL Spike1	Spex#	4074	Exp 5/04		
↓ 20 uL I-CAL1	Spex#	3748	Exp 10/03		
↓ 20 uL Sr @ 1kppm	IV#	4154	Exp 7/04		
** - RLB-02-030-04	1%	HNO_3/5%	HCL	Exp 12/03	
PBW and LCSW are prepared as 5 mL - **					
df 10 dilutions are prepared as 500 uL			sample:	4.5 mL - **	
					LOCATION: N/A

Joe 9-24-03

PREPARED BY: John Wells DATE: 9-24-03
REVIEWED BY: Laura Wright DATE: 9/24/03
DISPOSAL INT/DATE/LOC: ___

FRM-191 (Rev 2/Mar 03)

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

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010251

CLIENT(S): DIV 20
TASK ORDER(S): 030918-4 SDG(S): 234759
PROJECT NO(S): 06002.01.141
METHOD: 3005A ___ 3050B ___ 3050B-7.5 ___ 3010A ___ 3020A ___ 7760A ___ 7740A ___ $HClO_4$ ___ H_2SO_4 Sb ___
Microwave ___ Fusion ___ Teflon ___ Rock ___ OTHER Aliquot
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# 4261 EXP: 10/04 AMT: 50 nL
Oven/Hotplate ID: — Temperature (°C): —

SAMPLE IDENTIFICATION	pH	WT (g)	I.V. (mL)	F.V. (mL)	
PBW-K21W03			5	5	
LCSW-K21W1 *			↓	↓	
234761			↓	↓	
* Spike 50 nL Spike1	Spex#	4074	Exp 5/04		
↓ 20 nL I-CAL1	Spex#	3748	Exp 10-31-03		
↓ 20 nL Sr @ 1kppm	IV#	4154	Exp 7/04		
PBW and LCSW are prepared as		5 mLs	1% HNO_3 / 5% HCL	— **	
** RLB-02-030-04	1% HNO_3 / 5% HCL		Exp 12/03		
					LOCATION: N/A

Joe 10-21-03

PREPARED BY: John Willis DATE: 10-21-03
REVIEWED BY: Laura Wright DATE: 10/21/03
DISPOSAL INT/DATE/LOC: ___

FRM-191 (Rev 2/Mar 03)

Trace Metals Reagent Logbook

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010252

Reagent I.D.	Preparation Description:	Prep Date:	Exp Date:	Initials:
RLB2-~~023~~ 30 -01	5% KMnO3			
	150 G to 3 Liter Reag. Water			
	#3663	9-16-03	9-16-04	BV
RLB2-~~023~~ 30 -02	12% Hydroxalumine			
	Hydrochloride			
	360g to 3 Liters of			
	Reag Water.			
	#4058	9-16-03	9-16-04	BV
RLB2-30-03	BrCl Solution	9-9-03	9-9-04	BV
	KBr #0092 2.7g			
	KBrO3 #3570 3.8g			
	HCl #4191 250 ml			
RLB-02-030-04	1% HNO3 / 5% HCL	9-23-03	12-23-03	JW
	to a 250mL Nalgene bottle add			
	150mL di water, add 2.5mL HNO3			
	inorg# 4237, add 12.5mL HCL -			
	inorg# 4247 F.V. to 250mL w/di H2O			
RLB-02-030-05	1% HNO3 for Blue Line	10/1/03	AL	LW
	5mL HNO3 #4237 brought			
	to 500mL FV w/ di H2O.			
RLB-02-030-06	EF#1-522 w1	9-22-03	3-22-03	JW
	add di water to 13L jug, add 74.1 mL G.A			
	inorg#0707, add 33.4g NaOH inorg#4207			

F.V. to 13 L with di H2O, adjust ph to 4.88-4.93

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010253

TJA TRACE ICP DAILY LOG

ANALYST [illegible] DATE 9-25-03

As 189.042 Profile Line As Intensity: 450.323

PEAK POSITION .033234

VERNIER POSITION 301

AUTOSAMPLER Yes X No

QC PREP DATE:	
CCV/ICV	03I25
CRI	03I02
ICSA	03I15
ICSAB	03I15

STDs PREP DATE:	
CLP_STD1_SC	03I02
CLP_STD2_SC	03I02
CLP_STD3_SC	03H04
CLP_STD4_SC	03I02
CLP_STD5_SC	03H04
CLP_STD6_SC	~~03H16~~ 03I16 9-25-03
BLK_SC	03I25

COMMENTS	FILE	CLIENT	TO#	PROJECT NO.	METHOD
A309184	DAily 30	DIV 20	030918-4	06002.01.141	DAily154 206
A309184	DAily 30	DIV 20	030918-4	06002.01.141	DAily154 207
A309191 5	DAily 31	AMEC	030919-15	06861.01.006	DAily154 205
A309254	DAily 31	AMEC	030925-4	06053.06.025	DAily155 007
A309254 4A	DAily 31	AMEC	030919-16 030917-7	06861.01.006 06053.06.058	DAily155 004
			9-25-03		

COMMENTS: Changed data file to DAily 31

MAINTENANCE:

REVIEWED BY: CArdina DATE: 11/14/03

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6220 Culebra Rd
San Antonio, Texas 78228

010254

TJA TRACE ICP DAILY LOG

ANALYST [illegible] DATE 9-26-03

As 189.042 Profile Line As Intensity: 432.336

PEAK POSITION -.051105

VERNIER POSITION 301

AUTOSAMPLER Yes X No

QC PREP DATE:	
CCV/ICV	03I25
CRI	03I02
ICSA	03I15
ICSAB	03I15

STDs PREP DATE:	
CLP_STD1_SC	03I02
CLP_STD2_SC	03I02
CLP_STD3_SC	03H04
CLP_STD4_SC	03I02
CLP_STD5_SC	03H04
CLP_STD6_SC	03I16
BLK_SC	03I25

COMMENTS	FILE	CLIENT	TO#	PROJECT NO.	METHOD
A309254	DAily31	DPT, LABS.	030925-4	06053.06.025	DAily1 55007
A309184A	DAily31	Div 20	030918-4	06002.01.141	DAily1 54203
	DAily31	Div 20	030918-4	06002.01.141	DAily1 54204

[illegible] 9-26-03

COMMENTS:

MAINTENANCE:

REVIEWED BY: CArduña DATE: 11/14/03

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010255

TJA TRACE ICP DAILY LOG

ANALYST [signature] DATE 10-21-03

As 189.042 Profile Line As Intensity: 413.65

PEAK POSITION -.026939
VERNIER POSITION 245
AUTOSAMPLER Yes X No

QC PREP DATE:	
CCV/ICV	03514
CRI	03520
ICSA	03517
ICSAB	03520

STDs PREP DATE:	
CLP_STD1_SC	03501
CLP_STD2_SC	03501
CLP_STD3_SC	03501
CLP_STD4_SC	03501
CLP_STD5_SC	03501
CLP_STD6_SC	03501 X 8 014 10-27-03
BLK_SC	03501

COMMENTS	FILE	CLIENT	TO#	PROJECT NO.	METHOD
A031021	DAily ~~54~~ 31 OH	Div 20	030918-4	06002.01.141	DAily 54-243
~~A031021~~	~~DAily 31~~	~~Div 20~~	~~030918-4~~	~~06002.01.141~~	

[signature] 10-21-03

COMMENTS:

MAINTENANCE:

REVIEWED BY: [signature] DATE: 11/14/03

ICP Calibration Blank/ICB/CCB Solution

ID: BLK-03J02

Date Prepared: 9-2-03 Prepared By: [signature]

Make up as needed in 1000ml volumetric flask. 010256

Added ✓ 10 ml HNO3 INORG #: 4197

Added ✓ 50 ml HCL INORG #: 4190

Added ✓ 1000ul of 10000ppm Sc (INORG. VENT.) EXP. Date: 10-1-03 INORG #: 3683

ICP Calibration Blank/ICB/CCB Solution

ID: BLK-03J25

Date Prepared: 9-25-03 Prepared By: [signature]

Make up as needed in 1000ml volumetric flask.

Added ✓ 10 ml HNO3 INORG #: 4237

Added ✓ 50 ml HCL INORG #: 4247

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

ICP Calibration Blank/ICB/CCB Solution

ID: BLK- ~~03J31~~ 03J01 (AH 10-1-03)

Date Prepared: ~~9-31-03~~ 10-1-03 (AH) Prepared By: [signature]

Make up as needed in 1000ml volumetric flask.

Added ✓ 10 ml HNO3 INORG #: 4237

Added ✓ 50 ml HCL INORG #: 4249

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

ICP Calibration Blank/ICB/CCB Solution

ID: BLK-03J29

Date Prepared: 10-29-03 Prepared By: [signature]

Make up as needed in 1000ml volumetric flask.

Added ✓ 10 ml HNO3 INORG #: 4295

Added ✓ 50 ml HCL INORG #: 4292

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

ICP ICV/CCV SOLUTION

010257

CCV- 03125

Date Prepared: 9-25-03 Prepared By: [illegible]

HNO3 INORG #: 4237 HCl INORG #: 4247

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	3927	1000	1-15-04
Si	5	5ml	✓	SPEX	4232	1000	8-30-04
Ti	5	5ml	✓	SPEX	4234	1000	8-30-04
Sr	5	5ml	✓	SPEX	3961	1000	2-15-04
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	3928	1000	1-15-04
S	1	1ml	✓	SPEX	4140	1000	6-30-04
Th	1	1ml	✓	SPEX	4233	1000	8-30-04 ~~04~~ 9-25-03
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	3773	mix	11-30-03
ICV-2B	vary	1ml	✓	SPEX	3774	mix	11-30-03
ICV-2C	vary	10ml	✓	SPEX	3775	mix	11-30-03

Expiration Date: 11-30-03

ICP ICV/CCV SOLUTION

010258

CCV- 03514

Date Prepared: 10-14-03 Prepared By: DL

HNO3 INORG #: 4239 HCl INORG #: 4251

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	3927	1000	1-15-04
Si	5	5ml	✓	SPEX	4232	1000	8-30-04
Ti	5	5ml	✓	SPEX	4234	1000	8-30-04
Sr	5	5ml	✓	SPEX	3961	1000	2-15-04
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	3928	1000	1-15-04
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	3773	mix	11-30-03
ICV-2B	vary	1ml	✓	SPEX	3774	mix	11-30-03
ICV-2C	vary	10ml	✓	SPEX	3775	mix	11-30-03

Expiration Date: 11-30-03

ICP Calibration Standards

010259

Date Prepared: 8-4-03 Prepared By: DL

HNO3 INORG #: 4168 HCI INORG #: 4161

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

Prepared	Standard Name	Element	Std Conc (ppm)	Added ml	Check	Source	INORG #	Stock Conc (ppm)	Exp Date
8-4-03 DH	STD1- 03H04	Al	50	2.50	✓	INORVENT	3649	10000	9-1-03
		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	3738	10000	11-1-03
		Mg	25	1.25	✓	INORVENT	4204	10000	8-1-04
		Na	50	2.50	✓	INORVENT	4205	10000	8-1-04
		Li	10	5.00	✓	INORVENT	4149	1000	7-1-04
		Sc	10	0.500	✓	INORVENT	3683	10000	10-1-03
	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	
8-4-03 DH	STD3- 03H04	Cd	10	5.00	✓	INORVENT	3972	1000	3-1-04
		Co	10	5.00	✓	INORVENT	3973	1000	3-1-04
		Mn	10	5.00	✓	INORVENT	3921	1000	2-1-04
		V	10	5.00	✓	INORVENT	3740	1000	11-1-03
		Zn	10	5.00	✓	INORVENT	3741	1000	11-1-03
		Sc	10	0.500	✓	INORVENT	3683	10000	10-1-03
	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	
8-4-03 DH	STD5- 03H04	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	3762	1000	12-1-03
		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	4200	1000	8-1-04
		Sc	10	0.500	✓	INORVENT	3683	10000	10-1-03
8-4-03 DH	STD6- 03H04	La	10	5.00	✓	INORVENT	3650	1000	9-1-03
		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	3738	1000	11-1-03
		Th	10	5.00	✓	INORVENT	3681	1000	10-1-03
		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	3683	10000	10-1-03

Expiration Dates:

STD1: 9-1-03 STD4: ~~10-1-03~~ DH

STD2: STD5: 10-1-03

STD3: 10-1-03 STD6: 9-1-03

ICP Calibration Standards

010260

Date Prepared: 9-2-03 Prepared By: DH

HNO3 INORG #: 4197 HCl INORG #: 4190

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
DH 9-2-03	STD1- 03102	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	3738	10000	11-1-03
		Mg	25	1.25	✓	INORVENT	4204	10000	8-1-04
		Na	50	2.50	✓	INORVENT	4205	10000	8-1-04
		Li	10	5.00	✓	INORVENT	4149	1000	7-1-04
		Sc	10	0.500	✓	INORVENT	3683	10000	10-1-03
DH 9-2-03	STD2- 03102	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	3732	1000	11-1-03
		Cu	10	5.00	✓	INORVENT	3953	1000	3-1-04 DH
		Ni	10	5.00	✓	INORVENT	3957	1000	3-1-04
		Sc	10	0.500	✓	INORVENT	3683	10000	10-1-03
	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	
DH 9-2-03	STD4- 03102	Ag	2	1.00	✓	INORVENT	4222	1000	9-1-04
		As	10	5.00	✓	INORVENT	3999	1000	2-1-04
		Pb	10	5.00	✓	INORVENT	3735	1000	11-1-03
		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	3683	10000	10-1-03
	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	
DH 9-2-03	STD6- 03102	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	3739	1000	11-1-03
		Th	10	5.00	✓	INORVENT	3681	1000	10-1-03
		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	3958	1000	3-1-04
		SC	10	0.500	✓	INORVENT	3683	10000	10-1-03

Expiration Dates:

STD1: 10-1-03 STD4: 10-1-03

STD2: 11-1-03 STD5:

STD3: STD6: 10-1-03

ICP Calibration Standards

010261

Date Prepared: 9-16-03 Prepared By: D

HNO3 INORG #: 4235 HCl INORG #: 4192

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	
BL 03I16	STD6- 9-16-03	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	3739	1000	11-1-03
		Th	10	5.00	✓	INORVENT	3681	1000	10-1-03
		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	3958	1000	3-1-04
		SC	10	0.500	✓	INORVENT	3683	10000	10-1-03

Expiration Dates:

STD1: **STD4:**

STD2: **STD5:**

STD3: **STD6:** 10-1-03

ICP Calibration Standards

010262

Date Prepared: ~~9-31-03~~ 10-1-03 Prepared By: [illegible]

HNO3 INORG #: 4237 HCl INORG #: 4249

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
~~9-31-03~~ 10-1-03	STD1- 03501	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	3734	10000	11-1-03
		Mg	25	1.25	✓	INORVENT	4204	10000	8-1-04
		Na	50	2.50	✓	INORVENT	4205	10000	8-1-04
		Li	10	5.00	✓	INORVENT	4149	1000	7-1-04
		Sc	10	0.500	✓	INORVENT	4262	10000	10-1-04
~~9-31-03~~ 10-1-03	STD2- 03501	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	3732	1000	11-1-03
		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
~~9-31-03~~ 10-1-03	STD3- 03501	Cd	10	5.00	✓	INORVENT	3972	1000	3-1-04
		Co	10	5.00	✓	INORVENT	3973	1000	3-1-04
		Mn	10	5.00	✓	INORVENT	3921	1000	2-1-04
		V	10	5.00	✓	INORVENT	3740	1000	11-1-03
		Zn	10	5.00	✓	INORVENT	3741	1000	11-1-03
		Sc	10	0.500	✓	INORVENT	4262	10000	10-1-04
~~9-31-03~~ 10-1-03	STD4- 03501	Ag	2	1.00	✓	INORVENT	4222	1000	9-1-04
		As	10	5.00	✓	INORVENT	3999	1000	2-1-04
		Pb	10	5.00	✓	INORVENT	3735	1000	11-1-03
		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
~~9-31-03~~ 10-1-03	STD5- 03501	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	4049	1000	6-1-04
		Si	10	5.00	✓	INORVENT	4153	1000	7-1-04
		Ti	10	5.00	✓	INORVENT	3762	1000	12-1-03
		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	4200	1000	8-1-04
		Sc	10	0.500	✓	INORVENT	4262	10000	10-1-04
10-1-03	STD6- 03501	La	10	5.00	✓	INORVENT	4221	1000	9-1-04
		Na	1	0.05	42 ✓	INORVENT	4205	10000	8-1-04
		Pd	10	5.00	✓	INORVENT	3964	1000	3-1-04
		S	10	5.00	✓	INORVENT	3739	1000	11-1-03
		Th	10	5.00	✓	INORVENT	3681	1000	10-1-03
		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	3958	1000	3-1-04
		SC	10	0.500	✓	INORVENT	4262	10000	10-1-04

OH EXP. order

Expiration Dates:

STD1: 11-1-03 STD4: 11-1-03

STD2: 11-1-03 STD5: 12-1-03

STD3: 11-1-03 STD6: ~~11-1-03~~ 10-1-03

ICP Calibration Standards

010263

Date Prepared: 10-8-03 Prepared By: DL

HNO3 INORG #: 4239 HCl INORG #: 4250

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	
03508	STD6-	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	3739	1000	11-1-03
	10-8-03	Th	10	5.00	✓	INORVENT	4243	1000	11-1-03 4 OK 10-8-0
		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	3958	1000	3-1-04
		SC	10	0.500	✓	INORVENT	~~4264~~ OK 4262 10-8-03	10000	10-1-04

Expiration Dates:

STD1: **STD4:**

STD2: **STD5:**

STD3: **STD6:** 11-1-03

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Div. 20
TASK ORDER: 030918-4
SRR: 24974
SDG: 234759
CASE: CNWRA
VTSR: September 18, 2003
PROJECT#: 06002.01.141

CERTIFICATES OF ANALYSIS

010264

FISHER SCIENTIFIC
TRACEMETAL GRADE NITRIC ACID

CERTIFICATE OF ANALYSIS

Catalog No. A509 **Lot No: 1103050**
Date: May, 2003

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

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 09/10/03
DATE EXPIRED: 09/10/2013
DATE OPENED: 09/10/03
INORG: 4035-4040 PO: F52225

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

Fisher Chemical
A Fisher Scientific Company

FISHER SCIENTIFIC
TRACEMETAL GRADE NITRIC ACID

CERTIFICATE OF ANALYSIS

Catalog No. A509 Lot No: 1103030
Date: March, 2003

Tests	Units	Value
Assay	%	70%
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

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 07/28/03
DATE EXPIRED: 07/28/2013
DATE OPENED: 07/29/03
INORG: 4193-4198 PO: F52386

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

Fisher Chemical
A Fisher Scientific Company

010266

FISHER SCIENTIFIC
TRACEMETAL GRADE NITRIC ACID

CERTIFICATE OF ANALYSIS

Catalog No. A509 Lot No: 1103030
Date: March, 2003

Tests	Units	Value
Assay	%	70%
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

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 6/13/03
DATE EXPIRED: 6/13/2013
DATE OPENED: 8/13/03 DK
INORG: 4164-4169 PO: F52359

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

Fisher Chemical
A Fisher Scientific Company

010267

FISHER SCIENTIFIC
TRACEMETAL GRADE HYDROCHLORIC ACID

CERTIFICATE OF ANALYSIS

Catalog No. A508 **Lot No: 4102110**
Date: December, 2002

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: 09/10/03
DATE EXPIRED: 09/10/2013
DATE OPENED: 09/17/03
INORG: 4847-4852 PO: F52228

Element concentrations are at the point of bottling. Concentrations of some elements in particular, Ca, Si, K, Na, B, Al, Mg & Mn will increase due to storage in glass bottles.

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A Fisher Scientific Company

010268

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: 07/28/03
DATE EXPIRED: 07/28/2013
DATE OPENED: 07/29/03
INORG: 4187-4192 PO: F52386

Element concentrations are at the point of bottling. Concentrations of some elements in particular, Ca, Si, K, Na, B, Al, Mg & Mn will increase due to storage in glass bottles.

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Fisher Chemical
A Fisher Scientific Company

010269

FISHER SCIENTIFIC
TRACEMETAL GRADE HYDROCHLORIC ACID

CERTIFICATE OF ANALYSIS

Catalog No. A508 **Lot No: 4102110**
Date: December, 2002

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.

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INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 06/16/03
DATE EXPIRED: 06/16/2013
DATE OPENED: 06/25/03
INORG: 4156-4161 PO: F52368

SPEXertificate™

010270

Certificate of Reference Material

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 05/15/03
DATE EXPIRED: 05/15/2004
DATE OPENED: 05/15/03
INORG: 4074 PO: F52351

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: MAY '03 Certifying Officer: N. Kocherlakota

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010271

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 10/31/03
DATE EXPIRED: 10/31/2003
DATE OPENED: 10/31/03
INORG: 3748 PO: F52056

SPEXertificate™

Certificate of Reference Material

Catalog Number: ICAL-1 **Lot No.:** 6-104VY
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: OCT - - '02 Certifying Officer: N. Kocherlakota

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Certificate of Analysis

010272

CUSTOM-GRADE SOLUTION 10,000 μg/mL Scandium IN 5% HNO_3 (abs)

Catalog Number: CGSC10-1and CGSC10-5

Lot Number: **T-QSC01104**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 9/4/02
DATE EXPIRED: 10/1/2003 DR
DATE OPENED: 9/4/02
INORG: 3683 PO: F52048

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

CERTIFIED VALUE: 10,056 μg/mL

The certified value is the average of the classical wet assay and instrument analysis unless otherwise specified. All standards are accurate to a relative precision of ± 0.5% at the 95% confidence level for a period of 1 year. (See expiration date below)

Classical Wet Assay: 10,040 μg/mL
Method: EDTA Titration vs NIST SRM 928 Lead Nitrate
Sufficient number of sample measurements were made to give a minimum relative precision of ± 0.3% at the 95% confidence level.

Instrument Analysis: 10,071 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3148a
Sufficient number of sample measurements were made to give a minimum relative precision of ± 0.5% at the 95% confidence level.

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	<0.07	M	Dy	<0.006	M	Li	<0.01	M	Pr	<0.0003	M	Te	<0.03
M	Sb	<0.0005	M	Er	<0.005	M	Lu	<0.0004	M	Re	<0.001	M	Tb	<0.0003
M	As	<0.01	M	Eu	<0.003	M	Mg	<0.03	M	Rh	<0.001	M	Tl	<0.001
M	Ba	<0.01	M	Gd	<0.001	M	Mn	<0.004	M	Rb	<0.001	M	Th	0.028
M	Be	<0.0005	M	Ga	<0.001	O	Hg	i	M	Ru	<0.002	M	Tm	<0.0004
M	Bi	0.043	M	Ge	<0.006	M	Mo	<0.002	M	Sm	<0.001	M	Sn	<0.005
O	B	<0.034	M	Au	<0.003	M	Nd	<0.002	s	Sc		n	Ti	
M	Cd	<0.003	M	Hf	0.03	O	Ni	<0.084	O	Se	<0.67	M	W	<0.01
O	Ca	0.17	M	Ho	<0.0005	M	Nb	<0.0005	O	Si	<0.034	M	U	<0.002
M	Ce	<0.005	M	In	<0.001	n	Os		M	Ag	0.005	M	V	<0.002
M	Cs	<0.0003	M	Ir	<0.005	M	Pd	<0.005	O	Na	<0.16	M	Yb	<0.001
M	Cr	<0.005	O	Fe	<0.16	O	P	i	M	Sr	<0.0005	M	Y	<0.04
M	Co	<0.003	M	La	<0.0005	M	Pt	<0.002	n	S		M	Zn	0.075
M	Cu	<0.006	M	Pb	0.005	O	K	<5.01	M	Ta	<0.007	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): 1.062 g/mL

QA:KL Rev.050302DN

(over)

Inorganic Ventures, Inc.
195 Lehigh Avenue • Suite 4 • Lakewood, NJ 08701
Orders: 800-669-6799 • FAX (732) 901-1903
Technical Support: 800-569-6799

Paul R. Haines
Quality Assurance Manager

EXPIRES 1/2003

Certificate of Analysis

CUSTOM-GRADE SOLUTION

1000 μg/mL Scandium IN 5% HNO_3 (abs)

010273

Catalog Number: CGSC1-1and CGSC1-5

Lot Number: **W-SC02055**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 06/20/03
DATE EXPIRED: 07/01/2004
DATE OPENED: 06/23/03
INORG: 4151 PO: F52370

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.031303JTS

(over)

Paul R Haines

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Quality Assurance Manager

EXPIRES 01/2004

inorganic ventures / iv labs

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

certificate of analysis

CUSTOM-GRADE SOLUTION

1000 µg/mL Scandium IN 5% HNO_3 (abs) 010274

Catalog Number: CGSC1-1and CGSC1-5

Lot Number: **W-SC02055**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 09/04/03
DATE EXPIRED: 10/01/2004
DATE OPENED: 09/24/03
INORG: 42601 PO: E52232

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.031303JTS

Paul R. Haines

Quality Assurance Manager Expires: EXPIRES 01/2004

inorganic ventures / iv labs

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certificate of analysis

CUSTOM-GRADE SOLUTION 10,000 μg/mL Scandium IN 5% HNO_3 (abs) 010275

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: 42602 PO: F52232

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

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INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 06/09/03
DATE EXPIRED: 06/30/2004
DATE OPENED: 06/23/03
INORG: 4139 PO: F52370

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

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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

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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.

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INORG: 3927 PO: F53073

Catalog Number: PLP9-2X/2Y/2T **Lot No.** 9-29P

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: 1003.5 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# A158. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1004 mg/L

Method: Precipitation using Magnesia mixture. Filter, ignite, and weigh as Mg2O2.

Instrumentation Analysis By ICP spectrometer: 1003 mg/L

Uncertified Properties:

Density: 0.9997 @ 22.9 Degrees Celsius

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

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.05	Cu	<0.001	Pb	<0.001
As	<0.001	Fe	0.019	Rb	<0.001
Ag	<0.001	Ga	<0.001	Re	<0.001
B	<0.005	In	<0.001	Sn	0.006
Ba	<0.001	K	0.17	Sr	0.004
Be	<0.001	Li	0.004	Sb	0.01
Bi	<0.001	Mg	0.3	Ti	0.016
Ca	0.65	Mn	<0.001	Tl	<0.001
Cr	<0.001	Mo	<0.001	V	<0.001
Cd	<0.001	Na	0.5	Zr	<0.001
Co	<0.001	Ni	<0.001	Zn	6.7

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.-- '03 Certifying Officer: N. Kocherlakota

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DATE OPENED: 09/05/03
INORG: 4232 PO: 53225

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.

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

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DATE OPENED: 09/05/03
INORG: 4234 PO: F5225

Catalog Number: PLTI9-2X/2Y/2T **Lot No.** 10-38TI
Description: 1000 mg/L Titanium
Matrix: H2O/ 0.24% F-

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

Certified Value: 1001 mg/L
Uncertainty Associated with Measurement: 3.0mg/L
Certified Value is Traceable to: NIST SRM #3162a

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

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1003 mg/L

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

Instrumentation Analysis By ICP spectrometer: 999 mg/L

Uncertified Properties:

Density: 1.001 @ 22.5 Degrees Celsius

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

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

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

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

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Certificate of Reference Material

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.

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

INORGANIC LABS/RADCHEM LTD
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INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 06/20/03
DATE EXPIRED: 06/30/2004
DATE OPENED: 06/23/03
INORG: 4141 PO: F52370

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.

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

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Certificate of Reference Material

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.

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

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DATE EXPIRED: 06/30/2004
DATE OPENED: 06/23/03
INORG: 4138 PO: F52370

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Certificate of Reference Material

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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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.** 9-74PD

Description: 1000 mg/L Palladium

Matrix: 10% HCl

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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: 995 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# 07991E. 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: 990 mg/L

Method: Precipitation using dimethyl glyoxime,filter,dry and weigh as Pd(C4H702N2)2.

Instrumentation Analysis By ICP spectrometer: 1000 mg/L

Uncertified Properties:

Density: 1.025 @ 26.3 Degrees Celsius

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

Element	mg/L	Element	mg/L	Element	mg/L
Al	<0.004	Cr	<0.009	Pt	<0.004
Au	0.03	Fe	0.02	Re	<0.001
Ag	0.007	Ga	<0.001	Rh	0.002
B	<0.05	Ir	<0.001	Rb	<0.001
Be	<0.002	In	<0.001	Ru	<0.001
Bi	<0.001	Mg	<0.005	Sn	0.08
Ca	0.02	Mn	<0.001	Te	<0.001
Cd	<0.001	Na	<0.03	Ti	<0.001
Co	<0.001	Ni	0.004	W	<0.001
Cu	<0.006	Pb	<0.04	Zr	<0.001
				Zn	0.16

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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INORG: 4140 PO: F53370

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.

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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.

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DATE OPENED: 08/13/03
INORG: 4212 PO: E52218

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.

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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

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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

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Catalog Number: ICV-2A **Lot No.:** 22-12AS
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 -- '02 Certifying Officer: N. Kocherlakota

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DATE OPENED: 11/19/02
INORG: 3774 PO: F52064

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Catalog Number: PLSB7-2X/2Y/2T **Lot No.:** 8-175SB-X/Y/T
Description: 1000 mg/L Antimony
Matrix: Water/0.6% Tartaric Acid/tr HNO_3

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: Antimony(Sb): 999 mg/L ± 3 mg/L
Traceable to: NIST SRM 3102a

The CRM is prepared gravimetrically using high purity Antimony Metal (Sb) Lot#R1198A. 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: Gravimetric analysis by evaporating to dryness, fuming with Nitric Acid, igniting and weighing as Sb_2O_4.
Instrumental Analysis by ICP spectrometer: 1000 mg/L
Uncertified Properties:
Density: 1.007 at 24.0°C

Trace Metallic Impurities in the Actual Solution via ICP Analysis:

Element	mg/L	Element	mg/L	Element	mg/L
Ag	<0.001	Cu	<0.001	Pb	<0.001
Al	0.030	Fe	0.013	Rb	<0.001
As	0.001	Ga	<0.001	Re	<0.001
B	<0.001	In	<0.001	Sn	<0.001
Ba	<0.001	K	0.030	Sr	<0.001
Be	<0.001	Li	<0.001	Ti	0.001
Bi	<0.001	Mg	0.003	Tl	<0.001
Ca	0.012	Mn	<0.001	V	<0.001
Cd	<0.001	Mo	<0.001	Zn	<0.010
Co	<0.001	Na	0.005	Zr	<0.001
Cr	<0.001	Ni	<0.001		

Balances are calibrated regularly with weight sets traceable to NIST#s 32856, 32867 and others. This CRM is guaranteed stable to +/- 0.5% of the certified concentration inclusive of uncertainty of measurements and other effects, such as transpiration losses, for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: NOV -- '02 Certifying Officer: N. Kocherlakota

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DATE OPENED: 11/19/02
INORG: 3775 PO: F50464

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Catalog Number: ICV-2C **Lot No.:** 22-13AS
Description: **Initial Calibration Verification Standard II**
Matrix: 5% Nitric Acid

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

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

Refer to side 2 for details of measurement uncertainties.

Instrumental Analysis by ICP Spectrometer:

Element	Labeled (mg/L)	Measured (mg/L)	NIST SRM
As	500	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 -- '02 Certifying Officer: N. Kocherlakota

© 2000 SPEX CertiPrep, Inc.

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Cadmium in 2% HNO_3 (abs)

Catalog Number: CGCD1-1, CGCD1-2 and CGCD1-5

010297

Lot Number: **T-CD01125**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 3/03/03
DATE EXPIRED: 3/01/2004
DATE OPENED: 3/04/03
INORG: 3972 PO: F52064

Starting Material:	Cadmium Metal
Starting Material Purity:	99.999%
Starting Material Lot No:	H02K40A

CERTIFIED CONCENTRATION: 1003 ± 3 μg/mL

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

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

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

Classical Wet Assay: 1003 ± 3 μg/mL
Method: EDTA Titration vs NIST SRM 928 Lead Nitrate.

Instrument Analysis: 1003 ± 3 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3108.

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	<0.00030	M	Dy	<0.00060	O	Li	<0.0050	M	Pr	<0.000030	O	Te	<0.031
M	Sb	<0.000050	M	Er	<0.00050	M	Lu	<0.000040	M	Re	<0.00010	M	Tb	<0.000030
O	As	<0.12	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
s	Cd		M	Hf	<0.00020	O	Ni	<0.0060	O	Se	<0.020	M	W	<0.0010
O	Ca	0.0018	M	Ho	<0.000050	M	Nb	<0.000050	O	Si	<0.010	M	U	<0.00020
M	Ce	<0.00050	O	In	<0.030	n	Os		O	Ag	<0.27	M	V	<0.00020
M	Cs	<0.000030	M	Ir	<0.00050	O	Pd	<0.053	O	Na	<0.10	M	Yb	<0.00010
O	Cr	<0.0040	O	Fe	<0.0020	O	P	<0.030	M	Sr	<0.000050	M	Y	<0.0040
M	Co	<0.00030	M	La	<0.000050	M	Pt	<0.00020	O	S	<0.020	O	Zn	<0.030
M	Cu	<0.00060	M	Pb	<0.00030	O	K	<0.0060	M	Ta	<0.00070	M	Zr	<0.00050

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

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 1.015 g/mL

(over)

QA:KL Rev.080102DN

Paul R Haines

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Orders: 800-669-6799 • FAX (732) 901-1903
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Quality Assurance Manager

EXPIRES 1 MAR 2004

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."*

010298

2.0 DESCRIPTION OF CRM

Custom-Grade **1000 µg/mL Cobalt in 2% (abs) HNO_3**

Catalog Number:	CGCO1-1, CGCO1-2, and CGCO1-5
Lot Number:	**T-CO01120**
Starting Material:	Co powder
Starting Material Purity (%):	99.9957
Starting Material Lot No	22897
Matrix:	2% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 3/03/03
DATE EXPIRED: 3/01/2004
DATE OPENED: 3/04/03
INORG: 3973 PO: F52064

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1002 ± 3 µg/mL

Certified Density: 1.016 g/mL (measured at 22° C)

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

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

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

($\bar{x}$) = 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** **998 ± 4 µg/mL**
ICP Assay NIST SRM 3181 Lot Number: 000630

Assay Method #2 **1002 ± 3 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

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

010299

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

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

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

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

O	Al	0.00025	M	Dy	< 0.02419	O	Li	0.00001	M	Pr	< 0.00121	M	Te	< 0.12097
M	Sb	< 0.00202	M	Er	< 0.02016	M	Lu	< 0.00161	M	Re	< 0.00403	M	Tb	< 0.00121
O	As	< 0.10000	M	Eu	< 0.01210	O	Mg	0.00045	M	Rh	< 0.00403	M	Tl	< 0.00403
M	Ba	< 0.04032	M	Gd	< 0.00403	O	Mn	0.00003	M	Rb	< 0.00403	M	Th	< 0.00403
M	Be	< 0.00202	M	Ga	< 0.00403	O	Hg	< 0.05000	M	Ru	< 0.00807	M	Tm	< 0.00161
M	Bi	< 0.00161	M	Ge	< 0.02419	M	Mo	< 0.00807	M	Sm	< 0.00403	M	Sn	< 0.02016
O	B	< 0.04000	M	Au	< 0.01210	M	Nd	< 0.00807	M	Sc	< 0.04032	M	Ti	< 0.20162
M	Cd	< 0.01210	M	Hf	< 0.00807	O	Ni	< 0.02000	M	Se	< 0.03226	M	W	< 0.04032
O	Ca	0.00325	M	Ho	< 0.00202	M	Nb	< 0.00202	O	Si	< 0.00400	M	U	< 0.00807
M	Ce	< 0.02016	M	In	< 0.04032	n	Os		M	Ag	< 0.00807	M	V	< 0.00807
M	Cs	< 0.00121	M	Ir	< 0.02016	M	Pd	< 0.02016	O	Na	0.00138	M	Yb	< 0.00403
M	Cr	< 0.02016	O	Fe	0.00875	n	P		M	Sr	< 0.00202	M	Y	< 0.16129
s	Co		M	La	< 0.00202	M	Pt	< 0.00807	n	S		M	Zn	< 0.08065
M	Cu	< 0.02419	M	Pb	< 0.01210	O	K	0.03000	M	Ta	< 0.02823	M	Zr	< 0.02016

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

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.
Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 58.9332; +2; 6; $Co(H_2O)_6^{2+}$
Chemical Compatibility - Stable in HCl, HNO_3, H_2SO_4, HF, H_3PO_4. Avoid basic media. Stable with most metals and inorganic anions in acidic media.
Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO_3 / LDPE container.
Co Containing Samples (Preparation and Solution) - Metal (soluble in HNO_3); Oxides (Soluble in HCl); Ores (Dissolve in HCl / HNO_3).
Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES	238.892 nm	0.01/.002 µg/mL	1	ion	Fe, W, Ta
ICP-OES	228.616 nm	0.01/.001µg/mL	1	ion	
ICP-OES	237.862 nm	0.01/.002 µg/mL	1	ion	W, Re, Al, Ta
ICP-MS	59 amu	2 ppt	n/a	M^+	$^{42}Ca^{16}O^1H$, $^{40}Ar^{18}O^1H$, $^{36}Ar^{23}Na$, $^{43}Ca^{16}O$, $^{24}Mg^{35}Cl$

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

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

10.0 QUALITY STANDARD DOCUMENTATION

010300

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

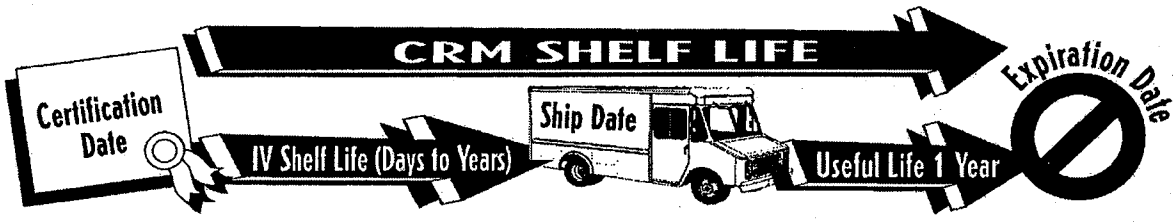
10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC), 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: September 05, 2002

Expiration Date: EXPIRES 1 MAR 2004

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 3/03/03
DATE EXPIRED: 3/01/2004
DATE OPENED: 3/04/03
INORG: 3973 PO: F52064

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 010301

ISO/IEC 17025 ISO GUIDE 34
ISO 9001:2000
REGISTERED SINCE 1993
10CFR-50 APPENDIX B, 10 CFR 21
MIL-STD 45662A

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Manganese in 2% HNO_3 (abs)

010302

Catalog Number: CGMN1-1, CGMN1-2, and CGMN1-5

Lot Number: **T-MN02033**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 01/16/03
DATE EXPIRED: 02/01/2004
DATE OPENED: 01/16/03
INORG: 3921 PO: F52073

Starting Material:	Manganese Metal
Starting Material Purity:	99.998%
Starting Material Lot No:	21563

CERTIFIED CONCENTRATION: 1004 ± 3 μg/mL

The Certified Value is the wet assay value. The following equations are used in the calculation of the certified value and the uncertainty:

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

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

Classical Wet Assay: 1004 ± 3 μg/mL
Method: EDTA Titration vs NIST SRM 928 Lead Nitrate.

Instrument Analysis: 1001 ± 3 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3132.

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.

M	Al	<0.00090	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	0.0040	M	Rh	<0.00010	M	Tl	<0.00010
M	Ba	<0.0010	M	Gd	<0.00010	s	Mn		M	Rb	<0.00010	M	Th	<0.00010
M	Be	<0.000050	i	Ga		O	Hg	<0.030	M	Ru	<0.00020	M	Tm	<0.000040
M	Bi	<0.000040	M	Ge	<0.00060	M	Mo	0.00024	M	Sm	<0.00010	M	Sn	<0.00050
M	B	<0.0070	M	Au	<0.00030	M	Nd	<0.00020	M	Sc	<0.0010	M	Ti	<0.0050
M	Cd	<0.00030	M	Hf	<0.00020	O	Ni	<0.050	O	Se	<0.40	M	W	<0.0010
O	Ca	<0.010	M	Ho	<0.000050	M	Nb	<0.000050	O	Si	<0.020	M	U	<0.00020
M	Ce	<0.00050	i	In		n	Os		M	Ag	<0.00020	i	V	
M	Cs	<0.000030	M	Ir	<0.00050	M	Pd	<0.00050	O	Na	<0.090	M	Yb	<0.00010
M	Cr	<0.00050	i	Fe		i	P		M	Sr	<0.000050	M	Y	<0.0040
O	Co	<0.050	M	La	<0.000050	M	Pt	<0.00020	n	S		M	Zn	<0.0020
M	Cu	<0.00060	M	Pb	<0.00030	n	K		M	Ta	<0.00070	M	Zr	<0.00050

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

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 1.015 g/mL

(over)

QA:KL Rev.082202DN

Paul R Haines

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Technical Support: 800-569-6799

Quality Assurance Manager

EXPIRES 1 FEB 2004

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Vanadium in 1.4% HNO_3 (abs) 010303

Catalog Number: CGV1-1, CGV1-2 and CGV1-5

Lot Number: **S-QV01080**

Starting Material:	Vanadium Pentoxide
Starting Material Purity:	99.999%
Starting Material Lot No:	46

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 10/22/02
DATE EXPIRED: 11/01/2003
DATE OPENED: 10/23/02
INORG: 3740 PO: F52057

CERTIFIED VALUE: 995 μg/mL

The certified value is the average of the classical wet assay and instrument analysis unless otherwise specified. All standards are accurate to a relative precision of ± 0.5% at the 95% confidence level for a period of 1 year. (See expiration date below)

Classical Wet Assay: 999 μg/mL
Method: EDTA Titration vs NIST SRM 928 Lead Nitrate
Sufficient number of sample measurements were made to give a minimum relative precision of ± 0.3% at the 95% confidence level.

Instrument Analysis: 991 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3165
Sufficient number of sample measurements were made to give a minimum relative precision of ± 0.5% at the 95% confidence level.

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.

M	Al	0.0095	M	Dy	<0.0006	M	Li	<0.001	M	Pr	<0.00003	M	Te	<0.003
M	Sb	0.042	M	Er	<0.0005	M	Lu	<0.00004	M	Re	<0.0001	M	Tb	<0.00003
M	As	<0.001	M	Eu	<0.0003	M	Mg	0.0089	M	Rh	<0.0001	M	Tl	<0.0001
M	Ba	<0.001	M	Gd	<0.0001	O	Mn	i	M	Rb	<0.0001	M	Th	<0.0001
M	Be	<0.00005	M	Ga	<0.0001	O	Hg	i	M	Ru	<0.0002	M	Tm	<0.00004
M	Bi	<0.00004	M	Ge	<0.0006	M	Mo	0.016	M	Sm	<0.0001	M	Sn	<0.0005
M	B	<0.007	M	Au	<0.0003	M	Nd	<0.0002	M	Sc	<0.001	M	Ti	<0.005
M	Cd	<0.0003	M	Hf	<0.0002	O	Ni	<0.05	O	Se	<0.4	M	W	0.00055
O	Ca	<0.01	M	Ho	<0.00005	M	Nb	0.00024	O	Si	<0.03	M	U	0.0011
M	Ce	<0.0005	O	In	<0.07	n	Os		M	Ag	0.00044	s	V	
M	Cs	<0.00003	M	Ir	<0.0005	M	Pd	<0.0005	O	Na	<0.09	M	Yb	<0.0001
O	Cr	<0.02	O	Fe	<0.05	O	P	i	M	Sr	<0.00005	M	Y	<0.004
O	Co	<0.05	M	La	<0.00005	M	Pt	<0.0002	n	S		M	Zn	0.0041
M	Cu	<0.0006	M	Pb	<0.0003	n	K		M	Ta	<0.0007	M	Zr	<0.0005

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): 1.013 g/mL

QA:KL Rev.011002DN

(over)

Inorganic Ventures, Inc.
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Technical Support: 800-569-6799

Paul R. Haines
Quality Assurance Manager

EXPIRES
1 NOV 2003

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Zinc in 1.4% HNO_3 (abs)

Catalog Number: CGZN1-1, CGZN1-2, and CGZN1-5

010304

Lot Number: **T-ZN02015**

Starting Material:	Zinc Metal
Starting Material Purity:	99.999%
Starting Material Lot No:	J17L26

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 10/22/02
DATE EXPIRED: 11/01/2003
DATE OPENED: 10/22/02
INORG: 3741 PO: F52057

CERTIFIED CONCENTRATION: 1007 ± 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: 1007 ± 2 μg/mL
Method: EDTA Titration vs NIST SRM 928 Lead Nitrate

Instrument Analysis: 1006 ± 4 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3168a

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	<0.0020	M	Dy	<0.025	O	Li	0.0000050	M	Pr	<0.0013	M	Te	<0.13
M	Sb	<0.0021	M	Er	<0.021	M	Lu	<0.0017	M	Re	<0.0041	M	Tb	<0.0013
M	As	<0.041	M	Eu	<0.013	O	Mg	0.00011	M	Rh	<0.0041	M	Tl	<0.0041
M	Ba	<0.041	M	Gd	<0.0041	M	Mn	<0.017	M	Rb	<0.0041	M	Th	<0.0041
M	Be	<0.0021	M	Ga	<0.0041	O	Hg	<0.010	M	Ru	<0.0082	M	Tm	<0.0017
M	Bi	<0.0017	M	Ge	<0.025	M	Mo	<0.0082	M	Sm	<0.0041	M	Sn	<0.021
O	B	0.00015	M	Au	<0.013	M	Nd	<0.0082	M	Sc	<0.041	M	Ti	<0.21
M	Cd	<0.013	M	Hf	<0.0082	O	Ni	0.000085	M	Se	<0.033	M	W	<0.041
O	Ca	0.00022	M	Ho	<0.0021	M	Nb	<0.0021	O	Si	<0.0040	M	U	<0.0082
M	Ce	<0.021	M	In	<0.041	n	Os		M	Ag	<0.0082	M	V	<0.0082
M	Cs	<0.0013	M	Ir	<0.021	M	Pd	<0.021	O	Na	0.00055	M	Yb	<0.0041
O	Cr	<0.0010	O	Fe	0.000045	O	P	<0.0030	M	Sr	<0.0021	M	Y	<0.17
M	Co	<0.013	M	La	<0.0021	M	Pt	<0.0082	O	S	<0.020	s	Zn	
O	Cu	<0.00050	M	Pb	<0.013	O	K	0.00018	M	Ta	<0.029	M	Zr	<0.021

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 21°C): 1.011 g/mL

QA:KL Rev.051702DN

(over)

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Paul R. Haines
Quality Assurance Manager

EXPIRES 1/2003

Certificate of Analysis

CUSTOM GRADE SOLUTION 1000 μg/mL Boron in H_2O

Catalog Number: CGB1-1, CGB1-2 and CGB1-5

010305

Lot Number: **T-B02038**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 02/13/03
DATE EXPIRED: 03/01/2004
DATE OPENED: 02/13/03
INORG: 3954 PO: F52060

Starting Material:	H_3BO_3
Starting Material Purity:	99.999%
Starting Material Lot No:	S-B02032

CERTIFIED CONCENTRATION: 1001 ± 3 μg/mL

The Certified Value is the instrument analysis value. The following equations are used in the calculation of the certified value and the uncertainty:

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

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

Instrument Analysis: 1001 ± 3 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3107.

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	<0.00090	M	Dy	<0.0060	O	Li	<0.000024	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	O	Mg	<0.000060	M	Rh	<0.0010	M	Tl	<0.0010
O	Ba	<0.00010	M	Gd	<0.0010	O	Mn	<0.000023	M	Rb	<0.0010	M	Th	<0.0010
O	Be	<0.00017	O	Ga	<0.0016	O	Hg	<0.015	M	Ru	<0.0020	M	Tm	<0.00040
M	Bi	<0.00040	M	Ge	<0.0060	M	Mo	<0.0020	M	Sm	<0.0010	M	Sn	<0.0050
s	B		M	Au	<0.0030	M	Nd	<0.0020	O	Sc	<0.000023	M	Ti	<0.050
M	Cd	<0.0030	M	Hf	<0.0020	O	Ni	<0.0023	O	Se	<0.0062	M	W	<0.010
O	Ca	<0.000070	M	Ho	<0.00050	M	Nb	<0.00050	O	Si	0.00067	M	U	<0.0020
O	Ce	<0.0030	M	In	<0.010	n	Os		M	Ag	<0.0020	O	V	<0.00083
M	Cs	<0.00030	M	Ir	<0.0050	M	Pd	<0.0050	O	Na	<0.00010	M	Yb	<0.0010
M	Cr	<0.0050	O	Fe	<0.0011	O	P	<0.0025	M	Sr	<0.00050	M	Y	<0.040
O	Co	<0.0011	M	La	<0.00050	M	Pt	<0.0020	O	S	<0.10	O	Zn	<0.00019
M	Cu	<0.0060	M	Pb	<0.0030	O	K	<0.0030	M	Ta	<0.0070	M	Zr	<0.0050

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

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 0.999 g/mL

QA:KL Rev.073102DN

(over)

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Quality Assurance Manager

EXPIRES 1 MAR 2004

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Molybdenum in H_2O tr. NH_4OH

Catalog Number: CGMO1-1, CGMO1-2 and CGMO1-5

010306

Lot Number: **T-MO01130**

Starting Material:	Ammonium Molybdenum Oxide
Starting Material Purity:	99.9943%
Starting Material Lot No:	21410

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 02/13/03
DATE EXPIRED: 03/01/2004
DATE OPENED: 02/13/03
INORG: 3956 PO: F52060

CERTIFIED CONCENTRATION: 997 ± 3 μg/mL

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

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

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

Calculated Value: 1000 μg/mL
Method: Calculated, based on starting material.

Instrument Analysis: 997 ± 3 μg/mL (Average of 2 runs)
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3134.

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	<0.050	M	Dy	<0.012	O	Li	<0.010	O	Pr	<0.10	i	Te	
M	Sb	0.0094	M	Er	<0.010	M	Lu	<0.00080	M	Re	<0.0020	M	Tb	<0.00060
M	As	<0.020	M	Eu	<0.0060	O	Mg	<0.050	M	Rh	<0.0020	M	Tl	<0.0020
M	Ba	<0.020	M	Gd	<0.0020	M	Mn	<0.0080	M	Rb	0.025	M	Th	<0.0020
M	Be	<0.0010	M	Ga	<0.0020	i	Hg		M	Ru	<0.0040	M	Tm	<0.00080
M	Bi	<0.00080	M	Ge	<0.012	s	Mo		M	Sm	<0.0020	M	Sn	<0.010
O	B	<0.50	M	Au	<0.0060	O	Nd	<0.050	O	Sc	<0.050	O	Ti	<0.0050
O	Cd	<0.50	M	Hf	<0.0040	M	Ni	<0.016	M	Se	<0.016	M	W	0.056*
O	Ca	0.00026	M	Ho	<0.0010	O	Nb	<0.10	O	Si	<0.10	M	U	<0.0040
O	Ce	<0.050	M	In	0.0024	n	Os		M	Ag	<0.0040	M	V	<0.0040
M	Cs	<0.00060	M	Ir	<0.010	M	Pd	<0.010	O	Na	<0.10	M	Yb	<0.0020
M	Cr	<0.010	O	Fe	<0.50	i	P		M	Sr	<0.0010	M	Y	<0.080
M	Co	<0.0060	M	La	<0.0010	M	Pt	<0.0040	i	S		M	Zn	<0.040
M	Cu	<0.012	M	Pb	< 0.0060	O	K	0.0098	M	Ta	<0.014	M	Zr	<0.010

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

*W impurity may be due to Mo doubly charged ion and represents the maximum concentration possible.

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 0.999 g/mL **(over)**

QA:KL Rev.073102DN

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EXPIRES 1 MAR 2004

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Phosphorus in H_2O

Catalog Number: CGP1-1, CGP1-2 and CGP1-5

010307

Lot Number: **T-P01118**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 01/09/03
DATE EXPIRED: 02/01/2004 DR
DATE OPENED: 01/10/03
INORG: 3901 PO: F52871

Starting Material:	Phosphoric Acid
Starting Material Purity:	99.999%
Starting Material Lot No:	J18804

CERTIFIED CONCENTRATION: 1004 ± 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: 1004 ± 2 μg/mL
Method: Acidimetric Titration vs NIST SRM 84k KHP.

Instrument Analysis: 1000 ± 3 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3139a.

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

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

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

O	Al	<0.040	M	Dy	<0.00060	M	Li	<0.0010	M	Pr	<0.000030	M	Te	<0.0030
M	Sb	0.012	M	Er	<0.00050	M	Lu	<0.000040	M	Re	<0.00010	M	Tb	<0.000030
M	As	<0.0010	M	Eu	<0.00030	M	Mg	<0.0030	M	Rh	<0.00010	M	Tl	<0.00010
M	Ba	<0.0010	M	Gd	<0.00010	M	Mn	<0.00040	M	Rb	<0.00010	M	Th	<0.00010
M	Be	<0.000050	M	Ga	0.00070	O	Hg	<0.020	M	Ru	<0.00020	M	Tm	<0.000040
M	Bi	<0.000040	M	Ge	<0.00060	M	Mo	<0.00020	M	Sm	<0.00010	M	Sn	<0.00050
M	B	<0.0070	M	Au	<0.00030	M	Nd	<0.00020	n	Sc		n	Ti	
M	Cd	<0.00030	M	Hf	<0.00020	O	Ni	<0.050	O	Se	<0.40	M	W	<0.0010
O	Ca	<0.010	M	Ho	<0.000050	M	Nb	<0.000050	O	Si	<0.020	M	U	<0.00020
M	Ce	<0.00050	M	In	<0.030	n	Os		M	Ag	<0.00020	M	V	<0.00020
M	Cs	<0.000030	M	Ir	<0.00050	M	Pd	<0.00050	O	Na	<0.090	M	Yb	<0.00010
M	Cr	<0.00050	O	Fe	<0.050	s	P		M	Sr	<0.000050	M	Y	<0.0040
M	Co	<0.00030	M	La	<0.000050	M	Pt	<0.00020	n	S		M	Zn	0.0035
M	Cu	0.080	M	Pb	<0.00030	n	K		M	Ta	<0.00070	M	Zr	<0.00050

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

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 0.999 g/mL **(over)**

QA:KL Rev.122002DN

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EXPIRES 1 FEB 2004

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."* 010308

2.0 DESCRIPTION OF CRM

Custom-Grade **1000 µg/mL Silicon in H_2O tr. HNO_3 tr. HF**

Catalog Number:	CGSI1-1, CGSI1-2, and CGSI1-5
Lot Number:	**W-SI02082**
Starting Material:	SiO_2
Starting Material Purity (%):	99.996367
Starting Material Lot No	C05310C
Matrix:	H_2O tr. HNO_3 tr. HF

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 06/20/03
DATE EXPIRED: 07/01/2004
DATE OPENED: 06/23/03
INORG: 4153 PO: F52370

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1000 ± 5 µg/mL

Certified Density: 1.002 g/mL (measured at 22° C)

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

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

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

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

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

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

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

4.1 **Assay Method #1** **1000 ± 5 µg/mL (Avg 2 runs)**
ICP Assay NIST SRM 3150 Lot Number: 991108

Assay Method #2 **1001 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.

010309

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

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

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

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

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

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

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

010310

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

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 28.0855; +4; 6; $Si(OH)_x(F)_y^{2-}$

Chemical Compatibility - Soluble in HCl, HF, H_3PO_4, H_2SO_4 and HNO_3 as the $Si(OH)_x(F)_y^{2-}$. Avoid neutral to basic media. Unstable at ppm levels with metals that would pull F^- away (i.e. Do not mix with Alkaline or Rare Earths, or high levels of transition elements unless they are fluorinated). Stable with most inorganic anions with a tendency to hydrolyze forming silicic acid (silicic acid is soluble up to ~100 ppm in water) in all dilute acids except HF.

Stability - 2-100 ppb levels - stability unknown - (alone or mixed with all other metals) as the $Si(OH)_x(F)_y^{2-}$. 1-10,000 ppm single element solutions as the $Si(OH)_x(F)_y^{2-}$ chemically stable for years in 2-5 % HNO_3 / trace HF in a LDPE container.

Si Containing Samples (Preparation and Solution) - Metal (Soluble in 1:1:1 H_2O / HF / HNO_3); Oxide - SiO_2, amorphic (Dissolve by heating in 1:1:1 H_2O / HF / HNO_3); Oxide - quartz (Fuse in Pt° with Na_2CO_3); Geological Samples (Fuse in Pt° with Na_2CO_3 followed by HCl solution of the fuseate); Organic Matrices containing silicates and non volatile silicon compounds (Dry ash at 450°C in Pt° and dissolve by gently warming with 1:1:1 H_2O / HF / H_2SO_4 or fuse / ash with Na_2CO_3 and dissolve fuseate with HCl / H_2O); Silicone Oils - dimethyl silicones depolymerize to form volatile monomer units when heated (Measure directly in alcoholic KOH / xylene mixture where sample is treated first with the KOH at 60-100 °C to "unzip" the Si-O-Si polymeric structure or digest with concentrated H_2SO_4/H_2O_2 followed by cooling and dissolution of the dehydrated silica with HF.) Note that the direct analysis of silicone oils in an organic solvent will result in false high results due to high vapor pressure of volatile monomer units like hexamethylcyclotrisiloxane. The KOH forms the $K_2{}^{+}Si(CH_3)_2O^{-}$ salt which is not volatile at room temperature.

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

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≤5ppm conc.)
ICP-OES	251.611 nm	0.012 / 0.003 µg/mL	1	ion	Ta, U, Zn, Th
ICP-OES	212.412 nm	0.02 / 0.01 µg/mL	1	ion	Hf, Os, Mo, Ta
ICP-OES	288.158 nm	0.03 / 0.004 µg/mL	1	ion	Ta, Ce, Cr, Cd, Th
ICP-MS	28 amu	4000 - 8000 ppt	n/a	M'	$^{14}N_2$, $^{12}C^{16}O$

HF Note: This standard should not be prepared or stored in glass.

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

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

10.0 QUALITY STANDARD DOCUMENTATION

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

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

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

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

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

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

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

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

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

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 06/20/03
DATE EXPIRED: 07/01/2004
DATE OPENED: 06/23/03
INORG: 4153 PO: F52370

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010311

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 24, 2003

Expiration Date: EXPIRES 01/2004

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: JoAnn Struthers, QA Administrative Assistant

Certificate Approved By: Katalin Le, QC Supervisor

Certifying Officer: Paul Gaines, Chemist, Senior Technical Director

Certificate of Analysis

010312

CUSTOM-GRADE SOLUTION 1000 μg/mL Titanium in 1.4% HNO_3 (abs) tr. HF

Catalog Number: CGTI1-1, CGTI1-2 and CGTI1-5

This standard should not be prepared or stored in glass.

Lot Number: **T-TI02039**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/12/02
DATE EXPIRED: 12/1/2003 PR
DATE OPENED: 11/13/02
INORG: 3762 PO: F52061

Starting Material:	Titanium Metal
Starting Material Purity:	99.999%
Starting Material Lot No:	F29I14

CERTIFIED CONCENTRATION: 1010 ± 3 μg/mL

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

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

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

Calculated Value: 1002 μg/mL
Method: Calculated, based on starting material.

Instrument Analysis: 1010 ± 3 μg/mL (Average of 3 runs)
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3162a.

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	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	O	Mg	< 0.020	M	Rh	<0.00010	M	Tl	<0.00010
M	Ba	<0.0010	M	Gd	<0.00010	M	Mn	0.0020	M	Rb	<0.00010	M	Th	<0.00010
M	Be	<0.000050	M	Ga	<0.00010	O	Hg	<0.050	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	<0.050	M	Au	<0.00030	M	Nd	<0.00020	O	Sc	<0.0020	s	Ti	
M	Cd	<0.00030	M	Hf	<0.00020	O	Ni	<0.050	O	Se	<0.40	M	W	<0.0010
O	Ca	<0.010	M	Ho	<0.000050	M	Nb	<0.000050	O	Si	<0.010	M	U	<0.00020
M	Ce	<0.00050	O	In	<0.020	n	Os		M	Ag	<0.00020	M	V	<0.00020
M	Cs	<0.000030	M	Ir	<0.00050	M	Pd	<0.00050	O	Na	0.12	M	Yb	<0.00010
M	Cr	<0.00050	O	Fe	<0.010	i	P		M	Sr	<0.000050	M	Y	<0.0040
M	Co	<0.00030	M	La	<0.000050	M	Pt	<0.00020	i	S		M	Zn	0.19
O	Cu	<0.040	M	Pb	<0.00030	n	K	0.23	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): 1.011 g/mL

QA:KL Rev.060502DN

(over)

Paul R. Haines
Quality Assurance Manager

Inorganic Ventures, Inc.
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Technical Support: 800-569-6799

EXPIRES 1 DEC 2003

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."*

010313

2.0 DESCRIPTION OF CRM

Custom-Grade **1000 µg/mL Strontium in 0.1% (abs) HNO_3**

Catalog Number:	CGSR1-1, CGSR1-2, and CGSR1-5
Lot Number:	**T-SR01123**
Starting Material:	$SrCO_3$
Starting Material Purity (%):	99.9951
Starting Material Lot No	22593
Matrix:	0.1% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 06/20/03
DATE EXPIRED: 07/01/2004
DATE OPENED: 06/23/03
INORG: 4154 PO: F52370

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 998 ± 2 µg/mL

Certified Density: 1.000 g/mL (measured at 22° C)

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

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

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 **998 ± 2 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

Assay Method #2 **1002 ± 8 µg/mL**
ICP Assay NIST SRM 3153a Lot Number: 990906

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.

010314

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

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

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

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

O Al < 0.00090	M Dy < 0.00600	O Li < 0.00003	M Pr < 0.00030	O Te < 0.10000
M Sb < 0.00050	M Er < 0.00500	M Lu < 0.00040	M Re < 0.00100	M Tb < 0.00030
O As < 0.00500	M Eu < 0.00300	O Mg 0.00037	O Rh < 0.00600	M Tl < 0.00100
M Ba 0.04001	M Gd < 0.00100	O Mn 0.00018	i Rb	M Th < 0.00100
O Be < 0.00009	M Ga < 0.00100	O Hg < 0.01500	O Ru < 0.00300	M Tm < 0.00040
M Bi < 0.00040	M Ge < 0.00600	M Mo < 0.00200	M Sm < 0.00100	M Sn < 0.00500
O B < 0.00060	M Au < 0.00300	M Nd < 0.00200	M Sc < 0.01000	M Ti < 0.05001
M Cd < 0.00300	M Hf < 0.00200	O Ni < 0.00300	O Se < 0.05000	M W < 0.01000
O Ca 0.03600	M Ho < 0.00050	M Nb < 0.00050	O Si 0.00056	M U < 0.00200
M Ce < 0.00500	O In < 0.00200	n Os	M Ag < 0.00200	M V < 0.00200
M Cs < 0.00030	M Ir < 0.00500	O Pd < 0.00400	O Na 0.00520	M Yb < 0.00100
O Cr < 0.00080	O Fe 0.00080	O P < 0.00480	s Sr	O Y < 0.00004
M Co < 0.00300	M La < 0.00050	M Pt < 0.00200	n S	M Zn < 0.02000
O Cu < 0.00140	M Pb < 0.00300	O K < 0.00170	M Ta < 0.00700	M Zr < 0.00500

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

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.
Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 87.62; +2; 6; $Sr(H_2O)_6^{+2}$
Chemical Compatibility - Soluble in HCl, and HNO_3. Avoid H_2SO_4, HF and neutral to basic media. Stable with most metals and inorganic anions forming insoluble silicate, carbonate, hydroxide, oxide, fluoride, sulfate, oxalate, chromate, arsenate and tungstate in neutral aqueous media.
Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1 - 3.5% HNO_3 / LDPE container.
Sr Containing Samples (Preparation and Solution) - Metal (Best dissolved in diluted HNO_3); Ores (Carbonate fusion in Pt^0 followed by HCl dissolution); Organic Matrices (Dry ash and dissolution in dilute HCl).
Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES 407.771 nm	0.0004 / 0.00006 µg/mL	1	ion	U, Ce
ICP-OES 421.552 nm	0.0008 / 0.00004 µg/mL	1	ion	Rb
ICP-OES 460.733 nm	0.07 / 0.003 µg/mL	1	atom	Ce
ICP-MS 88 amu	1200 ppt	n/a	M^+	$^{72}Ge^{16}O$, $^{176}Yb^{+2}$, $^{176}Lu^{+2}$, $^{176}Hf^{+2}$

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

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

10.0 QUALITY STANDARD DOCUMENTATION

010315

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

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

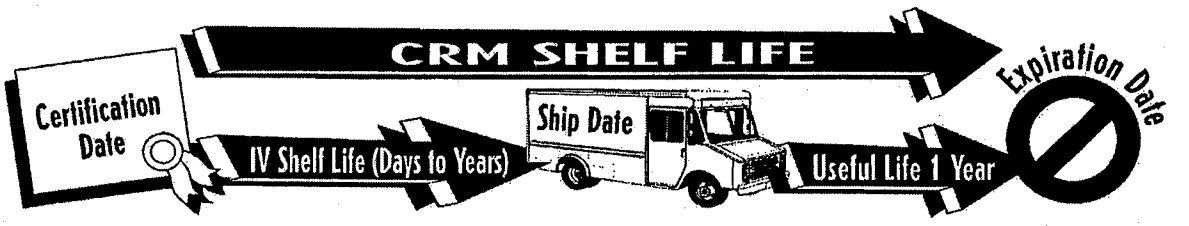
10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC),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

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

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

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

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



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

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

Certification Date: October 31, 2002

Expiration Date: EXPIRES 01 2004

INORGANIC LABS/RADCHEM LABS pg. 2 of 2
DATE RECEIVED: 06/20/03
DATE EXPIRED: 07/01/2004
DATE OPENED: 06/23/03
INORG: 4154 PO: F52370

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Debbie Newman, QA Administrator

Certificate Approved By: Katalin Le, QC Supervisor

Certifying Officer: Paul Gaines, Chemist, Senior Technical Director

010316

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."*

010317

2.0 DESCRIPTION OF CRM

Custom-Grade **1000 µg/mL Tin in H_2O tr HNO_3 tr HF**

Catalog Number:	CGSN1-1, CGSN1-2, and CGSN1-5
Lot Number:	**T-SN01110**
Starting Material:	#1, #2 SN SHOT
Starting Material Purity (%):	99.9969
Starting Material Lot No	AAJM H12H17, A23F09
Matrix:	H_2O tr HNO_3 tr HF

INORGANIC LABS/RADCHEM LABS Pg 1 of 2
DATE RECEIVED: 3/26/03
DATE EXPIRED: 4/01/2004
DATE OPENED: 3/28/03
INORG: 4026 PO: F52167

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1003 ± 5 µg/mL

Certified Density: 1.000 g/mL (measured at 22° C)

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

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

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

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

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

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

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

4.1 **Assay Method #1** **1003 ± 5 µg/mL (Avg 2 runs)**
ICP Assay NIST SRM 3161a Lot Number: 993107

Assay Method #2 **1000 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

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

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

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

010318

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

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

O	Al		0.00100	M	Dy	<	0.01217	O	Li	<	0.00002	M	Pr	<	0.00061	M	Te	<	0.06087
O	Sb	<	0.01000	M	Er	<	0.01014	M	Lu	<	0.00081	M	Re	<	0.00203	M	Tb	<	0.00061
M	As	<	0.02029	M	Eu	<	0.00609	O	Mg	<	0.00003	M	Rh	<	0.00203	M	Tl	<	0.00203
O	Ba	<	0.00070	M	Gd	<	0.00203	M	Mn	<	0.00812	M	Rb	<	0.00203	M	Th	<	0.00203
M	Be	<	0.00101	M	Ga	<	0.00203	O	Hg	<	0.01500	M	Ru	<	0.00406	M	Tm	<	0.00081
M	Bi	<	0.00081	M	Ge	<	0.01217	M	Mo	<	0.00406	M	Sm	<	0.00203	S	Sn		
O	B	<	0.01200	M	Au	<	0.00609	M	Nd	<	0.00406	M	Sc	<	0.02029	M	Ti	<	0.10144
O	Cd	<	0.00500	M	Hf	<	0.00406	O	Ni	<	0.01000	M	Se	<	0.01623	M	W	<	0.02029
O	Ca	<	0.00150	M	Ho	<	0.00101	M	Nb	<	0.00101	O	Si		0.02700	M	U	<	0.00406
M	Ce	<	0.01014	M	In	<	0.02029	n	Os			M	Ag	<	0.00406	M	V	<	0.00406
M	Cs	<	0.00061	M	Ir	<	0.01014	M	Pd	<	0.01014	O	Na		0.00325	M	Yb	<	0.00203
M	Cr	<	0.01014	O	Fe	<	0.00110	O	P	<	0.00500	M	Sr	<	0.00101	M	Y	<	0.08115
O	Co	<	0.00200	M	La	<	0.00101	M	Pt	<	0.00406	N	S			M	Zn	<	0.04058
M	Cu	<	0.01217	M	Pb	<	0.00609	O	K	<	0.00200	M	Ta	<	0.01420	M	Zr	<	0.01014

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

010319

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

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 118.710; +4; 4,5, 6,7,8 $Sn(OH)_2F_2^{2-}$

Chemical Compatibility - Soluble in HCl and dilute HF / HNO_3. Avoid neutral to basic media. Unstable at ppm levels with metals that would pull F^- away. (i.e. Do not mix with Alkaline or Rare Earths or high levels of transition elements unless they are fluorinated.) Stable with most inorganic anions provided it is in the chemical form shown above.

Stability - 2-100 ppb levels stable (alone or mixed with all other metals that are at comparable levels) as the $Sn(OH)_2F_2^{2-}$ for 1 year in 1% HNO_3 / LDPE container. 1-10,000 ppm single element solutions as the $Sn(OH)_2F_2^{2-}$ chemically stable for years in 2-5% HNO_3 / trace HF in a LDPE container.

Sn Containing Samples (Preparation and Solution) - Metal (Soluble in HF /HNO_3 or HCl); Oxides - SnO (soluble in HCl), SnO_2 -very resistant to all acids including HF(Fusion with equal parts of Na_2CO_3 and S. It is then soluble in water or dilute acids as the thiostannate.); Alloys (Treat first 0.1 g with 10 mL conc. H_2SO_4 to boiling until the alloy disintegrates and nearly all of the sulfuric acid is expelled. Then add 100 mL O_2 free water and 50 mL of conc HCl or transfer to a plastic container and add 1 mL HF in either case warming gently to bring about solution.); Organic Matrices (Volatility and precipitation of the insoluble stannic oxide are problems. Consultation of the literature should be made for individual matrices / Sn compounds.)

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

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≤50ppm conc.)
ICP-OES 189.989 nm	0.03 / 0.003 µg/mL	1	ion	
ICP-OES 242.949 nm	0.1 / 0.01 µg/mL	1	atom	W, Mo, Rh ,Ta, Co
ICP-MS 120 amu	5 ppt	n/a	M^+	^{120}Te, $^{104}Ru^{16}O$, $^{104}Pd^{16}O$

HF Note: This standard should not be prepared or stored in glass.

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

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

10.0 QUALITY STANDARD DOCUMENTATION

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

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

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

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

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

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

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 3/26/03
DATE EXPIRED: 4/01/2004
DATE OPENED: 3/28/03
INORG: 4026 PO: F52167

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010320

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

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

Certification Date: December 17, 2002

Expiration Date: EXPIRES 1 APR 2004

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Debbie Newman, QA Administrator

Certificate Approved By: Katalin Le, QC Supervisor

Certifying Officer: Paul Gaines, Chemist, Senior Technical Director

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."

010321

2.0 DESCRIPTION OF CRM

Custom-Grade **1000 µg/mL Bismuth in 3.5% (abs) HNO_3**

Catalog Number:	CGBI1-1 and CGBI1-5
Lot Number:	**W-BI01089**
Starting Material:	Bi needles
Starting Material Purity (%):	99.999090
Starting Material Lot No	G25L16
Matrix:	3.5% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 07/31/03
DATE EXPIRED: 08/01/2004
DATE OPENED: 08/01/03
INORG: 4200 PO: F52383

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1002 ± 4 µg/mL

Certified Density: 1.026 g/mL (measured at 22° C)

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

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

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

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

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

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

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

4.1 **Assay Method #1** **1002 ± 4 µg/mL (Avg 2 runs)**
ICP Assay NIST SRM 3106 Lot Number: 991212

Assay Method #2 **1002 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

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

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

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

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

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

O	Al		0.00012	M	Dy	<	0.01202	O	Li	<	0.00002	M	Pr	<	0.00060	M	Te	<	0.06008
M	Sb	<	0.00100	M	Er	<	0.01001	M	Lu	<	0.00080	M	Re	<	0.00200	M	Tb	<	0.00060
M	As	<	0.02003	M	Eu	<	0.00601	O	Mg		0.00070	M	Rh	<	0.00200	M	Tl	<	0.00200
M	Ba	<	0.02003	M	Gd	<	0.00200	O	Mn	<	0.00020	M	Rb	<	0.00200	M	Th	<	0.00200
M	Be	<	0.00100	M	Ga	<	0.00200	O	Hg	<	0.01500	M	Ru	<	0.00401	M	Tm	<	0.00080
s	Bi			M	Ge	<	0.01202	M	Mo	<	0.00401	M	Sm	<	0.00200	M	Sn	<	0.01001
M	B	<	0.14018	M	Au	<	0.00601	M	Nd	<	0.00401	M	Sc	<	0.02003	M	Ti	<	0.10013
O	Cd		0.00017	M	Hf	<	0.00401	M	Ni	<	0.01602	M	Se	<	0.01602	M	W	<	0.02003
O	Ca		0.00245	M	Ho	<	0.00100	M	Nb	<	0.00100	O	Si		0.00105	M	U	<	0.00401
M	Ce	<	0.01001	O	In		0.00105	n	Os			M	Ag	<	0.00401	M	V	<	0.00401
M	Cs	<	0.00060	M	Ir	<	0.01001	O	Pd	<	0.00400	O	Na		0.00240	M	Yb	<	0.00200
O	Cr		0.00020	O	Fe		0.00014	O	P	<	0.01000	M	Sr	<	0.00100	M	Y	<	0.08011
M	Co	<	0.00601	M	La	<	0.00100	M	Pt	<	0.00401	O	S	<	0.03000	O	Zn		0.00008
O	Cu		0.00014	O	Pb		0.00135	O	K		0.00039	M	Ta	<	0.01402	M	Zr	<	0.01001

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

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

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

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 208.9804; +3; 6 ;$Bi(O)(H_2O)_5^{3+}$

Chemical Compatibility - Stable in HCl, HNO_3, H_2SO_4 and HF. **Avoid** basic media forming insoluble hydroxide. Stable with most metals and inorganic anions in acidic media. Many salts that are insoluble in water are soluble in HCl, HNO_3 and HF. The major problem with Bi^{3+} is its tendency to hydrolyze at higher concentrations or in dilute acid. Nitric acid solutions should be 5% to hold the Bi in solution in the 100 to 10000 µg/mL concentration range

Stability - 2-100 ppb levels stable for months in 1 % HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 5 - 7% HNO_3 / LDPE container.

Bi Containing Samples (Preparation and Solution) - Metal (soluble in HNO_3); Oxides (Soluble in HNO_3); Alloys (Dissolve in conc. 4:1 HCl /HNO_3. Heating may be required.); Organic based (dry ash at 450°C and dissolve ash in HNO_3 or acid digestion with conc. hot sulfuric acid adding hydrogen peroxide dropwise and carefully until clear.)

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

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at 10 ppm)
ICP-OES	223.061 nm	0.04 / 0.005 µg/mL	1	atom	Th, Ir, Ti Cu
ICP-OES	306.772 nm	0.08 / 0.01 µg/mL	1	atom	**Th**, U, Zr, Hf, Fe
ICP-OES	222.825 nm	0.1 / 0.02 µg/mL	1	atom	Cr, Hf, Ce, Os
ICP-MS	209 amu	2 ppt	n/a	M+	$^{191}Ir^{16}O$

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

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

10.0 QUALITY STANDARD DOCUMENTATION

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

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

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

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

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

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

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 07/31/03
DATE EXPIRED: 08/01/2004
DATE OPENED: 08/01/03
INORG: 4200 PO: F52383

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010324

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

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

Certification Date: March 28, 2003

Expiration Date: EXPIRES 1 02004

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

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."

010325

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:

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

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

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

010327

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°); γ- Al_2O_3 (Soluble in acids such as HCl); Ores (Carbonate fusion in Pt° 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 ≤5ppm conc.)
ICP-OES 394.401 nm	0.05 / 0.006 µg/mL	1	atom	U, Ce
ICP-OES 396.152 nm	0.03 / 0.006 µg/mL	1	atom	Mo, Zr, Ce
ICP-OES 167.078 nm	0.1 / 0.009 µg/mL	1	ion	Fe
ICP-MS 27 amu	30 ppt	n/a	M'	$^{12}C^{15}N$, $^{13}C^{14}N$, $^{1}H^{12}C^{14}N$, $^{11}B^{16}O$, $^{54}Cr^{21}$, $^{54}Fe^{21}$

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

010328

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 SEP 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

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** 010329

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 3
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
$\sum S$ = 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 010331

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

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

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

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

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

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

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at= concs.)
ICP-OES	393.366 nm	0.0002 / 0.00004 µg/mL	1	ion	U, Ce
ICP-OES	396.847 nm	0.0005 / 0.00006 µg/mL	1	ion	Th
ICP-OES	422.673 nm	0.01 / 0.001 µg/mL	1	atom	Ge
ICP-MS	44 amu	1200 ppt	n/a	M^+	$^{16}O_2$, ^{12}C, $^{28}Si^{16}O$, $^{44}Sr^{2+}$

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

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

10.0 QUALITY STANDARD DOCUMENTATION

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

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

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

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

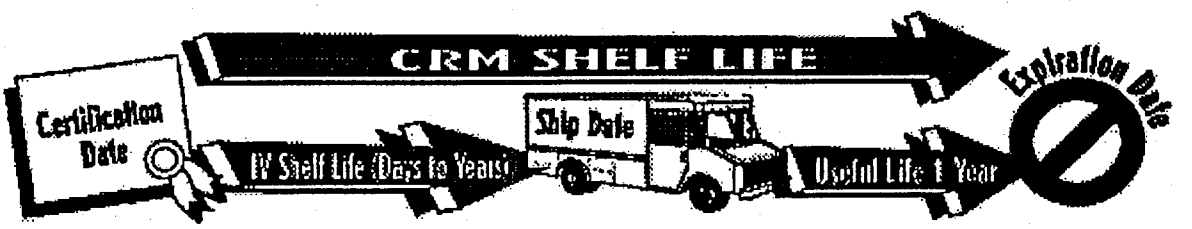
10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

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

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: F52071

010332

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



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

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

Certification Date: August 26, 2002

Expiration Date: EXPIRES 1 FEB 2004

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Debbie Newman, QA Administrator

Certificate Approved By: Katalin Le, QC Supervisor

Certifying Officer: Paul Gaines, Chemist, Senior Technical Director

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."*

010333

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.

010334

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

010335

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^+	$^{40}Ar^{15}N^1H$, $^{40}Ar^{16}O$, $^{36}Ar^{17}O^1H$, $^{38}Ar^{18}O$, $^{37}Cl^{18}O^1H$, $^{40}Ca^{16}O$

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

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

10.0 QUALITY STANDARD DOCUMENTATION

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

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

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

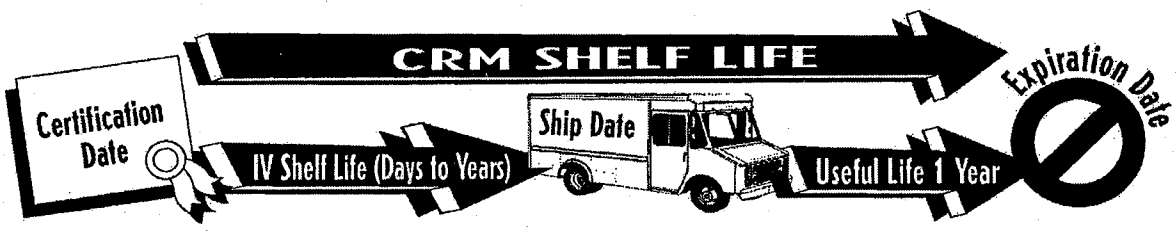
10.4 10CFR50 Appendix B - Nuclear Regulatory Commission - Domestic Licensing of Production and Utilization Facilities

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

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

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

Certificate Approved By: Katalin Le, QC Supervisor

Certifying Officer: Paul Gaines, Chemist, Senior Technical Director

010337

Certificate of Analysis

CUSTOM-GRADE SOLUTION 10,000 μg/mL Potassium in 1.4% HNO_3 (abs)

Catalog Number: CGK10-1and CGK10-5

Lot Number: **T-K02102**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 10/22/02
DATE EXPIRED: 11/01/2003
DATE OPENED: 10/23/02
INORG: 3738 PO: F52057

Starting Material:	Potassium Nitrate
Starting Material Purity:	99.996%
Starting Material Lot No:	K18J19

CERTIFIED CONCENTRATION: 9999 ± 7 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: 9999 ± 7 μg/mL
Method: Gravimetric as the Sulfate vs NIST weights #822/254143-94.

Instrument Analysis: 10,002 ± 27 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3141a.

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	<0.00090	M	Dy	<0.0060	O	Li	<0.000030	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	O	Mg	0.00015	M	Rh	<0.0010	M	Tl	<0.0010
M	Ba	<0.010	M	Gd	<0.0010	O	Mn	<0.000030	M	Rb	0.50	M	Th	<0.0010
O	Be	<0.00020	M	Ga	<0.0010	O	Hg	<0.015	M	Ru	<0.0020	M	Tm	<0.00040
M	Bi	<0.00040	O	Ge	<0.0015	M	Mo	<0.0020	M	Sm	<0.0010	M	Sn	<0.0050
O	B	<0.00060	O	Au	<0.0030	M	Nd	<0.0020	O	Sc	<0.000020	O	Ti	<0.00070
M	Cd	<0.0030	M	Hf	<0.0020	O	Ni	<0.0023	O	Se	<0.05	M	W	<0.0010
O	Ca	0.0016	M	Ho	<0.00050	M	Nb	<0.00050	O	Si	0.0025	M	U	<0.0020
M	Ce	<0.0050	M	In	<0.0010	n	Os		M	Ag	<0.0020	O	V	<0.00090
M	Cs	<0.00030	M	Ir	<0.0050	M	Pd	<0.0050	O	Na	0.61	M	Yb	<0.0010
M	Cr	<0.0050	O	Fe	0.0024	O	P	<0.0025	M	Sr	<0.00050	M	Y	<0.040
M	Co	<0.0030	M	La	<0.00050	M	Pt	<0.0020	O	S	0.021	O	Zn	0.0021
M	Cu	<0.0060	M	Pb	<0.0030	s	K		M	Ta	<0.0070	M	Zr	<0.0050

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): **1.023 g/mL** (over)

QA:KL Rev.032702DN

Paul R. Haines

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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 1 2003

010338

inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

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

2.0 DESCRIPTION OF CRM

Custom-Grade **10000 µg/mL 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:

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

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

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

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

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

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

4.1 **Assay Method #1** **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

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[6] followed by HCl dissolution); Organic Matrices (Sulfuric / peroxide digestion or nitric / sulfuric / perchloric acid decomposition, or dry ash and dissolution in dilute HCl).

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

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES	279.553 nm	0.0002 / 0.00003 µg/mL	1	ion	Th
ICP-OES	280.270 nm	0.0003 / 0.00005 µg/mL	1	ion	U, V
ICP-OES	285.213 nm	0.002 / 0.00003 µg/mL	1	atom	U, Hf, Cr, Zr
ICP-MS	24 amu	42 ppt	n/a	M'	$^{7}Li^{16}O$, $^{48}Ti^{+2}$, $^{48}Ca^{+2}$

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

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

10.0 QUALITY STANDARD DOCUMENTATION

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

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

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

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

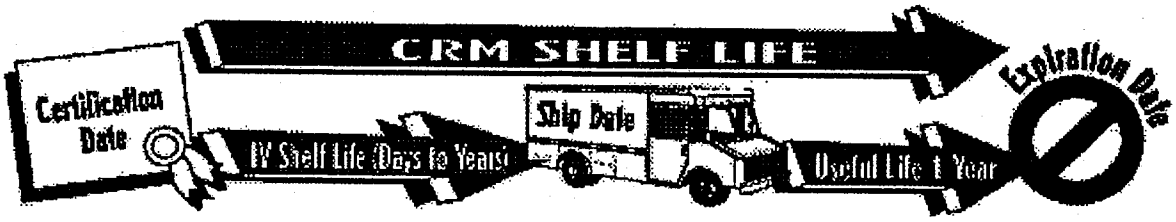
10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

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

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 07/31/03
DATE EXPIRED: 08/01/2004
DATE OPENED: 08/01/03
INORG: 4204 PO: E52391

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010341



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

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."*

010342

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 = 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-€. 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 ≤ppbcs.)
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'	$^{46}Ti^{12}$, $^{46}Ca^{12}$

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)

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 02 004

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

010346

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: F52370

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

Paul R. Haines

Inorganic Ventures, Inc.
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Technical Support: 800-569-6799

Quality Assurance Manager

EXPIRES 01/2004

010347

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Barium in 0.1% HNO_3 (abs)

Catalog Number: CGBA1-1, CGBA1-2, and CGBA1-5

Lot Number: **T-BA02021**

Starting Material:	$Ba(NO_3)_2$
Starting Material Purity:	99.999%
Starting Material Lot No:	21879

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 3/03/03
DATE EXPIRED: 3/01/2004
DATE OPENED: 3/04/03
INORG: 3971 PO: E52064

CERTIFIED CONCENTRATION: 1003 ± 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: 1003 ± 2 μg/mL
Method: Gravimetric as the Sulfate vs NIST weights #822/254143-94.

Instrument Analysis: 1002 ± 3 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3104a.

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

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

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

O	Al	<0.040	M	Dy	<0.00060	M	Li	<0.0010	n	Pr		i	Te	
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
s	Ba		M	Gd	0.0020	M	Mn	<0.00040	M	Rb	<0.00010	M	Th	<0.00010
M	Be	<0.000050	M	Ga	<0.00010	i	Hg		M	Ru	<0.00020	M	Tm	<0.000040
M	Bi	<0.000040	M	Ge	0.0010	M	Mo	<0.00020	M	Sm	<0.00010	M	Sn	<0.00050
M	B	<0.0070	M	Au	<0.00030	M	Nd	0.0020	M	Sc	<0.0010	M	Ti	<0.0050
M	Cd	<0.00030	M	Hf	<0.00020	i	Ni		O	Se	<0.40	M	W	<0.0010
O	Ca	<0.010	M	Ho	<0.000050	M	Nb	<0.000050	O	Si	<0.020	M	U	<0.00020
n	Ce		i	In		n	Os		M	Ag	<0.00020	M	V	<0.00020
n	Cs		M	Ir	<0.00050	M	Pd	<0.00050	O	Na	<0.090	M	Yb	<0.00010
M	Cr	<0.00050	O	Fe	<0.050	O	P	<0.050	M	Sr	0.0040	M	Y	<0.0040
M	Co	<0.00030	n	La		M	Pt	<0.00020	n	S		O	Zn	<0.030
M	Cu	<0.00060	M	Pb	<0.00030	n	K		M	Ta	<0.00070	M	Zr	<0.00050

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

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 1.000 g/mL

(over)

QA:KL Rev.112702DN

Paul R. Haines

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Technical Support: 800-569-6799

Quality Assurance Manager

EXPIRES 1 MAR 2004

010348

inorganic ventures / iv labs

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

certificate of analysis

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

2.0 DESCRIPTION OF CRM

Custom-Grade **1000 µg/mL Beryllium in 2% (abs) HNO_3**

Catalog Number:	CGBE1-1, CGBE1-2, and CGBE1-5
Lot Number:	**W-BE01100**
Starting Material:	Be(OOCCH3)2
Starting Material Purity (%):	99.999897
Starting Material Lot No	01-10-01
Matrix:	2% (abs) HNO_3

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 991 ± 3 µg/mL

Certified Density: 1.022 g/mL (measured at 22° C)

The Certified Value is the instrument analysis value. The following equations are used in the calculation of the certified value and the uncertainty:

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

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

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

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

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

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

4.1 **Assay Method #1** **991 ± 3 µg/mL (Avg 2 runs)**

ICP Assay NIST SRM 3105a Lot Number: 892707

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 05/09/03
DATE EXPIRED: 06/01/2004
DATE OPENED: 05/12/03
INORG: 40602 PO: F52181

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

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

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

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

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

O	Al	< 0.00800	M	Dy	< 0.01305	O	Li	< 0.00002	M	Pr	< 0.00065	M	Te	< 0.06525
M	Sb	< 0.00109	M	Er	< 0.01087	M	Lu	< 0.00087	M	Re	< 0.00218	M	Tb	< 0.00065
M	As	< 0.02175	M	Eu	< 0.00652	O	Mg	< 0.00003	M	Rh	< 0.00218	M	Tl	< 0.00218
M	Ba	< 0.02175	M	Gd	< 0.00218	O	Mn	< 0.00002	M	Rb	< 0.00218	M	Th	< 0.00218
s	Be		M	Ga	< 0.00218	O	Hg	< 0.01500	M	Ru	< 0.00435	M	Tm	< 0.00087
M	Bi	< 0.00087	M	Ge	< 0.01305	M	Mo	< 0.00435	M	Sm	< 0.00218	M	Sn	< 0.01087
O	B	< 0.01200	M	Au	< 0.00652	M	Nd	< 0.00435	O	Sc	< 0.00009	M	Ti	< 0.10874
M	Cd	< 0.00652	M	Hf	< 0.00435	M	Ni	< 0.65245	M	Se	< 0.01740	M	W	< 0.02175
O	Ca	0.00164	M	Ho	< 0.00109	M	Nb	< 0.00109	O	Si	0.00649	M	U	< 0.00435
M	Ce	< 0.01087	M	In	< 0.02175	n	Os		M	Ag	< 0.00435	M	V	< 0.00435
M	Cs	< 0.00065	M	Ir	< 0.01087	M	Pd	< 0.01087	O	Na	0.00368	M	Yb	< 0.00218
O	Cr	< 0.00900	O	Fe	0.00268	n	P		M	Sr	< 0.00109	M	Y	< 0.08699
M	Co	< 0.00652	M	La	< 0.00109	M	Pt	< 0.00435	i	S		M	Zn	< 0.04350
M	Cu	< 0.01305	M	Pb	< 0.00652	O	K	< 0.10000	M	Ta	< 0.01522	M	Zr	< 0.01087

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

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.
Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 9.01218; +2; 4; $Be^{+2}(H_2O)_4$
Chemical Compatibility - Soluble in HCl, HNO_3, H_2SO_4 and HF aqueous matrices. Stable with all metals and inorganic anions.
Stability - 2-100 ppb levels stable for months in 1 % HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 5-10 % HNO_3 / LDPE container.
Be Containing Samples (Preparation and Solution) - Metal (is best dissolved in diluted H_2SO_4); BeO (boiling nitric, hydrochloric, or sulfuric acids or $KHSO_4$ fusion); Ores (H_2SO_4/HF digestion or carbonate fusion in Pt[?]); Organic Matrices (sulfuric/peroxide digestion or nitric/sulfuric/perchloric acid decomposition, or dry ash and dissolution according to the BeO procedure above).
Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≥ppm conc.)
ICP-OES 313.042 nm	0.0003 / 0.00009 µg/mL	1	ion	Y, Ce, U
ICP-OES 234.861 nm	0.0003 / 0.00016 µg/mL	1	atom	Fe, Ta, Mo
ICP-OES 313.107 nm	0.0007 / 0.0005 µg/mL	1	ion	Ce, Th, Tm
ICP-MS 9 amu	4 ppt	n/a	M^+	

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

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

10.0 QUALITY STANDARD DOCUMENTATION

010350

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

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

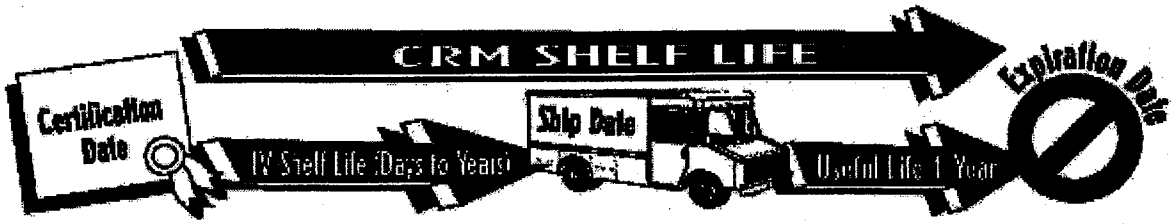
10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC),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

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

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

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

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



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

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

Certification Date: April 14, 2003

Expiration Date: EXPIRES 1 JAN 2004

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 05/09/03
DATE EXPIRED: 06/01/2004
DATE OPENED: 05/12/03
INORG: 4062 PO: F52181

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

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Chromium^{+3} in 1.4% HNO_3 (abs)

Catalog Number: CGCR(3)1-1, CGCR(3)1-2 and CGCR(3)1-5

010352

Lot Number: **T-CR02125**

Starting Material:	Chromium Metal
Starting Material Purity:	99.995%
Starting Material Lot No:	F16I22

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 10/22/02
DATE EXPIRED: 11/01/2003
DATE OPENED: 10/23/02
INORG: 3732 PO: F52057

CERTIFIED CONCENTRATION: 995 ± 3 μg/mL

The Certified Value is the instrument analysis value. The following equations are used in the calculation of the certified value and the uncertainty:

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

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

Instrument Analysis: 995 ± 3 μg/mL (Avg of 3 runs)
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3112a.

Calculated Value: 1002 μg/mL
Method: Calculated, based on starting material.

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	0.0028	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	O	Mg	<0.010	M	Rh	<0.00010	M	Tl	<0.00010
M	Ba	<0.0010	M	Gd	<0.00010	O	Mn	<0.050	M	Rb	0.0066	M	Th	<0.00010
M	Be	<0.000050	M	Ga	0.00070	O	Hg	<0.10	M	Ru	0.017	M	Tm	<0.000040
M	Bi	<0.000040	M	Ge	<0.00060	M	Mo	<0.00020	M	Sm	<0.00010	M	Sn	<0.00050
M	B	<0.0070	M	Au	<0.00030	M	Nd	<0.00020	M	Sc	<0.0010	M	Ti	<0.0050
M	Cd	<0.00030	M	Hf	<0.00020	O	Ni	<0.10	i	Se		M	W	<0.0010
O	Ca	0.0011	M	Ho	<0.000050	M	Nb	<0.000050	O	Si	<0.10	M	U	<0.00020
M	Ce	<0.00050	O	In	<0.10	n	Os		M	Ag	0.00070	i	V	
M	Cs	<0.000030	M	Ir	<0.00050	M	Pd	<0.00050	O	Na	0.016	M	Yb	<0.00010
s	Cr		O	Fe	<0.10	i	P		M	Sr	<0.000050	M	Y	<0.0040
O	Co	<0.10	M	La	<0.000050	M	Pt	<0.00020	n	S		O	Zn	<0.10
M	Cu	<0.00060	M	Pb	0.00039	n	K		M	Ta	<0.00070	M	Zr	<0.00050

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

ANALYZED DENSITY OF SOLUTION (measured at 22°C): **1.010 g/mL**

(over)

QA:KSL Rev.092502DN

Inorganic Ventures, Inc.
195 Lehigh Avenue • Suite 4 • Lakewood, NJ 08701
Orders: 800-669-6799 • FAX (732) 901-1903
Technical Support: 800-569-6799

Paul R. Haines
Quality Assurance Manager

EXPIRES
1/2003

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Copper in 2% HNO_3 (abs)

010353

Catalog Number: CGCU1-1, CGCU1-2 and CGCU1-5

Lot Number: **T-CU02060**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 02/13/03
DATE EXPIRED: 03/01/2004
DATE OPENED: 02/13/03
INORG: 3955 PO: F52060

Starting Material:	Copper Metal
Starting Material Purity:	99.999%
Starting Material Lot No:	K09C13

CERTIFIED CONCENTRATION: 1005 ± 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: 1005 ± 2 μg/mL
Method: EDTA Titration vs NIST SRM 928 Lead Nitrate.

Instrument Analysis: 1003 ± 5 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3114.

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	O	Li	<0.0050	M	Pr	<0.000030	O	Te	<0.031
M	Sb	<0.000050	M	Er	<0.00050	M	Lu	<0.00004	M	Re	<0.00010	M	Tb	<0.000030
O	As	<0.044	M	Eu	<0.00030	O	Mg	0.00080	M	Rh	0.0010	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	<0.00020	O	Ga	<0.0070	O	Hg	<0.0070	M	Ru	<0.00020	M	Tm	<0.000040
M	Bi	0.000090	O	Ge	<0.010	M	Mo	<0.00020	M	Sm	<0.00010	M	Sn	0.0013
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	<0.0060	O	Se	<0.020	M	W	<0.0010
O	Ca	0.00058	M	Ho	<0.000050	M	Nb	<0.00005	O	Si	<0.0033	M	U	<0.00020
M	Ce	<0.00050	O	In	<0.030	n	Os		O	Ag	<0.0040	M	V	<0.00020
M	Cs	<0.000030	M	Ir	<0.00050	M	Pd	0.0024	O	Na	<0.10	M	Yb	<0.00010
O	Cr	<0.0020	O	Fe	<0.0020	O	P	<0.030	M	Sr	<0.000050	M	Y	<0.0040
M	Co	<0.00030	M	La	<0.000050	M	Pt	<0.00020	O	S	<0.050	O	Zn	i
s	Cu		M	Pb	0.0029	O	K	<0.0060	M	Ta	<0.00070	M	Zr	<0.00050

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

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 1.015 g/mL

QA:KSL Rev.070302DN

(over)

Paul R. Haines

Quality Assurance Manager

Inorganic Ventures, Inc.
195 Lehigh Avenue • Suite 4 • Lakewood, NJ 08701
Orders: 800-669-6799 • FAX (732) 901-1903
Technical Support: 800-569-6799

EXPIRES 1 MAR 2004

010354

inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

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

2.0 DESCRIPTION OF CRM

Custom-Grade **1000 µg/mL Nickel in 1.4% (abs) HNO_3**

Catalog Number:	CGNI1-1, CGNI1-2, and CGNI1-5
Lot Number:	**T-NI02028**
Starting Material:	Ni pieces
Starting Material Purity (%):	99.9994
Starting Material Lot No	L06L02
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 02/13/03
DATE EXPIRED: 03/01/2004
DATE OPENED: 02/13/03
INORG: 3957 PO: E52060

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 998 ± 2 µg/mL

Certified Density: 1.011 g/mL (measured at 22° C)

The Certified Value is 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** **1002 ± 3 µg/mL**
ICP Assay NIST SRM 3136 Lot Number: 000612

Assay Method #2 **998 ± 2 µg/mL**
EDTA NIST SRM 928 Lot Number: 880710

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

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

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

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

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

O	Al	< 0.00938	M	Dy	< 0.06577	O	Li	< 0.00006	M	Pr	< 0.00329	M	Te	< 0.32886
M	Sb	< 0.00548	M	Er	< 0.05481	M	Lu	< 0.00439	M	Re	< 0.01096	M	Tb	< 0.00329
O	As	< 0.01689	M	Eu	< 0.03289	O	Mg	0.00002	M	Rh	< 0.01096	M	Tl	< 0.01096
M	Ba	< 0.10962	M	Gd	< 0.01096	M	Mn	< 0.04385	M	Rb	< 0.01096	M	Th	< 0.01096
O	Be	< 0.00626	M	Ga	< 0.01096	O	Hg	< 0.03441	M	Ru	< 0.02192	M	Tm	< 0.00439
M	Bi	< 0.00439	M	Ge	< 0.06577	M	Mo	< 0.02192	M	Sm	< 0.01096	M	Sn	< 0.05481
O	B	< 0.03097	M	Au	< 0.03289	M	Nd	< 0.02192	M	Sc	< 0.10962	M	Ti	< 0.54811
M	Cd	< 0.03289	M	Hf	< 0.02192	S	Ni		O	Se	< 0.01877	M	W	< 0.10962
O	Ca	< 0.01157	M	Ho	< 0.00548	M	Nb	< 0.00548	O	Si	0.00188	M	U	< 0.02192
M	Ce	< 0.05481	M	In	< 0.10962	n	Os		M	Ag	< 0.02192	M	V	< 0.02192
M	Cs	< 0.00329	M	Ir	< 0.05481	M	Pd	< 0.05481	O	Na	0.00102	M	Yb	< 0.01096
M	Cr	< 0.05481	O	Fe	0.00156	O	P	< 0.31280	M	Sr	< 0.00548	M	Y	< 0.43849
O	Co	0.00182	M	La	< 0.00548	M	Pt	< 0.02192	O	S	< 0.07820	M	Zn	0.00189
M	Cu	< 0.06577	M	Pb	< 0.03289	O	K	0.00043	M	Ta	< 0.07674	M	Zr	< 0.05481

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

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.
Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 58.69; +2; **6**; $Ni(H_2O)_6^{2+}$
Chemical Compatibility - Stable in HCl, HNO_3, H_2SO_4 ,HF, H_3PO_4. Avoid basic media. Stable with most metals and inorganic anions in acidic media.
Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO_3 / LDPE container.
Ni Containing Samples (Preparation and Solution) - Metal (Soluble in HNO_3); Oxides (Soluble in HCl); Ores (Dissolve in HCl / HNO_3).
Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≈ concs.)
ICP-OES	221.647 nm	0.01 / 0.0009 µg/mL	1	ion	Si
ICP-OES	232.003 nm	0.02 / 0.006 µg/mL	1	atom	Cr, Re, Os, Nb, Ag, Pt, Fe
ICP-OES	231.604 nm	0.02 / 0.002 µg/mL	1	ion	Sb, Ta, Co
ICP-MS	60 amu	100 ppt	n/a	M^+	$^{43}Ca^{16}O^1H$, $^{44}Ca^{16}O$, $^{23}Na^{37}Cl$

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

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

10.0 QUALITY STANDARD DOCUMENTATION

010356

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

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

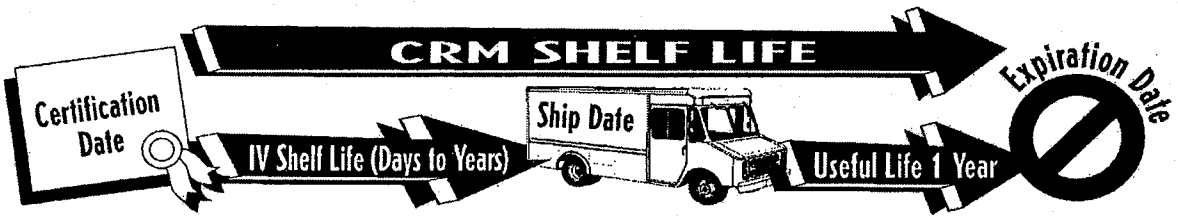
10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers" - Reference Materials Production - Accredited A2LA Certificate Number 883.02
A2LA Mutual Recognition Agreement Partners:
Australia (NATA), Austria (BmwA), Belgium (BELTEST) (BKO-OBE), Canada (SCC),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

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

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

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

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



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

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

Certification Date: October 11, 2002

Expiration Date: EXPIRES 1 MAR 2004

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 02/13/03
DATE EXPIRED: 03/01/2004
DATE OPENED: 02/13/03
INORG: 3957 PO: F52060

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

010357

Certificate Prepared By: Debbie Newman, QA Administrator

Certificate Approved By: Katalin Le, QC Supervisor

Certifying Officer: Paul Gaines, Chemist, Senior Technical Director

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

CUSTOM-GRADE SOLUTION 1000 μg/mL Silver in 3.5% HNO_3 (abs)

Catalog Number: CGAG1-1, CGAG1-2 and CGAG1-5

010358

Lot Number: **T-AG02015**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 08/26/03
DATE EXPIRED: 09/01/2004
DATE OPENED: 08/26/03
INORG: 4222 PO: F52224

Starting Material:	Silver Metal
Starting Material Purity:	99.999%
Starting Material Lot No:	F15102

CERTIFIED CONCENTRATION: 1001 ± 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: 1004 ± 3 μg/mL
Method: Volhard Titration vs NIST SRM 999a Potassium Chloride

Instrument Analysis: 1001 ± 2 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3151.

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

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

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

O	Al	<0.00010	M	Dy	<0.00060	O	Li	<0.000030	M	Pr	<0.000030	O	Te	<0.030			
M	Sb	<0.000050	M	Er	<0.00050	M	Lu	<0.000040	M	Re	<0.00010	M	Tb	<0.000030			
O	As	<0.0050	M	Eu	<0.00030	O	Mg	<0.000040	M	Rh	<0.00010	M	Tl	<0.00010			
M	Ba	<0.0010	M	Gd	<0.00010	O	Mn	<0.00030	M	Rb	<0.00010	M	Th	<0.00010			
O	Be	<0.00050	M	Ga	<0.00010	O	Hg	0.00090	M	Ru	<0.00020	M	Tm	<0.000040			
M	Bi	<0.000040	M	Ge	<0.00060	M	Mo	<0.00020	M	Sm	<0.00010	M	Sn	<0.00050			
O	B	<0.0020	O	Au	<0.012	M	Nd	<0.00020	M	Sc	<0.0010	O	Ti	<0.00070			
O	Cd	<0.0020	M	Hf	<0.00020	O	Ni	<0.0070	O	Se	<0.036	M	W	<0.0010			
O	Ca	<0.000050	M	Ho	<0.000050	M	Nb	<0.000050	O	Si	<0.0030	M	U	<0.00020			
M	Ce	<0.00050	O	In	<0.020	n	Os		s	Ag		M	V	<0.00020			
M	Cs	<0.000030	M	Ir	<0.00050	M	Pd	<0.00050	O	Na	<0.090	M	Yb	<0.00010			
O	Cr	<0.0020	O	Fe	<0.00070	O	P	<0.030	M	Sr	<0.000050	M	Y	<0.0040			
M	Co	<0.00030	M	La	<0.000050	M	Pt	<0.00020	O	S	<0.020	O	Zn	<0.0010			
M	Cu	<0.00060	M	Pb	<0.00030	O	K	<0.0060	M	Ta	<0.00070	M	Zr	<0.00050			

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

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 1.024 g/mL

QA:KL Rev.062102DN

Paul R. Haines
Quality Assurance Manager

Expires:

EXPIRES
1 SEP 2004

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Arsenic in 1.4% HNO_3 (abs)

Catalog Number: CGAS1-1, CGAS1-2 and CGAS1-5

010359

Lot Number: **T-AS02019**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 01/09/03
DATE EXPIRED: 02/01/2004 DR
DATE OPENED: 01/10/03
INORG: 3899 PO: F52071

Starting Material:	Arsenic Metal
Starting Material Purity:	99.999%
Starting Material Lot No:	23014

CERTIFIED CONCENTRATION: 1006 ± 3 μg/mL

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

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

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

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

Calculated Value: 1003 μg/mL
Method: Calculated, based on starting material.

Instrument Analysis: 1006 ± 3 μg/mL (Average of 3 runs)
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3103a.

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	0.00030	M	Dy	<0.012	O	Li	<0.000020	M	Pr	<0.00060	M	Te	<0.060
O	Sb	<0.010	M	Er	<0.010	M	Lu	<0.00080	O	Re	<0.010	M	Tb	<0.00060
s	As		M	Eu	<0.0060	O	Mg	<0.000030	M	Rh	<0.0020	M	Tl	<0.0020
M	Ba	<0.020	M	Gd	<0.0020	O	Mn	<0.000030	M	Rb	<0.0020	M	Th	<0.0020
M	Be	<0.0010	M	Ga	<0.0020	O	Hg	<0.012	M	Ru	<0.0040	M	Tm	<0.00080
M	Bi	<0.00080	M	Ge	<0.012	M	Mo	<0.0040	M	Sm	<0.0020	O	Sn	0.00053
O	B	<0.012	M	Au	<0.0060	M	Nd	<0.0040	M	Sc	<0.020	M	Ti	<0.10
M	Cd	<0.0060	M	Hf	<0.0040	M	Ni	<0.016	M	Se	<0.016	M	W	<0.020
O	Ca	<0.0015	M	Ho	<0.0010	O	Nb	<0.0020	O	Si	0.0077	M	U	<0.0040
M	Ce	<0.010	M	In	<0.020	n	Os		M	Ag	<0.0040	M	V	<0.0040
M	Cs	<0.00060	M	Ir	<0.010	M	Pd	<0.010	O	Na	0.00096	M	Yb	<0.0020
M	Cr	<0.010	O	Fe	<0.0011	O	P	<0.0026	M	Sr	<0.0010	M	Y	<0.080
M	Co	<0.0060	M	La	<0.0010	M	Pt	<0.0040	O	S	<0.025	O	Zn	0.00019
M	Cu	<0.012	M	Pb	<0.0060	O	K	0.00096	M	Ta	<0.014	M	Zr	<0.010

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): 1.010 g/mL

QA:KSL Rev.061202DN

(over)

Paul R Haines

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Technical Support: 800-569-6799

Quality Assurance Manager

EXPIRES 1 FEB 2004

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Lead in 0.35% HNO_3 (abs)

Catalog Number: CGPB1-1, CGPB1-2 and CGPB1-5

010360

Lot Number: **T-PB02110**

Starting Material:	Lead Nitrate
Starting Material Purity:	99.995%
Starting Material Lot No:	22150

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 10/22/02
DATE EXPIRED: 11/01/2003
DATE OPENED: 10/23/02
INORG: 3735 PO: F52057

CERTIFIED CONCENTRATION: 1004 ± 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: 1004 ± 2 μg/mL
Method: EDTA Titration vs NIST SRM 928 Lead Nitrate.

Instrument Analysis: 995 ± 8 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3128.

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

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

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

O	Al	<0.040	M	Dy	<0.00060	M	Li	<0.0010	M	Pr	<0.000030	M	Te	<0.0030
M	Sb	<0.000050	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	<0.020	M	Tl	<0.0050
M	Ba	<0.0010	M	Gd	<0.00010	M	Mn	<0.00040	M	Rb	<0.00010	M	Th	<0.00010
M	Be	<0.000050	M	Ga	<0.00010	O	Hg	<0.090	M	Ru	<0.00020	M	Tm	<0.000040
M	Bi	<0.0010	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	M	Sc	<0.0010	M	Ti	<0.0050
M	Cd	<0.00030	M	Hf	<0.00020	O	Ni	<0.050	O	Se	<0.40	M	W	<0.0010
O	Ca	<0.010	M	Ho	<0.000050	M	Nb	<0.000050	O	Si	<0.020	M	U	<0.00020
M	Ce	<0.00050	O	In	<0.030	n	Os		i	Na		M	V	<0.00020
M	Cs	<0.000030	M	Ir	<0.00050	M	Pd	<0.00050	M	Sr	0.00034	M	Yb	<0.00010
M	Cr	<0.00050	O	Fe	<0.050	O	P	<0.050	n	S		M	Y	<0.0040
M	Co	<0.00030	M	La	<0.000050	M	Pt	<0.00020	M	Ta	<0.00070	M	Zn	<0.0020
M	Cu	<0.00060	s	Pb		n	K					M	Zr	0.00120

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): 1.002 g/mL

(over)

QA:KSL Rev.061702JTS

Paul R. Haines
Quality Assurance Manager

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Technical Support: 800-569-6799

EXPIRES 1/2003

010361

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Antimony in 0.7% HNO_3 (abs) / 3% Tartaric Acid

Catalog Number: CGSB1-1, CGSB1-2 and CGSB1-5

Lot Number: **T-SB02074**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 02/13/03
DATE EXPIRED: 03/01/2004
DATE OPENED: 02/13/03
INORG: 3953 PO: F52060

Starting Material:	Antimony Metal
Starting Material Purity:	99.995%
Starting Material Lot No:	E14H25

CERTIFIED CONCENTRATION: 1003 ± 2 μg/mL

The Certified Value is the instrument analysis value. The following equations are used in the calculation of the certified value and the uncertainty:

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

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

Calculated Value: 999 μg/mL
Method: Calculated, based on starting material.

Instrument Analysis: 1003 ± 2 μg/mL (Average of 2 runs)
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3102a.

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.

M	Al	<0.0050	M	Dy	<0.00060	M	Li	<0.0010	M	Pr	<0.000030	n	Te				
s	Sb		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	0.00030			
O	Ba	<0.020	M	Gd	<0.00010	M	Mn	0.0080	M	Rb	<0.00010	M	Th	<0.00010			
M	Be	<0.000050	M	Ga	<0.00010	O	Hg	<0.030	M	Ru	<0.00020	M	Tm	<0.000040			
M	Bi	0.00070	M	Ge	<0.00060	M	Mo	<0.00020	M	Sm	<0.00010	n	Sn				
M	B	<0.0070	M	Au	<0.00030	M	Nd	<0.00020	M	Sc	<0.0010	M	Ti	<0.0050			
M	Cd	<0.00030	M	Hf	<0.00020	O	Ni	<0.050	O	Se	<0.40	M	W	<0.0010			
O	Ca	<0.020	M	Ho	<0.000050	M	Nb	<0.000050	O	Si	<0.020	M	U	<0.00020			
M	Ce	0.0018	O	In	<0.030	n	Os		M	Ag	<0.00020	M	V	<0.00020			
M	Cs	<0.000030	M	Ir	<0.00050	M	Pd	<0.00050	O	Na	<0.090	M	Yb	<0.00010			
M	Cr	0.031	O	Fe	<0.050	O	P	<0.050	M	Sr	<0.000050	M	Y	<0.0040			
M	Co	<0.00030	M	La	<0.040	M	Pt	<0.00020	n	S		M	Zn	<0.0020			
M	Cu	0,0016	M	Pb	0.0011	n	K		M	Ta	<0.00070	M	Zr	<0.00050			

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

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 1.019 g/mL

(over)

QA:KL Rev.082202DN

Paul R. Haines

Quality Assurance Manager

Expires:

EXPIRES 1 MAR 2004

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010362

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

certificate of analysis

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

2.0 DESCRIPTION OF CRM

Custom-Grade **1000 µg/mL Selenium in 1.4% (abs) HNO_3**

Catalog Number:	CGSE1-1, CGSE1-2, and CGSE1-5
Lot Number:	**T-SE01102**
Starting Material:	Se shot
Starting Material Purity (%):	99.9971
Starting Material Lot No	C09L08
Matrix:	1.4% (abs) HNO_3

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 06/20/03
DATE EXPIRED: 07/01/2004
DATE OPENED: 06/23/03
INORG: 4152 PO: F52370

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 995 ± 3 µg/mL

Certified Density: 1.010 g/mL (measured at 22° C)

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

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

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

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

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

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

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

4.1 **Assay Method #1** **995 ± 3 µg/mL (Avg. 2 runs)**
ICP Assay NIST SRM 3149 Lot Number: 992106

Assay Method #2 **1002 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

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

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

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

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

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

O	Al	0.00017	M	Dy	< 0.01196	O	Li	< 0.00003	M	Pr	< 0.00060	M	Te	< 0.05981
M	Sb	0.00160	M	Er	< 0.00997	M	Lu	< 0.00080	O	Re	< 0.00900	M	Tb	< 0.00060
O	As	< 0.00500	M	Eu	< 0.00598	O	Mg	< 0.00003	M	Rh	< 0.00199	M	Tl	< 0.00199
M	Ba	< 0.01994	M	Gd	< 0.00199	M	Mn	< 0.00798	M	Rb	< 0.00199	M	Th	< 0.00199
O	Be	< 0.00009	M	Ga	< 0.00199	O	Hg	0.01950	O	Ru	0.00220	M	Tm	< 0.00080
M	Bi	< 0.00080	M	Ge	< 0.01196	O	Mo	< 0.00400	M	Sm	< 0.00199	M	Sn	< 0.00997
O	B	< 0.00006	M	Au	< 0.00598	M	Nd	< 0.00399	M	Sc	< 0.01994	M	Ti	< 0.09969
M	Cd	< 0.00598	M	Hf	< 0.00399	O	Ni	< 0.00090	S	Se		M	W	< 0.01994
O	Ca	0.00200	M	Ho	< 0.00100	O	Nb	< 0.00400	O	Si	0.00055	M	U	< 0.00399
M	Ce	< 0.00997	M	In	< 0.01994	n	Os		M	Ag	0.00070	M	V	< 0.00399
M	Cs	< 0.00060	M	Ir	< 0.00997	M	Pd	< 0.00997	O	Na	0.00355	M	Yb	< 0.00199
M	Cr	< 0.00997	O	Fe	0.00060	O	P	< 0.00300	M	Sr	< 0.00100	M	Y	< 0.07975
M	Co	< 0.00598	M	La	< 0.00100	M	Pt	< 0.00399	O	S	0.00500	M	Zn	< 0.03988
M	Cu	< 0.01196	M	Pb	< 0.00598	O	K	0.00070	M	Ta	< 0.01396	O	Zr	< 0.00040

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

010364

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

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

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 78.96; +4; 6; H_2SeO_3

Chemical Compatibility - Soluble in HCl, HNO_3, H_3PO_4, H_2SO_4 and HF aqueous matrices and water. It is stable with most inorganic anions but many cationic metals form the insoluble selenites under pH neutral conditions. When fluorinated and/or under acidic conditions precipitation is typically not a problem at moderate to low concentrations.

Stability - 2-100 ppb levels - stable for months alone or mixed with other elements at equivalent levels - in 1 % HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO_3 / LDPE container.

Se Containing Samples (Preparation and Solution) - Metal (Soluble in HNO_3); Oxides (Readily soluble in water); Minerals and alloys (Acid digestion with HNO_3 or HNO_3 / HF); Organic Matrices (Acid digestion with hot concentrated H_2SO_4 accompanied by the careful dropwise addition of H_2O_2 until clear)

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

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≥50ppm conc.)
ICP-OES	196.026 nm	0.08 / 0.006 µg/mL	1	atom	Fe
ICP-OES	203.985 nm	0.2 / 0.05 µg/mL	1	atom	Sb, Ir, Cr, Ta
ICP-OES	206.279 nm	0.3 / 0.16 µg/mL	1	atom	Cr, Pt
ICP-MS	82 amu	200 ppt	n/a	M+	$^{12}C^{35}Cl_2$

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

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

10.0 QUALITY STANDARD DOCUMENTATION

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

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

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

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

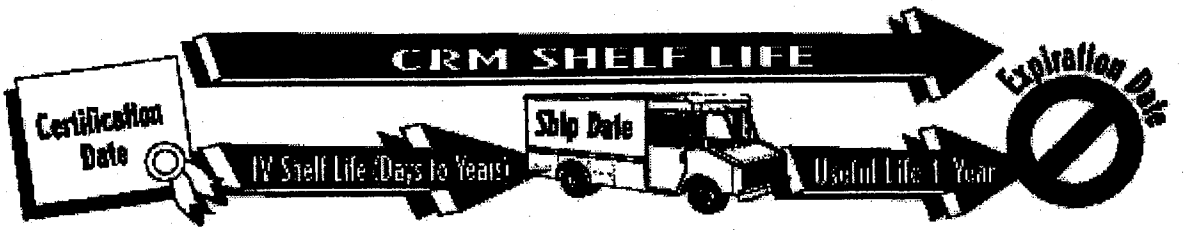
10.5 10CFR21 - Nuclear Regulatory Commission - Reporting Defects and Non-Compliance

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

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 06/20/03
DATE EXPIRED: 07/01/2004
DATE OPENED: 06/23/03
INORG: 4152 PO: E52370

010365

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: November 27, 2002

Expiration Date: EXPIRES 01/2004

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Debbie Newman, QA Administrator

Certificate Approved By: Katalin Le, QC Supervisor

Certifying Officer: Paul Gaines, Chemist, Senior Technical Director

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Thallium in 0.5% HNO_3 (abs) 010366

Catalog Number: CGTL1-1, CGTL1-2 and CGTL1-5

Lot Number: **T-TL01075**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 01/16/03
DATE EXPIRED: 02/01/2004
DATE OPENED: 01/16/03
INORG: 3922 PO: F52073

Starting Material:	Thallium Nitrate
Starting Material Purity:	99.999%
Starting Material Lot No:	59001

CERTIFIED CONCENTRATION: 997 ± 1 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.

Calculated Value: 1000 μg/mL
Method: Calculated, based on starting material.

Instrument Analysis: 997 ± 1 μg/mL (Average of 2 runs)
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3158.

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

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

O	Al	<0.040	M	Dy	<0.00060	M	Li	<0.0010	M	Pr	<0.000030	M	Te	<0.0030
M	Sb	0.000080	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	s	Tl	
M	Ba	<0.0010	M	Gd	<0.00010	M	Mn	<0.00040	M	Rb	<0.00010	M	Th	<0.00010
M	Be	<0.000050	M	Ga	<0.00010	O	Hg	i	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	0.00060
O	B	<0.020	M	Au	<0.00030	M	Nd	<0.00020	M	Sc	<0.0010	M	Ti	<0.0050
M	Cd	0.00090	M	Hf	0.0010	O	Ni	<0.050	O	Se	<0.40	M	W	<0.0010
O	Ca	<0.010	M	Ho	<0.000050	M	Nb	<0.000050	O	Si	<0.020	M	U	<0.00020
M	Ce	<0.00050	O	In	i	n	Os		M	Ag	<0.00020	M	V	<0.00020
M	Cs	0.00010	M	Ir	<0.00050	M	Pd	<0.00050	O	Na	<0.090	M	Yb	<0.00010
M	Cr	<0.00050	O	Fe	<0.050	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	0.015
M	Cu	<0.00060	M	Pb	<0.00030	n	K		M	Ta	<0.00070	M	Zr	<0.00050

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

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 1.002 g/mL

QA:KL Rev.031402DN

(over)

Paul R. Haines

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Quality Assurance Manager

EXPIRES 1 FEB 2004

Certificate of Analysis

CUSTOM-GRADE SOLUTION

1000 μg/mL Lanthanum in 1.4% HNO_3 (abs)

Catalog Number: CGLA1-1 and CGLA1-5

010367

Lot Number: **T-QLA01057**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 08/26/03
DATE EXPIRED: 09/01/2004
DATE OPENED: 08/26/03
INORG: 4221 PO: F52224

Starting Material:	Lanthanum Oxide
Starting Material Purity:	99.999%
Starting Material Lot No:	LA-0-5-017

CERTIFIED CONCENTRATION: 1002 ± 3 μg/mL

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

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

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

Classical Wet Assay: 1002 ± 3 μg/mL
Method: EDTA Titration vs NIST SRM 928 Lead Nitrate.

Instrument Analysis: 1007 ± 3 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3127a.

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

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

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

O	Al	<0.040	M	Dy	<0.00060	M	Li	<0.0010	O	Pr	<0.020	M	Te	<0.0030
M	Sb	<0.000050	M	Er	0.0010	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
O	Ba	<0.020	M	Gd	0.039	M	Mn	<0.00040	M	Rb	<0.00010	M	Th	<0.00010
M	Be	<0.000050	M	Ga	<0.00010	O	Hg	<0.030	M	Ru	<0.00020	M	Tm	<0.000040
M	Bi	<0.000040	M	Ge	<0.00060	M	Mo	<0.00020	M	Sm	0.00040	M	Sn	<0.00050
O	B	<0.020	M	Au	<0.00030	M	Nd	0.00020	M	Sc	<0.0010	M	Ti	<0.0050
M	Cd	<0.00030	M	Hf	<0.00020	O	Ni	<0.050	O	Se	<0.40	M	W	<0.0010
O	Ca	<0.010	M	Ho	0.00010	M	Nb	<0.000050	O	Si	<0.020	M	U	<0.00020
i	Ce		O	In	<0.030	n	Os		M	Ag	<0.00020	M	V	<0.00020
n	Cs		M	Ir	<0.00050	M	Pd	<0.00050	O	Na	<0.090	M	Yb	<0.00010
M	Cr	<0.00050	O	Fe	<0.050	O	P	<0.050	M	Sr	<0.000050	M	Y	<0.0040
M	Co	<0.00030	s	La		M	Pt	<0.00020	n	S		M	Zn	<0.0020
M	Cu	<0.00060	M	Pb	<0.00030	n	K		M	Ta	<0.00070	M	Zr	<0.00050

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

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 1.009 g/mL **(over)**

QA:KSL Rev.121702DN

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Quality Assurance Manager

EXPIRES
1 SEP 2004

Certificate of Analysis

CUSTOM-GRADE SOLUTION

1000 μg/mL Palladium in 3.3% HCl (abs) 010368

Catalog Number: CGPD1-1 and CGPD1-5

Lot Number: **T-PD02014**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 2/28/03
DATE EXPIRED: 3/01/2004
DATE OPENED: 2/28/03
INORG: 3964 PO: F52064

Starting Material:	Palladium Nitrate
Starting Material Purity:	99.999%
Starting Material Lot No:	00614

CERTIFIED CONCENTRATION: 1001 ± 3 μg/mL

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

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

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

Calculated Value: 1002 μg/mL
Method: Calculated, based on starting material.

Instrument Analysis: 1001 ± 3 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3138.

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.

M	Al	<0.00090	M	Dy	<0.00060	M	Li	<0.0010	M	Pr	<0.000030	M	Te	<0.0030
M	Sb	0.0017	M	Er	<0.00050	M	Lu	<0.000040	M	Re	<0.00010	M	Tb	<0.000030
M	As	<0.060	M	Eu	<0.00030	M	Mg	0.0090	O	Rh	<0.020	M	Tl	0.00010
M	Ba	<0.0010	M	Gd	<0.00010	M	Mn	<0.00040	M	Rb	<0.00010	M	Th	<0.00010
M	Be	<0.000050	M	Ga	0.00026	O	Hg	<0.030	O	Ru	<0.010	M	Tm	<0.000040
M	Bi	<0.000040	M	Ge	0.0058	M	Mo	<0.00020	M	Sm	<0.00010	M	Sn	<0.00050
M	B	<0.0070	M	Au	0.00090	M	Nd	0.00090	M	Sc	<0.0010	M	Ti	<0.0050
O	Cd	<0.010	M	Hf	<0.00020	O	Ni	<0.050	O	Se	<0.40	M	W	<0.0010
O	Ca	0.040	M	Ho	<0.000050	M	Nb	<0.000050	O	Si	<0.020	M	U	<0.00020
M	Ce	<0.00050	O	In	<0.030	n	Os		O	Ag	0.26	O	V	<0.010
i	Cs		M	Ir	<0.00050	s	Pd		O	Na	<0.090	M	Yb	<0.00010
O	Cr	<0.020	O	Fe	<0.050	O	P	<0.050	M	Sr	<0.000050	M	Y	<0.0040
M	Co	<0.00030	M	La	<0.000050	M	Pt	0.016	n	S		M	Zn	0.0030
M	Cu	0.0023	M	Pb	0.0022	n	K		M	Ta	<0.00070	M	Zr	<0.00050

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

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 1.022 g/mL

QA:KSL Rev.050202DN

(over)

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Paul R. Haines
Quality Assurance Manager

EXPIRES 1 MAR 2004

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Sulfur in H_2O

010369

Catalog Number: CGS1-1, CGS1-2, and CGS1-5

Lot Number: **T-S01058**

Starting Material:	H_2SO_4
Starting Material Purity:	99.999%
Starting Material Lot No:	N38818

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 10/22/02
DATE EXPIRED: 11/01/2003
DATE OPENED: 10/23/02
INORG: 3739 PO: F52057

CERTIFIED CONCENTRATION: 1000 ± 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: 1000 ± 2 μg/mL
Method: Acidimetric Titration vs NIST SRM KHP 84k.

Instrument Analysis: 1003 ± 4 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3154.

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	<0.0030	M	Dy	<0.012	O	Li	<0.00016	M	Pr	<0.00060	M	Te	<0.060
M	Sb	<0.0010	M	Er	<0.010	M	Lu	<0.00080	M	Re	<0.0020	M	Tb	<0.00060
M	As	<0.020	M	Eu	<0.0060	O	Mg	<0.000040	M	Rh	<0.0020	M	Tl	<0.0020
M	Ba	<0.020	M	Gd	<0.0020	M	Mn	<0.0080	M	Rb	<0.0020	M	Th	<0.0020
O	Be	<0.0020	M	Ga	<0.0020	O	Hg	<0.011	M	Ru	<0.0040	M	Tm	<0.00080
M	Bi	<0.00080	M	Ge	<0.012	M	Mo	<0.0040	M	Sm	<0.0020	M	Sn	<0.010
O	B	<0.010	M	Au	<0.0060	M	Nd	<0.0040	M	Sc	<0.020	M	Ti	<0.10
M	Cd	<0.0060	M	Hf	<0.0040	O	Ni	<0.0023	O	Se	<0.0062	M	W	<0.020
O	Ca	<0.0037	M	Ho	<0.0010	M	Nb	<0.0010	O	Si	<0.0041	M	U	<0.0040
M	Ce	<0.010	M	In	<0.020	n	Os		M	Ag	<0.0040	M	V	<0.0040
M	Cs	<0.00060	M	Ir	<0.010	M	Pd	<0.010	O	Na	<0.00010	M	Yb	<0.0020
M	Cr	<0.010	O	Fe	<0.0011	O	P	<0.0048	M	Sr	<0.0010	M	Y	<0.080
M	Co	<0.0060	M	La	<0.0010	M	Pt	<0.0040	s	S		O	Zn	0.0019
M	Cu	<0.012	M	Pb	<0.0060	O	K	<0.0017	M	Ta	<0.014	M	Zr	<0.010

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

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 0.999 g/mL **(over)**

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Paul R. Haines
Quality Assurance Manager

EXPIRES 1/2003

Certificate of Analysis

CUSTOM-GRADE SOLUTION

1000 μg/mL Thorium in 3% HNO_3 (abs)

010370

Catalog Number: CGTH1-1 and CGTH1-5

Lot Number: **T-TH01059**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 9/4/02
DATE EXPIRED: 10/1/2003 PR
DATE OPENED: 9/4/02
INORG: 3681 PO: FS2048

Starting Material:	Thorium Nitrate
Starting Material Purity:	99.999%
Starting Material Lot No:	C01L32

CERTIFIED CONCENTRATION: 1001 ± 3 μg/mL

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

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

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

Classical Wet Assay: 1001 ± 3 μg/mL
Method: EDTA Titration vs NIST SRM Lead Nitrate.

Instrument Analysis: 1002 ± 4 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3159.

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	<0.00090	M	Dy	0.0062	O	Li	<0.000030	M	Pr	0.00037	O	Te	<0.031
M	Sb	<0.000050	M	Er	<0.00050	M	Lu	<0.000040	M	Re	<0.00010	M	Tb	<0.000030
O	As	<0.014	M	Eu	<0.00030	O	Mg	<0.000060	M	Rh	<0.00010	M	Tl	<0.00010
M	Ba	0.0050	M	Gd	0.0054	O	Mn	<0.0000030	M	Rb	<0.00010	s	Th	
O	Be	<0.00020	M	Ga	<0.00010	i	Hg		M	Ru	<0.00020	M	Tm	<0.000040
M	Bi	<0.000040	M	Ge	<0.00060	M	Mo	<0.00020	M	Sm	0.0095	M	Sn	<0.00050
O	B	<0.00060	M	Au	<0.00030	M	Nd	0.0026	M	Sc	<0.0010	O	Ti	<0.00092
O	Cd	<0.0045	M	Hf	<0.00020	O	Ni	<0.0023	M	Se	<0.010	M	W	<0.0010
O	Ca	<0.030	M	Ho	0.00022	M	Nb	<0.000050	O	Si	<0.0034	M	U	0.074
M	Ce	<0.00050	O	In	<0.0020	n	Os		M	Ag	<0.00020	M	V	<0.00020
M	Cs	<0.000030	M	Ir	<0.00050	M	Pd	<0.00050	O	Na	<0.00010	M	Yb	<0.00010
O	Cr	<0.00080	O	Fe	<0.0011	i	P		M	Sr	<0.000050	M	Y	<0.0040
M	Co	<0.00030	M	La	<0.000050	M	Pt	<0.00020	O	S	<0.072	O	Zn	<0.00058
M	Cu	<0.00060	M	Pb	<0.00030	O	K	<0.0017	M	Ta	<0.00070	M	Zr	0.0085

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): 1.022 g/mL

QA:KL Rev.050802DN

(over)

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Paul R. Haines
Quality Assurance Manager

EXPIRES 1/2003

Certificate of Analysis

CUSTOM-GRADE SOLUTION

1000 μg/mL Uranium in 1% HNO_3 (abs)

Catalog Number: CGU1-1 and CGU1-5

010371

Lot Number: **T-U01056**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 3/03/03
DATE EXPIRED: 3/01/2004
DATE OPENED: 3/04/03
INORG: 3974 PO: E52064

Starting Material:	Uranium Oxynitrate*
Starting Material Purity:	99.95%
Starting Material Lot No:	E14L40

CERTIFIED CONCENTRATION: 1001 ± 1 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.

Instrument Analysis: 1001 ± 1 μg/mL (Avg. 2 runs)
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3164.

Calculated Value: 1000 μg/mL
Method: Calculated, based on starting material.

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	<0.20	M	Dy	<0.0060	O	Li	<0.010	M	Pr	<0.00030	M	Te	<0.030
M	Sb	0.00020	M	Er	<0.0050	M	Lu	<0.00040	M	Re	<0.0010	M	Tb	<0.00030
[illegible]	As	<0.010	M	Eu	<0.0030	O	Mg	0.012	M	Rh	<0.0010	M	Tl	<0.0010
M	Ba	0.0022	M	Gd	<0.0010	M	Mn	<0.0040	M	Rb	<0.0010	M	Th	<0.0010
O	Be	<0.10	M	Ga	<0.0010	i	Hg		M	Ru	<0.0020	M	Tm	<0.00040
M	Bi	0.00030	M	Ge	<0.0060	M	Mo	<0.0020	M	Sm	<0.0010	M	Sn	0.043
O	B	0.0020	M	Au	<0.0030	M	Nd	<0.0020	M	Sc	0.00080	M	Ti	0.029
M	Cd	<0.0030	M	Hf	<0.0020	i	Ni		M	Se	<0.0080	M	W	<0.010
O	Ca	0.11	M	Ho	<0.00050	M	Nb	<0.00050	i	Si		s	U	
M	Ce	<0.0050	M	In	<0.010	n	Os		M	Ag	<0.0020	M	V	0.00040
M	Cs	<0.00030	M	Ir	<0.0050	M	Pd	<0.0050	O	Na	0.19	M	Yb	<0.0010
M	Cr	0.0047	i	Fe		i	P		M	Sr	0.0011	M	Y	0.56
M	Co	0.014	M	La	0.0014	M	Pt	<0.0020	i	S		M	Zn	0.020
M	Cu	0.022	M	Pb	0.0025	i	K		M	Ta	<0.0070	M	Zr	0.00060

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

****NOTICE TO ICP-MS USERS:** The ^{235}U in this standard is depleted. The certified abundances in Atom % are as follows:

	Isotope	Natural Abundance Atom %	IV's Certified Abundance Atom %
Uranium	^{238}U	99.3	99.8 ± 0.1
	^{235}U	0.70	0.195 ± 0.005

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 1.008 g/mL

(over) QA:KSL Rev.092502DN

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Quality Assurance Manager

EXPIRES 1 MAR 2004

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."*

010372

2.0 DESCRIPTION OF CRM

Custom-Grade **1000 µg/mL Tungsten in 1% (abs) HNO_3/1% (abs) HF**

Catalog Number:	CGW1-1 and CGW1-5
Lot Number:	**W-W01080**
Starting Material:	W Powder
Starting Material Purity (%):	99.990703
Starting Material Lot No	21418,C31H46,D02J21,E03K06,D11F29
Matrix:	1% (abs) HNO_3/1% (abs) HF

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2
DATE RECEIVED: 07/31/03
DATE EXPIRED: 08/01/2004
DATE OPENED: 08/01/03
INORG: 4203 PO: E52383

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1001 ± 2 µg/mL

Certified Density: 1.006 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 (□) = $\frac{\Sigma x_i}{n}$

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

(□) = mean
x_i = individual results
n = number of measurements
■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 **1001 ± 2 µg/mL (Avg 2 runs)**
ICP Assay NIST SRM 3163 Lot Number: 990209

Assay Method #2 **1000 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

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

010373

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

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

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

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

O	Al	0.01792	M	Dy	< 0.00595	O	Li	< 0.00008	M	Pr	< 0.00030	M	Te	< 0.02974
M	Sb	< 0.00050	M	Er	< 0.00496	M	Lu	< 0.00040	i	Re		M	Tb	< 0.00030
M	As	< 0.00991	M	Eu	< 0.00297	O	Mg	0.00120	M	Rh	< 0.00099	M	Tl	< 0.00099
M	Ba	< 0.00991	M	Gd	< 0.00099	M	Mn	< 0.00397	M	Rb	< 0.00099	M	Th	< 0.00099
M	Be	< 0.00050	M	Ga	< 0.00099	O	Hg	< 0.04778	M	Ru	< 0.00198	M	Tm	< 0.00040
M	Bi	< 0.00040	M	Ge	< 0.00595	M	Mo	0.00050	M	Sm	< 0.00099	M	Sn	< 0.00496
O	B	< 1.19460	M	Au	< 0.00297	M	Nd	< 0.00198	O	Sc	< 0.00036	M	Ti	0.00198
M	Cd	< 0.00297	M	Hf	< 0.00198	M	Ni	< 0.00793	M	Se	< 0.00793	S	W	
O	Ca	0.00080	M	Ho	< 0.00050	O	Nb	< 0.06371	O	Si	< 0.01354	M	U	< 0.00198
M	Ce	< 0.00496	M	In	< 0.00991	n	Os		M	Ag	< 0.00198	M	V	< 0.00198
M	Cs	< 0.00030	M	Ir	< 0.00496	M	Pd	< 0.00496	O	Na	0.04778	M	Yb	< 0.00099
M	Cr	< 0.00496	O	Fe	< 0.03982	n	P		M	Sr	< 0.00050	M	Y	< 0.03965
M	Co	< 0.00297	M	La	< 0.00050	M	Pt	< 0.00198	n	S		M	Zn	< 0.01983
M	Cu	< 0.00595	M	Pb	0.00060	O	K	0.03146	O	Ta	< 0.39820	M	Zr	0.00079

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

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

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

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 183.85; +6; 6,7,8,9; WOF_5^{-2} (chemical form as received)

Chemical Compatibility - W is very readily hydrolyzed requiring 0.1 to 1% HF solutions for stable acidic solutions. The WOF_5^{-2} is soluble in % levels of HCl and HNO_3 provided it is in the WOF_5^{-2} form. Stable at ppm levels with some metals provided it is fluorinated. Do not mix with Alkaline or Rare Earths. Is best to be mixed only with other fluorinated metals (Ti, Zr, Hf, Nb, Ta, Mo, Si, Sn, Ge). Look for yellow WO_3 precipitate if mixed with other transition elements at higher levels indicating instability. The yellow WO_3 will form over a period of weeks even in trace HF, therefore, HF levels of W multi- element blends should be ~ 1 %.

Stability - 2-100 ppb levels stable (Alone or mixed with all other metals that are at comparable levels) as the WOF_5^{-2} for months in 1% HNO_3 / LDPE container. 1-10,000 ppm single element solutions as the WOF_5^{-2} chemically stable for years in 1% HF in an LDPE container.

W Containing Samples (Preparation and Solution) - Metal (Soluble in HF / HNO_3); Oxide (Soluble in HF or NH_4OH) ; Organic Matrices (Dry ash at 450 °C in Pt^4 and dissolve oxide with HF).

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

Technique/Line		Estimated D.L.	Order	Type	Interferences (underlined indicates severe at ≤ 10 ppm.)
ICP-OES	207.911 nm	0.03 / 0.001 µg/mL	1	ion	Ru, In
ICP-OES	224.875 nm	0.05 / 0.005 µg/mL	1	ion	Co, Rh, Ag
ICP-OES	209.475 nm	0.05 / 0.005 µg/mL	1	ion	Mo
ICP-MS	182 amu	5 ppt	n/a	M^+	$^{166}Er^{16}O$

HF Note: This standard should not be prepared or stored in glass.

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

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

10.0 QUALITY STANDARD DOCUMENTATION

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

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

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

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

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

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

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 07/31/03
DATE EXPIRED: 08/01/2004
DATE OPENED: 08/01/03
INORG: 4203 PO: F52383

010375

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

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

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

Certification Date: February 10, 2003

Expiration Date: EXPIRES 1/2/2004

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

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL **Yttrium** in 1.4% HNO_3 (abs)

Catalog Number: CGY1-1 and CGY1-5

010376

Lot Number: **T-Y01086**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 05/09/03
DATE EXPIRED: 06/01/2004
DATE OPENED: 05/12/03
INORG: 40603 PO: F52181

Starting Material:	Y_2O_3
Starting Material Purity:	99.999%
Starting Material Lot No:	Y-O-5-9503201

CERTIFIED CONCENTRATION: 1004 ± 3 μg/mL

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

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

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

Classical Wet Assay: 1004 ± 3 μg/mL
Method: EDTA Titration vs NIST SRM 928 Lead Nitrate.

Instrument Analysis: 1004 ± 4 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3167a.

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	0.00021	M	Dy	<0.0060	M	Li	<0.010	M	Pr	<0.00030	M	Te	<0.030
M	Sb	<0.00050	M	Er	<0.0050	O	Lu	<0.000020	M	Re	<0.0010	M	Tb	<0.00030
M	As	<0.010	M	Eu	<0.0030	O	Mg	<0.000030	M	Rh	<0.0010	M	Tl	<0.0010
M	Ba	<0.010	M	Gd	<0.0010	O	Mn	<0.000020	M	Rb	<0.0010	M	Th	<0.0010
M	Be	<0.00050	M	Ga	<0.0010	O	Hg	<0.020	M	Ru	<0.0020	M	Tm	<0.00040
M	Bi	<0.00040	M	Ge	<0.0060	M	Mo	<0.0020	M	Sm	<0.0010	M	Sn	<0.0050
O	B	<0.00014	M	Au	<0.0030	M	Nd	<0.0020	O	Sc	0.00024	M	Ti	<0.050
M	Cd	<0.0030	M	Hf	<0.0020	M	Ni	<0.080	M	Se	<0.0080	M	W	<0.010
O	Ca	0.00014	M	Ho	<0.00050	M	Nb	<0.00050	O	Si	0.000077	M	U	<0.0020
M	Ce	<0.0050	M	In	<0.010	n	Os		M	Ag	<0.0020	O	V	<0.00080
M	Cs	<0.00030	M	Ir	<0.0050	O	Pd	<0.10	O	Na	<0.050	M	Yb	<0.0010
M	Cr	<0.0050	O	Fe	0.0015	O	P	<0.070	M	Sr	<0.00050	s	Y	
M	Co	<0.0030	M	La	<0.00050	M	Pt	<0.0020	O	S	<0.043	M	Zn	<0.020
M	Cu	<0.0060	M	Pb	<0.0030	O	K	<0.10	M	Ta	<0.0070	O	Zr	<0.00070

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

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 1.010 g/mL **(over)**

QA:KL Rev.061802DN

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Quality Assurance Manager

EXPIRES 1 JUN 2004

Certificate of Analysis

CUSTOM-GRADE SOLUTION

1000 μg/mL Zirconium in H_2O tr. HF tr. HNO_3

010377

Catalog Number: CGZR1-1 and CGZR1-5

This standard should **not** be prepared or stored in glass.

Lot Number: **T-QZR01062**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 02/13/03
DATE EXPIRED: 03/01/2004
DATE OPENED: 02/13/03
INORG: 3958 PO: F52060

Starting Material:	Zirconium Metal
Starting Material Purity:	99.999%
Starting Material Lot No:	SP4811A

CERTIFIED CONCENTRATION: 1005 ± 6 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.

Instrument Analysis: 1005 ± 6 μg/mL (Average of 2 runs)
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3169

Calculated Value: 1000 μg/mL (For informational purposes)
Method: Calculated based on starting material.

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	0.055	M	Dy	<0.012	O	Li	<0.000030	M	Pr	<0.00059	M	Te	<0.059
M	Sb	0.00017	M	Er	<0.0098	M	Lu	<0.00079	M	Re	<0.0020	M	Tb	<0.00059
M	As	<0.020	M	Eu	<0.0059	O	Mg	<0.000030	M	Rh	<0.0020	M	Tl	<0.0020
M	Ba	0.013	M	Gd	<0.0020	O	Mn	0.0020	M	Rb	<0.0020	M	Th	<0.0020
O	Be	<0.10	M	Ga	<0.0020	O	Hg	<0.011	M	Ru	<0.0040	M	Tm	<0.00079
M	Bi	<0.00079	M	Ge	<0.012	O	Mo	<0.10	M	Sm	<0.0020	M	Sn	0.0011
i	B		M	Au	<0.0059	M	Nd	<0.0040	O	Sc	<0.00016	O	Ti	0.0031
O	Cd	<0.0053	M	Hf	0.087	O	Ni	0.014	M	Se	<0.016	M	W	0.0016
O	Ca	0.0020	M	Ho	<0.00098	i	Nb		i	Si		M	U	0.00040
M	Ce	<0.0098	M	In	<0.020	n	Os		i	Ag		M	V	0.0016
M	Cs	<0.00059	M	Ir	<0.0098	i	Pd		O	Na	0.041	M	Yb	<0.0020
O	Cr	0.034	O	Fe	0.45	O	P	<0.0048	M	Sr	<0.00098	O	Y	<0.0010
M	Co	<0.0059	M	La	<0.00098	M	Pt	<0.0040	i	S		O	Zn	0.0057
M	Cu	0.013	M	Pb	<0.0059	O	K	0.013	M	Ta	0.0011	s	Zr	

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): 1.000 g/mL

QA:KL Rev.100302DN

(over)

Paul R. Haines

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Quality Assurance Manager

EXPIRES 1 MAR 2004

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Phosphorus in H_2O

010378

Catalog Number: CGP1-1, CGP1-2 and CGP1-5

Lot Number: **T-P01118**

Starting Material:	Phosphoric Acid
Starting Material Purity:	99.999%
Starting Material Lot No:	J18804

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 05/01/03
DATE EXPIRED: 06/01/2004
DATE OPENED: 05/01/03
INORG: 4049 PO: F52180

CERTIFIED CONCENTRATION: 1004 ± 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: 1004 ± 2 μg/mL
Method: Acidimetric Titration vs NIST SRM 84k KHP.

Instrument Analysis: 1000 ± 3 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3139a.

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

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

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

O	Al	<0.040	M	Dy	<0.00060	M	Li	<0.0010	M	Pr	<0.000030	M	Te	<0.0030
M	Sb	0.012	M	Er	<0.00050	M	Lu	<0.000040	M	Re	<0.00010	M	Tb	<0.000030
M	As	<0.0010	M	Eu	<0.00030	M	Mg	<0.0030	M	Rh	<0.00010	M	Tl	<0.00010
M	Ba	<0.0010	M	Gd	<0.00010	M	Mn	<0.00040	M	Rb	<0.00010	M	Th	<0.00010
M	Be	<0.000050	M	Ga	0.00070	O	Hg	<0.020	M	Ru	<0.00020	M	Tm	<0.000040
M	Bi	<0.000040	M	Ge	<0.00060	M	Mo	<0.00020	M	Sm	<0.00010	M	Sn	<0.00050
M	B	<0.0070	M	Au	<0.00030	M	Nd	<0.00020	n	Sc		n	Ti	
M	Cd	<0.00030	M	Hf	<0.00020	O	Ni	<0.050	O	Se	<0.40	M	W	<0.0010
O	Ca	<0.010	M	Ho	<0.000050	M	Nb	<0.000050	O	Si	<0.020	M	U	<0.00020
M	Ce	<0.00050	M	In	<0.030	n	Os		M	Ag	<0.00020	M	V	<0.00020
M	Cs	<0.000030	M	Ir	<0.00050	M	Pd	<0.00050	O	Na	<0.090	M	Yb	<0.00010
M	Cr	<0.00050	O	Fe	<0.050	s	P		M	Sr	<0.000050	M	Y	<0.0040
M	Co	<0.00030	M	La	<0.000050	M	Pt	<0.00020	n	S		M	Zn	0.0035
M	Cu	0.080	M	Pb	<0.00030	n	K		M	Ta	<0.00070	M	Zr	<0.00050

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

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 0.999 g/mL

(over)

QA:KL Rev.122002DN

Paul R. Haines

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Quality Assurance Manager

EXPIRES 01 JUN 2004

Certificate of Analysis

CUSTOM-GRADE SOLUTION

1000 μg/mL Thorium in 3% HNO_3 (abs)

010379

Catalog Number: CGTH1-1 and CGTH1-5

Lot Number: **T-TH01059**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 10/08/03
DATE EXPIRED: 11/01/2004
DATE OPENED: 10/08/03
INORG: 4283 PO: F53240

Starting Material:	Thorium Nitrate
Starting Material Purity:	99.999%
Starting Material Lot No:	C01L32

CERTIFIED CONCENTRATION: 1001 ± 3 μg/mL

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

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

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

Classical Wet Assay: 1001 ± 3 μg/mL
Method: EDTA Titration vs NIST SRM Lead Nitrate.

Instrument Analysis: 1002 ± 4 μg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3159.

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	<0.00090	M	Dy	0.0062	O	Li	<0.000030	M	Pr	0.00037	O	Te	<0.031
M	Sb	<0.000050	M	Er	<0.00050	M	Lu	<0.000040	M	Re	<0.00010	M	Tb	<0.000030
O	As	<0.014	M	Eu	<0.00030	O	Mg	<0.000060	M	Rh	<0.00010	M	Tl	<0.00010
M	Ba	0.0050	M	Gd	0.0054	O	Mn	<0.0000030	M	Rb	<0.00010	s	Th	
O	Be	<0.00020	M	Ga	<0.00010	i	Hg		M	Ru	<0.00020	M	Tm	<0.000040
M	Bi	<0.000040	M	Ge	<0.00060	M	Mo	<0.00020	M	Sm	0.0095	M	Sn	<0.00050
O	B	<0.00060	M	Au	<0.00030	M	Nd	0.0026	M	Sc	<0.0010	O	Ti	<0.00092
O	Cd	<0.0045	M	Hf	<0.00020	O	Ni	<0.0023	M	Se	<0.010	M	W	<0.0010
O	Ca	<0.030	M	Ho	0.00022	M	Nb	<0.000050	O	Si	<0.0034	M	U	0.074
M	Ce	<0.00050	O	In	<0.0020	n	Os		M	Ag	<0.00020	M	V	<0.00020
M	Cs	<0.000030	M	Ir	<0.00050	M	Pd	<0.00050	O	Na	<0.00010	M	Yb	<0.00010
O	Cr	<0.00080	O	Fe	<0.0011	i	P		M	Sr	<0.000050	M	Y	<0.0040
M	Co	<0.00030	M	La	<0.000050	M	Pt	<0.00020	O	S	<0.072	O	Zn	<0.00058
M	Cu	<0.00060	M	Pb	<0.00030	O	K	<0.0017	M	Ta	<0.00070	M	Zr	0.0085

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): 1.022 g/mL

QA:KL Rev.050802DN

(over)

Inorganic Ventures, Inc.
195 Lehigh Avenue • Suite 4 • Lakewood, NJ 08701
Orders: 800-669-6799 • FAX (732) 901-1903
Technical Support: 800-569-6799

Paul R. Haines
Quality Assurance Manager

EXPIRES
01 NOV 2004

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Div. 20
TASK ORDER: 030918-4
SRR: 24974
SDG: 234759
CASE: CNWRA
VTSR: September 18, 2003
PROJECT#: 06002.01.141

Pipette Calibrations

Book/Page: 03 015

010380

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

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

V. Wright 9/25/03

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

Eppendorf #	True Value (uL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
Lab30	1000	1.0055	1.0056	1.0059	1.01	100.57
TMA1	1000	0.9906	0.9995	0.9907	0.99	99.36
TMA2	1000	1.0018	0.9987	0.9938	1.00	99.81
TMA3	1000	Broken				
TMA6	1000	Not Found				
TMB1	900	0.9089	0.9063	0.9027	0.91	100.66
TMC1	800	0.8085	0.8072	0.8066	0.81	100.93
TMDD1	750	0.7560	0.7604	0.7509	0.76	100.77
TMD1	700	0.7098	0.6985	0.7001	0.70	100.40
TMD2	700	0.7080	0.7088	0.7028	0.71	100.93
TME1	600	0.5961	0.5940	0.5956	0.60	99.21
TMF2	500	0.4980	0.4975	0.4986	0.50	99.61
TMF5	500	0.5099	0.5061	0.5059	0.51	101.46
ICF1	500	0.4955	0.4986	0.4992	0.50	99.55
L30-500	500	Not Found				
TMG3	400	0.3984	0.3958	0.3936	0.40	98.98
TMH1	300	0.3045	0.3048	0.3039	0.30	101.47
TMH2	300	0.2968	0.2974	0.2954	0.30	98.84
TMJ1	250	0.2562	0.2530	0.2531	0.25	101.64
TMJ2	250	0.2495	0.2502	0.2502	0.25	99.99
TMJ3	250	0.2540	0.2539	0.2531	0.25	101.47
TMK2	200	0.2002	0.2004	0.1998	0.20	100.07
TML1	150	0.1495	0.1484	0.1490	0.15	99.31
TMM1	120	0.1205	0.1194	0.1202	0.12	100.03
TMN3	100	0.0998	0.0996	0.0999	0.10	99.77
ICN1	100	0.1018	0.1012	0.1005	0.10	101.17
TMQ1	80	0.0800	0.0799	0.0798	0.08	99.88
TMR1	70	Out of Service				
TMS1	60	Out of Service				
LAB-30A	50	0.0493	0.0497	0.0499	0.05	99.27
TMU1	40	0.0400	0.0399	0.0401	0.04	100.00
TMU2	40	0.0398	0.0399	0.0398	0.04	99.58
TMV1	30	0.0301	0.0302	0.0300	0.03	100.33
L30-20	20	0.0200	0.0200	0.0201	0.02	100.17
TMW1	25	0.0249	0.0248	0.0249	0.02	99.47
TMY1	15	Out of Service				

FRM-246 (Rev 1/Mar 03)

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

Balance #: H634 (WW 8/27/03) Thermometer #: G-011 diH20 Temperature (°C): 22

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
Lab30	1000	1.0055	1.0056	1.0059
TMA1	1000	0.9906	0.9995	0.9907
TMA23 (WW 8/27/03)	1000	1.0296	broken	
TMA32	1000	1.0018	0.9987	0.9938
TMA6	1000	not found	(found in drawer - Lab39) 9/15/03	
TMB1	900	0.9089	0.9063	0.9027
TMC1	800	0.8085	0.8072	0.8066
TMDD1	750	0.7560	0.7604	0.7509
TMD1	700	0.7098	0.6985	0.7001
TMD2	700	0.7080	0.7088	0.7028
TME1	600	0.5961	0.5940	0.5956
TMF2	500	0.4980	0.4975	0.4986
TMF5	500	0.5099	0.5061	0.5059
ICF1	500	0.4955	0.4986	0.4992
L30-500	500	not found		
TMG3	400	0.3984	0.3958	0.3936
TMH1	300	0.3045	0.3048	0.3039
TMH2	300	0.2968	0.2974	0.2954
TMJ1	250	0.2562	0.2530	0.2531
TMJ2	250	0.2495	0.2502	0.2502
TMJ3	250	0.2540	0.2539	0.2531
TMK2	200	0.2002	0.2004	0.1998
TML1	150	0.1495	0.1484	0.1490
TMM1	120	0.1205	0.1194	0.1202
TMN3	100	0.0998	0.0996	0.0999
ICN1	100	0.1018	0.1012	0.1005
TMQ1	80	0.0800	0.0799	0.0798
TMR1	70	Out of service		
TMS1	60	Out of Service		
LAB-30A	50	0.0493	0.0497	0.0499
TMU1	40	0.0400	0.0399	0.0401
TMU2	40	0.0398	0.0399	0.0398
TMV1	30	0.0301	0.0302	0.0300
L30-20	20	0.0200	0.0200	0.0201
TMW1	25	0.0249	0.0248	0.0249
TMY1	15	Out of Service		

Analyst: Laura Wright Date: 8/27/03

Reviewed by: [signature] Date: 09/25/03

FRM-243b (Rev 3/Mar 03)

Book/Page: 03 017

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

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

9-25-03

010382

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

Eppendorf #	True Value (uL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
Lab30	1000	1.0152	1.0155	1.0158	1.02	101.55
TMA1	1000	1.0113	1.0096	1.0083	1.01	100.97
TMA2	1000	1.0033	1.0087	1.0067	1.01	100.62
TMA3	1000	OUT	OF	SERVICE		
TMA6	1000	1.0024	1.0001	1.0001	1.00	100.09
TMB1	900	0.9026	0.9044	0.9025	0.90	100.35
TMC1	800	0.8012	0.7989	0.7991	0.80	99.97
TMDD1	750	0.7498	0.7493	0.7496	0.75	99.94
TMD1	700	0.7004	0.7018	0.7011	0.70	100.16
TMD2	700	0.7071	0.7047	0.7011	0.70	100.61
TME1	600	0.6021	0.6009	0.6005	0.60	100.19
TMF2	500	0.4981	0.4938	0.4961	0.50	99.20
TMF5	500	0.5029	0.5056	0.5057	0.50	100.95
ICF1	500	0.5078	0.5029	0.5041	0.50	100.99
L30-500	500	0.5042	0.5059	0.5037	0.50	100.92
TMG3	400	0.3992	0.3991	0.3993	0.40	99.80
TMH1	300	0.3052	0.3037	0.3027	0.30	101.29
TMH2	300	0.3001	0.2997	0.2995	0.30	99.92
TMJ1	250	0.2518	0.2502	0.2486	0.25	100.08
TMJ2	250	0.2531	0.2487	0.2501	0.25	100.25
TMJ3	250	0.2518	0.2502	0.2508	0.25	100.37
TMK2	200	0.2022	0.2026	0.2031	0.20	101.32
TML1	150	0.1521	0.1517	0.1511	0.15	101.09
TMM1	120	0.1206	0.1203	0.1201	0.12	100.28
TMN3	100	0.1006	0.1008	0.1003	0.10	100.57
ICN1	100	0.1012	0.1004	0.1008	0.10	100.80
TMQ1	80	0.0802	0.0811	0.0805	0.08	100.75
TMR1	70	OUT	OF	SERVICE		
TMS1	60	OUT	OF	SERVICE		
LAB-30A	50	0.0501	0.0499	0.0498	0.05	99.87
TMU1	40	0.0401	0.0399	0.0399	0.04	99.92
TMU2	40	0.04	0.0399	0.04	0.04	99.92
TMV1	30	0.0301	0.0301	0.0299	0.03	100.11
L30-20	20	0.0201	0.0201	0.0201	0.02	100.50
TMW1	25	0.0251	0.0251	0.0249	0.03	100.13
TMY1	15	OUT	OF	SERVICE		

010383

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

Balance #: 16 Thermometer #: 6011 diH20 Temperature (°C): 21

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
Lab30	1000	1.0152	1.0155	1.0158
TMA1	1000	1.0113	1.0096	1.0083
TMA2	1000	1.0033	1.0087	1.0067
TMA3	1000	OUT	OF	SERVICE
TMA6	1000	1.0024	1.0001	1.0001
TMB1	900	.9026	.9044	.9025
TMC1	800	.8012	.7989	.7991
TMDD1	750	.7498	.7493	.7496
TMD1	700	.7004	.7018	.7011
TMD2	700	.7071	.7047	.7011
TME1	600	.6021	.6009	.6005
TMF2	500	.4981	.4938	.4961
TMF5	500	.5029	.5056	.5057
ICF1	500	.5078	.5029	.5041
L30-500	500	.5042	.5059	.5037
TMG3	400	.3992	.3991	.3993
TMH1	300	.3052	.3037	.3027
TMH2	300	.3001	.2997	.2995
TMJ1	250	.2518	.2502	.2486
TMJ2	250	.2531	.2487	.2501
TMJ3	250	.2578	.2502	.2508
TMK2	200	.2022	.2026	.2031
TML1	150	.1521	.1517	.1511
TMM1	120	.1206	.1203	.1201
TMN3	100	.1006	.1008	.1003
ICN1	100	.1012	.1004	.1008
TMQ1	80	.0802	.0811	.0805
TMR1	70	OUT	OF	SERVICE
TMS1	60	OUT	OF	SERVICE
LAB-30A	50	.0501	.0499	.0498
TMU1	40	.0401	.0399	.0399
TMU2	40	.0400	.0399	.0400
TMV1	30	.0301	.0301	.0299
L30-20	20	.0201	.0201	.0201
TMW1	25	.0251	.0251	.0249
TMY1	15	OUT	OF	SERVICE

Analyst: John Wilks Date: 9-25-03

Reviewed by: Laura Wright Date: 9/25/03

FRM-243b (Rev 3/Mar 03)

010384

Book/Page: 03 019

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

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

L. Wright 11/4/03

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

Eppendorf #	True Value (uL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
Lab30	1000	1.0184	1.0102	1.0165	1.015	101.50
TMA1	1000	1.0187	1.0064	1.0019	1.009	100.90
TMA2	1000	1.0175	1.0126	1.0052	1.012	101.18
TMA3	1000	Out of Service				
TMA6	1000	1.0013	1.0015	1.0033	1.002	100.20
TMB1	900	0.9002	0.9001	0.9005	0.900	100.03
TMC1	800	0.803	0.7978	0.7995	0.800	100.01
TMDD1	750	0.7484	0.7491	0.7479	0.748	99.80
TMD1	700	0.7009	0.6906	0.6998	0.697	99.59
TMD2	700	0.7065	0.7082	0.7049	0.707	100.93
TME1	600	0.607	0.605	0.6051	0.606	100.95
TMF2	500	0.5077	0.5062	0.5026	0.506	101.10
TMF5	500	0.509	0.5061	0.501	0.505	101.07
ICF1	500	0.5012	0.5014	0.5003	0.501	100.19
L30-500	500	0.4997	0.4998	0.4989	0.499	99.89
TMG3	400	0.3979	0.3958	0.3995	0.398	99.43
TMH1	300	Out of Service				
TMH2	300	0.2993	0.2978	0.3009	0.299	99.78
TMJ1	250	0.25	0.2503	0.2499	0.250	100.03
TMJ2	250	0.2488	0.2492	0.2495	0.249	99.67
TMJ3	250	0.2504	0.2503	0.2519	0.251	100.35
TMK2	200	0.2	0.2001	0.2006	0.200	100.12
TML1	150	0.1486	0.1493	0.149	0.149	99.31
TMM1	120	0.1207	0.1202	0.1205	0.120	100.39
TMN3	100	0.1003	0.1001	0.1002	0.100	100.20
ICN1	100	0.1004	0.0999	0.0993	0.100	99.87
TMQ1	80	0.0799	0.08	0.0799	0.080	99.92
TMR1	70	Out of Service				
TMS1	60	Out of Service				
LAB-30A	50	0.0498	0.0497	0.0496	0.050	99.40
TMU1	40	0.0402	0.0403	0.0402	0.040	100.58
TMU2	40	0.04	0.0399	0.04	0.040	99.92
TMV1	30	0.0296	0.0298	0.0297	0.030	99.00
L30-20	20	0.0199	0.0198	0.0199	0.020	99.33
TMW1	25	0.025	0.025	0.0249	0.025	99.87
TMY1	15	Out of Service				

FRM-246 (Rev 1/Mar 03)

010385

Book/Page 03 020

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

Balance #: 16 Thermometer #: G011 diH20 Temperature (°C): 21

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
Lab30	1000	1.0184	1.0102	1.0165
TMA1	1000	1.0187	1.0064	1.0019
TMA2	1000	1.0175	1.0126	1.0052
~~TMA3~~	~~1000~~	out		
TMA6 ~~out~~ OK	1000	~~1.0414~~ 1.0013 LW 10/31/03	~~1.0220~~ 1.0015	~~1.0105~~ 1.0033 LW 10/31/03
TMB1	900	0.9002	0.9001	0.9005
TMC1	800	0.8030	0.7978	0.7995
TMDD1	750	0.7484	0.7491	0.7479
TMD1	700	0.7009	0.6906	0.6998
TMD2	700	0.7065	0.7082	0.7049
TME1	600	0.6070	0.6050	0.6051
TMF2	500	0.5077	0.5062	0.5026
TMF5	500	0.5090	0.5061	0.5010
ICF1	500	0.5012	0.5014	0.5003
L30-500	500	0.4997	0.4998	0.4989
TMG3	400	0.3979	0.3958	0.3995
TMH1 out!	300	of service 0.2192	0.2100	0.2182
TMH2	300	0.2993	0.2978	0.3009
TMJ1	250	0.2500	0.2503	0.2499
TMJ2	250	0.2488	0.2492	0.2495
TMJ3	250	0.2504	0.2503	0.2519
TMK2	200	0.2000	0.2001	0.2006
TML1	150	0.1486	0.1493	0.1490
TMM1	120	0.1207	0.1202	0.1205
TMN3	100	0.1003	0.1001	0.1002
ICN1	100	0.1004	0.0999	0.0993
TMQ1	80	0.0799	0.0800	0.0799
~~TMR1~~	~~70~~	out		
~~TMS1~~	~~60~~	out		
LAB-30A	50	0.0498	0.0497	0.0496
TMU1	40	0.0402	0.0403	0.0402
TMU2	40	0.0400	0.0399	0.0400
TMV1	30	0.0296	0.0298	0.0297
L30-20	20	0.0199	0.0198	0.0199
TMW1	25	0.0250	0.0250	0.0249
~~TMY1~~	~~15~~	out		

Analyst: Laura Wright Date: 10/21/03

Reviewed by: [illegible] Date: 12/02/03

FRM-243b (Rev 3/Mar 03)

Book/page: 03 051

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

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

9-18-03

010386

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

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	20	0.0200	0.0201	0.0201	0.020	100.33
ADJ200-A	100	0.1000	0.0997	0.1004	0.100	100.03
	200	0.1995	0.1996	0.1996	0.200	99.78
	20	0.0201	0.0200	0.0201	0.020	100.33
ADJ200-C	100	0.0994	0.1004	0.0999	0.100	99.90
	200	0.1986	0.2004	0.2011	0.200	100.02
	20	0.0198	0.0200	0.0200	0.020	99.67
ADJ200-D	100	0.0993	0.1001	0.0997	0.100	99.70
	200	0.1988	0.1994	0.2001	0.199	99.72
	20					
ADJ200-E	100	NOT	FOUND			
	200					
	20	0.0204	0.0203	0.0200	0.020	101.17
ADJ200-G	100	0.0992	0.0992	0.0988	0.099	99.07
	200	0.1990	0.2000	0.1991	0.199	99.68
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					

9-18-03

FRM-247a (Rev 2/Mar 03)

010387 Book/page: 03 052

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 16 Thermometer #: G011 diH20 Temperature (° C) 21

	Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
20 µL – 200 µL		20	.0200	.0201	.0201
	ADJ200-A	100	.1000	.0997	.1004
		200	.1995	.1996	.1996
		20	.0201	.0200	.0201
	ADJ200-C	100	.0994	.1004	.0999
		200	.1986	.2004	.2011
		20	.0198	.0200	.0200
	ADJ200-D	100	.0993	.1001	.0997
		200	.1988	.1994	.2001
		20			
	ADJ200-E	100	OUT	OF	SERVICE
		200	(pipet could	not be found)	broken stem.
		20	.0204	.0203	.0200
	ADJ200-G	100	.0992	.0992	.0988
		200	.1990	.2000	.1991
		20			
	ADJ200	100			
		200			
		20			
	ADJ200	100			
		200			
		20			
	ADJ200	100			
		200			
		20			
	ADJ200	100			
		200			

JW 9-18-03

Analyst: John Wilber Date: 9-18-03

Reviewed by: Walter Alfer Date: 09/25/03

Book/page: 04 005

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

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

10-18-03

010388

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	0.0198	0.0202	0.0201	0.020	100.17
ADJ200-A	100	0.0990	0.0990	0.0993	0.099	99.10
	200	0.1989	0.1999	0.2000	0.200	99.80
	20	0.0202	0.0201	0.0201	0.020	100.67
ADJ200-C	100	0.0989	0.0984	0.0989	0.099	98.73
	200	0.1991	0.1989	0.1993	0.199	99.55
	20	0.0202	0.0202	0.0200	0.020	100.67
ADJ200-D	100	0.0995	0.0992	0.0991	0.099	99.27
	200	0.1988	0.1983	0.1990	0.199	99.50
	20	0.0200	0.0201	0.0200	0.020	100.17
ADJ200-G	100	0.0989	0.0984	0.0985	0.099	98.60
	200	0.1994	0.1996	0.1993	0.199	99.72
	20	0.0198	0.0198	0.0202	0.020	99.67
ADJ200-H	100	0.0992	0.1004	0.0998	0.100	99.80
	200	0.2000	0.1997	0.2000	0.200	99.95
	20	0.0202	0.0203	0.0203	0.020	101.33
ADJ200-J	100	0.0997	0.0995	0.0993	0.100	99.50
	200	0.1994	0.1998	0.1986	0.199	99.63
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					

WJ 10/27/03

FRM-247a (Rev 3/Oct 03)

010389

Book/page: 004 006

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

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

	Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
20 µL – 200 µL		20	.0198	.0202	.0201
	ADJ200-A	100	.0990	.0990	.0993
		200	.1989	.1999	.2000
		20	.0202	.0201	.0201
	ADJ200-C	100	.0989	.0984	.0989
		200	.1991	.1989	.1993
		20	.0202	.0202	.0200
	ADJ200-D	100	.0995	.0992	.0991
		200	.1988	.1983	.1990
		20	.0200	.0201	.0200
	ADJ200-G	100	.0989	.0984	.0985
		200	.1994	.1996	.1993
		20	.0198	.0198	.0202
	ADJ200-H	100	.0992	.1004	.0998
		200	.2000	.1997	.2000
		20	.0202	.0203	.0203
	ADJ200-J	100	.0997	.0995	.0993
		200	.1994	.1998	.1986
		20			
	ADJ200	100			
		200		10-18-03	
		20			
	ADJ200	100			
		200			

Analyst: John Wilks Date: 10-18-03

Reviewed by: Laura Wright Date: 10/27/03

Book/page: 03 101

010390

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

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

9-18-03

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	0.1017	0.1003	0.0999	0.101	100.63
ADJ1000-C	500	0.4967	0.4937	0.4974	0.496	99.19
	1000	0.9955	0.9956	0.9960	0.996	99.57
	100	0.1005	0.1018	0.1016	0.101	101.30
ADJ1000-D	500	0.4958	0.4945	0.4980	0.496	99.22
	1000	0.9963	1.0021	1.0002	1.000	99.95
	100	0.0992	0.0986	0.0996	0.099	99.13
ADJ1000-E	500	0.4952	0.4957	0.4941	0.495	99.00
	1000	0.9901	0.9926	0.9938	0.992	99.22
	100	0.1012	0.1012	0.1015	0.101	101.30
ADJ1000-F	500	0.5004	0.5030	0.5016	0.502	100.33
	1000	1.0004	1.0002	1.0014	1.001	100.07
	100	0.0983	0.0992	0.0981	0.099	98.53
ADJ1000-G	500	0.4970	0.4997	0.4971	0.498	99.59
	1000	0.9996	1.0056	1.0031	1.003	100.28
	100	0.0991	0.1011	0.1006	0.100	100.27
ADJ1000-H	500	0.4940	0.4974	0.4961	0.496	99.17
	1000	0.9947	0.9941	0.9967	0.995	99.52
	100					
ADJ1000	500					
	1000					
	100					
ADJ1000	500					
	1000					
	100					
ADJ1000	500					
	1000					

9-18-03

010391 Book/page: 03 102

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 16 Thermometer #: G011 diH20 Temperature (° C) 21

100 µL – 1000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	100	.1017	.1003	.0999
ADJ1000-C	500	.4967	.4937	.4974
	1000	.9955	.9956	.9960
	100	.1005	.1018	.1016
ADJ1000-D	500	.4958	.4945	.4980
	1000	.9963	1.0021	1.0002
	100	.0992	.0986	.0996
ADJ1000-E	500	.4952	.4957	.4941
	1000	.9901	.9926	.9938
	100	.1012	.1012	.1015
ADJ1000-F	500	.5004	.5030	.5016
	1000	1.0004	1.0002	1.0014
	100	.0983	.0992	.0981
ADJ1000-G	500	.4970	.4997	.4971
	1000	.9996	1.0056	1.0031
	100	.0991	.1011	.1006
ADJ1000-H	500	.4940	.4974	.4961
	1000	.9947	.9941	.9967
	100			
ADJ1000	500			
	1000			
	100			
ADJ1000	500			
	1000			
	100			
ADJ1000	500			
	1000			

JED 9-18-03

Analyst: [signature] Date: 9-18-03

Reviewed by: [signature] Date: 09/25/03

Book/page: 04 059

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

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

10/8/03

010392

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	0.1008	0.1005	0.1015	0.101	100.93
ADJ1000-C	500	0.4939	0.4972	0.4972	0.496	99.22
	1000	0.9989	0.9991	1.0010	1.000	99.97
	100	0.1002	0.0998	0.1005	0.100	100.17
ADJ1000-D	500	0.4965	0.4951	0.4956	0.496	99.15
	1000	1.0021	1.0022	0.9989	1.001	100.11
	100	0.0989	0.0997	0.0999	0.100	99.50
ADJ1000-E	500	0.4954	0.4949	0.4950	0.495	99.02
	1000	0.9956	1.0054	0.9989	1.000	100.00
	100	0.1012	0.1014	0.1012	0.101	101.27
ADJ1000-F	500	0.4971	0.4978	0.4963	0.497	99.41
	1000	0.9931	0.9937	0.9967	0.995	99.45
	100	0.0994	0.0992	0.1011	0.100	99.90
ADJ1000-G	500	0.4959	0.4986	0.4927	0.496	99.15
	1000	0.9940	1.0021	0.9991	0.998	99.84
	100	0.0999	0.0995	0.1008	0.100	100.05
ADJ1000-H	500	0.4941	0.4946	0.4964	0.495	99.01
	1000	1.0105	1.0034	0.9999	1.005	100.46
	100	0.1009	0.1000	0.1017	0.101	100.87
ADJ1000-J	500	0.4949	0.4988	0.4991	0.498	99.52
	1000	1.0006	0.9983	0.9998	1.000	99.98
	100					
ADJ1000	500					
	1000					
	100					
ADJ1000	500					
	1000					

W 10/27/03

FRM-247b (Rev 2/Oct 03)

010393 V20 A0

Book/page: 04 060

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

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

100 µL – 1000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	100	.1008	.1005	.1015
ADJ1000-C	500	.4939	.4972	.4972
	1000	.9989	.9991	1.0010
	100	.1002	.0998	.1005
ADJ1000-D	500	.4965	.4951	.4956
	1000	1.0021	1.0022	.9989
	100	.0989	.0997	.0999
ADJ1000-E	500	.4954	.4949	.4950
	1000	.9956	1.0054	.9989
	100	.1012	.1014	.1012
ADJ1000-F	500	.4971	.4978	.4963
	1000	.9931	.9937	.9967
	100	.0994	.0992	.1011
ADJ1000-G	500	.4959	.4986	.4927
	1000	.9940	1.0021	.9991
	100	.0999	.0995	.1008
ADJ1000-H	500	.4941	.4946	.4964
	1000	1.0105	1.0034	.9999
	100	.1009	.1000	.1017
ADJ1000-J	500	.4949	.4988	.4991
	1000	1.0006	.9983	.9998
	100			
ADJ1000	500			
	1000			
	100			
ADJ1000	500			
	1000			

10-18-03

Analyst: John Wilks Date: 10-18-03

Reviewed by: Laura Wright Date: 10/27/03

Book/page: 03 153

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

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

9-18-03

010394

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	0.5029	0.5018	0.5061	0.504	100.72
ADJ5000-C	2500	2.5233	2.5148	2.5082	2.515	100.62
	5000	5.0185	5.0594	5.0499	5.043	100.85
	500	0.4995	0.5019	0.4952	0.499	99.77
ADJ5000-G	2500	2.5014	2.5109	2.5066	2.506	100.25
	5000	5.0167	5.0325	5.0186	5.023	100.45
	500	0.5056	0.5088	0.5087	0.508	101.54
ADJ5000-H	2500	2.4937	2.4974	2.4933	2.495	99.79
	5000	4.9968	4.9961	4.9943	4.996	99.91
	500	0.5017	0.5021	0.4983	0.501	100.14
ADJ5000-I	2500	2.5010	2.5103	2.5000	2.504	100.15
	5000	5.0008	5.0183	4.9983	5.006	100.12
	500	0.4981	0.4925	0.4989	0.497	99.30
ADJ5000-J	2500	2.4982	2.5075	2.5014	2.502	100.09
	5000	5.0070	5.0168	5.0050	5.010	100.19
	500	0.5048	0.5077	0.5076	0.507	101.34
ADJ5000-K	2500	2.5182	2.5148	2.5129	2.515	100.61
	5000	5.0209	5.0302	5.0240	5.024	100.48
	500	0.4925	0.4915	0.4997	0.495	98.91
ADJ5000-L	2500	2.5030	2.4931	2.5009	2.499	99.96
	5000	4.9985	5.0203	5.0108	5.010	100.20
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					

9-18-03

FRM-247c (Rev 2/Mar 03)

010395 Book/page: 03 154

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 16 Thermometer #: G011 diH20 Temperature (° C) 21

500 µL – 5000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	500	.5029	.5018	.5061
ADJ5000-C	2500	2.5233	2.5148	2.5082
	5000	5.0185	5.0594	5.0499
	500	.4995	.5019	.4952
ADJ5000-G	2500	2.5014	2.5109	2.5066
	5000	5.0167	5.0325	5.0186
	500	.5056	.5088	.5087
ADJ5000-H	2500	2.4937	2.4974	2.4933
	5000	4.9968	4.9961	4.9943
	500	.5017	.5021	.4983
ADJ5000-I	2500	2.5010	2.5103	2.5000
	5000	5.0008	5.0183	4.9983
	500	.4981	.4925	.4989
ADJ5000-J	2500	2.4982	2.5075	2.5014
	5000	5.0070	5.0168	5.0050
	500	.5048	.5077	.5076
ADJ5000-K	2500	2.5182	2.5148	2.5129
	5000	5.0209	5.0302	5.0240
	500	.4925	.4915	.4997
ADJ5000-L	2500	2.5030	2.4931	2.5009
	5000	4.9985	5.0203	5.0108
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			

9-18-03

Analyst: John Willis Date: 9-18-03

Reviewed by: John Clifford Date: 09/25/03

Book/page: 04 113

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

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

10-18-03

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	0.5056	0.5105	0.5094	0.509	101.70
ADJ5000-C	2500	2.5050	2.4983	2.4989	2.501	100.03
	5000	5.0010	5.0219	4.9952	5.006	100.12
	500	0.5071	0.5092	0.5086	0.508	101.66
ADJ5000-G	2500	2.4974	2.4994	2.4970	2.498	99.92
	5000	5.0038	5.0221	5.0055	5.010	100.21
	500	0.5084	0.5065	0.5008	0.505	101.05
ADJ5000-H	2500	2.5024	2.4988	2.5017	2.501	100.04
	5000	5.0094	5.0154	4.9999	5.008	100.16
	500	0.4933	0.4952	0.4916	0.493	98.67
ADJ5000-I	2500	2.4961	2.5014	2.5042	2.501	100.02
	5000	5.0386	5.0165	5.0118	5.022	100.45
	500	0.5031	0.5016	0.4986	0.501	100.22
ADJ5000-J	2500	2.4955	2.4956	2.4911	2.494	99.76
	5000	4.9988	4.9965	4.9993	4.998	99.96
	500	0.5002	0.5085	0.5071	0.505	101.05
ADJ5000-K	2500	2.5011	2.5079	2.5110	2.507	100.27
	5000	5.0229	5.0297	5.0100	5.021	100.42
	500	0.4944	0.4956	0.4912	0.494	98.75
ADJ5000-L	2500	2.4970	2.4985	2.4979	2.498	99.91
	5000	5.0249	5.0023	5.0054	5.011	100.22
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000				10-18-03	
	500					
ADJ5000	2500					
	5000					

FRM-247c (Rev 2/Mar 03)

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Book/page: 04 114

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

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

500 µL – 5000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	500	.5056	.5105	.5094
ADJ5000-C	2500	2.5050	2.4983	2.4989
	5000	5.0010	5.0219	4.9952
	500	.5071	.5092	.5086
ADJ5000-G	2500	2.4974	2.4994	2.4970
	5000	5.0038	5.0221	5.0055
	500	.5084	.5065	.5008
ADJ5000-H	2500	2.5024	2.4988	2.5017
	5000	5.0094	5.0154	4.9999
	500	.4933	.4952	.4916
ADJ5000-I	2500	2.4961	2.5014	2.5042
	5000	5.0386	5.0165	5.0118
	500	.5031	.5016	.4986
ADJ5000-J	2500	2.4955	2.4956	2.4911
	5000	4.9988	4.9965	4.9993
	500	.5002	.5085	.5071
ADJ5000-K	2500	2.5011	2.5079	2.5110
	5000	5.0229	5.0297	5.0100
	500	.4944	.4956	.4912
ADJ5000-L	2500	2.4970	2.4985	2.4979
	5000	5.0249	5.0023	5.0054
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			

JW 10-18-03

Analyst: John Wilkes Date: 10-18-03

Reviewed by: Dana Wright Date: 10/27/03

FRM-244 (c) (Rev 3/Mar 03)

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Div. 20
TASK ORDER: 030918-4
SRR: 24974
SDG: 234759
CASE: CNWRA
VTSR: September 18, 2003
PROJECT#: 06002.01.141

Balance Calibrations

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	
9/19/03	2.0000	2.0000	WW	SN:99-J50526-15
9/22/03	2.0000	2.0000	WW	"
9-23-03	2.0000	2.0001	JW	"
9/24/03	2.0000	1.9999	WW	"
9-25-03	2.0000	1.9999	JW	"
9-26-03	2.0000	2.0000	JW	"
9/29/03	2.0000	1.9999	WW	"
9-30-03	2.0000	1.9999	JW	"
10-1-03	2.0000	2.0000	JW	"
10/2/03	2.0000	1.9999	WW	"

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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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	
10/17/03	2.0000	2.0000	MW	SN:99-J50526-15
10-20-03	2.0000	1.9999	JW	"
10-21-03	2.0000	2.0000	JW	"
10-22-03	2.0000	1.9999	JW	"
10/23/03	2.0000	1.9999	MW	"
10-24-03	2.0000	1.9999	JW	"
10/27/03	2.0000	2.0001	MW	"
			MW 10/27/03	

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.

✓ Ams
10/27/03

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010399

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	
9-10-03	10.00	10.00	JW	SN:99-550624-5
9/11/03	10.00	10.00	JW	"
9-12-03	10.00	10.00	JW	"
9-15-03	10.00	10.01	JW	"
9-16-03	10.00	10.01	JW	"
9-17-03	10.00	10.01	JW	"
9-18-03	10.00	10.00	JW	"
9/19/03	10.00	10.00	JW	"
9/22/03	10.00	10.00	JW	"
9-23-03	10.00	10.00	JW	"

If balance is out of limits, clean the balance and re-calibrate using Class "S" weights.
If balance is still out of limits, place a "DO NOT USE" sign on it and call (x5896) for service.

Page # 1

FRM-112 (Rev 1/Dec 99)

010400

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	
9/24/03	10.00	10.00	MW	SN:99-J50624-5
9-25-03	10.00	10.01	JW	"
9-26-03	10.00	10.00	JW	"
9/29/03	10.00	10.00	MW	"
9-30-03	10.00	10.00	JW	"
10-1-03	10.00	10.00	JW	"
10/2/03	10.00	9.99	MW	"
10-3-03	10.00	10.01	JW	"
10/6/03	10.00	10.00	MW	"
10-7-03	10.00	10.00	JW	"

If balance is out of limits, clean the balance and re-calibrate using Class "S" weights.
If balance is still out of limits, place a "DO NOT USE" sign on it and call (x5896) for service.

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FRM-112 (Rev 1/Dec 99)

010401

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	
10/8/03	10.00	10.00	LW	sn:99-J50624-5
10-9-03	10.00	10.00	JW	"
10-10-03	10.00	10.01	JW	"
10-13-03	10.00	10.00	JW	"
10-14-03	10.00	10.00	JW	"
10-15-03	10.00	10.00	JW	"
10-16-03	10.00	10.00	JW	"
10/17/03	10.00	10.00	LW	"
10-20-03	10.00	10.00	JW	"
10-21-03	10.00	10.00	JW	"

If balance is out of limits, clean the balance and re-calibrate using Class "S" weights.
If balance is still out of limits, place a "DO NOT USE" sign on it and call (x5896) for service.

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FRM-112 (Rev 1/Dec 99)

010402

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	
9-18-03	2.0000	1.9999	JW	SN-99-J50526-15
9/19/03	2.0000	2.0000	MW	"
9/22/03	2.0000	2.0000	MW	"
9-23-03	2.0000	1.9999	JW	"
9/24/03	2.0000	1.9999	MW	"
9-25-03	2.0000	2.0000	JW	"
9-26-03	2.0000	2.0000	JW	"
9/29/03	2.0000	2.0001	MW	"
9-30-03	2.0000	2.0000	JW	"
10-1-03	2.0000	1.9999	JW	"

If balance is out of limits, clean the balance and re-calibrate using Class "S" weights.
If balance is still out of limits, place a "DO NOT USE" sign on it and call (x5896) for service.

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010403

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	
10-16-03	2.0000	2.0001	JW	SN:99-J505216-15
10/17/03	2.0000	2.0000	JW	"
10-18-03	2.0000	2.0001	JW	"
JW ~~10-19~~ 10-20-03	2.0000	2.0000	JW	"
10-21-03	2.0000	2.0000	JW	"
10-22-03	2.0000	1.9999	JW	"
10/23/03	2.0000	1.9999	JW	"
10-24-03	2.0000	1.9999	JW	"
10/27/03	2.0000	2.0000	JW	"
				JW 10/27/03

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.

✓ and 10/27/03

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010404

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Div. 20
TASK ORDER: 030918-4
SRR: 24974
SDG: 234759
CASE: CNWRA
VTSR: September 18, 2003
PROJECT#: 06002.01.141

DI Water Verification

D.I. WATER SYSTEM NOTEBOOK
METALS LAB
SOUTHWEST RESEARCH INSTITUTE

01 028

010405

DATE	INITIALS	READING (M OHMS)	SET PT./ QC LT. Green=OK	CALL FOR Service LT. Green=OK	USAGE (GALS)	COMMENTS
9/23/03	DR	18.0	✓	✓	51391.3	5:47pm
9/24/03	DR	18.0	✓	✓	51398.6	5:26pm
9/25/03	area under construction, unable to read.				DR 9/25/03	
9/26/03	DR	18.0	✓	✓	51419.0	6:43pm
9/29/03	DR	18.0	✓	✓	51416.8	8:40pm
9/30/03	DR	18.0	✓	✓	51420.3	7:43pm
10/1/03	DR	18.0	✓	✓	51424.2	7:30pm
10/2/03	DR	18.0	✓	✓	51431.3	6:20pm
10/3/03	DR	18.0	✓	✓	51434.5	5:32pm
10/6/03	DR	18.0	✓	✓	51445.0	5:46pm
10/7/03	DR	18.0	✓	✓	51448.9	7:22pm
10/8/03	DR	18.0	✓	✓	51454.0	6:35pm
10/9/03	DR	18.0	✓	✓	51468.8	8pm
10/10/03	DR	18.0	✓	✓	51464.0	6:07pm
←		VDJ 10/13/03				→
10/13/03	DR	18.0	✓	✓	51474.8	6:53pm
10/14/03	DR	18.0	✓	✓	51476.1	7:13pm
10/15/03	DR	18.0	✓	✓	51478.3	7:20pm
10/16/03	DR	18.0	✓	✓	51482.3	6:40pm
10/17/03	DR	18.0	✓	✓	51486.5	8:11pm
10/18/03	DR	18.0	✓	✓	51489.2	8:21pm
10/21/03	DR	18.0	✓	✓	51495.4	7:15pm
10/22/03	DR	18.0	✓	✓	51502.2	8:00pm
10/23/03	DR	18.0	✓	✓	51509.0	9:16pm
10/24/03	DR	18.0	✓	✓	51514.5	8:15pm
10/27/03	LW — Reviewed					
10/27/03	DR	18.0	✓	✓	51519.5	9:00pm
10/28/03	DR	18.0	✓	✓	51523.6	6:02pm
10/29/03	DR	18.0	✓	✓	51526.4	7:35pm
10/30/03	DR	18.0	✓	✓	51531.2	8:40pm
10/31/03	DR	18.0	✓	✓	51533.7	5:45pm
11/3/03	DR	18.0	✓	✓	51539.4	7:25pm
11/4/03	DR	18.0	✓	✓	51548.9	7:09pm
11/5/03	DR	18.0	✓	✓	51553.2	8:29pm
11/6/03	DR	18.0	✓	✓	51556.9	7:16pm

✓ ams 11/17/03

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Div. 20
TASK ORDER: 030918-4
SRR: 24974
SDG: 234759
CASE: CNWRA
VTSR: September 18, 2003
PROJECT#: 06002.01.141

SURVEILLANCE REPORTS
From Division 30