010001

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 030604-8
SRR: 24405
SDG: 227265
CASE: CNWRA
VTSR: June 04, 2003
PROJECT#: 06002.01.081

FINAL REPORT

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010002

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 06/04/03

Matrix: Liquid

Project No.: 20.06002.01.081

SRR: 24405

TO: 030604-8

Sample ID	Lab System ID	Lead Results (mg/L)	Chloride Results (mg/L)
Prep Blank	----	<0.003	<0.1
Lab Control	----	0.495	212
True Value	----	0.500	200
Recovery	----	99.0%	106%
#1 1:10 Dilution PbCl2 Solution	227265	1200	1170
Duplicate result	227265	1150	1171
RPD	227265	4.26%	0.09%
Spike result	227265	1700	1548
Spike added	227265	500	400
Recovery	227265	100%	94.5%
#2 1:10 Dilution PbCl2 Solution	227266	1200	1442

Reporting Limit: 0.003 mg/L 0.1 mg/L

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010003

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 030604-8
SRR: 24405
SDG: 227265
CASE: CNWRA
VTSR: June 04, 2003
PROJECT#: 06002.01.081

Work Orders/01-QPP-015

Southwest Research Institute

Laboratory Task Order

TO #: 030604-8 Revision: 0

010004

SDG: 227265
VTSR: 06/04/03
CASE: YPAN / CNWRA

SRR #'s: 24405
Client(s): DIV 20

Project(s): 06002.01.081
Manager(s): DAMMANN, MIKE
To PM: 06/06/03
To QA: 06/17/03
To Client: 06/17/03

Instructions

DIVISON 20. Task Order is NUCLEAR SAFETY RELATED 10 CFR 50, PART 21, APPENDIX B. Please contact Institute QA (Charlie Butcher 5928, pager 271.5172) before starting ANY work. Lead and Chloride analysis by ICP and IC. Lead preliminary results needed on 06/06/03. 14-day TAT on hard copy. Division 20 contact is Yi Ming Pan, ext. 6640. Contact PM with any questions.

Documents Related to this task order: 5394

Test: DIL-DILUTION
Section: METALPREP

Holding: 28 days from CED
Prep, Dilution

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
227265		1	Liquid	#1 1:10 Dilution PbCl2 Solution	04 Jun 03	02 Jul 03
227266		1	Liquid	#2 1:10 Dilution PbCl2 Solution	04 Jun 03	02 Jul 03

Test: IC-300.0
Section: WETCHEM

Holding: 28 days from CED
IC Method 300.0 anions (only for Bromide, Chloride, Fluoride, Sulfate)

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
227265		1	Liquid	#1 1:10 Dilution PbCl2 Solution	04 Jun 03	02 Jul 03
227266		1	Liquid	#2 1:10 Dilution PbCl2 Solution	04 Jun 03	02 Jul 03

Test: ICP-SWRI
Section: METALS

Holding: 180 days from CED
ICP Analysis by SwRI Method

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
227265		1	Liquid	#1 1:10 Dilution PbCl2 Solution	04 Jun 03	01 Dec 03
227266		1	Liquid	#2 1:10 Dilution PbCl2 Solution	04 Jun 03	01 Dec 03

ver 05/09/2003

010005

Sample Receipt

Sample Receipt Number: 24405

Southwest Research Institute

VTSR: 06/04/03

Time: 15:10:00

Project: 06002.01.081
Case #: CNWRA
Client: DIV 20

Manager: DAMMANN, MIKE
Logged in by: kedrisi
Creation Date: 06/04/03

Notes

Samples were received hand delivered at ambient temperature (22.0 °C).

QC Note: As per method.

Parameters: Analysis for Pb by ICP and Chlorine by IC. As per COC.

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

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

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

Note: All personnel must be QA Nuclear Certified.

Note: See chain of custody as part of the work order system for more information. Contact Project Manager for questions. POC- is Yiming Pan ext.# 6640.

Note: Turnaround time is 14 days from VTSR.

Note: Samples were received intact.
*** kedrisi Jun 4 2003 4:13PM ***

System ID	Customer ID	CED	Matrix	Containers
227265	#1 1:10 Dilution PbCl2 Solution	06/04/03	Liquid	1
227266	#2 1:10 Dilution PbCl2 Solution	06/04/03	Liquid	1
Containers: 2				Samples: 2

Thermometer: 026
Temperature: 22.0

Client: DIV 20

SR#: 2440

FRM-002

Page Printed: 4 Jun 2003 16:40:46
ver (05/09/2003)

SAMPLE LIST/CHAIN OF CUSTODY

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

Shipper Name/Address: Yi-Ming Pan X6640

Client: DIV. 20

Client Purchase Order/Other ID:

Site/Zone ID:

Requested Turnaround:
- ☐ 2 Weeks
- ☐ 3 Weeks
- ☒ Other: 3-day prelim, 14-day hard copy

SwRI Contact: MIKE DAMMANN

Analyses Requested

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers	Lead by ICP	Chlorine by IC							Intact	
#1 1:10 Dilution PbCl2 Solution	6/4/03		W		1	↓	↓							✓	
#2 1:10 Dilution PbCl2 Solution	6/4/03		W		1	↓	↓							✓	

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
10 CFR 50 PART 21

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:

Relinquished by (Print/Signature)	Date	Time
D Ramirez for Yi-Ming PAN	6/4/03	3:10pm
Received by (Print/Signature)	Date	Time
Relinquished by (Print/Signature)	Date	Time
Received by (Print/Signature)	Date	Time
Relinquished by (Print/Signature)	Date	Time

SwRI Project#: 20.06002.01.081

Received by SwRI Lab: (Signature)

Date: 6/4/03 Time: 1510

Samples Disposed: Date: Time:

Samples Disposed by:

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

Page _____ of _____

010006

010007

01-QPP-015
Division 01
Revision 4
November 2002

Document No. 3

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

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:

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

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

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

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

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

1.0 INTRODUCTION

This Quality Project Plan (QPP) defines the Quality Assurance (QA) program requirements for personnel providing the chemical analyses for commercial nuclear power plants. Southwest Research Institute (SwRI) ***Program Quality Plan (PQP-Nuclear)***, *Nuclear Services* shall implement the QA requirements. Project activities controlled by the PQP-Nuclear shall be accomplished as specified by the appropriate sections of **01-QAP-004**, *Quality Assurance Plan for Analytical and Environmental Services* and/or nationally recognized testing methods as specified on individual purchase orders. This QPP shall be applied to all projects initiated for nuclear utilities in the Department of Analytical and Environmental Chemistry. If, as a result of complexity, duration, or other factors, it is determined that a unique, project-specific quality plan is required, the project QAE shall notify the Project Manager and a project-specific quality plan shall be generated in accordance with **SOP-01-5.2**, *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-CH/AN* to Quality Project Plan, *QPP-015*
Extensive revision to comply with Project Quality Plan PQP-Nuclear, *Nuclear Services*, which replaces SwRI NQAPM, *Nuclear Quality Assurance Program Manual.*

Southwest Research Institute

010016

Traffic Report

Sample Custodian Signature: 6/4/03

Project: 06002.01-081

Case: CNWRA / SDG: _____

Airbill: HAND DELIVERED

Sample Receipt: 24405

1. Custody Seal — Not Present or Damaged
2. Chain of Custody — Present
3. Sample Tags — Not Present
   Sample Tag Numbers — Not on COC
4. SMO Forms — Not Present

Date Received	Time Received	COC Record	SMO Sample #	Corresponding		Traffic Rpt, Tags, COC Agree	Sample Condition
				Sample Tag #	SwRI #		
06/04/03	15:10:00	None	#1 1:10 Dilution PbCl2 Solution	None	227265	YES	Intact
06/04/03	15:10:00	None	#2 1:10 Dilution PbCl2 Solution	None	227266	YES	Intact

Client: DIV 20

WO: 24405

FRM-217

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 030604-8
SRR: 24405
SDG: 227265
CASE: CNWRA
VTSR: June 04, 2003
PROJECT#: 06002.01.081

Chain of Custody/Login Paperwork

5394

SAMPLE LIST/CHAIN OF CUSTODY

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

Shipper Name/Address: Yi-Ming Pan X6640

Client: DIV. 20

Client Purchase Order/Other ID:

Site/Zone ID:

Requested Turnaround:
- ☐ 2 Weeks
- ☐ 3 Weeks
- ☒ Other: 3-day prelim ~~14-day hardcopy~~

SwRI Contact: MIKE DAMMANN

Analyses Requested

Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers	Lead by ICP	Chlorine by IC							Intact	
#1 1:10 Dilution PbCl2 Solution	6/4/03		W		1	↓	↓							✓	
#2 1:10 Dilution PbCl2 Solution	6/4/03		W		1	↓	↓							✓	

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 10 CFR 50 PART 21

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:

Relinquished by (Print/Signature)	Date	Time
D Ramirez for Yi-Ming Pan	6/4/03	3:10pm
Received by (Print/Signature)	Date	Time
Relinquished by (Print/Signature)	Date	Time
Received by (Print/Signature)	Date	Time
Relinquished by (Print/Signature)	Date	Time

SwRI Project#: 20.06002.01.081

Received by SwRI Lab: (Signature)

Date: 6/4/03 Time: 1510

Samples Disposed: Date: Time:

Samples Disposed by:

010018

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

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Southwest Research Institute

LOG-IN CHECKLIST

Sample Receipt Report No.: **24405**

010019

Project Information All product information shall be derived from a contract, statement of work (SOW), or project manager (PM).				
Previous PM information	Yes	☐	No	☒
Current PM information	Yes	☒	No	☐
Sponsor's Documentation All original documentation must be attached to the work order and sent to Div 01 Quality Assurance (DQA).				
Delivery documentation (*) = (Tape on 8 ½ x 11 white paper)	Yes	☐	No	☒
Hand carried	Yes	☒	No	☐
Correspondence	Yes	☐	No	☒
Custody seals*	Yes	☐	No	☒
Chain-of-custody/Traffic report	Yes	☒	No	☐
Sample tags* (Confirm with container information before removal)	Yes	☐	No	☒
Hazard notifications	Yes	☐	No	☒
Product Condition Sample(s) shall not be left unattended once an ice chest has been opened.				
Sample(s) received intact	Yes	☒	No	☐
Container(s) received leaking	Yes	☐	No	☒
Container(s) received damaged	Yes	☐	No	☒
Lid(s) received damaged	Yes	☐	No	☒
Product Preparation				
FRM-115 (pH) Preservation Report / Metals & Wetchem H2O	Yes	☐	No	☒
Product Storage Sample(s) shall be stored in a designated location with their corresponding sample control records (SCR).				
Sample(s) in designated location	Yes	☒	No	☐
Sample Receipt Report All copies must be legible.				
Computerized sample receipt report with original documents	Yes	☒	No	☐
Sample custodian signature and date on all original documents.	Yes	☒	No	☐
Copy of sample receipt report to PM	Yes	☒	No	☐
PM sample receipt report approval with initial and date	Yes	☒	No	☐
Case file documents to DQA	Yes	☒	No	☐
Print sample log-in page and place in log-in notebook	Yes	☒	No	☐
Chain-of-Custody/Traffic Report				
Sample Custodian's signature, date, and time	Yes	☒	No	☐
Document thermometer no. / temperature (Confirm calibration is current)	Yes	☒	No	☐
Document condition of sample(s)	Yes	☒	No	☐
FRM-109				
Discrepancies	Yes	☐	No	☒
FRM-109 to PM	Yes	☐	No	☒
FRM-109 to Client (Only for required contracts)	Yes	☐	No	☒
FRM-109 to Inorganics for discrepancies of FRM-115	Yes	☐	No	☒
Ice Chest Shipment				
Clean ice chest/Discard used bags and ice/Return Sponsor's packing material	Yes	☐	No	☒
SwRI shipping ticket with project identification	Yes	☐	No	☒
Log-In Closure				
Sample Custodian's Signature:	Date: 06/04/03		Time: 4:17 PM	

SAMPLE LOG-IN SHEET

010020

Lab Name: Southwest Research Institute

Page 1 of 1

Received By (Print Name): Khaled Edris

Log-in Date: 06/04/2003

Received By (Signature): Khaled E

Case Number: CNWRA

Sample Delivery Group No.

SAS Number: N/A

Remarks: 06002.01.081

			EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc
1.	Custody Seal(s)	Present/Absent* Intact/Broken	#1 1:10 Dilution PbCl2 Solution	None	227265	Intact
2.	Custody Seal Nos.	N/A	#2 1:10 Dilution PbCl2 Solution	None	227266	Intact
3.	Chain-of Custody Records	Present/Absent*				
4.	Traffic Reports or Packing Lists	Present/Absent				
5.	Airbill	Airbill/Sticker Present/Absent*				
6.	Airbill No.	HAND DELIVERED				
7.	Sample Tags	Present/Absent				
	Sample Tag Numbers	Listed/Not listed on Chain of Custody				
8.	Sample Condition	Intact/Broken*/ Leaking				
9.	Cooler Temperature	22.0C				
10.	Does Information on custody records, traffic reports, and sample tags agree?	Yes/No*				
11.	Date Received at Lab	06/04/2003				
12.	Time Received	15:10:00				

Sample Transfer

Fraction: ICP, IC	Fraction:
Area #: Inorg. 1	Area #: 6/4/03
By: KE	By: KE
On: 6/4/03	On:

* Contact SMO and attach record of resolution

Reviewed By: CYNTHIA A. SALCEDA

Date: 06/04/2003

Logbook No.: Sample Receipt (24405)

Logbook Page No.: 4727 (2,3 of 4)

FORM DC-1

OLMO4.2

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 030604-8
SRR: 24405
SDG: 227265
CASE: CNWRA
VTSR: June 04, 2003
PROJECT#: 06002.01.081

Copies of Login Book

Sample Login Book

Jun 04, 2003

SwRI Login Area
Division 1

Sample Receipt: 24402 | Project: 04311.01.00X | Client: COLUMBIA UNIVERS
VTSR Date: Jun 04, 2003 | VTSR Time: 08:15:00 | Manager: CAMANN, DAVID

System ID	Customer Sample ID	Matrix
227249	E126 PUF2	Puf
227250	E126 PUF3	Puf
227251	E129 PUF2	Puf
227252	E129 PUF3	Puf
227253	E129 PUF4	Puf
227254	E133 PUF2	Puf
227255	E133 PUF3	Puf

Sample Receipt: 24403 | Project: 04311.01.007 | Client: COLUMBIA UNIVERS
VTSR Date: Jun 04, 2003 | VTSR Time: 08:15:00 | Manager: CAMANN, DAVID

System ID	Customer Sample ID	Matrix
227256	M1731.SUB	Puf
227257	M1901	Puf
227258	M1920	Puf
227259	M1932	Puf
227260	M1936	Puf

Sample Receipt: 24404 | Project: 03227.09.100 | Client: DIV 03
VTSR Date: Jun 04, 2003 | VTSR Time: 13:30:00 | Manager: QUARDERER, SHRADDHA

System ID	Customer Sample ID	Matrix
227262	Run 5426	Air
227263	Run 5430	Air
227264	Run 5434	Air

Sample Receipt: 24405 | Project: 06002.01.081 | Client: DIV 20
VTSR Date: Jun 04, 2003 | VTSR Time: 15:10:00 | Manager: DAMMANN, MIKE

System ID	Customer Sample ID	Matrix
227265	#1 1:10 Dilution PbCl2 Solution	Liquid

Sample Login Book

Jun 04, 2003

010023

SwRI Login Area
Division 1

Sample Receipt: 24405	Project: 06002.01.081	Client: DIV 20
VTSR Date: Jun 04, 2003	VTSR Time: 15:10:00	Manager: DAMMANN, MIKE

System ID	Customer Sample ID	Matrix
227266	#2 1:10 Dilution PbCl2 Solution	Liquid

Sample Receipt: 24406	Project: 06413.01.004	Client: DIV. 08
VTSR Date: Jun 04, 2003	VTSR Time: 16:04:00	Manager: QUARDERER, SHRADDHA

System ID	Customer Sample ID	Matrix
227267	Blank 3	Filter
227268	Blank 4	Filter
227269	EMAOIL-SS1	Filter
227270	EMAOIL-SS2	Filter
227271	EMAOIL-SS3	Filter
227272	EMAOIL-SS4	Filter
227273	EMAOIL-SS5	Filter
227274	EMAOIL-SS6	Filter
227275	EMAOIL-SS7	Filter
227276	EMAOIL-SS8	Filter
227277	EMAOILFTP1	Filter

Sample Receipt: 24407	Project: 06413.01.004	Client: DIV. 08
VTSR Date: Jun 04, 2003	VTSR Time: 16:04:00	Manager: QUARDERER, SHRADDHA

System ID	Customer Sample ID	Matrix
227278	Blank 1	Filter
227279	Blank 2	Filter
227280	EMA2D FTP1	Filter
227281	EMA2D-SS1	Filter
227282	EMA2D-SS2	Filter
227283	EMA2D-SS3	Filter
227284	EMA2D-SS4	Filter
227285	EMA2D-SS5	Filter
227286	EMA2D-SS6	Filter

010024

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 030604-8
SRR: 24405
SDG: 227265
CASE: CNWRA
VTSR: June 04, 2003
PROJECT#: 06002.01.081

RAW DATA

Div 20
to#030604-8
06002.01.081

									@instr				
system id	elem	result	qual	units	rl	tv	rec		ug/ml	df	mg/L	date	time
pbw	Pb220	0.003	U	mg/L	0.003				0.00186	1	0.00186	06/09/03	10:36
lcsw	Pb220	0.495		mg/L	0.003	0.5	99.0%		0.49515	1	0.49515	06/09/03	10:42
227265	Pb220	1200		mg/L	3				1.20074	1000	1200.74	06/09/03	10:47
227265d	Pb220	1150		mg/L	3				1.15113	1000	1151.13	06/09/03	10:52
227265s	Pb220	1700		mg/L	3	500	100.0%		1.69622	1000	1696.22	06/09/03	10:57
227266	Pb220	1200		mg/L	3				1.20430	1000	1204.3	06/09/03	11:02

6/10/03

6/10/03

ICP ANALYSIS

PROJ. NO.	PROJECT	TO#	DATE	MATRIX	LOGBK PG
06002.01.081	Div 20	030604-8	6-9-03	Liquid	N/A

INSTRUMENT: Trace 1 FILENAME: A06048

INSTRUMENT DL: _____

010027

Standardization Rpt. 06/09/03 09:57:58 AM page 1

Method: DAILY1 Standard: blk
Run Time: 06/09/03 09:52:59

Elem	Ag3280	Al3082	As1890	B 2496	Ba4934	Be3130	Bi2230
Avge	-.00001	.0007	-.0000	.0035	-.0000	-.0001	-.0000
SDev	.00000	.0001	.0000	.0000	.0000	.0000	.0000
%RSD	71.479	6.707	192.2	.2976	2.261	.2798	5.122
#1	-.00001	.0008	.0000	.0035	-.0000	-.0001	-.0000
#2	-.00000	.0007	-.0000	.0035	-.0000	-.0001	-.0000

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K 7664
Avge	.0000	.0000	-.0000	-.0000	.0004	-.0000	.0026
SDev	.0000	.0000	.0000	.0000	.0000	.0000	.0003
%RSD	8.000	115.4	213.4	36.32	1.436	19.94	11.73
#1	.0000	.0000	.0000	-.0000	.0004	-.0000	.0024
#2	.0000	.0000	-.0000	-.0000	.0005	-.0000	.0028

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Avge	.0005	.0005	.0000	.0000	-.0000	-.0157	-.0002
SDev	.0000	.0000	.0000	.0000	.0000	.0002	.0000
%RSD	.3584	2.742	27.30	48.05	172.3	1.225	21.89
#1	.0005	.0005	.0000	.0000	-.0000	-.0159	-.0002
#2	.0005	.0005	.0000	.0000	.0000	-.0156	-.0002

Elem	Ni2316	P 1782	2203/1	2203/2	Pd3404	S 1820	Sb2068
Avge	.0000	.0001	.0002	-.0000	-.0000	.0000	.0000
SDev	.0000	.0000	.0001	.0001	.0000	.0000	.0000
%RSD	141.4	.6358	30.13	233.0	14.70	157.4	141.4
#1	.0000	.0001	.0002	.0000	-.0000	-.0000	.0000
#2	.0000	.0001	.0002	-.0001	-.0000	.0000	.0000

Elem	Sc3613	1960/1	1960/2	Si2881	Sn1899	Sr4215	Th2837
Avge	63.90	-.0001	.0001	.0018	-.0000	.0000	.0000
SDev	.66	.0001	.0000	.0000	.0000	.0000	.0000
%RSD	1.030	41.58	20.75	.3177	110.4	1.028	42.11
#1	63.44	-.0002	.0001	.0018	-.0000	.0000	.0000
#2	64.37	-.0001	.0001	.0018	-.0000	.0000	.0000

Elem	Ti3372	Tl1908	U 3859	V 2924	W 2079	Y 3710	Zn2062
Avge	-.0014	-.0000	.0044	-.0000	.0001	-.0000	.0000
SDev	.0001	.0000	.0000	.0000	.0000	.0000	.0000
%RSD	3.810	29.02	.6752	59.77	2.599	141.4	85.51
#1	-.0015	-.0000	.0044	-.0000	.0001	.0000	.0000
#2	-.0014	-.0000	.0044	-.0000	.0001	-.0000	.0000

Elem	Zr3496
Avge	.0002
SDev	.0000
%RSD	5.312
#1	.0002
#2	.0002

6-9-03

6/10/03

30 Jun 03

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	638963	10000	--	--	--	--	--
SDev	6569.022	.0000000	--	--	--	--	--
%RSD	1.028075	.0000000	--	--	--	--	--
#1	634318	10000	--	--	--	--	--
#2	643608	10000	--	--	--	--	--

Standardization Rpt. 06/09/03 10:02:23 AM page 1

Method: DAILY1 Standard: clp_std4
Run Time: 06/09/03 09:58:08

Elem	Ag3280	As1890	2203/1	2203/2	Sb2068	1960/1	1960/2
Avge	.05614	.1288	.4917	.5098	.1320	.2622	.4646
SDev	.00045	.0002	.0003	.0028	.0003	.0008	.0037
%RSD	.79486	.1628	.0591	.5499	.2288	.3169	.8040
#1	.05582	.1287	.4919	.5078	.1318	.2628	.4620
#2	.05646	.1290	.4915	.5117	.1322	.2616	.4672

Elem	Tl1908
Avge	.0347
SDev	.0002
%RSD	.5914
#1	.0346
#2	.0349

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	625836	10000	--	--	--	--	--
SDev	1675.843	.0000000	--	--	--	--	--
%RSD	.2677767	.0000000	--	--	--	--	--
#1	624651	10000	--	--	--	--	--
#2	627021	10000	--	--	--	--	--

Standardization Rpt. 06/09/03 10:06:47 AM page 1

Method: DAILY1 Standard: clp_std1
Run Time: 06/09/03 10:02:33

Elem	Al3082	Ca3179	Fe2714	K_7664	Li6707	Mg2790	Na3302
Avge	.1288	.1595	.1113	1.444	2.991	.0588	.0117
SDev	.0001	.0002	.0003	.006	.010	.0001	.0001
%RSD	.0685	.1248	.3061	.4350	.3275	.1898	.8009
#1	.1287	.1593	.1115	1.449	2.998	.0588	.0116
#2	.1289	.1596	.1110	1.440	2.984	.0587	.0117

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	620086	10000	--	--	--	--	--
SDev	2.121320	.0000000	--	--	--	--	--
%RSD	.0003421	.0000000	--	--	--	--	--
#1	620088	10000	--	--	--	--	--
#2	620085	10000	--	--	--	--	--

Standardization Rpt. 06/09/03 10:10:50 AM page 1

Method: DAILY1 Standard: clp_std5
Run Time: 06/09/03 10:06:57

Elem	B 2496	Bi2230	Mo2020	P 1782	Si2881	Sn1899	Sr4215
Avge	.4258	.0654	.1818	.0502	.1423	.2200	1.429
SDev	.0008	.0003	.0016	.0001	.0007	.0008	.006
%RSD	.1828	.5257	.8661	.1827	.4969	.3600	.4480
#1	.4264	.0657	.1807	.0502	.1428	.2206	1.433
#2	.4253	.0652	.1829	.0503	.1418	.2194	1.424

Elem	Ti3372
Avge	1.080
SDev	.002
%RSD	.1581
#1	1.081
#2	1.079

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	632521	10000	--	--	--	--	--
SDev	3476.137	.0000000	--	--	--	--	--
%RSD	.5495686	.0000000	--	--	--	--	--
#1	630063	10000	--	--	--	--	--
#2	634979	10000	--	--	--	--	--

Standardization Rpt. 06/09/03 10:14:31 AM page 1

Method: DAILY1 Standard: clp_std2
Run Time: 06/09/03 10:11:00

Elem	Ba4934	Be3130	Cr2677	Cu3247	Ni2316
Avge	.5911	.2783	.3376	.3258	.8751
SDev	.0007	.0011	.0013	.0018	.0021
%RSD	[illegible]	.3817	.3974	.5458	.2421
#1	.5916	.2775	.3386	.3271	.8736
#2	.5906	.2790	.3367	.3246	.8766

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	596984	10000	--	--	--	--	--
SDev	7824.137	.0000000	--	--	--	--	--
%RSD	1.310610	.0000000	--	--	--	--	--
#1	591452	10000	--	--	--	--	--
#2	602517	10000	--	--	--	--	--

Standardization Rpt. 06/09/03 10:18:56 AM page 1

Method: DAILY1 Standard: clp_std3
Run Time: 06/09/03 10:14:41

Elem	Cd2265	Co2286	Mn2576	V_2924	Zn2062
Avge	1.351	.3103	.4530	.0791	.1085
SDev	.006	.0016	.0030	.0004	.0004
%RSD	.4590	.5162	.6603	.4696	.3847
#1	1.346	.3091	.4509	.0788	.1082
#2	1.355	.3114	.4551	.0794	.1088

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	625874	10000	--	--	--	--	--
SDev	3046.216	.0000000	--	--	--	--	--
%RSD	.4867140	.0000000	--	--	--	--	--
#1	628028	10000	--	--	--	--	--
#2	623720	10000	--	--	--	--	--

Stand ·dization Rpt. 06/09/03 10:24:04 AM page 1

Method: DAILY1 Standard: clp_std6
Run Time: 06/09/03 10:19:06

Elem	La4086	Na5889	Pd3404	S_1820	Th2837	U_3859	W_2079
Avge	.3564	.0966	.1523	.0533	.0595	.0298	.1127
SDev	.0008	.0001	.0001	.0005	.0002	.0000	.0005
%RSD	.2320	.0616	.0400	.9230	.3157	.0120	.4669
#1	.3570	.0966	.1523	.0536	.0596	.0298	.1131
#2	.3558	.0967	.1522	.0529	.0594	.0298	.1124

Elem	Y_3710	Zr3496
Avge	1.016	1.175
SDev	.001	.003
%RSD	.0580	.2321
#1	1.017	1.177
#2	1.016	1.173

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	627919	10000	--	--	--	--	--
SDev	2730.846	.0000000	--	--	--	--	--
%RSD	.4349042	.0000000	--	--	--	--	--
#1	625988	10000	--	--	--	--	--
#2	629850	10000	--	--	--	--	--

Standardization Report 06/09/03 10:24:05 AM 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	35.6210	.000224	06/09/03 10:19:06
Al3082	308.215	clp_std1	blk	390.466	-.289147	06/09/03 10:19:06
As1890	189.042	clp_std4	blk	77.6139	.001022	06/09/03 10:19:06
B 2496	249.678	clp_std5	blk	23.6785	-.082510	06/09/03 10:19:06
Ba4934	493.409	clp_std2	blk	16.9169	.000569	06/09/03 10:19:06
Be3130	313.042	clp_std2	blk	17.9578	.002656	06/09/03 10:19:06
Bi2230	223.061	clp_std5	blk	75.8066	.001364	06/09/03 10:19:06
Ca3179	317.933	clp_std1	blk	313.623	-.009821	06/09/03 10:19:06
Cd2265	226.502	clp_std3	blk	7.40194	-.000063	06/09/03 10:19:06
Co2286	228.616	clp_std3	blk	32.2293	.000100	06/09/03 10:19:06
Cr2677	267.716	clp_std2	blk	29.6189	.000186	06/09/03 10:19:06
Cu3247	324.753	clp_std2	blk	30.7336	-.013803	06/09/03 10:19:06
Fe2714	271.441	clp_std1	blk	449.164	.018960	06/09/03 10:19:06
K 7664	766.491	clp_std1	blk	34.6825	-.089670	06/09/03 10:19:06
La4086	408.672	clp_std6	blk	27.1598	-.013007	06/09/03 10:19:06
Li6707	670.784	clp_std1	blk	3.34407	-.001727	06/09/03 10:19:06
Mg2790	279.078	clp_std1	blk	425.288	-.001662	06/09/03 10:19:06
Mn2576	257.610	clp_std3	blk	22.0730	-.000104	06/09/03 10:19:06
Mo2020	202.030	clp_std5	blk	55.0155	.000391	06/09/03 10:19:06
Na5889	588.995	clp_std6	blk	8.90061	.139961	06/09/03 10:19:06
Na3302	330.232	clp_std1	blk	4213.36	.782277	06/09/03 10:19:06
Ni2316	231.604	clp_std2	blk	11.4279	-.000036	06/09/03 10:19:06
P 1782	178.287	clp_std5	blk	199.633	-.026556	06/09/03 10:19:06
2203/1	220.351	clp_std4	blk	20.3454	-.004178	06/09/03 10:19:06
2203/2	220.352	clp_std4	blk	19.6156	.000956	06/09/03 10:19:06
Pd3404	340.458	clp_std6	blk	66.6586	.000469	06/09/03 10:19:06
S 1820	182.040	clp_std6	blk	187.977	-.002626	06/09/03 10:19:06
Sb2068	206.838	clp_std4	blk	75.7795	-.000765	06/09/03 10:19:06
Sc3613	361.384	blk	dark	1.56801	-.198589	06/09/03 10:19:06
1960/1	196.021	clp_std4	blk	38.1178	.005201	06/09/03 10:19:06
1960/2	196.022	clp_std4	blk	21.5291	-.001750	06/09/03 10:19:06
Si2881	288.158	clp_std5	blk	70.9557	-.128370	06/09/03 10:19:06
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	45.4758	.000966	06/09/03 10:19:06
Sr4215	421.552	clp_std5	blk	6.99999	-.000077	06/09/03 10:19:06
Th2837	283.730	clp_std6	blk	176.486	-.003170	06/09/03 10:19:06
Ti3372	337.280	clp_std5	blk	9.24629	.013243	06/09/03 10:19:06
Tl1908	190.864	clp_std4	blk	287.770	.007420	06/09/03 10:19:06
U 3859	385.958	clp_std6	blk	393.386	-1.73796	06/09/03 10:19:06
V 2924	292.402	clp_std3	blk	126.409	.000690	06/09/03 10:19:06
W 2079	207.910	clp_std6	blk	44.3843	-.004063	06/09/03 10:19:06
Y 3710	371.030	clp_std6	blk	9.83620	.000053	06/09/03 10:19:06
Zn2062	206.200	clp_std3	blk	92.1582	-.000362	06/09/03 10:19:06
Zr3496	349.621	clp_std6	blk	9.05675	-.001871	06/09/03 10:19:06

Analysis Report QC Standard 06/09/03 10:29:14 AM page 1

Method: DAILY1 Sample Name: icv/ccv Operator:
Run Time: 06/09/03 10:24:15
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B 2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.0230	9.738	4.933	4.744	9.918	1.011	5.008
SDev	.0026	.002	.035	.025	.032	.001	.007
%RSD	.25837	.0200	.7025	.5265	.3275	.0591	.1[illegible]4
#1	1.0212	9.737	4.909	4.726	9.895	1.011	5.003
#2	1.0249	9.739	4.958	4.761	9.940	1.010	5.013
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	20.13	1.017	5.010	1.969	2.007	10.19	18.02
SDev	.01	.000	.020	.005	.010	.00	.11
%RSD	.0274	.0272	.3930	.2294	.5034	.0255	.6106
#1	20.12	1.017	4.996	1.966	2.000	10.19	Q17.94
#2	20.13	1.017	5.024	1.973	2.014	10.19	18.10
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	5.032	4.751	19.89	1.038	5.085	Q48.56	27.02
SDev	.009	.026	.03	.004	.036	.41	.15
%RSD	.1807	.5488	.1316	.3446	.7034	.8409	.5675
#1	5.026	4.732	19.87	1.036	5.060	Q48.27	27.13
#2	5.039	4.769	19.91	1.041	5.110	Q48.84	Q26.91
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	4.857	5.095	5.038	5.055	1.036	1.032	.9904
SDev	.001	.027	.017	.017	.002	.007	.0003
%RSD	.0261	.5235	.3380	.3333	.2228	.6559	.0354
#1	4.856	5.076	5.026	5.043	1.038	1.028	.9901
#2	4.858	5.114	5.050	5.067	1.034	1.037	.9906
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	98.67	5.207	5.144	5.034	5.045	5.160	4.950
SDev	.13	.026	.038	.010	.017	.034	.012
%RSD	.1308	.4904	.7448	.2013	.3348	.6593	.2337
#1	98.58	5.189	5.117	5.027	5.033	5.136	4.941
#2	98.76	5.225	5.171	5.041	5.056	5.184	4.958
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	5.262	.9982	4.953	5.309	.9959	5.032	Q1.375
SDev	.007	.0026	.002	.043	.0101	.008	.015
%RSD	.1284	.2574	.0465	.8118	1.011	.1506	1.108
#1	5.257	.9964	4.952	5.279	1.003	5.026	Q1.364
#2	5.267	1.000	4.955	5.340	.9888	5.037	Q1.386
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	4.874	1.032	4.881
SDev	.004	.005	.006
%RSD	.0893	.5264	.1277
#1	4.877	1.029	4.877
#2	4.871	1.036	4.885
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	630502	10000	--	--	--	--	--
SDev	851.3566	.0000000	--	--	--	--	--
%RSD	.1350284	.0000000	--	--	--	--	--
#1	629900	10000	--	--	--	--	--
#2	631104	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: icb/ccb Operator:
Run Time: 06/09/03 10:31:44
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00069	-.0028	.0007	-.0249	.0002	-.0000	.0015
SDev	.00059	.0006	.0010	.0002	.0001	.0000	.0024
%RSD	84.820	22.14	135.6	.7986	40.10	163.7	158.8
#1	-.00111	-.0033	.0014	-.0248	.0003	.0000	.0033
#2	-.00028	-.0024	.0000	-.0250	.0002	-.0000	-.0007
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	.0025	-.0001	-.0003	.0003	.0002	-.0009	-.0141
SDev	.0000	.0000	.0004	.0001	.0002	.0081	.0020
%RSD	1.622	13.65	140.8	20.33	97.79	949.8	14.11
#1	.0025	-.0001	-.0006	.0002	.0001	-.0066	-.0155
#2	.0026	-.0001	-.0000	.0003	.0003	.0049	-.0127
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	.0000	-.0074	-.0000	.0041	-.0040	L-.0928
SDev	.0007	.0001	.0024	.0000	.0013	.0012	.0867
%RSD	293.9	263.7	32.29	143.2	32.59	30.81	93.36
#1	-.0007	.0001	-.0090	-.0001	H.0051	-.0031	-.0315
#2	.0002	-.0000	-.0057	.0000	.0032	-.0049	L-.1541
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	-.0003	-.0005	-.0016	.0018	.0005	.0046	-.0003
SDev	.0000	.0013	.0000	.0025	.0000	.0040	.0018
%RSD	12.45	270.1	2.549	136.8	.7424	85.70	576.0
#1	-.0003	.0004	-.0016	.0036	.0005	.0074	-.0015
#2	-.0003	-.0014	-.0016	.0001	.0005	.0018	.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

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Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	99.43	.0058	.0027	-.0062	.0007	.0038	.0020
SDev	.18	.0039	.0018	.0013	.0016	.0025	.0021
%RSD	.1803	66.57	65.60	20.12	243.8	65.86	103.4
#1	99.55	.0031	.0015	-.0071	.0018	.0020	.0005
#2	99.30	.0086	.0040	-.0053	-.0005	H.0055	.0035
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	.0006	-.0001	.0029	-.0057	.0002	-.0007
SDev	.0001	.0001	.0001	.0026	.0097	.0001	.0016
%RSD	57.85	15.58	172.7	87.96	169.5	57.97	236.7
#1	.0001	.0005	.0000	.0011	-.0126	.0001	.0005
#2	.0001	.0007	-.0001	.0047	.0011	.0003	-.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	.0007	-.0001
SDev	.0001	.0004	.0004
%RSD	56.77	62.52	664.8
#1	.0002	.0009	-.0003
#2	.0001	.0004	.0002
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

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IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	635314	10000	--	--	--	--	--
SDev	1160.362	.0000000	--	--	--	--	--
%RSD	.1826440	.0000000	--	--	--	--	--
#1	636134	10000	--	--	--	--	--
#2	634493	10000	--	--	--	--	--

Analysis Report 06/09/03 10:41:57 AM page 1

Method: DAILY1 Sample Name: pbw Operator:
Run Time: 06/09/03 10:36:52
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00007	.0140	-.0018	-.0410	-.0000	-.0001	.0009
SDev	.00024	.0000	.0001	.0020	.0000	.0001	.0008
%RSD	371.08	.0520	5.305	4.950	141.0	90.51	81.37
#1	.00011	.0140	-.0018	-.0396	-.0001	-.0002	.0004
#2	-.00024	.0140	-.0017	-.0424	-.0000	-.0000	.0015
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	-.0023	-.0000	-.0000	.0002	.0004	-.0018	-.0033
SDev	.0001	.0000	.0000	.0003	.0003	.0052	.0058
%RSD	2.148	256.5	121.7	183.1	80.06	298.0	175.6
#1	-.0023	.0000	-.0001	-.0001	.0006	-.0055	.0008
#2	-.0024	-.0000	-.0000	.0004	.0002	.0019	-.0074
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0500	.0050	.0050	.0050	.0050	.0250	.1000
Low	-.0500	-.0050	-.0050	-.0050	-.0050	-.0250	-.1000

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0003	-.0017	-.0037	-.0001	.0011	-.0125	H.1013
SDev	.0004	.0000	.0029	.0000	.0011	.0005	.0851
%RSD	126.5	2.505	78.61	26.51	100.7	4.116	84.02
#1	-.0000	-.0016	-.0017	-.0001	.0003	-.0129	H.1614
#2	-.0006	-.0017	-.0058	-.0001	.0018	-.0121	.0411
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	.0009	.0050	.0003	-.0003	-.0044	.0020
SDev	.0004	.0005	.0015	.0011	.0000	.0043	.0002
%RSD	120.7	50.55	30.84	405.1	13.11	95.82	7.873
#1	-.0006	.0006	.0061	-.0005	-.0003	-.0014	.0022
#2	-.0001	.0013	.0039	.0011	-.0003	-.0074	.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	97.75	.0042	-.0021	-.0050	.0019	-.0000	.0016
SDev	.06	.0040	.0002	.0009	.0002	.0014	.0028
%RSD	.0650	95.24	9.253	17.42	12.72	5025.	171.4
#1	97.79	.0070	-.0020	-.0044	.0017	.0010	-.0003
#2	97.70	.0014	-.0023	-.0056	.0020	-.0011	.0036
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	-.0014	.0002	L-.0198	-.0078	-.0000	.0034
SDev	.0000	.0009	.0001	.0110	.0176	.0004	.0014
%RSD	20.12	64.29	34.59	55.91	224.0	4273.	39.82
#1	-.0000	-.0007	.0003	L-.0276	.0046	-.0003	.0025
#2	-.0000	-.0020	.0002	L-.0119	-.0203	.0003	.0044
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	-.0000	.0007	-.0008
SDev	.0000	.0004	.0002
%RSD	99.82	62.10	30.67
#1	-.0001	.0010	-.0009
#2	-.0000	.0004	-.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	624604	10000	--	--	--	--	--
SDev	409.4148	.0000000	--	--	--	--	--
%RSD	.0655480	.0000000	--	--	--	--	--
#1	624893	10000	--	--	--	--	--
#2	624314	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: lcsw Operator:
Run Time: 06/09/03 10:42:06 5mL spiked with 0.025uL Pb (100ppm) = 0.5ppm #3735
Comment:
Mode: CONC Corr. Factor: 1 DL 6-9-03

Elem	Ag3280	Al3082	As1890	B 2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00018	.0038	.0000	-.0462	.0001	-.0001	.0017
SDev	.00010	.0002	.0034	.0008	.0000	.0001	.0001
%RSD	53.304	5.932	13010.	1.735	36.66	41.85	4.862
#1	.00011	.0036	-.0024	-.0456	.0001	-.0002	.0017
#2	.00025	.0040	.0024	-.0468	.0001	-.0001	.0016

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K 7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	-.0001	.0000	.0006	.0009	.0035	-.0042
SDev	.0005	.0000	.0003	.0004	.0003	.0002	.0052
%RSD	103.6	27.08	621.7	78.17	36.07	6.496	126.3
#1	-.0008	-.0001	-.0002	.0009	.0007	.0033	-.0004
#2	-.0001	-.0001	.0003	.0003	.0011	.0036	-.0079

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0005	-.0017	-.0024	.0001	.0009	-.0023	.1205
SDev	.0001	.0000	.0019	.0000	.0001	.0011	.0052
%RSD	13.55	2.294	81.70	42.38	7.129	46.59	4.284
#1	.0004	-.0016	-.0038	.0000	.0009	-.0016	.1242
#2	.0005	-.0017	-.0010	.0001	.0008	-.0031	.1169

Elem	Ni2316	P 1782	2203/1	2203/2	Pd3404	S 1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0021	.4962	.4953	-.0009	-.0009	.0001
SDev	.0001	.0100	.0028	.0029	.0000	.0163	.0022
%RSD	363.1	470.1	.5643	.5852	4.000	1743.	2329.
#1	-.0001	-.0050	.4943	.4974	-.0009	.0106	.0017
#2	.0000	.0092	.4982	.4933	-.0009	-.0125	-.0015

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	96.91	.0032	.0045	-.0024	.4952	.0041	.0009
SDev	.08	.0060	.0015	.0021	.0010	.0030	.0006
%RSD	.0812	190.6	33.49	90.50	.2016	74.18	67.86
#1	96.97	.0075	.0056	-.0039	.4959	.0062	.0005
#2	96.86	-.0011	.0034	-.0009	.4944	.0019	.0014

Elem	Sr4215	Th2837	Ti3372	Tl1908	U 3859	V 2924	W 2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0011	.0006	-.0051	-.0222	.0002	.0012
SDev	.0000	.0025	.0001	.0105	.0030	.0001	.0028
%RSD	.1952	238.9	12.38	204.7	13.55	80.50	232.3
#1	-.0000	-.0007	.0006	-.0126	-.0243	.0003	.0032
#2	-.0000	.0029	.0005	.0023	-.0201	.0001	-.0008

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0005	-.0001
SDev	.0001	.0004	.0000
%RSD	101.0	78.86	27.84
#1	.0000	.0008	-.0002
#2	.0001	.0002	-.0001

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	619280	10000	--	--	--	--	--
SDev	443.3560	.0000000	--	--	--	--	--
%RSD	.0715922	.0000000	--	--	--	--	--
#1	619593	10000	--	--	--	--	--
#2	618966	10000	--	--	--	--	--

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Method: DAILY1 Sample Name: 227265 Operator:
Run Time: 06/09/03 10:47:14
Comment:
Mode: CONC Corr. Factor: 1

df1000 JL 6/10/03

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00008	.0045	-.0018	-.0460	.0001	-.0003	.0028
SDev	.00045	.0050	.0024	.0020	.0000	.0001	.0050
%RSD	543.21	112.0	130.1	4.387	.8556	31.87	175.7
#1	.00024	.0079	-.0001	-.0446	.0001	-.0002	.0063
#2	-.00040	.0080	-.0035	-.0475	.0001	-.0004	-.0007

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0024	-.0002	-.0002	.0003	.0008	.0072	.0011
SDev	.0012	.0000	.0003	.0001	.0006	.0023	.0263
%RSD	49.91	27.34	137.4	46.03	80.41	32.07	2362.
#1	.0032	-.0001	-.0000	.0004	.0012	.0056	.0197
#2	.0015	-.0002	-.0005	.0002	.0003	.0088	-.0175

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	-.0016	-.0023	.0000	-.0004	.0147	.1773
SDev	.0008	.0001	.0058	.0001	.0006	.0054	.4294
%RSD	349.5	5.958	246.3	133.5	155.4	36.55	242.2
#1	.0008	-.0016	.0017	.0000	.0000	.0186	.4810
#2	-.0004	-.0017	-.0064	.0001	-.0008	.0109	-.1264

Elem	Ni2316	P 1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0008	.0042	1.195	1.205	.0017	-.0056	-.0002
SDev	.0002	.0067	.007	.000	.0015	.0010	.0030
%RSD	22.88	158.8	.5947	.0273	83.73	18.76	1323.
#1	-.0009	-.0005	1.190	1.205	.0028	-.0063	.001[illegible]
#2	-.0007	.0089	1.200	1.206	.0007	-.0048	-.0023

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	98.53	.0013	.0028	.0128	1.201	.0023	.0021
SDev	.21	.0002	.0016	.0025	.003	.0010	.0013
%RSD	.2163	18.02	57.03	19.60	.2153	43.15	63.35
#1	98.38	.0011	.0040	.0146	1.199	.0030	.0030
#2	98.68	.0014	.0017	.0110	1.203	.0016	.0012

Elem	Sr4215	Th2837	Ti3372	Tl1908	U 3859	V_2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0000	.0001	.0009	-.0102	-.0019	.0003	.0022
SDev	.0000	.0024	.0004	.0087	.0043	.0003	.0020
%RSD	128.8	2057.	49.69	85.42	229.5	99.13	87.52
#1	.0000	.0019	.0012	-.0040	.0012	.0001	.0036
#2	.0000	-.0016	.0006	-.0163	-.0049	.0005	.0009

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0001	.0005	-.0007
SDev	.0001	.0004	.0001
%RSD	103.9	79.43	21.07
#1	.0000	.0002	-.0006
#2	.0001	.0008	-.0008

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	629596	10000	--	--	--	--	--
SDev	1397.243	.0000000	--	--	--	--	--
%RSD	.2219269	.0000000	--	--	--	--	--
#1	628608	10000	--	--	--	--	--
#2	630584	10000	--	--	--	--	--

Analysis Report 06/09/03 10:57:19 AM page 1

Method: DAILY1 Sample Name: 227265d df 1000 Operator:
Run Time: 06/09/03 10:52:21 JR 6/10/03
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B 2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00001	.0035	-.0004	-.0447	-.0000	-.0002	-.0010
SDev	.00004	.0073	.0014	.0007	.0000	.0000	.0017
%RSD	291.74	207.8	316.1	1.542	34.43	.6973	175.4
#1	-.00004	.0087	-.0014	-.0442	-.0000	-.0002	-.0021
#2	.00001	-.0017	.0005	-.0452	-.0000	-.0002	.0002

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K 7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0012	-.0002	-.0004	-.0001	.0008	-.0063	-.0200
SDev	.0006	.0002	.0001	.0002	.0003	.0056	.0158
%RSD	54.87	74.32	39.11	290.4	37.74	89.85	78.84
#1	-.0016	-.0003	-.0003	-.0003	.0010	-.0023	-.0312
#2	-.0007	-.0001	-.0005	.0001	.0006	-.0102	-.0089

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0002	-.0017	-.0052	-.0000	.0006	.0050	-.1021
SDev	.0001	.0001	.0030	.0001	.0004	.0047	.2586
%RSD	53.53	3.128	56.45	1345.	66.88	94.25	253.3
#1	-.0001	-.0018	-.0073	.0000	.0008	.0017	-.2850
#2	-.0003	-.0017	-.0032	-.0001	.0003	.0084	.0808

Elem	Ni2316	P 1782	2203/1	2203/2	Pd3404	S 1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0011	.0075	1.144	1.156	-.0001	.0062	.0009
SDev	.0009	.0018	.005	.006	.0015	.0006	.0007
%RSD	81.93	24.49	.4000	.5093	3016.	9.565	84.00
#1	-.0004	.0088	1.147	1.161	.0010	.0058	.0014
#2	-.0017	.0062	1.141	1.152	-.0011	.0066	.0003

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	95.87	.0017	-.0008	.0125	1.151	.0000	.0003
SDev	.64	.0007	.0008	.0008	.005	.0003	.0014
%RSD	.6709	39.29	99.68	6.668	.4731	889.2	498.1
#1	95.41	.0012	-.0002	.0130	1.155	.0003	-.0007
#2	96.32	.0022	-.0014	.0119	1.147	-.0002	.0012

Elem	Sr4215	Th2837	Ti3372	Tl1908	U 3859	V 2924	W 2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0008	.0001	-.0081	-.0511	-.0003	.0027
SDev	.0000	.0010	.0000	.0065	.0012	.0003	.0012
%RSD	.5168	117.3	28.14	81.02	2.267	83.02	42.75
#1	-.0000	.0015	.0002	-.0034	-.0503	-.0001	.0036
#2	-.0000	.0001	.0001	-.0127	-.0519	-.0005	.0019

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0001	.0004	-.0006
SDev	.0000	.0000	.0008
%RSD	76.34	.7706	120.6
#1	-.0000	.0004	-.0001
#2	-.0001	.0004	-.0012

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	612628	10000	--	--	--	--	--
SDev	4046.772	.0000000	--	--	--	--	--
%RSD	.6605600	.0000000	--	--	--	--	--
#1	609766	10000	--	--	--	--	--
#2	615489	10000	--	--	--	--	--

010051

df1000 JR 6/10/03

Analysis Report 06/09/03 11:02:26 AM page 1

Method: DAILY1 Sample Name: 227265s Operator:
Run Time: 06/09/03 10:57:28 5ml sample spiked with 0.025ml Pb (100ppm) = ~~0.5ppm~~ 0.5ppm #3735
Comment:
Mode: CONC Corr. Factor: 1 DL 6-9-03

Elem	Ag3280	Al3082	As1890	B 2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00002	.0209	-.0027	-.0434	.0001	-.0001	.0016
SDev	.00062	.0011	.0044	.0010	.0001	.0000	.0002
%RSD	2707.0	5.415	163.5	2.214	69.41	3.693	11.60
#1	.00046	.0217	-.0057	-.0427	.0002	-.0001	.0017
#2	-.00042	.0201	.0004	-.0441	.0001	-.0001	.0015

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K 7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0004	-.0001	-.0000	.0002	.0013	.0055	-.0084
SDev	.0004	.0000	.0005	.0005	.0001	.0107	.0008
%RSD	121.1	20.24	1443.	227.3	5.934	193.8	9.849
#1	-.0001	-.0001	.0003	.0006	.0012	.0131	-.0089
#2	-.0007	-.0001	-.0004	-.0001	.0013	-.0020	-.0078

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0002	-.0017	-.0013	.0000	.0002	-.0068	-.0029
SDev	.0007	.0000	.0005	.0001	.0001	.0029	.1583
%RSD	347.6	1.388	33.95	1536.	38.43	43.22	5473.
#1	.0007	-.0017	-.0017	.0001	.0002	-.0088	-.1148
#2	-.0003	-.0017	-.0010	-.0001	.0001	-.0047	.1090

Elem	Ni2316	P 1782	2203/1	2203/2	Pd3404	S 1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0006	-.0061	1.693	1.700	.0001	.0081	-.0009
SDev	.0007	.0011	.011	.002	.0019	.0041	.0007
%RSD	120.7	18.24	.6274	.0899	1713.	50.65	78.75
#1	-.0001	-.0069	1.701	1.701	.0015	.0052	-.0004
#2	-.0011	-.0054	1.686	1.699	-.0012	.0111	-.0014

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	95.64	-.0011	.0005	.0134	1.696	-.0002	.0014
SDev	.16	.0029	.0020	.0030	.005	.0004	.0016
%RSD	.1695	182.6	421.4	22.61	.2686	180.3	118.8
#1	95.52	.0005	-.0009	.0113	1.699	-.0004	.0025
#2	95.75	-.0036	.0018	.0156	1.693	.0001	.0002

Elem	Sr4215	Th2837	Ti3372	Tl1908	U 3859	V 2924	W 2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	-.0006	.0003	-.0103	-.0126	-.0001	.0057
SDev	.0000	.0013	.0001	.0144	.0162	.0006	.0015
%RSD	31.42	216.6	20.51	139.9	128.3	424.4	26.60
#1	-.0000	.0003	.0004	-.0204	-.0012	.0003	.0047
#2	-.0000	-.0016	.0003	-.0001	-.0240	-.0006	.0068

Elem	Y 3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0003	-.0008
SDev	.0001	.0003	.0005
%RSD	421.0	102.1	67.75
#1	.0000	.0005	-.0004
#2	-.0001	.0001	-.0011

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	611176	10000	--	--	--	--	--
SDev	1055.710	.0000000	--	--	--	--	--
%RSD	.1727344	.0000000	--	--	--	--	--
#1	610429	10000	--	--	--	--	--
#2	611922	10000	--	--	--	--	--

Analysis Report 06/09/03 11:07:33 AM page 1

Method: DAILY1 Sample Name: 227266 Operator:
Run Time: 06/09/03 11:02:35
Comment:
Mode: CONC Corr. Factor: 1

DF1000 LR 6/10/03

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00054	.0112	.0008	-.0477	-.0000	-.0002	.0017
SDev	.00009	.0041	.0039	.0003	.0000	.0000	.0002
%RSD	16.680	36.52	501.1	.6439	692.9	13.03	10.25
#1	-.00060	.0083	-.0020	-.0475	-.0000	-.0001	.0018
#2	-.00047	.0141	.0035	-.0480	.0000	-.0002	.0016

Elem	Ca3179	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.0008	-.0002	.0002	.0002	.0007	-.0016	-.0505
SDev	.0003	.0000	.0001	.0002	.0001	.0037	.0496
%RSD	44.72	22.08	48.41	87.47	8.380	224.4	98.25
#1	.0010	-.0001	.0002	.0001	.0008	.0010	-.0855
#2	.0005	-.0002	.0001	.0004	.0007	-.0042	-.0154

Elem	La4086	Li6707	Mg2790	Mn2576	Mo2020	Na5889	Na3302
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0007	-.0018	-.0070	-.0000	-.0011	-.0119	-.3758
SDev	.0002	.0002	.0014	.0000	.0003	.0073	.3250
%RSD	33.17	8.520	19.98	516.7	30.98	61.41	86.49
#1	-.0009	-.0020	-.0080	-.0000	-.0009	-.0170	-.6056
#2	-.0005	-.0017	-.0060	.0000	-.0013	-.0067	-.1460

Elem	Ni2316	P 1782	2203/1	2203/2	Pd3404	S_1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0005	-.0035	1.200	1.208	-.0017	.0034	-.0003
SDev	.0001	.0073	.017	.008	.0005	.0003	.0006
%RSD	20.38	207.8	1.436	.6684	33.05	9.367	178.2
#1	-.0006	-.0087	1.187	1.203	-.0020	.0031	.0001
#2	-.0005	.0017	1.212	1.214	-.0013	.0036	-.0008

Elem	Sc3613	1960/1	1960/2	Si2881	Pb220	Se196	Sn1899
Units	%R	ppm	ppm	ppm	ppm	ppm	ppm
Avge	95.15	-.0014	.0038	.0170	1.204	.0021	.0019
SDev	1.44	.0034	.0008	.0016	.011	.0006	.0006
%RSD	1.511	237.3	21.81	9.291	.9230	28.29	33.69
#1	96.16	.0010	.0032	.0159	1.196	.0025	.0015
#2	94.13	-.0039	.0044	.0181	1.212	.0017	.0024

Elem	Sr4215	Th2837	Ti3372	Tl1908	U 3859	V 2924	W_2079
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.0000	.0015	.0005	-.0129	-.0499	-.0001	.0040
SDev	.0000	.0033	.0003	.0037	.0024	.0001	.0010
%RSD	81.02	217.8	56.50	28.77	4.882	242.1	26.41
#1	-.0001	.0039	.0007	-.0155	-.0516	-.0002	.0032
#2	-.0000	-.0008	.0003	-.0103	-.0482	.0000	.0047

Elem	Y_3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	-.0000	.0000	-.0011
SDev	.0000	.0001	.0002
%RSD	92.91	612.7	21.96
#1	-.0001	-.0001	-.0013
#2	-.0000	.0001	-.0009

IntStd	1	2	3	4	5	6	7
Mode	*Counts	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	608008	10000	--	--	--	--	--
SDev	9111.778	.0000000	--	--	--	--	--
%RSD	1.498628	.0000000	--	--	--	--	--
#1	614451	10000	--	--	--	--	--
#2	601565	10000	--	--	--	--	--

Analysis Report QC Standard 06/09/03 11:17:22 AM page 1

Method: DAILY1 Sample Name: icv/ccv Operator:
Run Time: 06/09/03 11:12:23
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B 2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.0232	9.726	4.962	4.741	9.882	1.024	5.023
SDev	.0006	.017	.006	.005	.045	.001	.003
%RSD	.05418	.1714	.1170	.1150	.4579	.1127	.0671
#1	1.0228	9.714	4.966	4.737	9.850	1.023	5.026
#2	1.0235	9.737	4.958	4.745	9.914	1.024	5.021
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	20.40	1.030	5.058	1.991	1.997	10.30	Q17.93
SDev	.01	.004	.023	.008	.001	.05	.07
%RSD	.0716	.3822	.4503	.4156	.0746	.4592	.3732
#1	20.39	1.027	5.042	1.985	1.996	10.26	Q17.88
#2	20.41	1.033	5.074	1.997	1.998	10.33	Q17.98
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Fail
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	5.023	4.750	20.07	1.049	5.122	Q48.51	Q26.77
SDev	.022	.019	.01	.002	.030	.04	.06
%RSD	.4284	.4036	.0699	.2182	.5947	.0795	.2258
#1	5.008	4.736	20.06	1.048	5.100	Q48.49	Q26.81
#2	5.038	4.763	20.08	1.051	5.143	Q48.54	Q26.73
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Fail	QC Fail
Value	5.000	5.000	20.00	1.000	5.000	30.00	30.00
Range	10.00	10.00	10.00	10.00	10.00	10.00	10.00

Elem	Ni2316	P 1782	2203/1	2203/2	Pd3404	S 1820	Sb2068
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.906	5.250	5.083	5.054	1.033	1.050	.9916
SDev	.023	.029	.032	.019	.000	.015	.0009
%RSD	.4751	.5470	.6344	.3686	.0286	1.431	.0933
#1	4.890	5.270	5.106	5.067	1.033	1.039	.9922
#2	4.923	5.229	5.060	5.041	1.033	1.061	.9909
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	97.30	5.202	5.083	5.059	5.059	5.117	4.979
SDev	1.31	.044	.001	.001	.023	.015	.011
%RSD	1.347	.8547	.0159	.0176	.4575	.2999	.2276
#1	96.37	5.234	5.083	5.058	5.075	5.128	4.971
#2	98.22	5.171	5.082	5.060	5.042	5.107	4.987
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	5.262	1.007	4.961	5.348	.9965	5.064	Q1.373
SDev	.013	.001	.001	.034	.0031	.014	.007
%RSD	.2484	.0947	.0143	.6339	.3138	.2702	.5178
#1	5.253	1.008	4.961	5.324	.9943	5.055	Q1.378
#2	5.271	1.006	4.960	5.372	.9987	5.074	Q1.368
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	4.885	1.046	4.889
SDev	.003	.004	.008
%RSD	.0585	.4109	.1734
#1	4.883	1.043	4.883
#2	4.887	1.049	4.895
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	621738	10000	--	--	--	--	--
SDev	8386.286	.0000000	--	--	--	--	--
%RSD	1.348846	.0000000	--	--	--	--	--
#1	615808	10000	--	--	--	--	--
#2	627668	10000	--	--	--	--	--

Analysis Report Blank Sample 06/09/03 11:24:51 AM page 1

Method: DAILY1 Sample Name: icb/ccb Operator:
Run Time: 06/09/03 11:19:52
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Bi2230
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00026	.0032	-.0003	-.0382	.0004	-.0001	.0002
SDev	.00061	.0032	.0001	.0001	.0003	.0002	.0018
%RSD	232.05	99.91	18.44	.2889	60.92	179.5	859.2
#1	-.00069	.0055	-.0004	-.0383	.0002	-.0003	.0015
#2	.00017	.0009	-.0003	-.0381	.0006	.0000	-.0011
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	.0041	.0000	.0002	.0004	.0002	.0112	-.0006
SDev	.0016	.0002	.0003	.0005	.0001	.0089	.0005
%RSD	37.95	505.9	144.4	107.6	61.26	79.24	78.47
#1	.0030	-.0001	-.0000	.0001	.0001	.0049	-.0003
#2	.0053	.0002	.0005	.0008	.0003	.0175	-.0009
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	-.0000	-.0003	.0001	.0040	.0024	H.1420
SDev	.0006	.0000	.0010	.0001	.0006	.0026	.0599
%RSD	105.0	91.51	333.9	124.3	15.33	109.1	42.17
#1	.0001	-.0001	-.0010	.0000	.0044	.0005	H.1843
#2	.0010	-.0000	.0004	.0001	.0036	.0042	H.0996
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	.0081	-.0017	.0007	.0009	.0039	.0018
SDev	.0004	.0089	.0015	.0001	.0024	.0012	.0027
%RSD	162.3	109.6	87.42	18.66	270.7	29.77	150.8
#1	-.0006	.0018	-.0027	.0006	-.0029	.0047	.0037
#2	.0000	H.0145	-.0006	.0008	.0026	.0031	-.0001
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	96.62	.0053	-.0005	-.0041	-.0001	.0015	.0045
SDev	1.25	.0016	.0010	.0006	.0006	.0012	.0028
%RSD	1.298	29.88	193.2	15.41	539.7	82.60	61.63
#1	95.73	.0042	-.0012	-.0037	-.0005	.0006	.0025
#2	97.51	.0065	.0002	-.0046	.0003	.0023	H.0064
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	.0002	.0009	.0002	-.0007	-.0082	.0006	.0048
SDev	.0001	.0010	.0005	.0048	.0092	.0004	.0054
%RSD	54.91	103.5	226.0	673.0	112.6	70.27	113.5
#1	.0001	.0016	-.0001	.0027	-.0147	.0003	.0009
#2	.0003	.0002	.0005	-.0041	-.0017	.0009	.0086
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.0050	.0100	.0050	.0100	.1000	.0050	.0100
Low	-.0050	-.0100	-.0050	-.0100	-.1000	-.0050	-.0100

Elem	Y 3710	Zn2062	Zr3496
Units	ppm	ppm	ppm
Avge	.0003	.0002	-.0001
SDev	.0002	.0004	.0007
%RSD	70.46	178.3	579.7
#1	.0002	-.0001	-.0006
#2	.0004	.0005	.0004
Errors	LC Pass	LC Pass	LC Pass
High	.0050	.0050	.0050
Low	-.0050	-.0050	-.0050

Analysis Report Blank Sample 06/09/03 11:24:51 AM

IntStd	1	2	3	4	5	6	7
Mode	*Count	Time	NOTUSED	NOTUSED	NOTUSED	NOTUSED	NOTUSED
Elem	Sc	--	--	--	--	--	--
Wavlen	361.384	--	--	--	--	--	--
Avge	617434	10000	--	--	--	--	--
SDev	7976.872	.0000000	--	--	--	--	--
%RSD	1.291940	.0000000	--	--	--	--	--
#1	611793	10000	--	--	--	--	--
#2	623074	10000	--	--	--	--	--

✓ ams 6/25/03

010061

DIVISION 20
06002.01.081
TO#030604-8

Date: 06/06/03
Analyst: RSPIES
Method: EPA 300

RSpies

System ID	Analyte	Conc mg/L	RESULT mg/L	Qual	DL	TV	% Rec or RPD
227265	CHLORIDE	1170.310	1170		20		
227265D	CHLORIDE	1170.983	1171		20		0.06%
227265S	CHLORIDE	1548.012	1548		20	400	94.4%
227266	CHLORIDE	1442.236	1442		20		

U = UNDETECTED

Book/Page: 10 084

010062

Southwest Research Institute

RSmith 6/7/03

Schedule File: C:\PeakNet\schedule\06JUN03.sch

Line	Sample	Sample Type	Level	Method	Data File	Dilution
1	ICV	Sample		anions030318.met	030606_001.dxd	20
2	ICB	Sample		anions030318.met	030606_002.dxd	1
3	227265	Sample		anions030318.met	030606_003.dxd	200
4	227265	Sample		anions030318.met	030606_004.dxd	200
5	227265D	Sample		anions030318.met	030606_005.dxd	200
6	227265S	Sample		anions030318.met	030606_006.dxd	200
7	227266	Sample		anions030318.met	030606_007.dxd	200
8	CCV	Sample		anions030318.met	030606_008.dxd	20
9	CCB	Sample		anions030318.met	030606_009.dxd	1
10	227357	Sample		anions030318.met	030606_010.dxd	1
11	227357D	Sample		anions030318.met	030606_011.dxd	1
12	227357S	Sample		anions030318.met	030606_012.dxd	1
13	227358	Sample		anions030318.met	030606_013.dxd	1
14	227359	Sample		anions030318.met	030606_014.dxd	1
15	227360	Sample		anions030318.met	030606_015.dxd	1
16	CCV	Sample		anions030318.met	030606_016.dxd	20
17	CCB	Sample		anions030318.met	030606_017.dxd	1

Default Method Path: C:\PEAKNET\METHOD
Default Data Path: C:\PEAKNET\DATA\030606
Comment:
DIV 20 06002.01.081 TO030604-8
LA CANTERA 05827.03.006 TO#030609-1

RSmith

30 Jun 03

VAms 6/24/03

010063

Book/Page: 10 085

Southwest Research Institute

Dionex DX500 Ion Chromatography Daily Log

Analyst: RSpies

Date: 6/6/03

Conductivity: 16.9

Client	Project #	TO #	Analytical Method
DIV 20	06002.01.081	030604-8	300M
LaCantera	05827.03.00	030609-1	✓

Loop: 40ul

Method: Anions 030318

Column: AS14: 13535

Calibration: 03/18/03

Comments:

ICV/CCV/MS:

1st Source SPEX (Inorg # 3989)

2nd Source Nitrite-N

Lot #: 24-79AS

Lot #: 190-01-1C3

CCV Conc: 1:20

CCV Conc: 1:20

MS Conc: 1:100

MS Conc:

✓ ELUENT SOLUTION PREP:

FV = 2.0L DI H20

1.0 mM Sodium Bicarbonate & 3.5 mM Sodium Carbonate

6/6/03 RSS

Weight: 0.168g $NaHCO_3$

Weight: 0.7419 Na_2HCO_3

Source: Aldrich

Source: ~~Alfa~~ Aesar

Lot: 15308EI

Lot: L06M34

Other Eluent:

✓100 mA-Autoregen (ASRS)

Other Regen:

Balance: # 34

5000L
1000G
200G

✓ ams 6/24/03

FRM-226 (Rev 3/Mar 03)

7-02-03

Schedule File: C:\PeakNet\schedule\06JUN03.sch

010064

Line	Sample	Sample Type	Level	Method	Data File	Dilution
1	ICV	Sample		anions030318.met	030606_001.dxd	20
2	ICB	Sample		anions030318.met	030606_002.dxd	1
3	227265	Sample		anions030318.met	030606_003.dxd	200
4	227265	Sample		anions030318.met	030606_004.dxd	200
5	227265D	Sample		anions030318.met	030606_005.dxd	200
6	227265S	Sample		anions030318.met	030606_006.dxd	200
7	227266	Sample		anions030318.met	030606_007.dxd	200
8	CCV	Sample		anions030318.met	030606_008.dxd	20
9	CCB	Sample		anions030318.met	030606_009.dxd	1
10	227357	Sample		anions030318.met	030606_010.dxd	1
11	227357D	Sample		anions030318.met	030606_011.dxd	1
12	227357S	Sample		anions030318.met	030606_012.dxd	1
13	227358	Sample		anions030318.met	030606_013.dxd	1
14	227359	Sample		anions030318.met	030606_014.dxd	1
15	227360	Sample		anions030318.met	030606_015.dxd	1
16	CCV	Sample		anions030318.met	030606_016.dxd	20
17	CCB	Sample		anions030318.met	030606_017.dxd	1

Default Method Path: C:\PEAKNET\METHOD
Default Data Path: C:\PEAKNET\DATA\030606
Comment:
DIV 20 06002.01.081 TO030604-8
LA CANTERA 05827.03.006 TO#030609-1

RSpex

ICV/CCV = Spex #2479(AS) Inorg # 3989
NO_2N = #190-01-1C3

T.V. F = 100 mg/L
Cl = ~~400 mg/L~~ 200 mg/L
NO_2N = 100 mg/L
NO_3N = 90.4
Br = 400
PO4P = 191
SO4 = 400

Spike 1:100 of Spex → Sample

010065

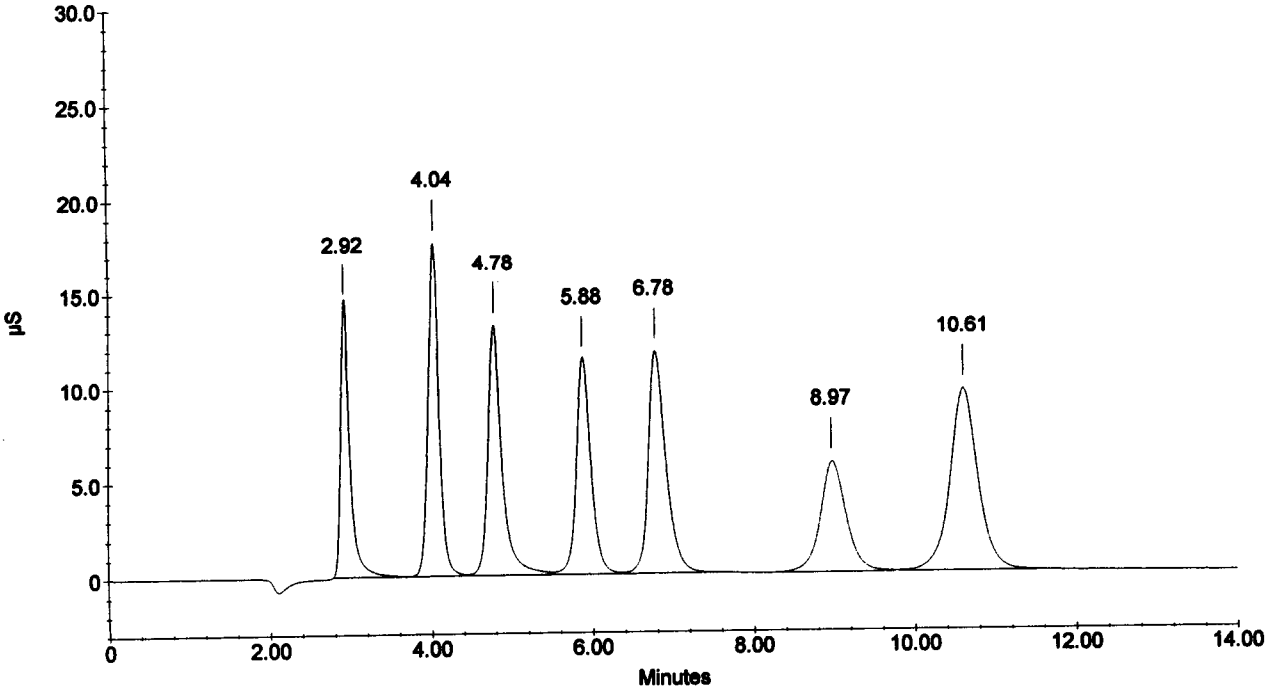
Sample Name : ICV
Dilution Factor : 20.00
Injection Number : 1
Data File Name : c:\peaknet\data\030606\030606_001.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\06jun03.sch

Date Time Collected : 6/6/03 3:01:10 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : rss

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	2.92	FLUORIDE	107.395	142104	1153208	1	-2.67
2	4.04	CHLORIDE	211.578	175982	1647325	2	-4.42
3	4.78	NITRITE-N	99.466	131462	1602813	2	-5.78
4	5.88	BROMIDE	428.079	112548	1427717	2	-6.57
5	6.78	NITRATE-N	97.814	116448	1770649	2	-5.74
6	8.97	PHOSPHATE-P	205.817	57389	1299574	2	-7.56
7	10.61	SULFATE	399.672	95041	2314707	2	-8.40
	0.00		---total(s)--- 1549.821		11215994		

ICV



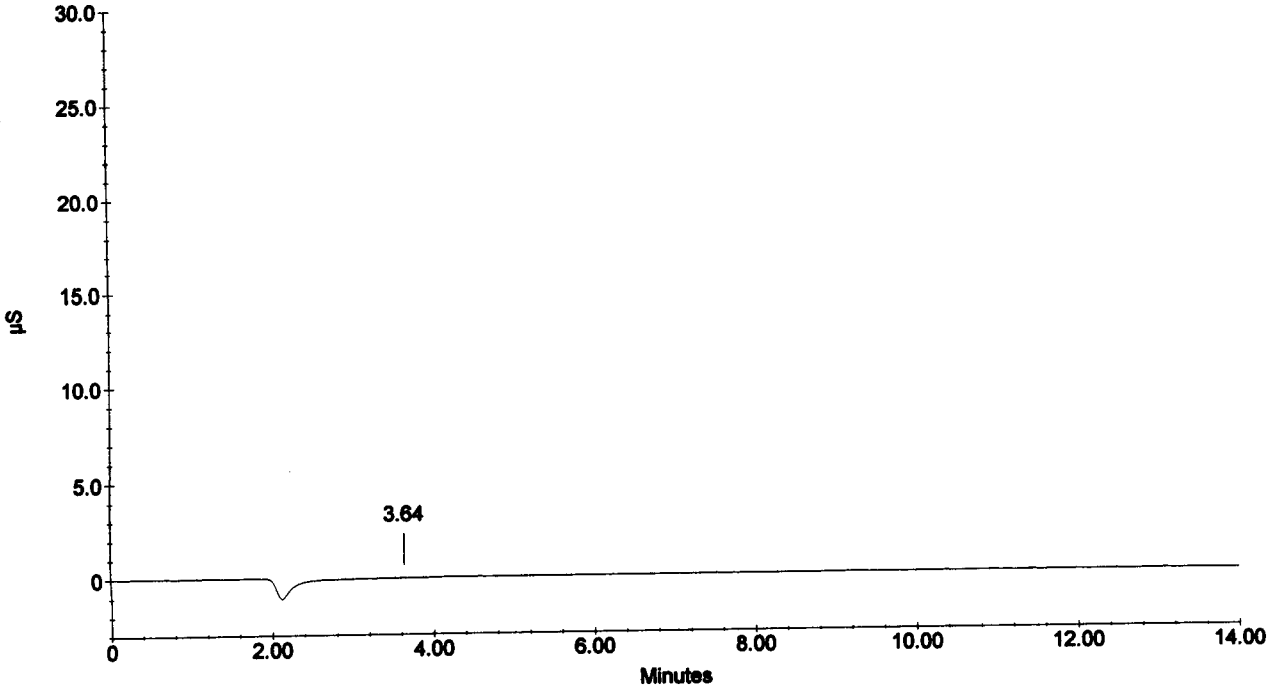
Sample Name : ICB
Dilution Factor : 1.00
Injection Number : 2
Data File Name : c:\peaknet\data\030606\030606_002.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\06jun03.sch

Date Time Collected : 6/6/03 3:17:57 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : rss

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.64		0.000	124	1996	1	
		CHLORIDE					
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
			---total(s)---				
	0.00		0.000		1996		

ICB



010067

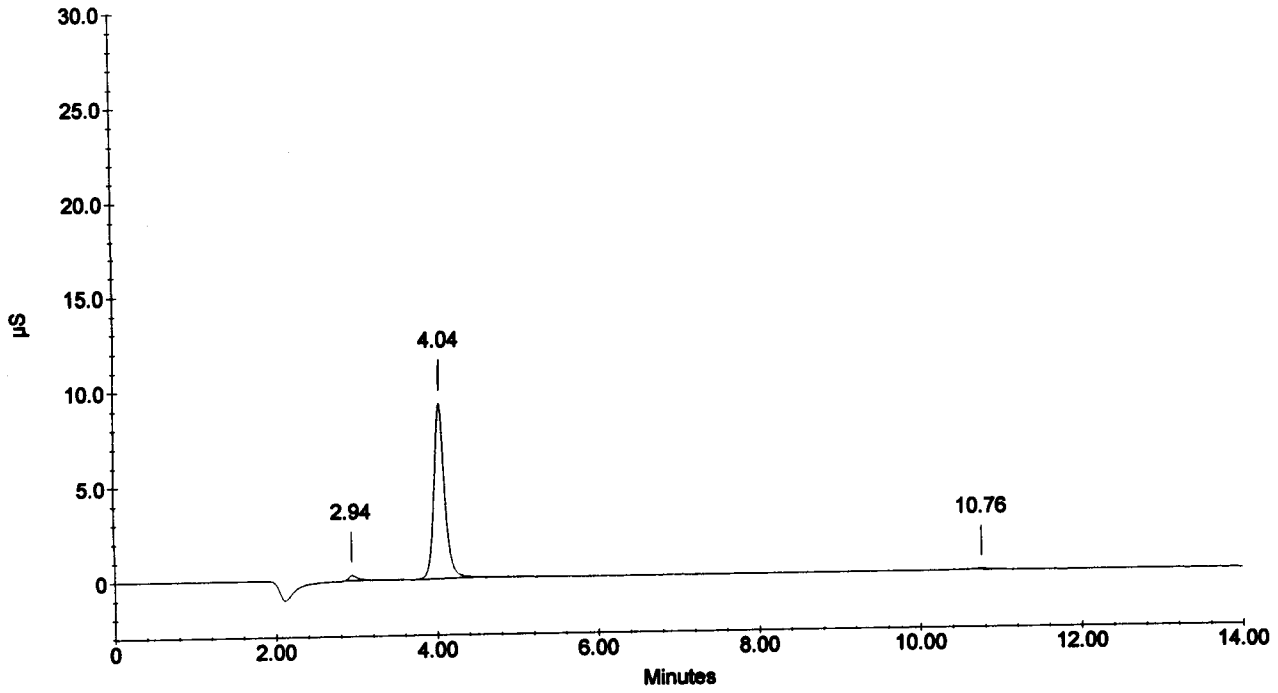
Sample Name : 227265
Dilution Factor : 200.00
Injection Number : 3
Data File Name : c:\peaknet\data\030606\030606_003.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\06jun03.sch

Date Time Collected : 6/6/03 3:34:42 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : rss

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	2.94	FLUORIDE	29.676	2572	19294	1	-1.78
2	4.04	CHLORIDE	1160.394	91816	847224	1	-4.42
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
3	10.76	SULFATE	21.080	382	6039	1	-7.14
			---total(s)---				
	0.00		1211.150		872557		

227265



Sample Name : 227265
Dilution Factor : 200.00
Injection Number : 4
Data File Name : c:\peaknet\data\030606\030606_004.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\06jun03.sch

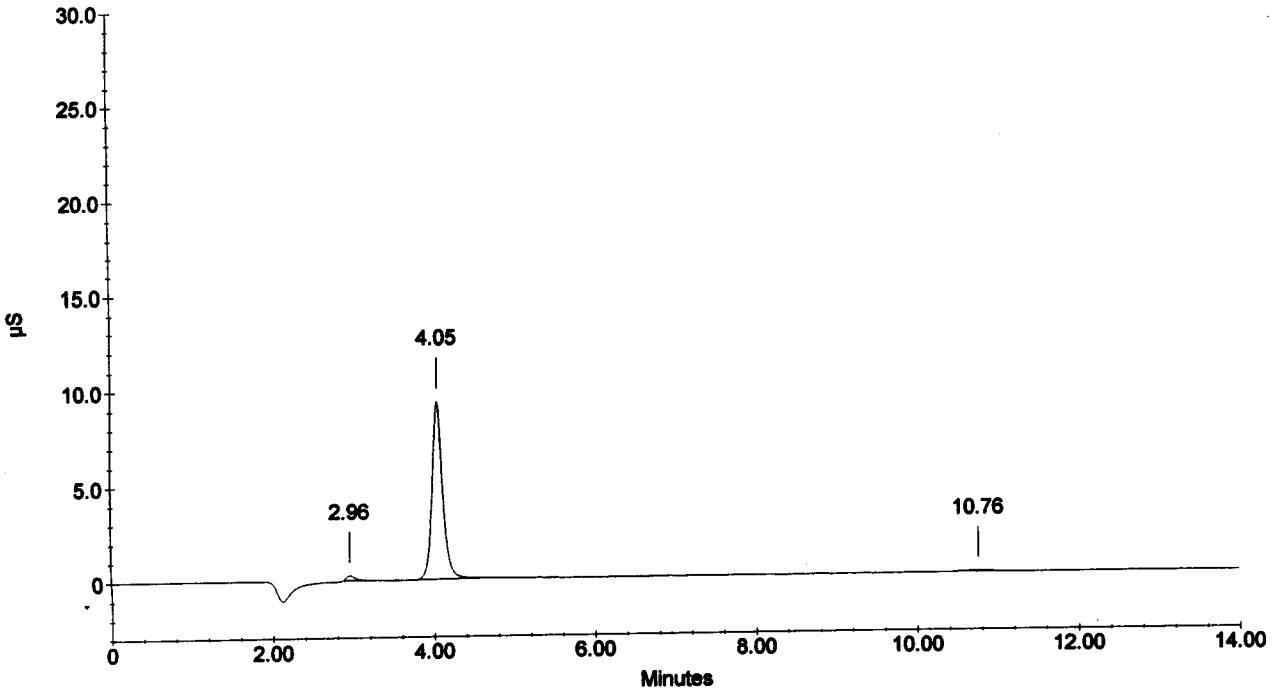
Date Time Collected : 6/6/03 3:51:30 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : rss

010068

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	2.96	FLUORIDE	31.382	2725	21009	1	-1.33
2	4.05	CHLORIDE	1170.310	92838	855058	1	-4.10
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
3	10.76	SULFATE	27.974	504	9579	1	-7.14
	0.00		---total(s)--- 1229.666		885646		

227265



010069

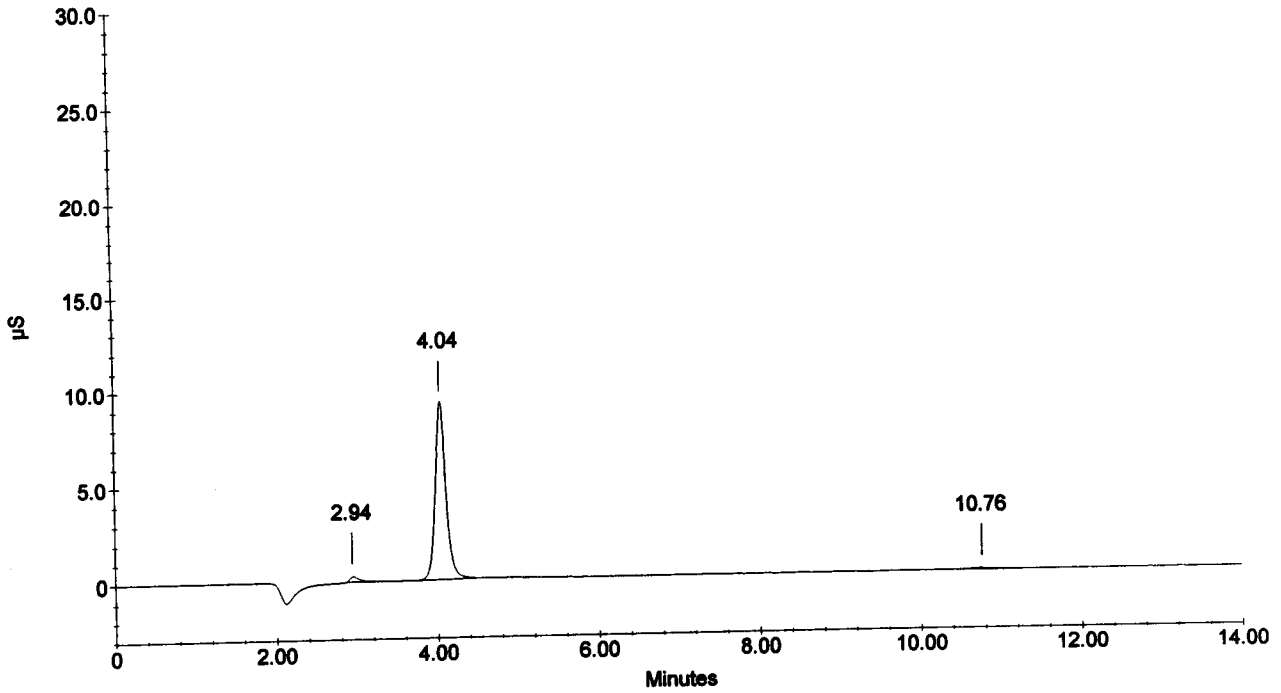
Sample Name : 227265D
Dilution Factor : 200.00
Injection Number : 5
Data File Name : c:\peaknet\data\030606\030606_005.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\06jun03.sch

Date Time Collected : 6/6/03 4:08:25 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : rss

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	2.94	FLUORIDE	31.638	2685	21266	1	-1.78
2	4.04	CHLORIDE	1170.983	91362	855589	1	-4.42
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
3	10.76	SULFATE	24.506	408	7798	1	-7.14
	0.00		---total(s)--- 1227.127		884654		

227265D



Sample Name : 227265S
Dilution Factor : 200.00
Injection Number : 6
Data File Name : c:\peaknet\data\030606\030606_006.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\06jun03.sch

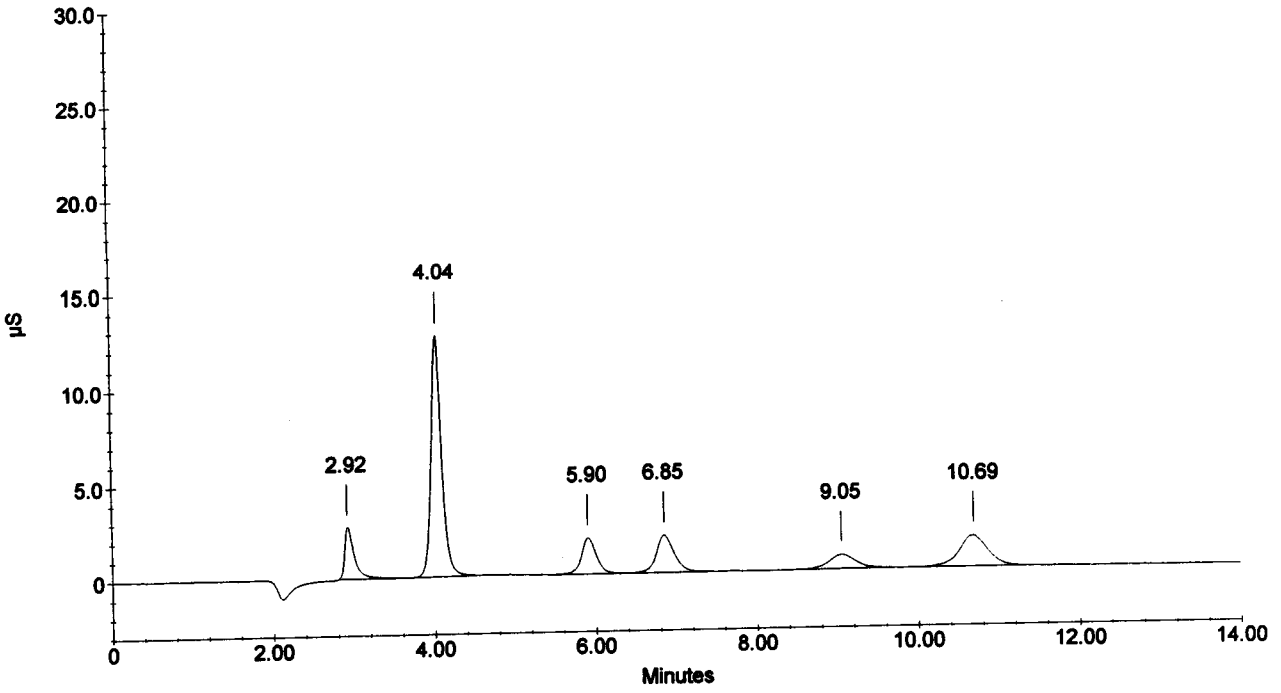
Date Time Collected : 6/6/03 4:25:18 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : rss

010070

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	2.92	FLUORIDE	235.606	26922	229584	1	-2.67
2	4.04	CHLORIDE	1548.012 ✓	125973	1160978	1	-4.42
3	5.90	NITRITE-N BROMIDE	828.077	19092	244839	2	-6.15
4	6.85	NITRATE-N	187.998	19685	308420	2	-4.82
5	9.05	PHOSPHATE-P	312.285	7429	170737	1	-6.73
6	10.69	SULFATE	781.502	16309	404182	1	-7.71
	0.00		---total(s)--- 3893.481		2518741		

227265S



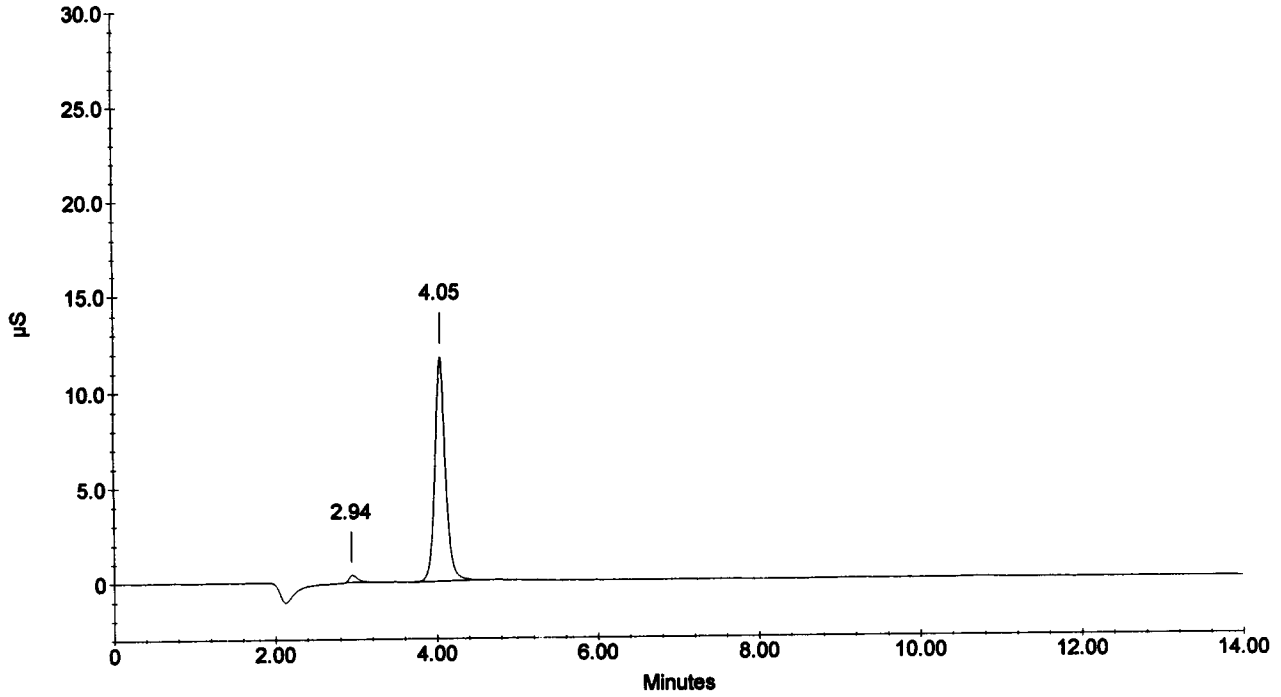
Sample Name : 227266
Dilution Factor : 200.00
Injection Number : 7
Data File Name : c:\peaknet\data\030606\030606_007.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\06jun03.sch

Date Time Collected : 6/6/03 4:41:58 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : rss

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	2.94	FLUORIDE	38.654	3613	28325	1	-1.78
2	4.05	CHLORIDE	1442.236	117320	1073833	1	-4.10
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
			—total(s)—				
	0.00		1480.889		1102158		

227266



010072

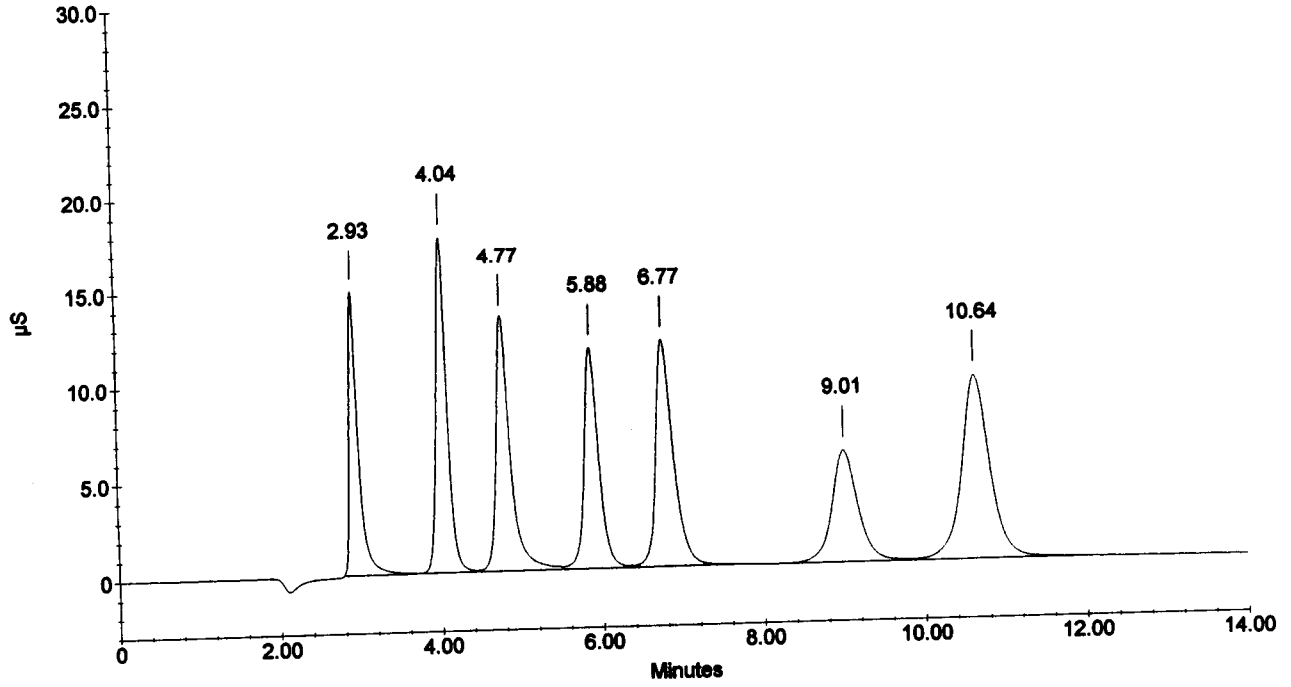
Sample Name : CCV
Dilution Factor : 20.00
Injection Number : 8
Data File Name : c:\peaknet\data\030606\030606_008.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\06jun03.sch

Date Time Collected : 6/6/03 4:58:38 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : rss

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	2.93	FLUORIDE	108.069	147753	1161060	2	-2.22
2	4.04	CHLORIDE	212.117	176288	1652087	2	-4.42
3	4.77	NITRITE-N	100.992	131762	1629269	2	-6.04
4	5.88	BROMIDE	431.445	114676	1439406	2	-6.57
5	6.77	NITRATE-N	98.633	117654	1786898	2	-5.93
6	9.01	PHOSPHATE-P	207.782	57966	1313743	2	-7.15
7	10.64	SULFATE	403.688	95450	2341730	2	-8.17
	0.00		—total(s)— 1562.726		11324193		

CCV



010073

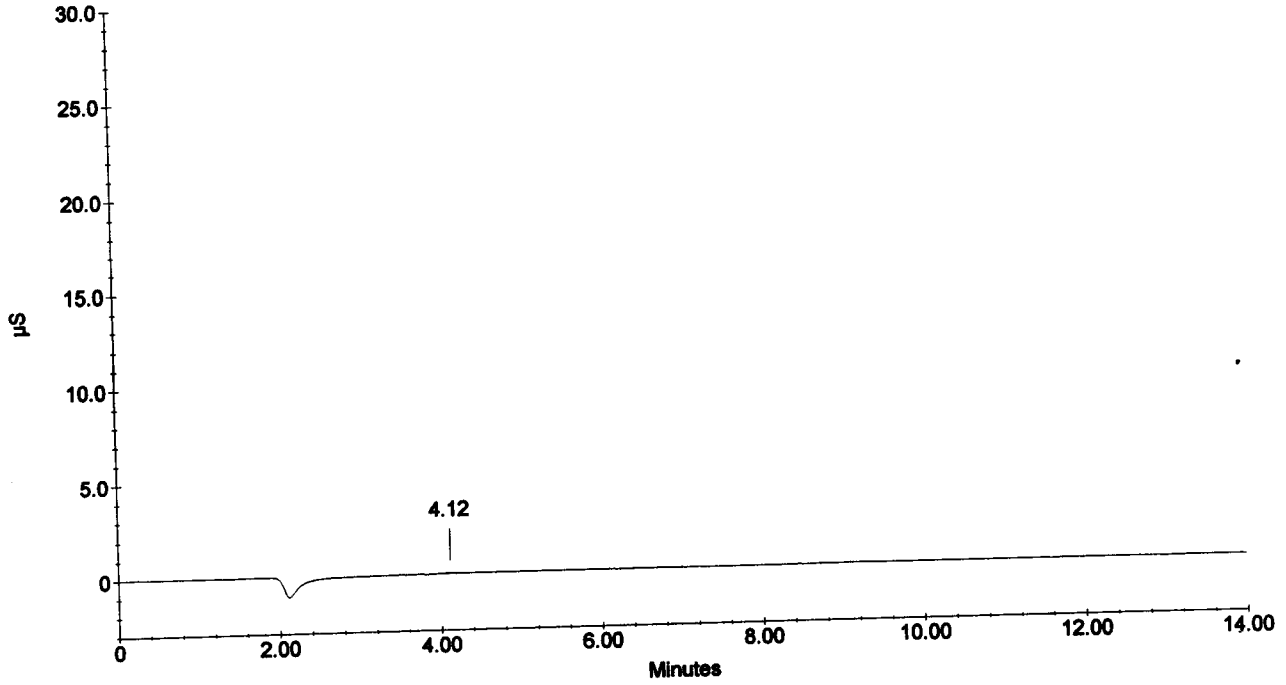
Sample Name : CCB
Dilution Factor : 1.00
Injection Number : 9
Data File Name : c:\peaknet\data\030606\030606_009.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\06jun03.sch

Date Time Collected : 6/6/03 5:15:19 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : rss

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.12	CHLORIDE	0.018	183	2005	1	-2.53
1	4.12	CHLORIDE	0.018	183	2005	1	-2.53
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
	0.00		—total(s)— 0.036		4010		

CCB



010074

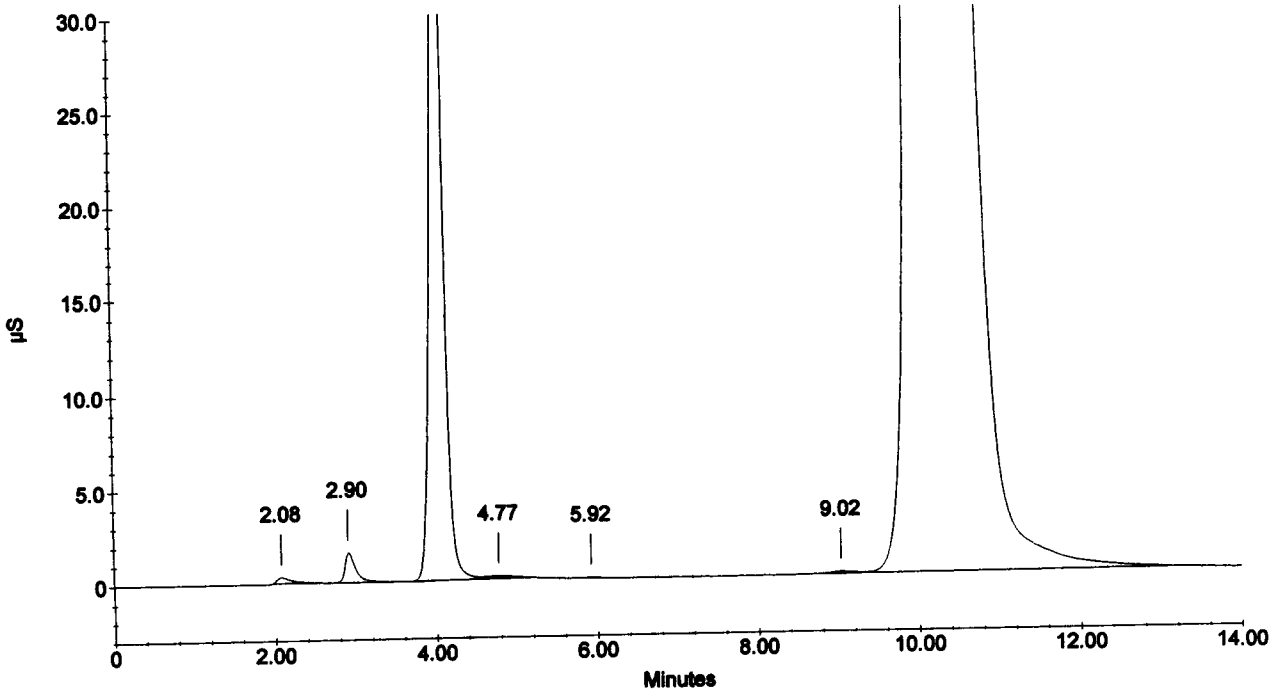
Sample Name : 227357
Dilution Factor : 1.00
Injection Number : 10
Data File Name : ...\030606_010.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\06jun03.sch

Date Time Collected : 6/6/03 5:32:00 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : rss

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
2	2.90	FLUORIDE	0.779	15709	147231	1	-3.11
3	4.06	CHLORIDE	27.091	426394	4620181	3	-3.79
4	4.77	NITRITE-N	0.129	1016	24275	4	-6.04
5	5.92	BROMIDE	0.115	434	4768	1	-5.94
		NITRATE-N					
7	10.08	PHOSPHATE-P	86979.908	2671661	86113659	2	3.85
		SULFATE					
	0.00		—total(s)— 87008.022		90910113		

227357



Sample Name : 227357D
Dilution Factor : 1.00
Injection Number : 11
Data File Name : ...\030606_011.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\06jun03.sch

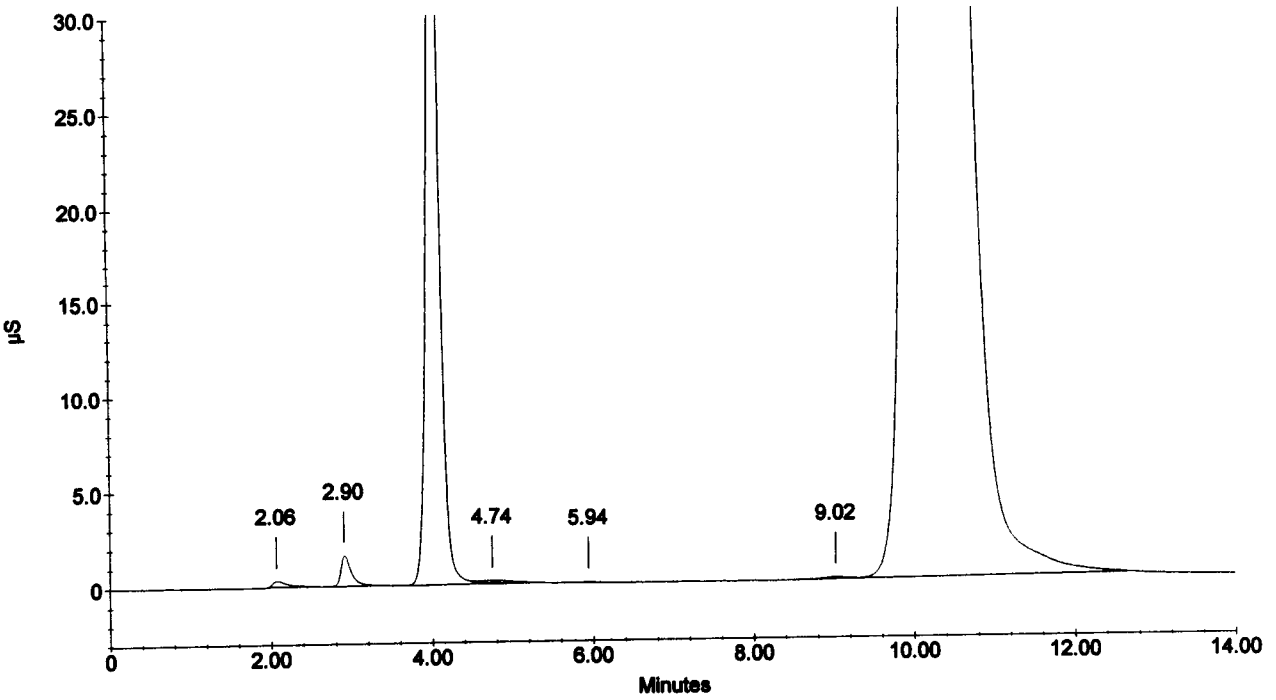
Date Time Collected : 6/6/03 5:48:40 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : rss

010075

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
2	2.90	FLUORIDE	0.756	15852	142593	1	-3.11
3	4.06	CHLORIDE	27.188	438365	4635638	3	-3.79
4	4.74	NITRITE-N	0.166	1333	35458	4	-6.57
5	5.94	BROMIDE	0.114	468	4676	1	-5.51
		NITRATE-N					
7	10.09	PHOSPHATE-P	86622.190	2675977	85998387	2	3.98
		SULFATE					
	0.00		—total(s)— 86650.413		90816751		

227357D



010076

Sample Name : 227357S
Dilution Factor : 1.00
Injection Number : 12
Data File Name : ...\030606_012.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\06jun03.sch

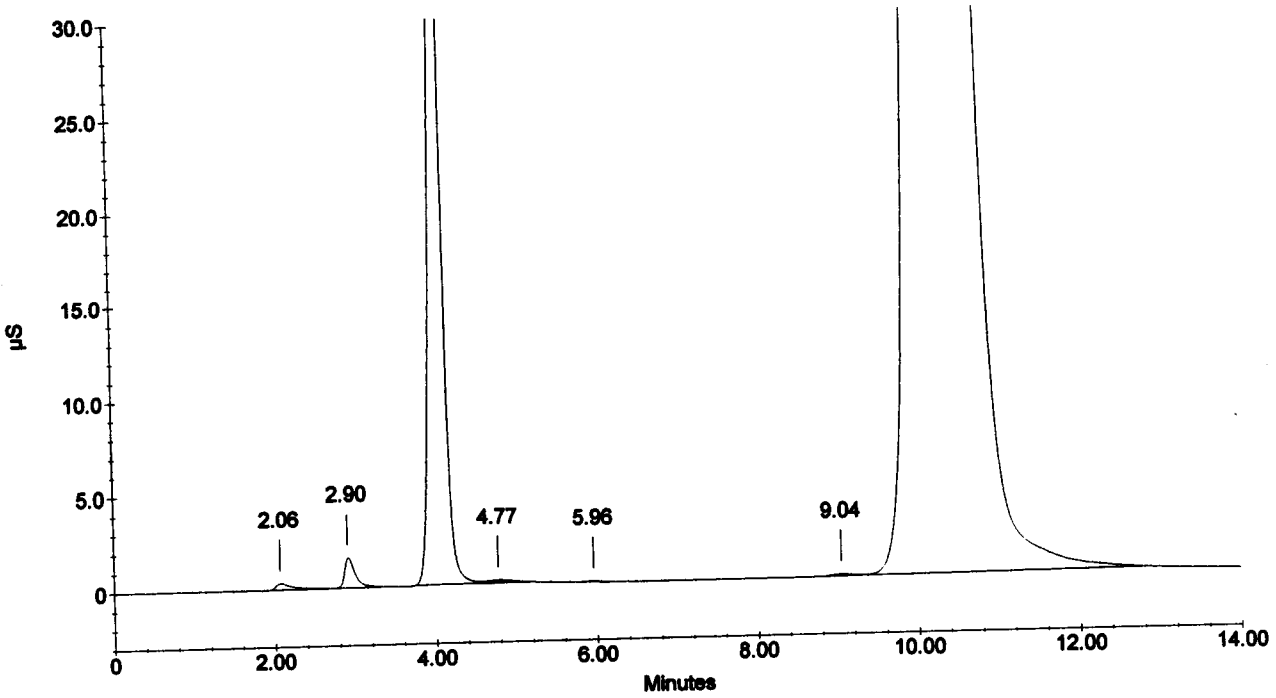
Date Time Collected : 6/6/03 6:05:22 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : rss

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
2	2.90	FLUORIDE	0.772	15619	145911	1	-3.11
3	4.06	CHLORIDE	27.092	441773	4620363	3	-3.79
4	4.77	NITRITE-N	0.143	1289	28635	4	-6.04
5	5.96	BROMIDE	0.142	534	6285	1	-5.30
7	10.10	NITRATE-N PHOSPHATE-P SULFATE	86550.890	2668648	85975373	2	4.12
	0.00		—total(s)— 86579.039		90776566		

Reanalyze - Inadvertantly Did not Spike
RSS 6/9/03

227357S



010077

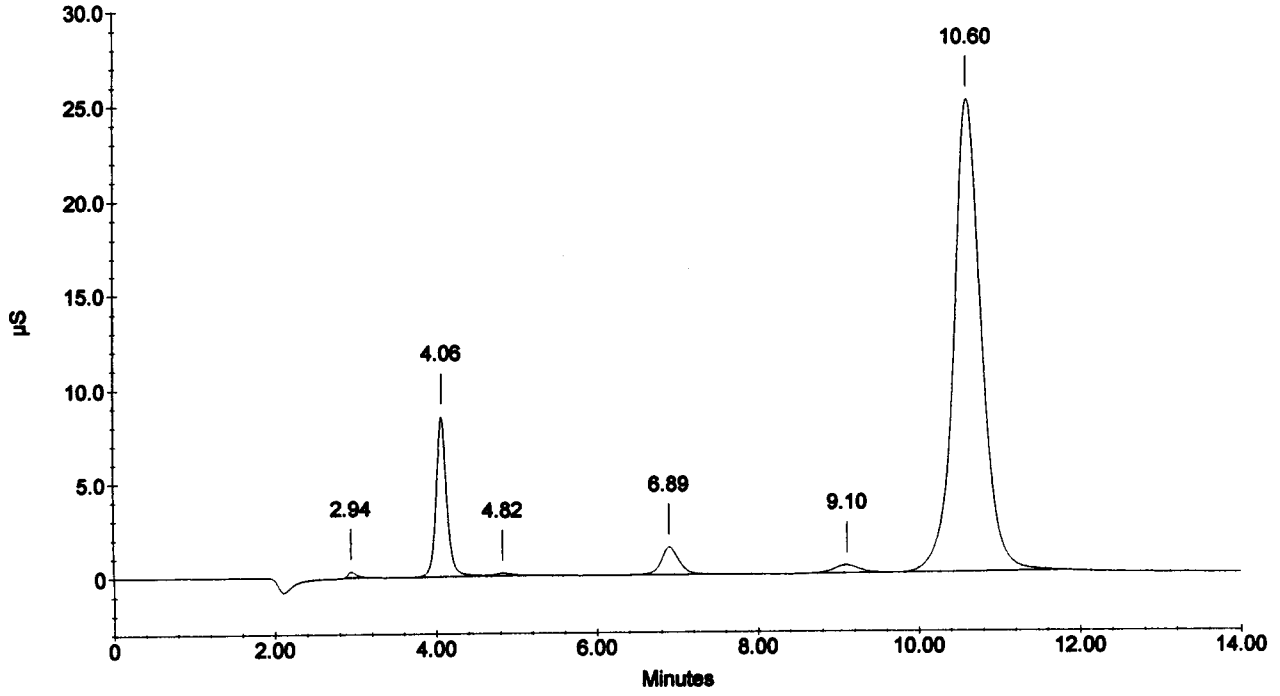
Sample Name : 227358
Dilution Factor : 1.00
Injection Number : 13
Data File Name : ...\030606_013.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\06jun03.sch

Date Time Collected : 6/6/03 6:22:01 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : rss

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	2.94	FLUORIDE	0.163	2985	22268	1	-1.78
2	4.06	CHLORIDE	5.380	85017	780890	2	-3.79
3	4.82	NITRITE-N	0.118	1419	20829	2	-4.99
		BROMIDE					
4	6.89	NITRATE-N	0.700	14702	225853	1	-4.26
5	9.10	PHOSPHATE-P	0.887	4263	94071	1	-6.18
6	10.60	SULFATE	39.810	249669	5943796	1	-8.52
			—total(s)—				
	0.00		47.058		7087708		

227358



010078

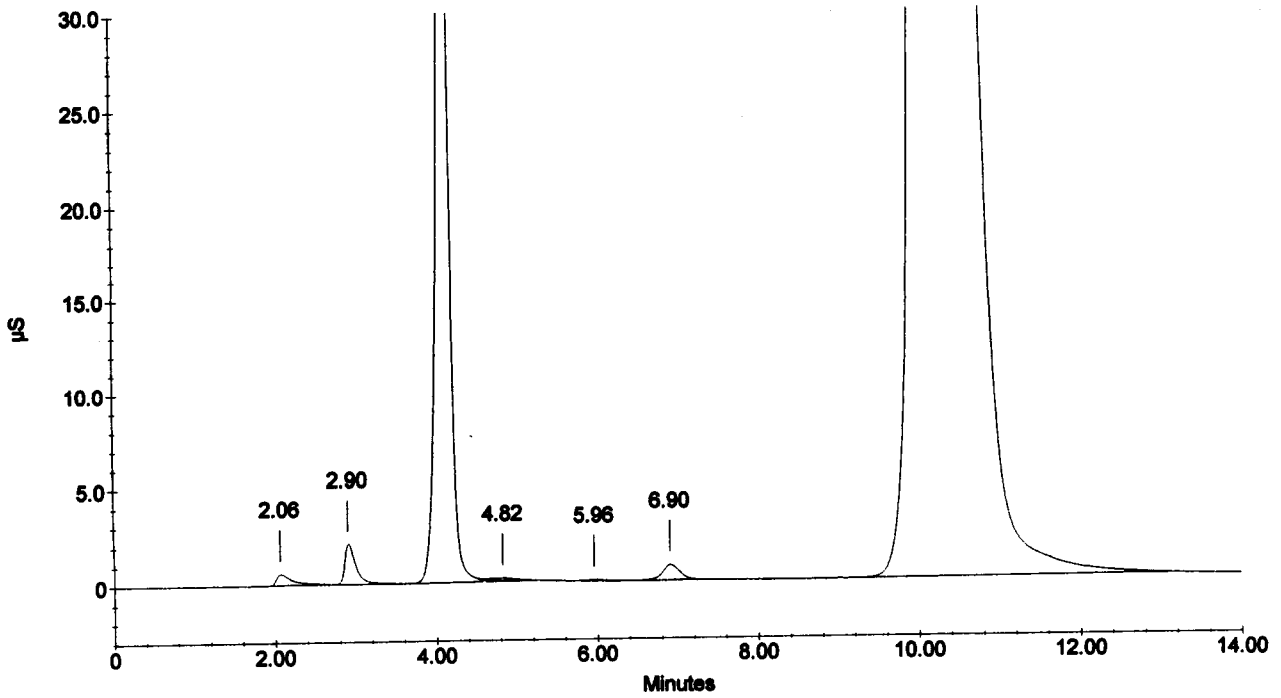
Sample Name : 227359
Dilution Factor : 1.00
Injection Number : 14
Data File Name : ...\030606_014.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\06jun03.sch

Date Time Collected : 6/6/03 6:38:42 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : rss

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
2	2.90	FLUORIDE	1.049✓	20549	202860	1	-3.11
3	4.13	CHLORIDE	29.473	503081	4989795	3	-2.21
4	4.82	NITRITE-N	0.145✓	1356	29139	4	-4.99
5	5.96	BROMIDE	0.176	663	8256	1	-5.30
6	6.90	NITRATE-N	0.390✓	7966	120544	1	-4.08
7	10.12	PHOSPHATE-P	75946.032	2592130	82400869	1	4.26
		SULFATE					
			—total(s)—				
	0.00		75977.266		87751463		

227359



010079

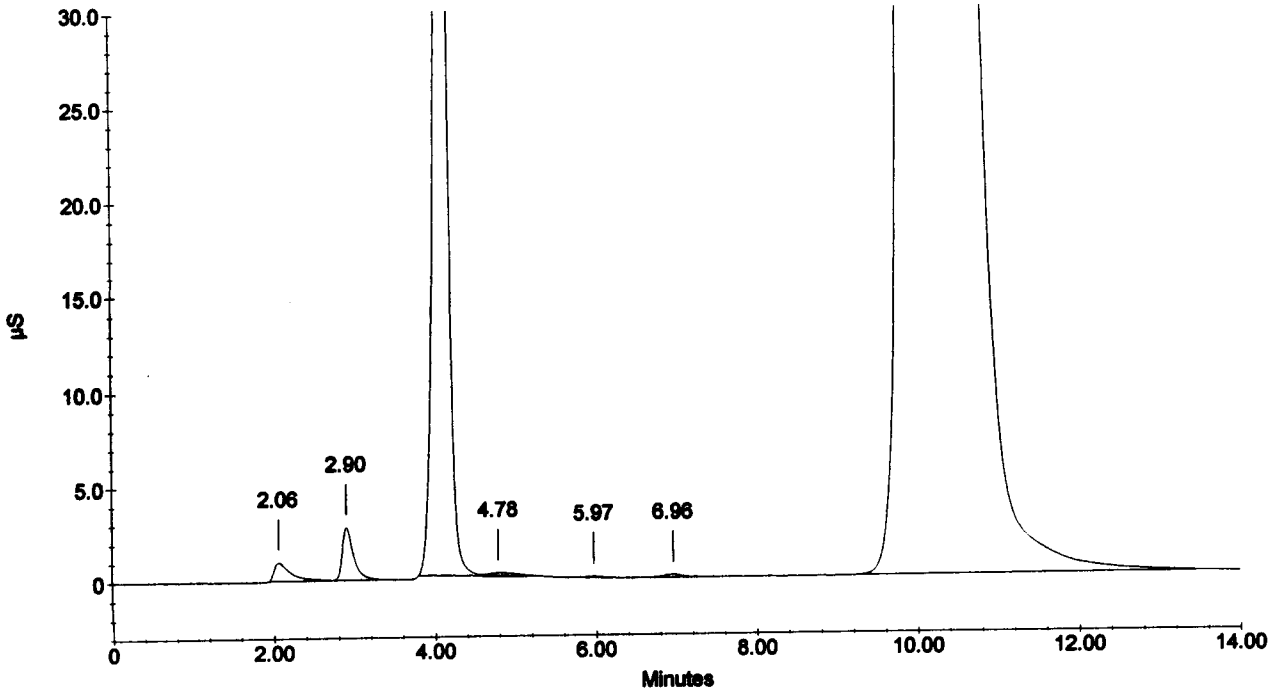
Sample Name : 227360
Dilution Factor : 1.00
Injection Number : 15
Data File Name : ...\030606_015.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\06jun03.sch

Date Time Collected : 6/6/03 6:55:24 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : rss

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
2	2.90	FLUORIDE	1.369 ✓	27747	269290	1	-3.11
3	4.12	CHLORIDE	41.580	627690	6539677	3	-2.53
4	4.78	NITRITE-N	0.199 ✓	1823	45616	4	-5.78
5	5.97	BROMIDE	0.173	719	8081	1	-5.09
6	6.96	NITRATE-N	0.102 ✓	1484	23396	1	-3.33
7	9.98	PHOSPHATE-P	242875.142	3371424	120365761	1	2.89
		SULFATE					
	0.00		—total(s)— 242918.565		127251821		

227360



010080

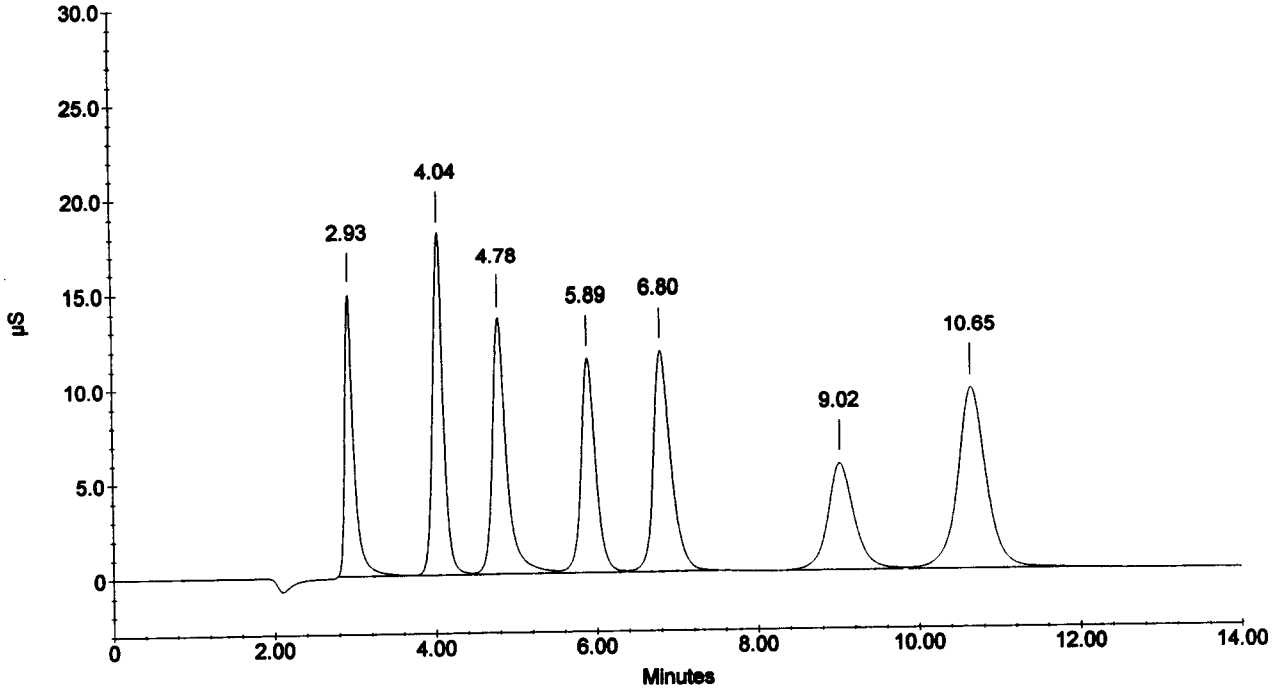
Sample Name : CCV
Dilution Factor : 20.00
Injection Number : 16
Data File Name : c:\peaknet\data\030606\030606_016.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\06jun03.sch

Date Time Collected : 6/6/03 7:12:04 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : rss

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	2.93	FLUORIDE	107.959	148020	1159781	2	-2.22
2	4.04	CHLORIDE	212.198	179282	1652802	2	-4.42
3	4.78	NITRITE-N	102.467	134285	1654880	2	-5.78
4	5.89	BROMIDE	426.844	112686	1423426	2	-6.36
5	6.80	NITRATE-N	97.502	116134	1764463	2	-5.56
6	9.02	PHOSPHATE-P	204.924	56332	1293149	2	-7.01
7	10.65	SULFATE	409.003	95632	2377655	2	-8.06
	0.00		—total(s)— 1560.898		11326155		

CCV



Sample Name : CCB
Dilution Factor : 1.00
Injection Number : 17
Data File Name : c:\peaknet\data\030606\030606_017.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\06jun03.sch

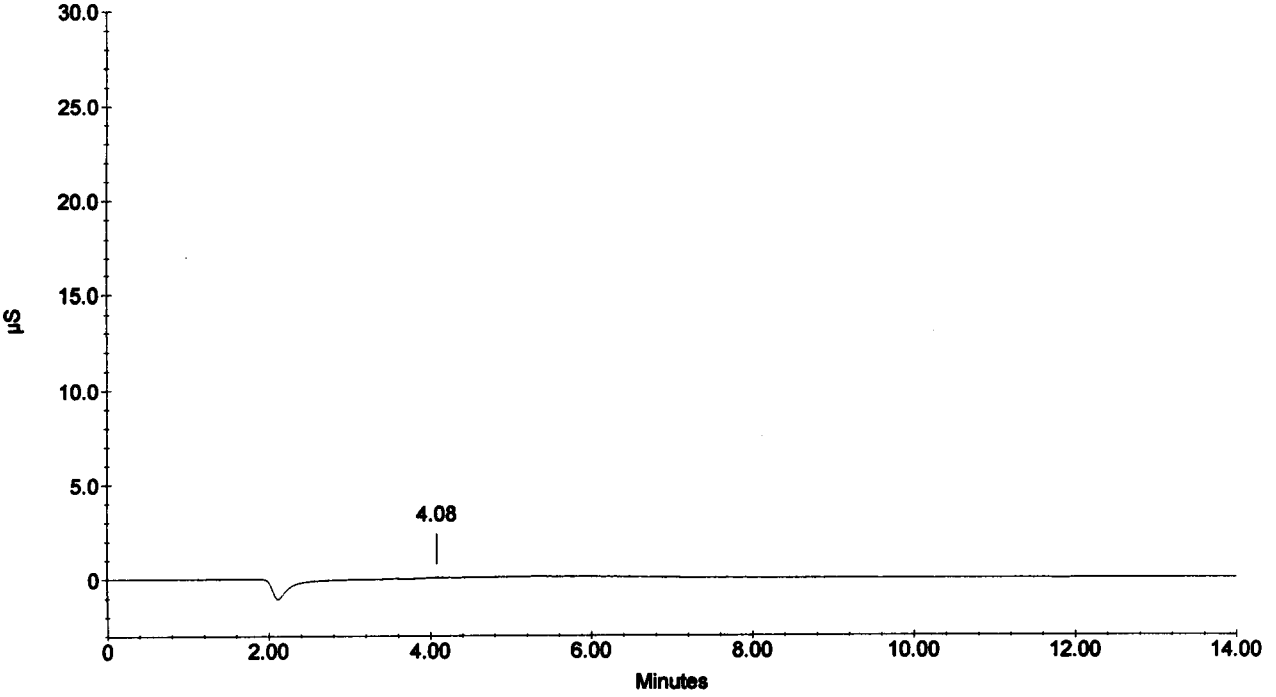
Date Time Collected : 6/6/03 7:28:45 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : rss

010081

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.08	CHLORIDE	0.011	177	1064	1	-3.47
1	4.08	CHLORIDE	0.011	177	1064	1	-3.47
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
			—total(s)—				
	0.00		0.022		2128		

CCB



190 TITLE

SwRI

PROJECT NO. 010082

BOOK NO. IC3

Work continued from Page

190-01-IC3 Nitrite-N (100 ppm)

Diluted 0.0492 Sodium Nitrite in 100mL DI H_2O

(Fisher, Lot # 934669B, Inorg # 0379)

Balance #34

WAN 01/10/03

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE L Warren A. Naegeli

DATE 01/10/03

DISCLOSED TO AND UNDERSTOOD BY ams

DATE 11/20/03

WITNESS

DATE

FISHER SCIENTIFIC CHEMICAL DIVISION
One Reagent Lane, Fair Lawn, NJ 07410

010083

ANALYTICAL CONTROL LABORATORY ANALYSIS

Name & Grade:
SODIUM NITRITE, A.C.S.
Catalog Number: S347
Lot Number: 934669
P.O./ Other Customer ID:

Date of Testing/Mfg: 08/17/93

This is to certify that units of the above mentioned lot number were tested and found to comply with the specifications of the grade listed. The following are the actual analytical results obtained:

Test	Unit	Result
APPEARANCE	PASS/FAIL	PASS-YELLOW WHITE CRYSTALS
ASSAY	%	99.8000
CALCIUM IN %	%	0.0020
CHLORIDE	%	0.0010
HEAVY METALS	%	0.0002
IDENTIFICATION		PASS
INSOLUBLE MATTER	%	0.0020
IRON	%	0.00020
POTASSIUM	%	0.00100
SULFATE (SO4)	%	0.0020

Approved by: Frederick H. Turk, FL Analytical QA Supv. or Edgar E. Hess, BPF Analytical QA Supv.

Date: 08/25/93 (Signed and dated original is on file)

NOTE: The data listed is valid for all package sizes of this lot of product, expressed as a extension of the catalog number listed above. If there are any questions with this certificate, please call Steven P. Davis, Analytical QA Manager, at (201) 703-3149.

Ref. No. S347..934669.B1.

Location: FL

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	
12-30-02	2.0000	2.0000	JW	SN: 350526-15
12/31/02	2.0000	1.9999	JW	"
1-2-03	2.0000	1.9999	JW	"
1/03/03	2.0000	2.0000	JW	"
1/06/03	2.0000	2.0000	JW	"
1/07/03	2.0000	2.0000	JW	"
1-8-03	2.0000	2.0000	JW	"
1-9-03	2.0000	2.0000	JW	"
1-10-03	2.0000	2.0000	JW	"
1/13/03	2.0000	2.0000	JW	"

If balance is out of limits, clean the balance and re-calibrate using Class "S" weights.
If balance is still out of limits, place a "DO NOT USE" sign on it and call (x5896) for service.

✓ ams 1/15/03

Page # ____13___

FRM-112 (Rev 1/Dec 99)

D.I. WATER SYSTEM NOTEBOOK
METALS LAB
SOUTHWEST RESEARCH INSTITUTE

01 021
010085

DATE	INITIALS	READING (M OHMS)	SET PT./ QC LT. Green=OK	CALL FOR Service LT. Green=OK	USAGE (GALS)	COMMENTS
12/16/02	DR	18.0	✓	✓	48534.1	5:35 p.m.
12/17/02	DR	18.0	✓	✓	48546.2	9:25 p.m
12/18/02	DR	18.0	✓	✓	48562.0	5:56 p.m.
12/19/02	DR	18.0	✓	✓	48570.9	6:09 p.m
12/20/02	DR	18.0	✓	✓	48585.4	6 p.m.
12/23/02	DR	18.0	✓	✓	48595.2	6:21 p.m
12/26/02	DR	18.0	✓	✓	48601.0	12:25 p.m.
12/27/02	DR	18.0	✓	✓	48617.5	5:35 p.m
12/30/02	DR	18.0	✓	✓	48629.2	6:04 p.m
1-31/03	DR	18.0	✓	✓	48639.0	10:15 a.m
01/02/2003	DR	18.0	✓	✓	48647.9	6:45 p.m Happy New Year's
01/03/2003	DR	18.0	✓	✓	48661.5	5:50 p.m
01/06/03	DR	18.0	✓	✓	48689.5	6:45 p.m.
01/07/03	DR	18.0	✓	✓	48699.7	6:21 p.m.
01/08/03	DR	18.0	✓	✓	48705.8	7:30 p.m
01/09/03	DR	18.0	✓	✓	48735.2	6:38 p.m
01/10/03	DR	18.0	✓	✓	48767.4	6:15 p.m
01/13/03	DR	18.0	✓	✓	48791.6	7:40 p.m
01/14/03	DR	18.0	✓	✓	48814.6	10:55 p.m.
		Reviewed ams 1/15/03				
01/15/03	DR	18.0	✓	✓	48829.0	8:01 p.m
01/16/03	DR	18.0	✓	✓	48838.5	5:20 p.m
1/17-1/19/03	System could not be checked due to asbestos abatement →					
		Reviewed ams 1/20/03				

Work continued from Page

199-01-IC3 20 ppm Anions Standard expires 6/15/03

Anion	Std Vol(ml)	Std conc ppm	Std Lot#	Spex Source	Exp Date
Fluoride	1.0	1000	3895	23-109AS	1/15/2004
Chloride	1.0	1000	3487	21-58AS	6/15/2003
Nitrite-N	3.3	304	3488	5-255 VY	6/15/2003
Bromide	1.0	1000	3490	22-114AS	6/15/2003
Nitrate-N	1.0	1000	3960	23-82AS	2/15/2004
Phosphate-P	3.07	326	3880	24-63AS	12/15/2003
Sulfate	1.0	1000	3489	6-76 VY	6/15/2003

FV = 50ml

199-02-IC3 15 ppm Std
3ml 199-01-IC3 + 1ml DI H_2O

199-03-IC3 10 ppm Std
2ml 199-01-IC3 + 2ml DI H_2O

199-04-IC3 5 ppm Std
2ml 199-03-IC3 + 2ml DI H_2O

199-05-IC3 1 ppm Std
1ml 199-04-IC3 + 4ml DI H_2O

199-06-IC3 0.5 ppm Std
2ml 199-05-IC3 + 2ml DI H_2O

199-07-IC3 0.1 ppm Std
1ml 199-06-IC3 + 4ml DI H_2O

199-08-IC3 0 ppm Std
DI H_2O

Balance: 34
Eppendorfs: 5000G
1000E

SIGNATURE AMS DATE 3/18/03

DISCLOSED TO AND UNDERSTOOD BY RSPM DATE WITNESS DATE 4/11/03

010087

Book/Page: 10 016

Southwest Research Institute

JMS 3/18/03

Schedule File: C:\PeakNet\schedule\030318.sch

Line	Sample	Sample Type	Level	Method	Data File	Dilution
1	0 PPM 199-08-IC3	Calibration St	1	anions030318.met	030318_001.dxd	1
2	0.1 PPM 199-07-IC3	Calibration St	2	anions030318.met	030318_002.dxd	1
3	0.5 PPM 199-06-IC3	Calibration St	3	anions030318.met	030318_003.dxd	1
4	1.0 PPM 199-05-IC3	Calibration St	4	anions030318.met	030318_004.dxd	1
5	5.0 PPM 199-04-IC3	Calibration St	5	anions030318.met	030318_005.dxd	1
6	10 PPM 199-03-IC3	Calibration St	6	anions030318.met	030318_006.dxd	1
7	15 PPM 199-02-IC3	Calibration St	7	anions030318.met	030318_007.dxd	1
8	20 PPM 199-01-IC3	Calibration St	8	anions030318.met	030318_008.dxd	1
9	ICV	Sample		anions030318.met	030318_009.dxd	20
10	ICB	Sample		anions030318.met	030318_010.dxd	1
11	MDL-1	Sample		anions030318.met	030318_011.dxd	1
12	MDL-2	Sample		anions030318.met	030318_012.dxd	1
13	MDL-3	Sample		anions030318.met	030318_013.dxd	1
14	MDL-4	Sample		anions030318.met	030318_014.dxd	1
15	MDL-5	Sample		anions030318.met	030318_015.dxd	1
16	MDL-6	Sample		anions030318.met	030318_016.dxd	1
17	MDL-7	Sample		anions030318.met	030318_017.dxd	1
18	DOC-1	Sample		anions030318.met	030318_018.dxd	1
19	DOC-2	Sample		anions030318.met	030318_019.dxd	1
20	DOC-3	Sample		anions030318.met	030318_020.dxd	1
21	CCV	Sample		anions030318.met	030318_021.dxd	20
22	CCB	Sample		anions030318.met	030318_022.dxd	1
23	DOC-4	Sample		anions030318.met	030318_023.dxd	1
24	CCV	Sample		anions030318.met	030318_024.dxd	20
25	CCB	Sample		anions030318.met	030318_025.dxd	1
26	CCB	Sample		astop.met	030318_001.dxd	1

Default Method Path: C:\PEAKNET\METHOD
Default Data Path: C:\PEAKNET\DATA\030318
Comment:

JMS 3/18/03

Book/Page: 10 017

010088

Southwest Research Institute

Dionex DX500 Ion Chromatography Daily Log

Analyst: ams

Date: 3/18/03

Conductivity: 16.8

Client	Project #	TO #	Analytical Method
Div 01	01H001.113	NA	300
			9056

Loop: 40uL

Column: AS14: 13535

Comments: The MDL and DOC were not used

Method: Anions 030318

Calibration: 3/18/03

ICV/CCV/MS:

1st Source: Spex (Inorg# 3989)

Lot #: 24-79AS

CCV Conc: 1:20

MS Conc:

2nd Source: Nitrite

Lot #: 190-01-TC3

CCV Conc: 1:20

MS Conc:

✓ ELUENT SOLUTION PREP:

FV = 2.0L DI H20

1.0 mM Sodium Bicarbonate & 3.5 mM Sodium Carbonate

Weight: 0.168 g $NaHCO_3$

Source: Aldrich

Lot: 15308ET

Weight: 0.7419 g Na_2HCO_3

Source: Aldrich

Lot: 14315BO

Other Eluent:

50 mA-Autoregen (ASRS)

Other Regen:

D Spriet 4/11/03

FRM-226 (Rev 3/Mar 03)

Page 2 of 2

Balance: 34

Pipets: 5000 G
1000 E
200 D

Schedule File: C:\PeakNet\schedule\030318.sch

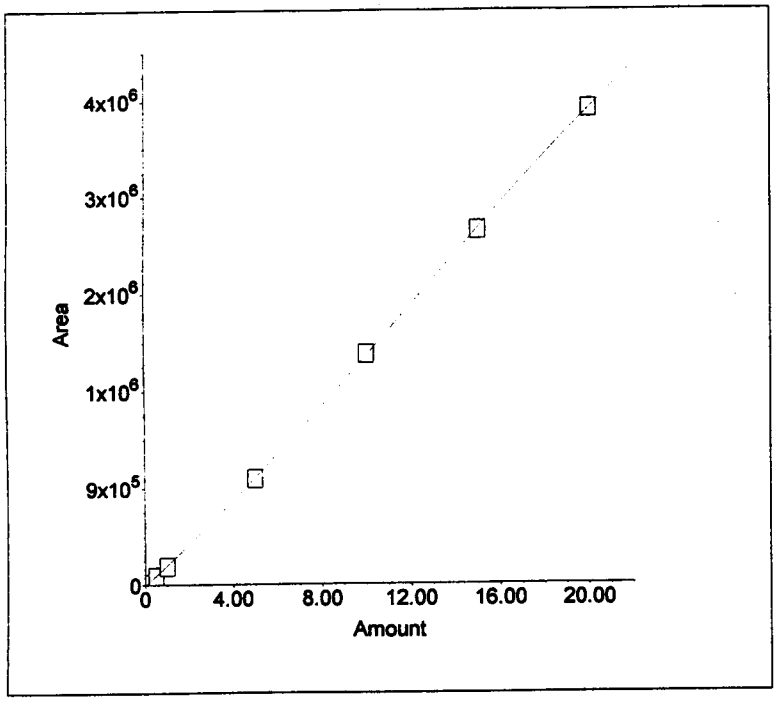
Line	Sample	Sample Type	Level	Method	Data File	Dilution
1	0 PPM 199-08-IC3	Calibration St	1	anions030318.met	030318_001.dxd	1
2	0.1 PPM 199-07-IC3	Calibration St	2	anions030318.met	030318_002.dxd	1
3	0.5 PPM 199-06-IC3	Calibration St	3	anions030318.met	030318_003.dxd	1
4	1.0 PPM 199-05-IC3	Calibration St	4	anions030318.met	030318_004.dxd	1
5	5.0 PPM 199-04-IC3	Calibration St	5	anions030318.met	030318_005.dxd	1
6	10 PPM 199-03-IC3	Calibration St	6	anions030318.met	030318_006.dxd	1
7	15 PPM 199-02-IC3	Calibration St	7	anions030318.met	030318_007.dxd	1
8	20 PPM 199-01-IC3	Calibration St	8	anions030318.met	030318_008.dxd	1
9	ICV	Sample		anions030318.met	030318_009.dxd	20
10	ICB	Sample		anions030318.met	030318_010.dxd	1

010089

Default Method Path: C:\PEAKNET\METHOD
Default Data Path: C:\PEAKNET\DATA\030318
Comment:

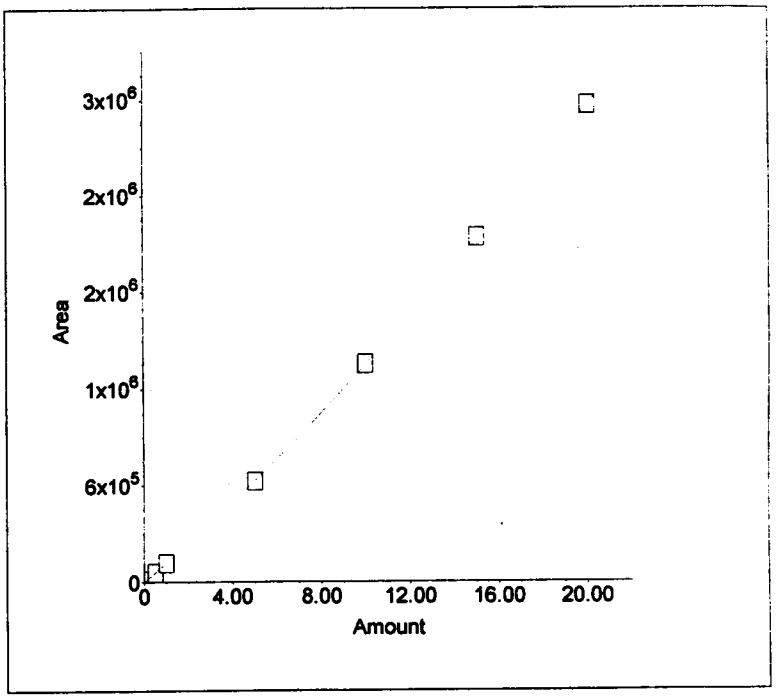
Method:C:\PEAKNET\METHOD\ANIONS030318.MET Updated:3/18/03 6:04:56 PM Total:7

1. Component:FLUORIDE
Standard:External Fit Type:Cubic
Origin:Include Calibration:Area
r^2=0.999963
Amt=4.560939e-020*Resp³+
-3.796787e-013*Resp²+
4.988197e-006*Resp+0.05228

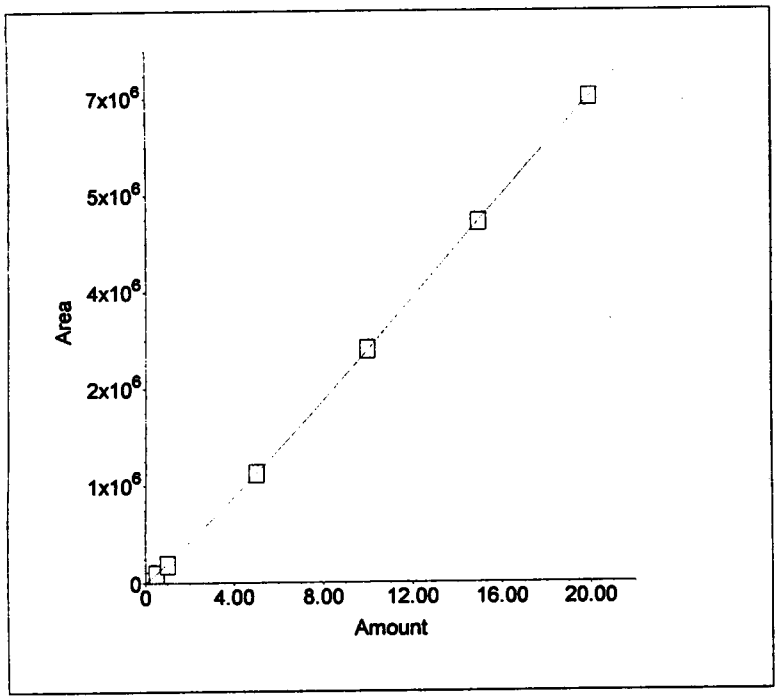


2. Component:CHLORIDE
Standard:External Fit Type:Cubic
Origin:Include Calibration:Area
r^2=0.999994
Amt=9.097756e-020*Resp³+
-7.575694e-013*Resp²+
7.421034e-006*Resp+0.003143

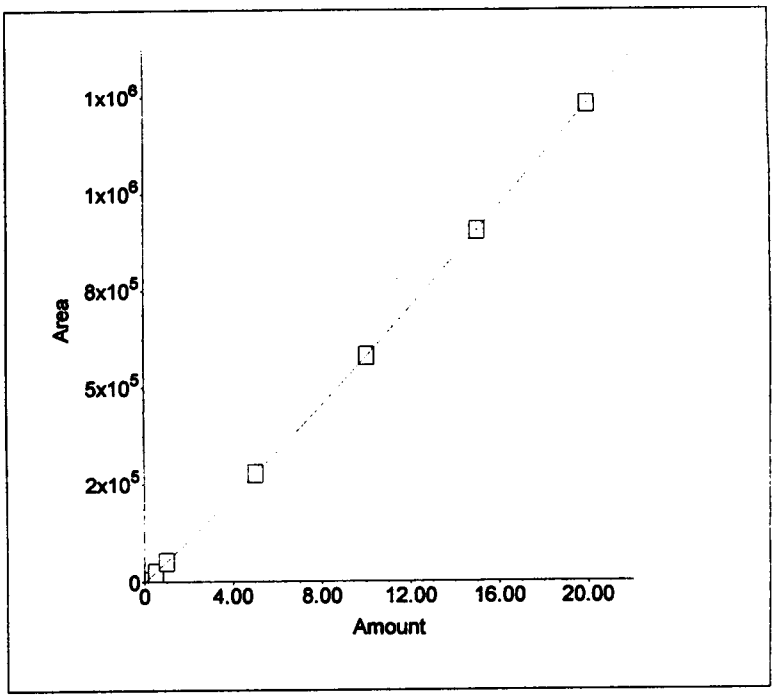
010090



3. Component:NITRITE-N
Standard:External Fit Type:Cubic
Origin:Include Calibration:Area
r^2=0.999973
Amt=1.127229e-020*Resp³+
-1.520875e-013*Resp²+
3.286842e-006*Resp+0.04943

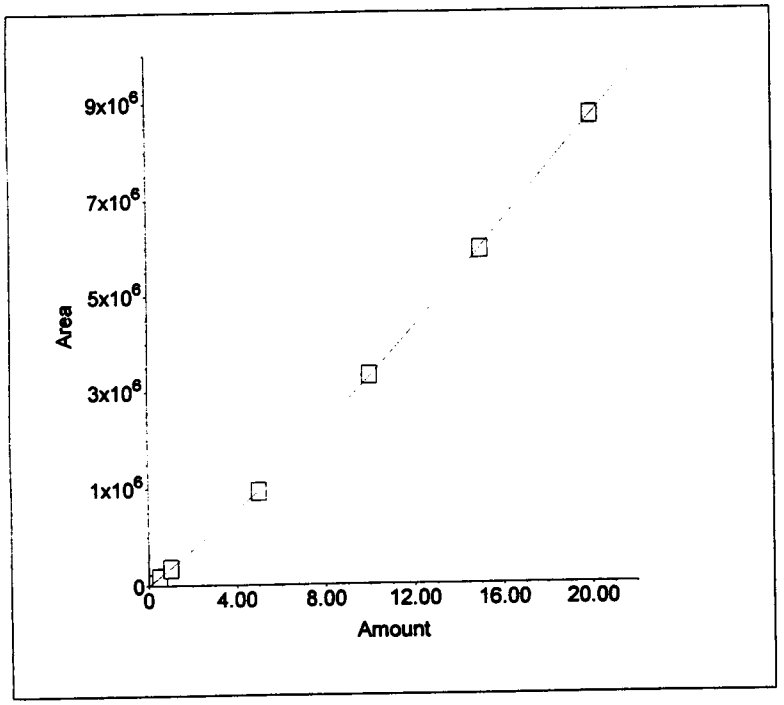


4. Component:BROMIDE
Standard:External Fit Type:Cubic
Origin:Include Calibration:Area
r^2=0.999995
Amt=9.491457e-019*Resp³+
-3.118417e-012*Resp²+
1.748685e-005*Resp+0.03193

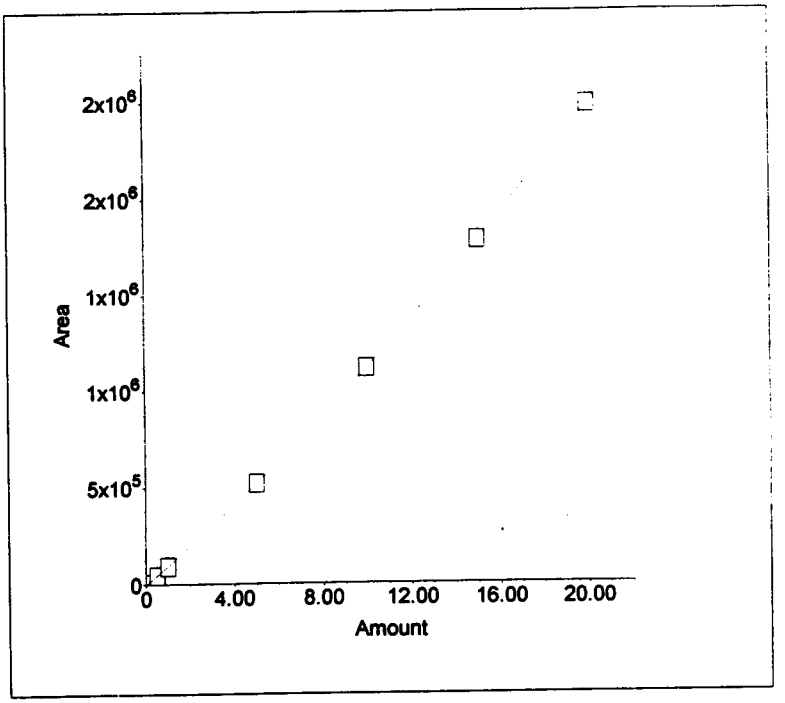


010091

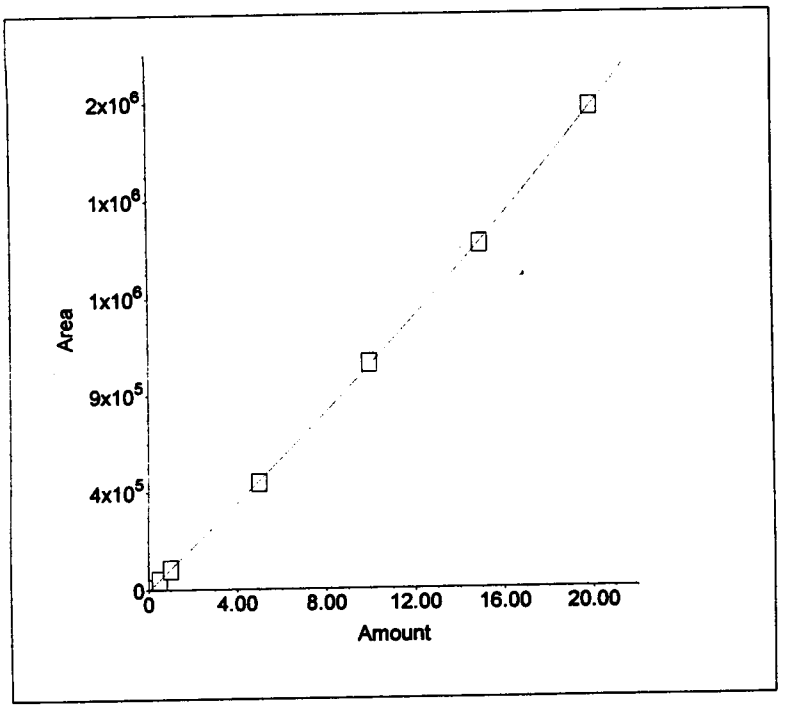
5. Component:NITRATE-N
Standard:External Fit Type:Cubic
Origin:Include Calibration:Area
r^2=0.999969
Amt=7.448464e-021*Resp³+
-1.522719e-013*Resp²+
2.990313e-006*Resp+0.03198



6. Component:PHOSPHATE-P
Standard:External Fit Type:Cubic
Origin:Include Calibration:Area
r^2=0.999992
Amt=1.478626e-019*Resp³+
-1.109022e-012*Resp²+
9.076872e-006*Resp+0.04326



7. Component:SULFATE
Standard:External Fit Type:Cubic
Origin:Include Calibration:Area
r^2=0.999936
Amt=-6.918347e-021*Resp³+
-4.728284e-013*Resp²+
9.744727e-006*Resp+0.04657



Sample Name : 0 PPM 199-08-IC3
Dilution Factor : 1.00
Injection Number : 1
Data File Name : ...\030318_001.DXD
Method File Name : ...\ANIONS030318.met
Schedule File Name : c:\peaknet\schedule\030318.sch

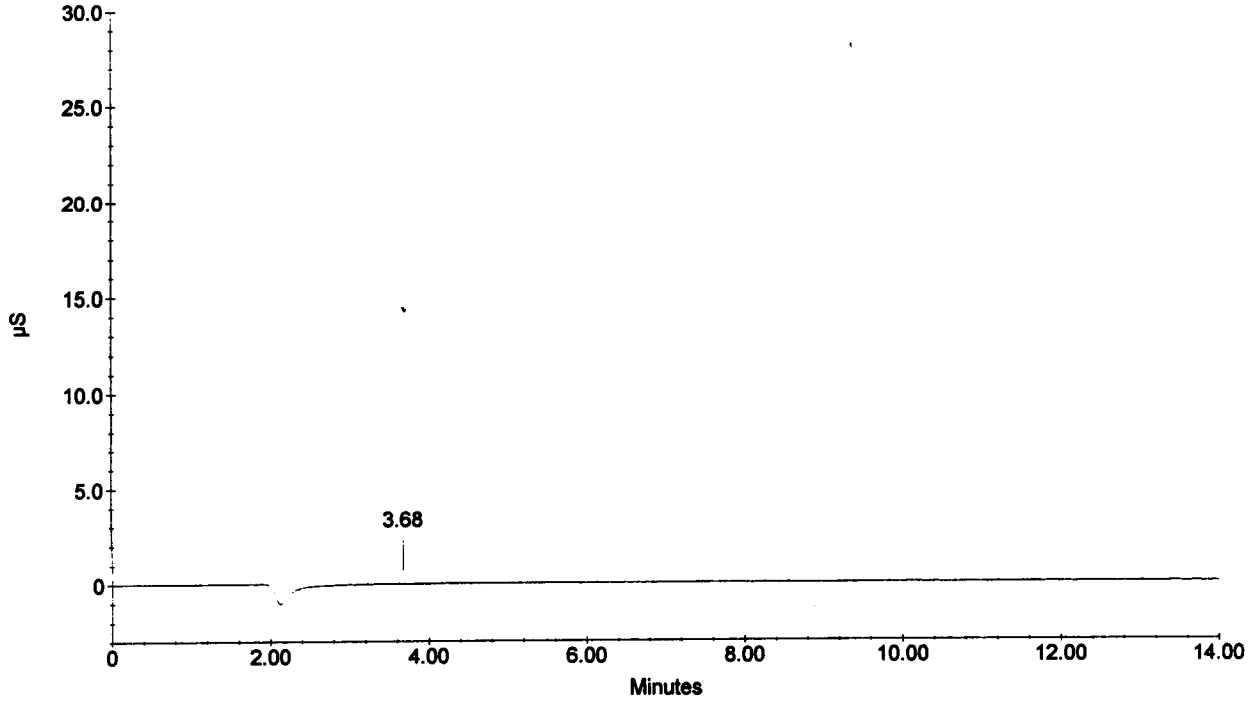
Date Time Collected : 3/18/03 3:51:45 PM
Date Time Updated : 3/19/03 10:27:27 AM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : ams

010092

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	3.68		0.00	589	90
		CHLORIDE			
		NITRITE-N			
		BROMIDE			
		NITRATE-N			
		PHOSPHATE-P			
		SULFATE			

0 PPM 199-08-IC3



010093

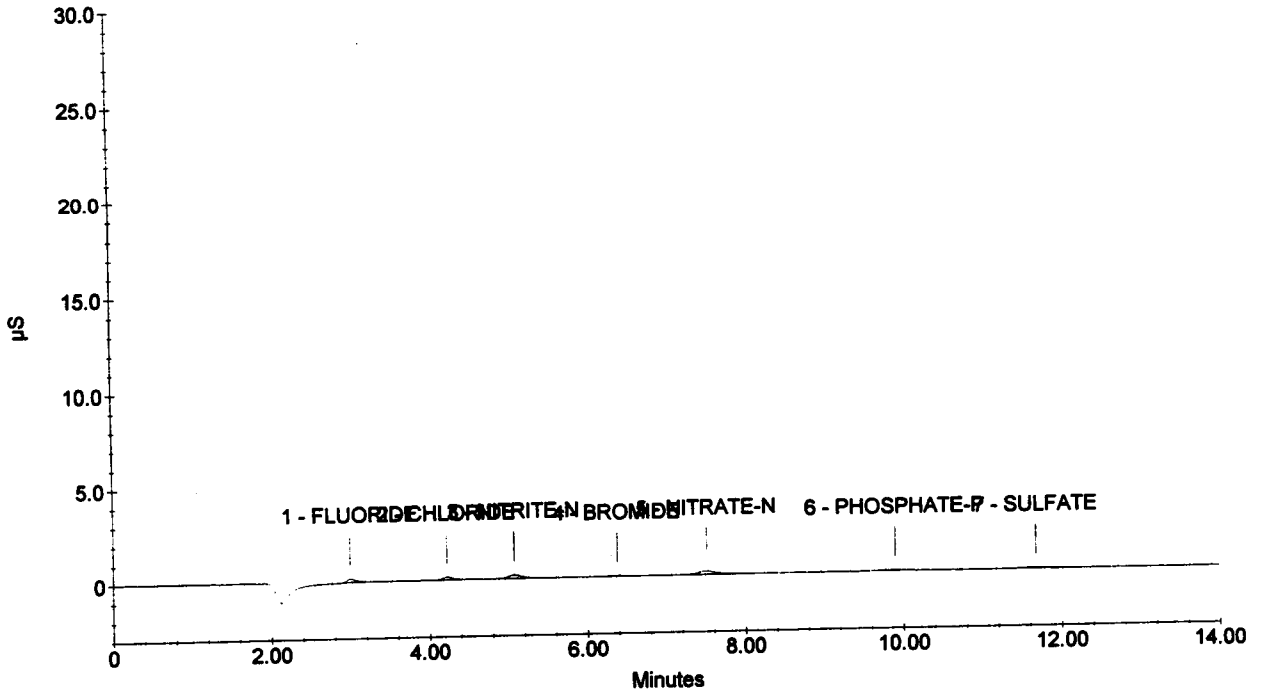
Sample Name : 0.1 PPM 199-07-IC3
Dilution Factor : 1.00
Injection Number : 2
Data File Name : c:\peaknet\data\030318\030318_002.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\030318.sch

Date Time Collected : 3/18/03 4:08:24 PM
Date Time Updated : 3/18/03 4:24:55 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : ams

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	3.00	FLUORIDE	0.10	13730	1785
2	4.22	CHLORIDE	0.10	13218	1541
3	5.08	NITRITE-N	0.10	24273	1898
4	6.38	BROMIDE	0.10	3949	340
5	7.52	NITRATE-N	0.10	30325	1745
6	9.90	PHOSPHATE-P	0.10	4642	317
7	11.68	SULFATE	0.10	5356	310

0.1 PPM 199-07-IC3



Sample Name : 0.5 PPM 199-06-IC3
Dilution Factor : 1.00
Injection Number : 3
Data File Name : c:\peaknet\data\030318\030318_003.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\030318.sch

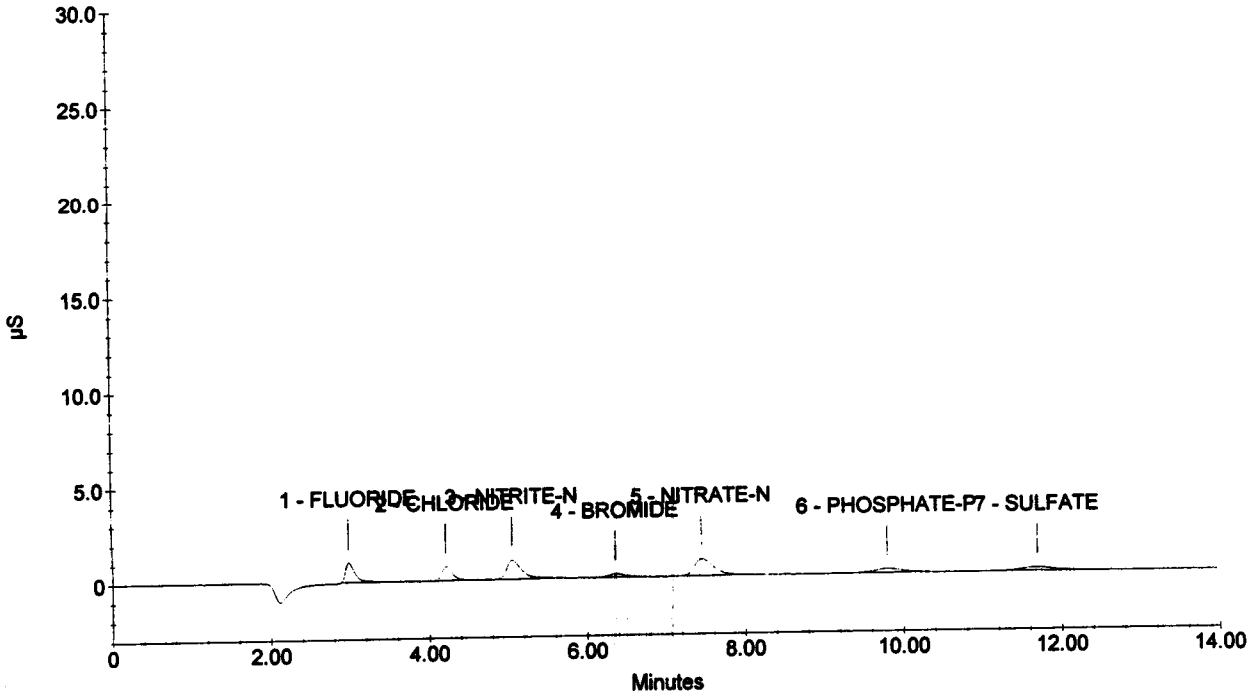
Date Time Collected : 3/18/03 4:25:05 PM
Date Time Updated : 3/18/03 4:41:36 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : ams

010094

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	2.98	FLUORIDE	0.50	86272	10330
2	4.21	CHLORIDE	0.50	66360	7251
3	5.05	NITRITE-N	0.50	132062	10042
4	6.36	BROMIDE	0.50	25330	1873
5	7.45	NITRATE-N	0.50	152281	8939
6	9.80	PHOSPHATE-P	0.50	50112	2163
7	11.69	SULFATE	0.50	45512	1773

0.5 PPM 199-06-IC3



Sample Name : 1.0 PPM 199-05-IC3
Dilution Factor : 1.00
Injection Number : 4
Data File Name : c:\peaknet\data\030318\030318_004.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\030318.sch

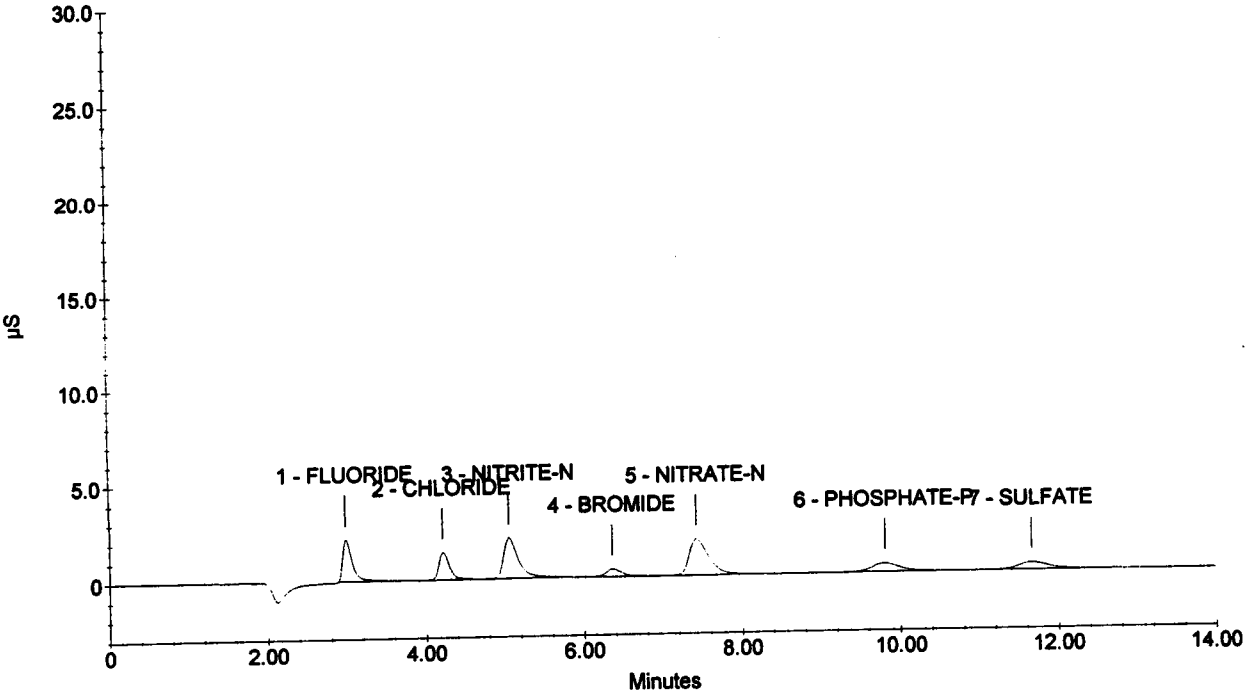
Date Time Collected : 3/18/03 4:41:44 PM
Date Time Updated : 3/18/03 4:58:16 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : ams

010095

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	2.98	FLUORIDE	1.00	181934	21611
2	4.21	CHLORIDE	1.00	134489	14086
3	5.05	NITRITE-N	1.00	271640	20921
4	6.36	BROMIDE	1.00	55197	3852
5	7.42	NITRATE-N	1.00	319757	18682
6	9.81	PHOSPHATE-P	1.00	103514	4278
7	11.66	SULFATE	1.00	96561	3647

1.0 PPM 199-05-IC3



010096

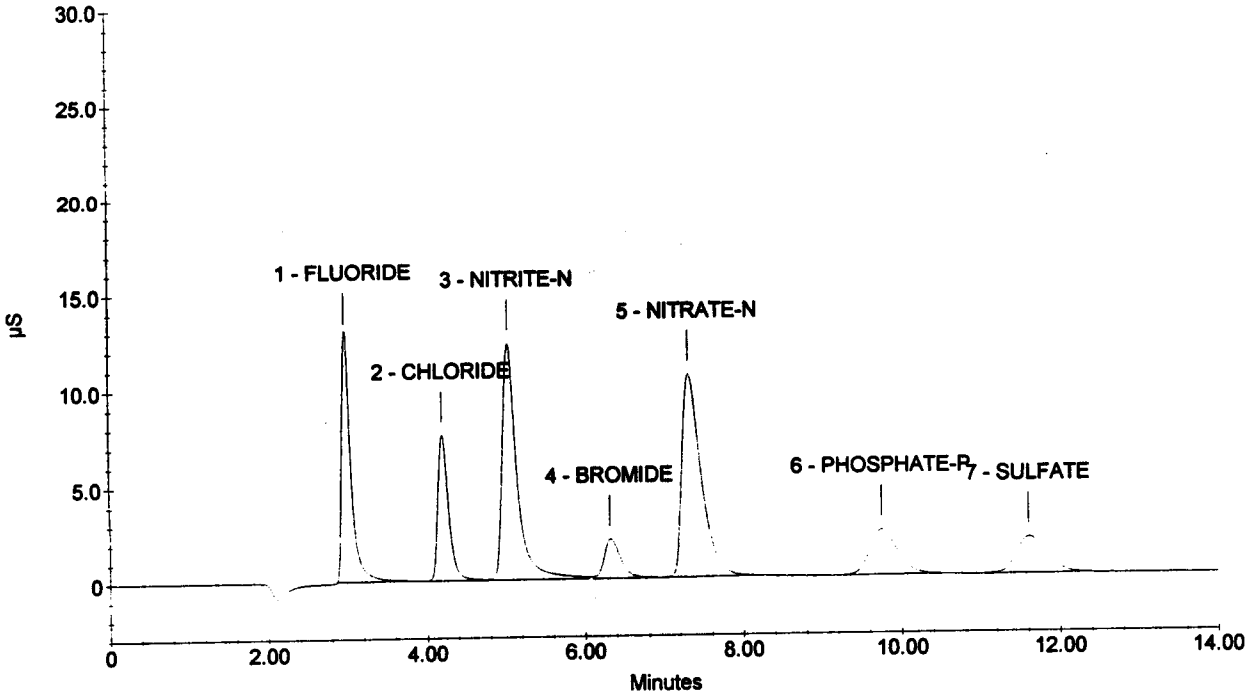
Sample Name : 5.0 PPM 199-04-IC3
Dilution Factor : 1.00
Injection Number : 5
Data File Name : c:\peaknet\data\030318\030318_005.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\030318.sch

Date Time Collected : 3/18/03 4:58:25 PM
Date Time Updated : 3/18/03 5:14:55 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : ams

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	2.97	FLUORIDE	5.00	1059616	127211
2	4.20	CHLORIDE	5.00	718692	75551
3	5.04	NITRITE-N	5.00	1608860	122628
4	6.32	BROMIDE	5.00	299013	20725
5	7.32	NITRATE-N	5.00	1793767	105411
6	9.76	PHOSPHATE-P	5.00	584472	24051
7	11.61	SULFATE	5.00	513489	19362

5.0 PPM 199-04-IC3



Sample Name : 10 PPM 199-03-IC3
Dilution Factor : 1.00
Injection Number : 6
Data File Name : c:\peaknet\data\030318\030318_006.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\030318.sch

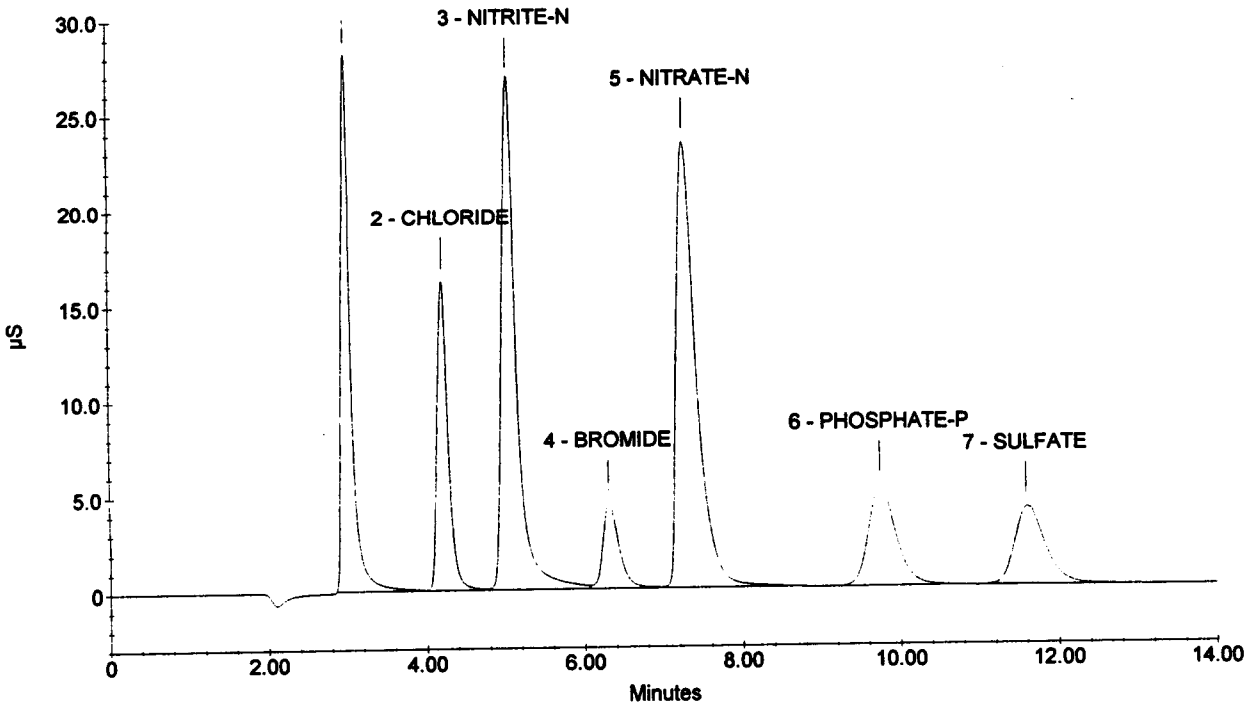
Date Time Collected : 3/18/03 5:15:04 PM
Date Time Updated : 3/18/03 5:31:36 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : ams

010097

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	2.98	FLUORIDE	10.00	2300140	279678
2	4.21	CHLORIDE	10.00	1551559	161330
3	5.04	NITRITE-N	10.00	3450232	266157
4	6.30	BROMIDE	10.00	626766	44087
5	7.26	NITRATE-N	10.00	4019438	233270
6	9.74	PHOSPHATE-P	10.00	1259660	52354
7	11.58	SULFATE	10.00	1091937	40532

10 PPM 199-03-IC3



Sample Name : 15 PPM 199-02-IC3
Dilution Factor : 1.00
Injection Number : 7
Data File Name : c:\peaknet\data\030318\030318_007.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\030318.sch

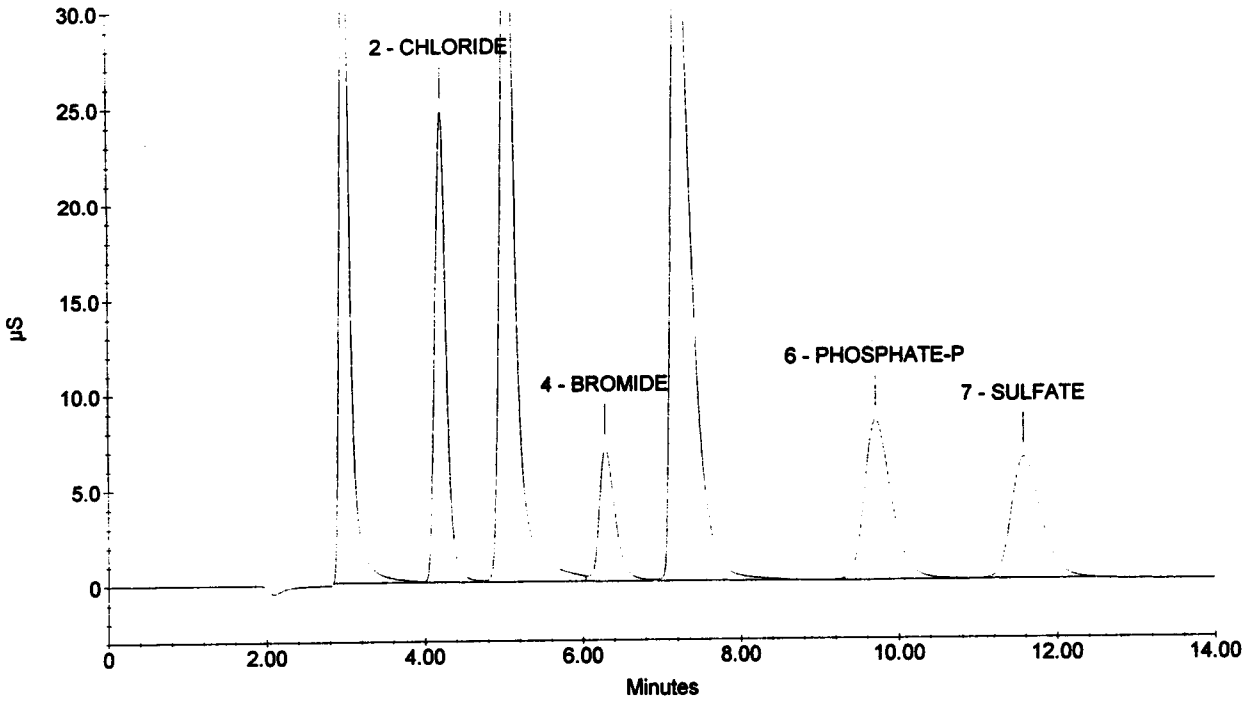
Date Time Collected : 3/18/03 5:31:45 PM
Date Time Updated : 3/18/03 5:48:16 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : ams

010098

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	2.98	FLUORIDE	15.00	3533095	412978
2	4.21	CHLORIDE	15.00	2450707	246283
3	5.05	NITRITE-N	15.00	5334974	411021
4	6.29	BROMIDE	15.00	975050	69684
5	7.21	NITRATE-N	15.00	6435271	368588
6	9.72	PHOSPHATE-P	15.00	2007302	83915
7	11.58	SULFATE	15.00	1664855	63447

15 PPM 199-02-IC3



010099

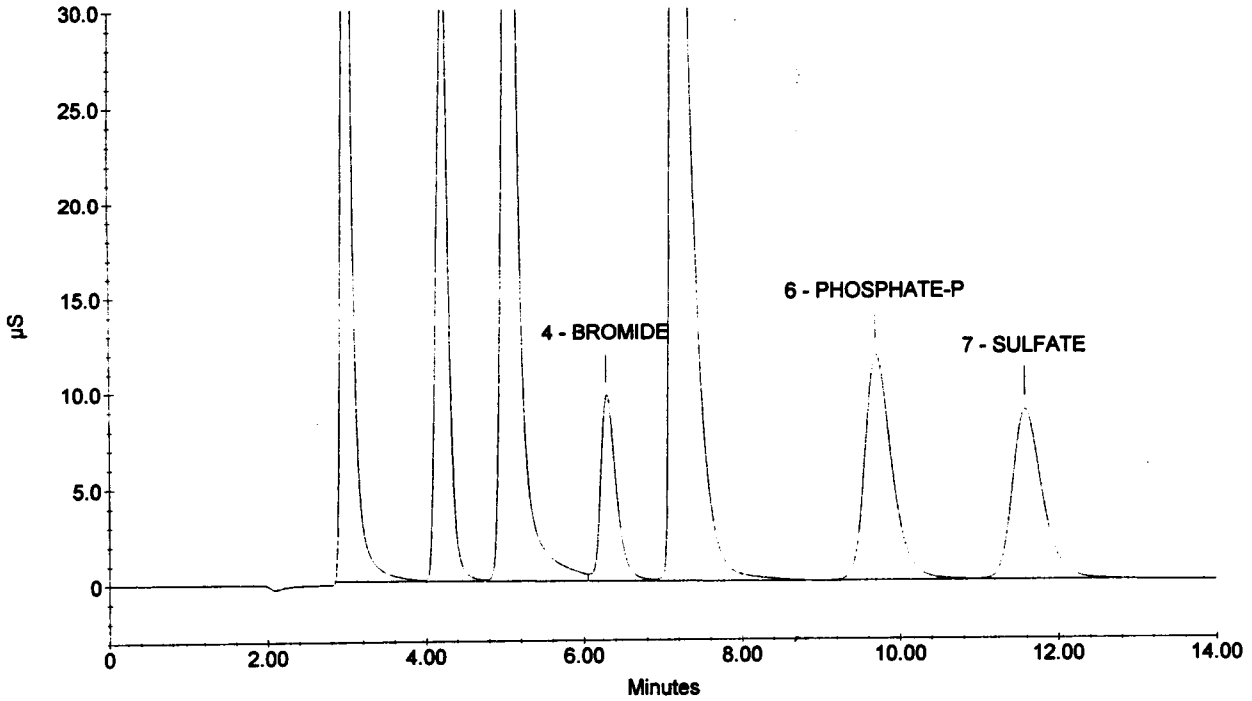
Sample Name : 20 PPM 199-01-IC3
Dilution Factor : 1.00
Injection Number : 8
Data File Name : c:\peaknet\data\030318\030318_008.DXD
Method File Name : c:\peaknet\method\anions030318.met
Schedule File Name : c:\peaknet\schedule\030318.sch

Date Time Collected : 3/18/03 5:48:25 PM
Date Time Updated : 3/18/03 6:04:56 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#13535 AG14-#15177
System Operator : ams

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	3.00	FLUORIDE	20.00	4737882	534154
2	4.22	CHLORIDE	20.00	3391142	327028
3	5.08	NITRITE-N	20.00	7189769	543842
4	6.29	BROMIDE	20.00	1329614	95991
5	7.20	NITRATE-N	20.00	8985285	508024
6	9.70	PHOSPHATE-P	20.00	2798840	117450
7	11.58	SULFATE	20.00	2319013	88034

20 PPM 199-01-IC3



BOOK/ PAGE 14 056

010100

SOUTHWEST RESEARCH INSTITUTE®

6220 Culebra Rd
San Antonio, Texas 78228

TJA TRACE ICP DAILY LOG

ANALYST DL

DATE 6-9-03

As 189.042 Profile Line As Intensity: 412.229

PEAK POSITION 622917

VERNIER POSITION 296

AUTOSAMPLER Yes X No

STDs PREP DATE:	
CLP_STD1_SC	03E27
CLP_STD2_SC	03D1L
CLP_STD3_SC	03001
CLP_STD4_SC	03E13
CLP_STD5_SC	03E05
CLP_STD6_SC	03001
BLK_SC	03F08

QC PREP DATE:	
CCV/ICV	03F08
CRI	03F05
ICSA	03F05
ICSAB	03E27

COMMENTS	FILE	CLIENT	TO#	PROJECT NO.	METHOD
A060A-8	Daily 28	Div 20	030604-8	06002.01.081	Daily 1
A052013	Daily 28	Div 20	030520-13	06002.01.071	Daily 1 54-056

DL 6-9-03

COMMENTS:

MAINTENANCE:

REVIEWED BY: C. Orduña

DATE: 6/18/03

ICP Calibration Blank/ICB/CCB Solution

010101

ID: BLK- 03406

Date Prepared: 6-8-03 Prepared By: [illegible]

Make up as needed in 1000ml volumetric flask.

Added ✓ 10 ml HNO3 INORG #: 4074

Added ✓ 50 ml HCL INORG #: 4077

Added ✓ 1000ul of 10000ppm Sc (INORG. VENT.) EXP. Date: 10-1-03 INORG #: 3683

ICP Calibration Blank/ICB/CCB Solution

ID: BLK-

Date Prepared:_____ Prepared By:_____

Make up as needed in 1000ml volumetric flask.

Added_____ 10 ml HNO3 INORG #:_____

Added_____ 50 ml HCL INORG #:_____

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

ICP Calibration Blank/ICB/CCB Solution

ID: BLK-

Date Prepared:_____ Prepared By:_____

Make up as needed in 1000ml volumetric flask.

Added_____ 10 ml HNO3 INORG #:_____

Added_____ 50 ml HCL INORG #:_____

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

ICP Calibration Blank/ICB/CCB Solution

ID: BLK-

Date Prepared:_____ Prepared By:_____

Make up as needed in 1000ml volumetric flask.

Added_____ 10 ml HNO3 INORG #:_____

Added_____ 50 ml HCL INORG #:_____

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

ICP ICV/CCV SOLUTION

010102

CCV- 03F08

Date Prepared: 6-8-03 Prepared By: [signature]

HNO3 INORG #: 4014 HCl INORG #: 4077

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	3683	10000	10-1-03
B	5	5ml	✓	SPEX	3611	1000	8-15-03
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	3858	1000	12-15-03
Ti	5	5ml	✓	SPEX	3857	1000	12-15-03
Sr	5	5ml	✓	SPEX	3961	1000	2-15-04
Sn	5	5ml	✓	SPEX	3644	1000	8-15-03
Bi	5	5ml	✓	SPEX	3643	1000	8-15-03
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	3562	1000	7-15-03
Th	1	1ml	✓	SPEX	3684	1000	9-15-03
U	1	1ml	✓	SPEX	3533	1000	6-30-03
W	1	1ml	✓	SPEX	3646	1000	8-15-03
Zr	5	5ml	✓	SPEX	3646	1000	8-15-03
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: 6-30-03

ICP Calibration Standards

010103

Date Prepared: 5-27-03 Prepared By: DL

HNO3 INORG #: 4092 HCl INORG #: 4076

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
5-27-03	STD1- 03E27	Al	50	2.50	✓	INORVENT	3849	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	3564	10000	8-1-03
		Na	50	2.50	✓	INORVENT	3565	10000	8-1-03
		Li	10	5.00	✓	INORVENT	3736	1000	11-1-03
		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	
	STD3-	Cd	10	5.00		INORVENT		1000	
		Co	10	5.00		INORVENT		1000	
		Mn	10	5.00		INORVENT		1000	
		V	10	5.00		INORVENT		1000	
		Zn	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD4-	Ag	2	1.00		INORVENT		1000	
		As	10	5.00		INORVENT		1000	
		Pb	10	5.00		INORVENT		1000	
		Sb	10	5.00		INORVENT		1000	
		Se	10	5.00		INORVENT		1000	
		TL	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD5-	B	10	5.00		INORVENT		1000	
		Mo	10	5.00		INORVENT		1000	
		P	10	5.00		INORVENT		1000	
		Si	10	5.00		INORVENT		1000	
		Ti	10	5.00		INORVENT		1000	
		Sr	10	5.00		INORVENT		1000	
		Sn	10	5.00		INORVENT		1000	
		Bi	5	2.50		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD6-	La	10	5.00		INORVENT		1000	
		Na	1	0.05		INORVENT		10000	
		Pd	10	5.00		INORVENT		1000	
		S	10	5.00		INORVENT		1000	
		Th	10	5.00		INORVENT		1000	
		U	10	5.00		INORVENT		1000	
		W	5	2.50		INORVENT		1000	
		Y	10	5.00		INORVENT		1000	
		Zr	10	5.00		INORVENT		1000	
		SC	10	0.500		INORVENT		10000	

Expiration Dates:

STD1: **STD4:**

STD2: **STD5:**

STD3: **STD6:**

ICP Calibration Standards

010104

Date Prepared: 4-14-03 Prepared By: [illegible]

HNO3 INORG #: 4012 HCl INORG #: 4017

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	
4-14-03	STD2-	Ba	10	5.00	✓	INORVENT	3971	1000	3-1-04
		Be	5	2.50	✓	INORVENT	3499	1000	7-1-03
	03D14	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	3643	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	
	STD4-	Ag	2	1.00		INORVENT		1000	
		As	10	5.00		INORVENT		1000	
		Pb	10	5.00		INORVENT		1000	
		Sb	10	5.00		INORVENT		1000	
		Se	10	5.00		INORVENT		1000	
		TL	10	5.00		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD5-	B	10	5.00		INORVENT		1000	
		Mo	10	5.00		INORVENT		1000	
		P	10	5.00		INORVENT		1000	
		Si	10	5.00		INORVENT		1000	
		Ti	10	5.00		INORVENT		1000	
		Sr	10	5.00		INORVENT		1000	
		Sn	10	5.00		INORVENT		1000	
		Bi	5	2.50		INORVENT		1000	
		Sc	10	0.500		INORVENT		10000	
	STD6-	La	10	5.00		INORVENT		1000	
		Na	1	0.05		INORVENT		10000	
		Pd	10	5.00		INORVENT		1000	
		S	10	5.00		INORVENT		1000	
		Th	10	5.00		INORVENT		1000	
		U	10	5.00		INORVENT		1000	
		W	5	2.50		INORVENT		1000	
		Y	10	5.00		INORVENT		1000	
		Zr	10	5.00		INORVENT		1000	
		SC	10	0.500		INORVENT		10000	

Expiration Dates:

STD1: **STD4:**

STD2: 7-1-03 **STD5:**

STD3: **STD6:**

ICP Calibration Standards

010105

Date Prepared: 4-1-03 Prepared By: DL

HNO3 INORG #: ~~3949~~ 4011 HCl INORG #: ~~3949~~ 3950

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	
4-1-03	STD3- 03001	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	
	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	
4-1-03	STD6- 03001	La	10	5.00	✓	INORVENT	3650	1000	9-1-03
		Na	1	0.05	✓	INORVENT	3565	10000	8-1-03
		Pd	10	5.00	✓	INORVENT	3964	1000	3-1-04
		S	10	5.00	✓	INORVENT	3789	1000	11-1-03
		Th	10	5.00	✓	INORVENT	3641	1000	10-1-03
		U	10	5.00	✓	INORVENT	3501	1000	7-1-03
		W	5	2.50	✓	INORVENT	3568	1000	8-1-03
		Y	10	5.00	✓	INORVENT	3654	1000	9-1-03
		Zr	10	5.00	✓	INORVENT	3958	1000	5-1-04
		SC	10	0.500	✓	INORVENT	3683	10000	10-1-03

Expiration Dates:

STD1:

STD2:

STD3: 10-3-01

STD4:

STD5:

STD6: 7-1-03

ICP Calibration Standards

010106

Date Prepared: 5-13-03 Prepared By: [illegible]

HNO3 INORG #: 4052 HCl INORG #: 4021

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	
5-13-03	STD4-	Ag	2	1.00	✓	INORVENT	3653	1000	9-1-03
		As	10	5.00	✓	INORVENT	3899	1000	2-1-04
		Pb	10	5.00	✓	INORVENT	3735	1000	11-1-03
		Sb	10	5.00	✓	INORVENT	3953	1000	3-1-04
	~~0360~~ 03E13	Se	10	5.00	✓	INORVENT	3652	1000	9-1-03
		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	
	STD6-	La	10	5.00		INORVENT		1000	
		Na	1	0.05		INORVENT		10000	
		Pd	10	5.00		INORVENT		1000	
		S	10	5.00		INORVENT		1000	
		Th	10	5.00		INORVENT		1000	
		U	10	5.00		INORVENT		1000	
		W	5	2.50		INORVENT		1000	
		Y	10	5.00		INORVENT		1000	
		Zr	10	5.00		INORVENT		1000	
		SC	10	0.500		INORVENT		10000	

Expiration Dates:

STD1: **STD4:** 9-1-03

STD2: **STD5:**

STD3: **STD6:**

ICP Calibration Standards

010107

Date Prepared: 5-5-03 Prepared By: D

HNO3 INORG #: 4015 HCl INORG #: 4020

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	
5-5-03 03E05 DH	STD5- 03E05	B	10	5.00	✓	INORVENT	3654	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	3500	1000	7-1-03
		Ti	10	5.00	✓	INORVENT	3762	1000	12-1-03
		Sr	10	5.00	✓	INORVENT	3566	1000	8-1-03
		Sn	10	5.00	✓	INORVENT	4026	1000	4-1-04
		Bi	5	2.50	✓	INORVENT	3606	1000	8-1-03
		Sc	10	0.500	✓	INORVENT	3683	10000	10-1-03
	STD6-	La	10	5.00		INORVENT		1000	
		Na	1	0.05		INORVENT		10000	
		Pd	10	5.00		INORVENT		1000	
		S	10	5.00		INORVENT		1000	
		Th	10	5.00		INORVENT		1000	
		U	10	5.00		INORVENT		1000	
		W	5	2.50		INORVENT		1000	
		Y	10	5.00		INORVENT		1000	
		Zr	10	5.00		INORVENT		1000	
		SC	10	0.500		INORVENT		10000	

Expiration Dates:

STD1: **STD4:**

STD2: **STD5:** 7-1-03

STD3: **STD6:** ~~7-1-03~~ DH

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 030604-8
SRR: 24405
SDG: 227265
CASE: CNWRA
VTSR: June 04, 2003
PROJECT#: 06002.01.081

Certificates of Analysis

Certificate of Analysis

THE RIGHT CHEMICALS
THE RIGHT CHEMISTRY

INORGANIC LABS/RADCHEM LABS 010109
DATE RECEIVED: 02/27/03
DATE EXPIRED: 02/27/2013
DATE OPENED: 04/10/03
INORG: 4033 PO: 330176E

Sodium carbonate, ACS primary standard, 99.95-100.05% (dried basis)

Stock Number: 33377
Lot Number: L06M34

Analysis

Test	Limits	Results
Assay (dried basis)	99.95 – 100.05 %	100.0 %
Insoluble	0.01 % max	< 0.01 %
Loss on heating (285°C)	1.0 % max	< 0.05 %
Chloride	0.001 % max	< 0.001 %
Nitrogen compounds	0.001 % max	< 0.001 %
Phosphate	0.001 % max	< 0.001 %
Silica	0.005 % max	< 0.005 %
Sulfur compounds	0.003 % max	< 0.003 %
NH_4OH precipitate	0.01 % max	< 0.01 %
Potassium	0.005 % max	< 0.001 %
Calcium	0.02 % max	< 0.01 %
Magnesium	0.004 % max	< 0.004 %
Heavy metals (as Pb)	0.0005 % max	< 0.0005 %
Iron	0.0005 % max	< 0.0005 %

Traceable to NIST? Yes

Certified by:

Quality Control:

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ALDRICH®

Certificate of Analysis 010110

PO NBR:
INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 3/10/03
DATE EXPIRED: 3/10/2013
DATE OPENED: 3/11/03
INORG: 3981 PO: 330225E

PRODUCT NUMBER: 20442-0

LOT NUMBER: 14315BO

PRODUCT NAME: SODIUM CARBONATE, 99.995%

FORMULA: NA2CO3

FORMULA WEIGHT: 105.99

APPEARANCE	WHITE GRANULAR POWDER
TITRATION	56.4% CO3 (WITH HCL)

TRACE ANALYSIS, ICP

CA,SI	< 5	PPM
B	3.1	PPM
GA	2.8	PPM
FE	2.2	PPM
NI	1.4	PPM
Y	1.0	PPM
CU	0.7	PPM
K,IR	0.4	PPM
AL	0.3	PPM
SR	0.2	PPM
ZR,CR	0.1	PPM
CS	0.07	PPM
SN	0.06	PPM
MG,MN	0.05	PPM
SC	0.03	PPM

ICP ASSAY	CONFIRMS SODIUM COMPONENT.
PURITY	99.995+% BASED ON TRACE METAL ANALYSIS.

CONTINUED ON NEXT PAGE

ALDRICH CHEMICAL COMPANY
DAVID SWESSEL
APRIL 4, 2001

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Certificate of Analysis

PO NBR: 1306866

SOUTHWEST RESEARCH INST
DANNY RAMIREZ
6220 CULEBRA RD
SAN ANTONIO TX 78238

1/9/2001
1/9/2002 DK
1/9/2001
2636 1306866

PRODUCT NUMBER: 236527-500G

LOT NUMBER: 15306EI

PRODUCT NAME: SODIUM HYDROGENCARBONATE, 99.7+%, A.C.S. REAGENT

FORMULA: NAHCO3

FORMULA WEIGHT: 84.01

APPEARANCE	WHITE POWDER
TITRATION	100.3 % (WITH HCL)
ICP ASSAY	CONFIRMS SODIUM COMPONENT
INSOLUBLE MATTER	0.001% *
CALCIUM	0.0050%
CHLORIDE	0.0014% *
IRON	< 0.0001% *
HEAVY METALS	<5PPM (AS PB) *
POTASSIUM	<0.0020 % *
MAGNESIUM	0.00025%
AMMONIUM	<5PPM *
PHOSPHATE	<0.001% *
CALCIUM, MAGNESIUM & R2O3 PRECIPITATE	0.016% *

CONTINUED ON NEXT PAGE

ALDRICH CHEMICAL COMPANY
DAVID SWESSEL
JANUARY 5, 2001

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Certificate of Reference Material

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 3/12/03
DATE EXPIRED: 3/15/2004 DR
DATE OPENED: 3/12/03
INORG: 3969 PO: F52153

Catalog Number: ICMIX2-100 **Lot No.:** 24-79AS
Description: **IC Instrument Check Standard 2**
Matrix: H_2O

This **ASSURANCE** ®certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for Ion Chromatography instrumentation. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

The CRM is prepared from high purity single ion concentrates of individual elements using Class A laboratory ware to give precise concentration.
Refer to side 2 for details of measurement uncertainties.

Instrumental Analysis by ION Chromatography:

Analyte	Labeled (mg/L)	Measured (mg/L)	NIST SRM
F^-	100	98.7	3183
Cl^-	200	200	3182
Br^-	400	401	3184
NO_3^-	400	399	3185
HPO_4^{-2}	600	600	3186
SO_4^{-2}	400	399	3181

Spex Reference Multi: Lot #IC6-103VY

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

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

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010113

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: AUG 31 2003
DATE EXPIRED: 01/15/2004 DK
DATE OPENED: 01/03/2003
INORG: 3695 PO: F52071

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Certificate of Reference Material

Catalog Number: AS-F9-2X/2Y **Lot No.:** 23-109AS
Description: 1000 mg/L of Fluoride
Matrix: H_2O

This **ASSURANCE** ®certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for Ion Chromatography instrumentation. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: Fluoride (F^-): 999.5 mg/L $\pm$ 3 mg/L
Traceable to: NIST SRM 3183

The CRM is prepared gravimetrically using high purity Sodium Fluoride (NaF) Lot#M44142. The certified value listed is the average of values obtained by classical wet assay and Ion Chromatography analysis.

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 999 mg/L
Method: Potentiometric analysis using Fluoride combination Electrode.

Instrumental Analysis by Ion Chromatography: 1,000 mg/L

Trace Anion Impurities in the Actual Solution via IC Analysis:

Element	mg/L
Cl^-	<10.00
NO_2^-	<0.20
Br^-	<0.20
NO_3^-	<0.20
PO_4^{-3}	<1.00
SO_4^{-2}	<0.50

Balances are calibrated regularly with weight sets traceable to NIST#s 32856, 32867 and others. This CRM is guaranteed stable and accurate to +/- 0.5% of the certified concentration value for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

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

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SPECertificate™ 010114

Certificate of Reference Material

Catalog Number: AS-CL9-2X/2Y **Lot No.:**21-58AS
Description: 1000 mg/L of Chloride
Matrix: Water

This **ASSURANCE** ®certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for Ion Chromatography instrumentation. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: Chloride (Cl^-): 997.75 mg/L ± 3 mg/L
Traceable to: NIST SRM 3182

The CRM is prepared gravimetrically using high purity Sodium Chloride (NaCl) Lot#12001B. The certified value listed is the average of values obtained by classical wet assay and Ion Chromatography analysis.

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 999.5 mg/L
Method: Gravimetric analysis by precipitation using Silver Nitrate, filtering, drying and weighing as AgCl.

Instrumental Analysis by Ion Chromatography: 996.0 mg/L

Trace Anion Impurities in the Actual Solution via IC Analysis:

Component	mg/L	Component	mg/L
F^-	<0.1	PO_4^{3-}	<0.2
NO_2^-	<0.1	NO_3^-	<0.2
SO_4^{2-}	<0.1		

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: JUN '02 Certifying Officer: N. Kocherlakota

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010115

SPECertificate™

Certificate of Reference Material

Catalog Number: AS-$NO_2$9-2X/2Y **Lot No.:**5-255VY
Description: 1000 mg/L of Nitrite
Matrix: H_2O

3488
6/13/02
6/15/2003 DR
6/17/02
F51940

This **ASSURANCE** ®certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for Ion Chromatography instrumentation. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: Nitrite (NO_2^-): 1000.5 mg/L ± 3 mg/L
Traceable to: SPEX CRM 0601NO_2

The CRM is prepared gravimetrically using high purity Sodium Nitrite ($NaNO_2$) Lot#0791R. The certified value listed is the average of values obtained by classical wet assay and Ion Chromatography analysis.

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1000 mg/L
Method: Titrimetric analysis using $KMnO_4$. KMnO4 standardized with As_2O_3 NIST SRM #83d.

Instrumental Analysis by Ion Chromatography: 1001 mg/L

Trace Anion Impurities in the Actual Solution via IC Analysis:

Element	mg/L
F^-	<0.2
SO_4^{-2}	<0.2
Cl^-	<0.5
PO_4^{-3}	<0.5
Br^-	<10.0
NO_3^-	<10.0

Balances are calibrated regularly with weight sets traceable to NIST#s 32856, 32867 and others. This CRM is guaranteed stable and accurate to +/- 0.5% of the certified concentration value for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: JUN '02 Certifying Officer: N. Kocherlakota

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010116

SPEXertificate™

Certificate of Reference Material

Catalog Number: AS-BR9-2X/2Y **Lot No.:**22-114AS
Description: 1000 mg/L of Bromide
Matrix: H_2O

This **ASSURANCE** ®certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for Ion Chromatography instrumentation. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: Bromide (Br^-): 992.5 mg/L ± 3 mg/L
Traceable to: NIST SRM 3184

The CRM is prepared gravimetrically using high purity Sodium Bromide (NaBr) Lot#04931B
The certified value listed is the average of values obtained by classical wet assay and Ion Chromatography analysis.

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 991 mg/L
Method: Gravimetric analysis by precipitation using Silver Nitrate, filtering, drying and weighing as AgBr.

Instrumental Analysis by Ion Chromatography: 994 mg/L

Trace Anion Impurities in the Actual Solution via IC Analysis:

Element	mg/L
F^-	<0.10
Cl^-	<0.20
NO_2^-	<0.20
NO_3^-	<0.30
SO_4^{-2}	<0.20
PO_4^{-3}	<0.20

Balances are calibrated regularly with weight sets traceable to NIST#s 32856, 32867 and others. This CRM is guaranteed stable and accurate to +/- 0.5% of the certified concentration value for a period of one year from the date of certification. This guarantee is valid only when the material is kept tightly capped and transported and stored under laboratory conditions.

Date of Certification: JUN '02 Certifying Officer: N. Kocherlakota

6/13/02
6/13/03
3490
F5194

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010117

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 2/24/03
DATE EXPIRED: 3/31/2004
DATE OPENED: 2/24/03
INORG: 3960 PO: E52061

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Certificate of Reference Material

Catalog Number: AS-NO_3N9-2X/2Y **Lot No.:** 23-82AS
Description: 1000 mg/L of Nitrate-N
Matrix: H_2O

This **ASSURANCE** ®certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for Ion Chromatography instrumentation. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: Nitrate-N (NO_3^--N): 1002.5 mg/L $\pm$ 3 mg/L
Traceable to: NIST SRM 3185

The CRM is prepared gravimetrically using high purity Sodium Nitrate ($NaNO_3$) Lot#M14156. The certified value listed is the average of values obtained by classical wet assay and Ion Chromatography analysis.

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1003 mg/L
Method: Gravimetric analysis by precipitation using Nitron Acetate, filtering, drying and weighing as Nitron Nitrate ($C_{20}H_{17}N_4.NO_3$).

Instrumental Analysis by Ion Chromatography: 1002 mg/L

Trace Anion Impurities in the Actual Solution via IC Analysis:

Element	mg/L
F^-	<0.25
Cl^-	<0.5
NO_2^-	<0.5
Br^-	<1.0
SO_4^-	<1.0
PO_4^{3-}	<2.5

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: _____ Certifying Officer: N. Kocherlakota

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Certificate of Reference Material

Catalog Number: AS-$PO_4$9-2X/2Y **Lot No.:** 24-63AS
Description: 1000 mg/L of Phosphate
Matrix: H2O

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 12/17/02
DATE EXPIRED: 12/15/2003
DATE OPENED: 12/17/02
INORG: 3680 PO: FS2419

This **ASSURANCE** ®certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for Ion Chromatography instrumentation. It can be employed in USEPA, ASTM and other methods relevant to the certified properties listed below.

Certified Value: Phosphate (PO_4^{-3}): 998.5 mg/L
Uncertainty Associated with Measurement: +/- 3 mg/L
Certified Value is Traceable to: NIST SRM 3186

The CRM is prepared gravimetrically using high purity Potassium Dihydrogen Phosphate (KH_2PO_4) Lot#08001F. The certified value listed is the average of values obtained by classical wet assay and Ion Chromatography analysis.

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 999 mg/L
Method: Gravimetric analysis by precipitation using Magnesia Mixture, filtering, igniting and weighing as $Mg_2P_2O_7$.

Instrumental Analysis by Ion Chromatography: 998 mg/L

Trace Anion Impurities in the Actual Solution via IC Analysis:

Component	mg/L	Component	mg/L
F^-	<0.01	NO_3^-	<0.2
Br^-	<0.2	NO_2^-	<0.2
SO_4^{2-}	<0.2	Cl^-	<0.6

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: DEC -- '02 Certifying Officer: N. Kocherlakota

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010119

Certificate of Reference Material

Catalog Number: AS-SO49-2X/2Y **Lot No.** 6-76VY
Description: 1000 mg/L Sulfate
Matrix: H2O

3488
6/13/02
6/15/2003
6/17/02
F51640

This **ASSURANCE** ®certified reference material, CRM, is intended primarily for use as a calibration standard or quality control standard for Ion Chromatography instrumentation. It can be employed in USEPA, ASTM and other methods relevent to the certified properties listed below.

Certified Value: 1000.5 mg/L
Traceable to: NIST SRM 3181

The CRM is prepared gravimetrically using high purity Potassium Sulfate Lot# T24163 . 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 Barium Chloride, filter, ignite and weigh as BaSO4.

Instrumentation Analysis By ICP spectrometer: 1,004 mg/L
Uncertified Properties:

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

Element	mg/L	Element	mg/L	Element	mg/L
Cl	<1.0	Br	<1.0		
F	<0.5	NO3	<0.5		
NO2	<1.0	PO4	<1.0		

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 '02 Certifying Officer: N. Kocherlakota

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010120

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

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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

010121

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: 5/16/03
DATE EXPIRED: 5/16/03 OK
DATE OPENED: 5/16/03
INORG: 4003-7 4082 PO: F5A161

Element concentrations are at the point of bottling. Concentrations of some elements in particular, Ca, Si, K, Na, B, Al, Mg & Mn will increase due to storage in glass bottles.

B McKelvey

Dr. B. McKelvey
QA/QC Manager

Fisher Scientific Chemical Division
Pittsburgh, PA., 15275 Phone (412) 490-8300

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Certificate of Analysis

010122

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 DR
DATE EXPIRED: 10/1/2003
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.
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Quality Assurance Manager

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010123

Catalog Number: PLB9-2X/2Y/2T **Lot No.** 8-138B

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: 998 mg/L

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

Certified Value is Traceable to: NIST SRM 3107

The CRM is prepared gravimetrically using high purity Ammonium Tetraborate 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: 998 mg/L

Method: Titration with Sodium Hydroxide using Phenolphthalein as indicator. Sodium Hydroxide standardized against Potassium Biphthalate NIST SRM # 84j

Instrumentation Analysis By ICP spectrometer: 998 mg/L

Uncertified Properties:

Density: 1.008 @ 26.7 Degrees Celsius

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

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.07	Cu	<0.001	Pb	<0.002
As	<0.001	Fe	0.002	Re	<0.001
Ag	<0.001	Ga	<0.001	Rb	<0.001
Ba	<0.001	In	<0.001	Sr	<0.001
Be	<0.01	K	0.002	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	0.008	Mg	<0.001	V	<0.001
Cr	<0.004	Na	0.01	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: AUG 02 Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 8/8/02
DATE EXPIRED: 8/15/2003
DATE OPENED: 8/9/02
INORG: 3611 PO: E59935

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010124

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 05/12/03
DATE EXPIRED: 05/15/2004
DATE OPENED: 05/12/03
INORG: 4065 PO: F52181

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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INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 05/12/03
DATE EXPIRED: 05/15/2004
DATE OPENED: 05/12/03
INORG: 4266 PO: F52181

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

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

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

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

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 999 mg/L

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

Instrumentation Analysis By ICP spectrometer: 1001 mg/L
Uncertified Properties:

Density: 0.9987 @ 24.6 Degrees Celsius

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

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

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

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

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DATE RECEIVED: 01/16/03
DATE EXPIRED: 01/15/2004
DATE OPENED: 01/23/03
INORG: 3927 PO: F-52073

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 EXPIRED: 12/9/03
DATE OPENED: 12/9/02
INORG: 3858 PO: F52066

010127

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Certificate of Reference Material

Catalog Number: PLSI9-2X/2Y/2T **Lot No.** 9-66SI

Description: 1000 mg/L Silicon

Matrix: H2O / Tr 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 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 3150

The CRM is prepared gravimetrically using high purity Ammonium HexafluorosiliLot# 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: 1003 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: 1.001 @ 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	0.002	Cu	0.01	Pb	<0.001
As	<0.001	Fe	0.006	Rb	<0.001
Ag	0.009	Ga	<0.001	Re	<0.001
B	<0.05	In	<0.001	Sn	<0.001
Ba	<0.001	K	0.014	Sr	<0.001
Be	<0.001	Li	<0.001	Sb	<0.001
Bi	<0.001	Mg	<0.001	Ti	<0.002
Ca	0.004	Mn	<0.001	Tl	<0.001
Cr	<0.002	Mo	<0.001	V	<0.001
Cd	<0.001	Na	0.006	Zr	0.008
Co	<0.001	Ni	<0.001	Zn	0.02

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

Date of Certification: DEC -- '02 Certifying Officer: N. Kocherlakota

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Certificate of Reference Material

Catalog Number: PLTI9-2X/2Y/2T **Lot No.** 9-52TI

Description: 1000 mg/L Titanium

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: 995.5 mg/L

Uncertainty Associated with Measurement: +/- 3 mg/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: 996 mg/L

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

Instrumentation Analysis By ICP spectrometer: 995 mg/ L

Uncertified Properties:

Density: 1.000 @ 23.9 Degrees Celsius

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

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.01	Cu	0.35	Pb	0.002
As	<0.001	Fe	0.01	Rb	<0.001
Ag	<0.001	Ga	<0.001	Re	<0.001
B	<0.005	In	<0.001	Sn	<0.001
Ba	<0.001	K	<0.05	Sr	<0.001
Be	<0.002	Li	<0.001	Sb	0.005
Bi	0.008	Mg	0.008	Tl	<0.001
Ca	0.095	Mn	0.001	V	<0.001
Cr	<0.001	Mo	<0.001	Zr	0.20
Cd	<0.001	Na	0.009	Zn	0.030
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: DEC - - '02 Certifying Officer: N. Kocherlakota

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INORG: 3961 PO: E52060

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

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Certificate of Reference Material

Catalog Number: PLSN5-2X/2Y/2T **Lot No.** 9-81SN

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: 1002.5 mg/L

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

Certified Value is Traceable to: NIST SRM 3161

The CRM is prepared gravimetrically using high purity Tin Powder Lot# 10831R. 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: 1006 mg/L

Method: Precipitation using ammonium hydroxide,filter,ignite and weigh as Sn02.

Instrumentation Analysis By ICP spectrometer: 999 mg/L

Uncertified Properties:

Density: 1.037 @ 25.0 Degrees Celsius

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

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.008	Cu	<0.002	Pb	0.01
As	0.02	Fe	0.06	Rb	<0.001
Ag	0.02	Ga	<0.001	Re	<0.001
B	<0.02	In	0.10	Sr	<0.001
Ba	<0.001	K	<0.3	Sb	0.008
Be	<0.001	Li	<0.001	Ti	<0.003
Bi	<0.001	Mg	<0.001	Tl	<0.001
Ca	0.015	Mn	<0.001	V	0.3
Cr	<0.002	Mo	<0.001	Zr	<0.001
Cd	<0.001	Na	0.05	Zn	4
Co	0.009	Ni	0.06		

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

Date of Certification: AUG -- '02 Certifying Officer: N. Kocherlakota

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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: AUG -- '02 Certifying Officer: N. Kocherlakota

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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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DATE OPENED: 05/12/03
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DATE OPENED: 05/12/03
INORG: 40067 PO: F52181

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

Description: 1,000 mg/L Yttrium

Matrix: 2% HNO3

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

Certified Value: 1001.5 mg/L

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

Certified Value is Traceable to: NIST SRM 3167a.

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

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1002 mg/L

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

Instrumentation Analysis By ICP spectrometer: 1001 mg/L

Uncertified Properties:

Density: 1.010 @ 24.8 Degrees Celsius

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

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

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

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

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DATE RECEIVED: 01/16/03
DATE EXPIRED: 01/15/2004
DATE OPENED: 01/23/03
INORG: 3928 PO: F52073

Catalog Number: PLPD3-2X/2Y **Lot No.** 9-74PD

Description: 1000 mg/L Palladium

Matrix: 10% HCl

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

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

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010135

Catalog Number: PLS9-2X/2Y/2T **Lot No.** 9-64S

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: 1000.5 +/- 3 mg/L

Uncertainty Associated with Measurement:

Certified Value is Traceable to: NIST SRM 3154

The CRM is prepared gravimetrically using high purity AMMONIUM SULFATE Lot# 0891NK. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1001 mg/L

Method: PRECIPITATION USING BARIUM CHLORIDE,FILTER,IGNITE AND WEIGH AS BaS04.

Instrumentation Analysis By ICP spectrometer: 1000 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
Ag	<0.001	Cu	<0.01	Pb	<0.1
Al	0.002	Fe	0.012	Rb	<0.001
As	<0.001	Ga	<0.001	Re	<0.001
Ba	<0.001	In	<0.001	Sn	<0.001
Be	<0.001	K	<0.08	Sr	<0.001
B	<0.006	Li	<0.001	Sb	<0.001
Bi	<0.001	Mg	0.02	Ti	<0.001
Cr	0.002	Mn	<0.001	Tl	<0.001
Co	<0.001	Mo	<0.001	V	<0.001
Cd	<0.001	Na	0.02	Zr	<0.001
Ca	0.015	Ni	<0.001	Zn	0.38

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

Date of Certification: Jul -- '02 Certifying Officer: N. Kocherlakota

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DATE EXPIRED: 9/15/2003 DR
DATE OPENED: 9/4/02
INORG: 3684 PO: F52048

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Certificate of Reference Material

Catalog Number: PLTH2-2X/2Y **Lot No.** 9-95TH

Description: 1000 mg/Lthorium

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: 1000 mg/L +/- 3 mg/L

Uncertainty Associated with Measurement:

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: 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: 999 mg/L

Uncertified Properties:

Density: 1.043 @ 25.2 Degrees Celsius

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

Element	mg/L	Element	mg/L	Element	mg/L
Ce	0.008	La	0.002	Tb	<0.001
Ca	0.01	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	0.002	Tl	<0.001
Fe	<0.01	Ni	<0.001	V	<0.001
Gd	<0.001	Na	0.03	W	<0.001
Ga	<0.001	Pr	<0.001	Y	0.001
Hf	<0.001	Rb	<0.001	Yb	<0.001
Ho	<0.001	Sc	0.002	Zr	0.002
In	<0.001	Sm	<0.001		

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

Date of Certification: SEP -- '02 Certifying Officer: N. Kocherlakota

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Catalog Number: PLU2-2X/2Y **Lot No.** 8-123U

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: 1000.5 mg/L +/- 3 mg/L

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: 1001 mg/L

Method: Evaporate to dryness,ignite and weigh as U3 O8.

Instrumentation Analysis By ICP spectrometer: 1000 mg/L

Uncertified Properties:

Density: 1.018 @ 23.5 Degrees Celsius

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

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.05	Cu	0.02	Pb	<0.007
As	0.05	Fe	0.10	Rb	<0.001
Ag	<0.005	Ga	<0.001	Re	<0.001
B	<0.004	In	<0.001	Sn	<0.001
Ba	0.003	K	0.06	Sr	0.004
Be	<0.001	Li	<0.001	Sb	0.003
Bi	0.002	Mg	0.003	Ti	<0.001
Ca	.12	Mn	0.003	Tl	<0.001
Cr	<0.003	Mo	0.005	V	0.005
Cd	<0.001	Na	0.1	Zr	<0.001
Co	<0.001	Ni	<0.002	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 -- '02 Certifying Officer: N. Kocherlakota

3533

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Certificate of Reference Material

Catalog Number: PLW9-2X/2Y **Lot No.** 8-135W

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: 999.5 mg/L +/- 3 mg/L

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: 997 mg/L

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

Instrumentation Analysis By ICP spectrometer: 1002 mg/L

Uncertified Properties:

Density: 1.006 @ 25.2 Degrees Celsius

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

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.005	Cu	<0.001	Pb	<0.008
As	0.006	Fe	0.003	Rb	<0.001
Ag	<0.004	Ga	<0.001	Re	0.009
B	<0.004	In	<0.001	Sn	0.001
Ba	<0.001	K	0.07	Sr	<0.001
Be	<0.001	Li	0.04	Sb	0.002
Bi	<0.001	Mg	0.006	Ti	<0.002
Ca	0.008	Mn	<0.001	Tl	<0.001
Cr	<0.005	Mo	0.005	V	<0.001
Cd	<0.001	Na	0.03	Zr	<0.001
Co	<0.001	Ni	<0.001	Zn	<0.2

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 -- '02 Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 8/20/02
DATE EXPIRED: 8/15/03
DATE OPENED: 8/22/02
INORG: 3646 PO: FS2039

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010139

Certificate of Reference Material

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 8/20/02
DATE EXPIRED: 8/15/03
DATE OPENED: 8/22/02
INORG: 3648 PO: 75039

Catalog Number: PLZR2-2X/2Y/2T **Lot No.** 9-07ZR

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 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: 996 mg/L

Method: Fume with Sulfuric Acid to dryness,ignite and weigh as ZrO2.

Instrumentation Analysis By ICP spectrometer: 998 mg/L

Uncertified Properties:

Density: 1.009 @ 25.0 Degrees Celsius

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

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.02	Cu	<0.001	Pb	<0.001
As	<0.002	Fe	0.039	Rb	<0.001
Ag	0.2	Ga	<0.001	Re	<0.001
B	<0.05	In	<0.001	Sn	<0.001
Ba	<0.001	K	<0.08	Sr	<0.001
Be	<0.001	Li	<0.005	Sb	<0.001
Bi	<0.001	Mg	<0.002	Ti	<0.002
Ca	0.04	Mn	<0.001	Tl	<0.001
Cr	<0.005	Mo	<0.001	V	<0.001
Cd	0.004	Na	<0.03	Zn	0.005
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 -- '02 Certifying Officer: N. Kocherlakota

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SPEXertificate™ 010140

Certificate of Reference Material

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

Description: 10,000 mg/L Sodium

Matrix: 5% HNO3

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

Certified Value: 10,036.5 mg/L

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

Certified Value is Traceable to: NIST SRM 3152a

The CRM is prepared gravimetrically using high purity Sodium Carbonate Lot# 02021A. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 10,039 mg/L

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

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

Uncertified Properties:

Density: 1.048 @ 23.9 Degrees Celsius

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

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

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

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

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

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Certificate of Reference Material

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/19/02
DATE EXPIRED: 11/30/2003
DATE OPENED: 11/21/02
INORG: 3723 PO: F52064

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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Certificate of Reference Material

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

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/19/02
DATE EXPIRED: 11/30/03 OK
DATE OPENED: 11/19/02
INORG: 3224 PO: F52064

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INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/14/02
DATE EXPIRED: 11/30/2003
DATE OPENED: 11/18/02
INORG: 3775 PO: F5d064

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Certificate of Reference Material

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

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Certificate of Analysis

010144

CUSTOM-GRADE SOLUTION 1000 µg/mL Silver in 3.5% HNO_3 (abs)

Catalog Number: CGAG1-1, CGAG1-2 and CGAG1-5

Lot Number: **T-AG02013**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 08/23/02
DATE EXPIRED: 09/01/2003
DATE OPENED: 08/26/02
INORG: 3653 PO: F52042

Starting Material:	Silver Metal
Starting Material Purity:	99.999%
Starting Material Lot No:	F15102

CERTIFIED CONCENTRATION: 996 ± 3 µg/mL

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

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

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

Classical Wet Assay: 998 ± 3 µg/mL
Method: Volhard Titration vs NIST SRM 999a Potassium Chloride

Instrument Analysis: 996 ± 3 µg/mL
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3151.

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

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

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

M	Al	<0.0009	M	Dy	<0.0006	M	Li	<0.001	M	Pr	<0.00003	M	Te	<0.003
M	Sb	0.0006	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	<0.003	n	Rh		M	Tl	<0.0001
M	Ba	<0.001	M	Gd	<0.0001	M	Mn	<0.0004	M	Rb	<0.0001	M	Th	<0.0001
M	Be	<0.00005	M	Ga	<0.0001	O	Hg	<0.02	n	Ru		M	Tm	<0.00004
M	Bi	0.0007	M	Ge	0.001	M	Mo	<0.0002	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
O	Cd	<0.01	M	Hf	<0.0002	O	Ni	<0.05	O	Se	<0.4	M	W	<0.001
O	Ca	<0.01	M	Ho	<0.00005	M	Nb	<0.00005	O	Si	<0.02	M	U	<0.0002
M	Ce	<0.0005	O	In	<0.03	n	Os		s	Ag		M	V	<0.0002
M	Cs	<0.00003	M	Ir	<0.0005	n	Pd		O	Na	<0.09	M	Yb	<0.0001
M	Cr	<0.002	O	Fe	<0.05	O	P	<0.05	M	Sr	<0.00005	M	Y	<0.004
M	Co	<0.0003	M	La	<0.00005	M	Pt	<0.0002	n	S		M	Zn	0.006
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): 1.025 g/mL (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 SEP 2003

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Arsenic in 1.4% HNO_3 (abs)

010145

Catalog Number: CGAS1-1, CGAS1-2 and CGAS1-5

Lot Number: **T-AS02019**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 01/09/03
DATE EXPIRED: 02/04/2004 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:

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

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

Calculated Value: 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)

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Technical Support: 800-569-6799

Quality Assurance Manager

EXPIRES 1/2/2004

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 μg/mL Lead in 0.35% HNO_3 (abs)

010146

Catalog Number: CGPB1-1, CGPB1-2 and CGPB1-5

Lot Number: **T-PB02110**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 10/22/02
DATE EXPIRED: 11/01/2003
DATE OPENED: 10/23/02
INORG: 3735 PO: F52057

Starting Material:	Lead Nitrate
Starting Material Purity:	99.995%
Starting Material Lot No:	22150

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.061702.JTS

Quality Assurance Manager

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195 Lehigh Avenue • Suite 4 • Lakewood, NJ 08701
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010147

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

Expires:

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

010148

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 µg/mL Selenium in 1.4% HNO_3 (abs)

Catalog Number: CGSE1-1, CGSE1-2 and CGSE1-5

Lot Number: **T-SE01098**

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 08/23/02
DATE EXPIRED: 09/01/2003
DATE OPENED: 08/26/02
INORG: 3652 PO: F52042

Starting Material:	Selenium Metal
Starting Material Purity:	99.998%
Starting Material Lot No:	A09C08

CERTIFIED CONCENTRATION: 996 ± 4 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: 1005 µg/mL
Method: Calculated, based on starting material.

Instrument Analysis: 996 ± 4 µg/mL (Average of 2 runs)
Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3149.

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	<0.04	M	Dy	<0.0006	M	Li	<0.001	M	Pr	<0.00003	M	Te	<0.003
M	Sb	<0.00005	M	Er	<0.0005	M	Lu	<0.00004	M	Re	<0.0001	M	Tb	<0.00003
M	As	0.004	M	Eu	<0.0003	M	Mg	<0.003	M	Rh	<0.0001	M	Tl	<0.0001
M	Ba	<0.001	M	Gd	<0.0001	M	Mn	0.0008	M	Rb	0.0002	M	Th	<0.0001
M	Be	<0.00005	M	Ga	<0.0001	O	Hg	<0.02	M	Ru	<0.0002	M	Tm	<0.00004
M	Bi	<0.00004	M	Ge	<0.0006	M	Mo	0.0024	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	s	Se		M	W	0.0042
O	Ca	<0.01	M	Ho	<0.00005	M	Nb	<0.03	O	Si	<0.02	M	U	<0.0002
M	Ce	<0.0005	M	In	<0.0001	n	Os		M	Ag	<0.0002	M	V	0.0012
M	Cs	<0.00003	M	Ir	<0.0005	M	Pd	<0.0005	O	Na	<0.09	M	Yb	<0.0001
M	Cr	<0.0005	O	Fe	<0.05	O	P	<0.05	M	Sr	<0.00005	M	Y	<0.004
M	Co	<0.0003	M	La	<0.00005	M	Pt	<0.0002	n	S		M	Zn	0.0032
M	Cu	0.0035	M	Pb	<0.0003	M	K	<0.02	M	Ta	<0.0007	M	Zr	<0.004

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

QA:KSL Rev.032502DN

(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 SEP 2003

010149

Certificate of Analysis

CUSTOM-GRADE SOLUTION 1000 µg/mL Thallium in 0.5% HNO_3 (abs)

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
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 FEB 2004

010150

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 030604-8
SRR: 24405
SDG: 227265
CASE: CNWRA
VTSR: June 04, 2003
PROJECT#: 06002.01.081

Pipette Calibrations

Book/page: 03 020

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010151

Balance #: 34 Thermometer #: 3271 diH20 Temperature (° C) _____

20 µL – 200 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	20	0.0199	0.0200	0.0197
ADJ200-A	100	0.0988	0.0987	0.0983
Lab 34	200	0.1966	0.1968	0.1961
	20	0.0203	0.0204	0.0202
ADJ200-C	100	0.0992	0.0992	0.0993
Lab 28	200	0.1996	0.1998	0.1996
	20	0.0199	0.0195	0.0199
ADJ200-D	100	0.0989	0.0998	0.0996
	200	0.1966	0.1960	0.1968
	20	0.0201	0.0202	0.0202
ADJ200-E	100	0.0990	0.0990	0.0995
	200	0.1984	0.1986	0.1988
	20	0.0197	0.0199	0.0198
ADJ200-G	100	0.0982	0.0983	0.0980
Lab 29	200	0.2004	0.1993	0.2001
	20			
ADJ200	100			
	200			
	20			
ADJ200	100			
	200			
	20			
ADJ200	100			
	200			
	20			
ADJ200	100			
	200			

WW 6/6/03

Analyst: Laura Wright Date: 6/6/03

Reviewed by: Valli Elgin Date: 06/16/03

Book/page: 03 019

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

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

010152

L. Wright 6/13/03

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
	20	0.0199	0.0200	0.0197	0.020	99.33
ADJ200-A	100	0.0988	0.0987	0.0983	0.099	98.60
	200	0.1966	0.1968	0.1961	0.197	98.25
	20	0.0203	0.0204	0.0202	0.020	101.50
ADJ200-C	100	0.0992	0.0992	0.0993	0.099	99.23
	200	0.1996	0.1998	0.1996	0.200	99.83
	20	0.0199	0.0195	0.0199	0.020	98.83
ADJ200-D	100	0.0989	0.0998	0.0996	0.099	99.43
	200	0.1966	0.1960	0.1968	0.196	98.23
	20	0.0201	0.0202	0.0202	0.020	100.83
ADJ200-E	100	0.0990	0.0990	0.0995	0.099	99.17
	200	0.1984	0.1986	0.1988	0.199	99.30
	20	0.0197	0.0199	0.0198	0.020	99.00
ADJ200-G	100	0.0982	0.0983	0.0980	0.098	98.17
	200	0.2004	0.1993	0.2001	0.200	99.97
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					

WP 6/13/03

FRM-247a (Rev 2/Mar 03)

Book/page: 03 071

010153

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

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

L.Wright 6/13/03

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	0.0990	0.0991	0.0993	0.099	99.13
ADJ1000-C	500	0.4902	0.4991	0.4956	0.495	98.99
	1000	0.9871	0.9832	0.9899	0.987	98.67
	100	0.1002	0.1004	0.1009	0.101	100.50
ADJ1000-D	500	0.4996	0.4984	0.4991	0.499	99.81
	1000	0.9905	0.9909	0.9871	0.990	98.95
	100	0.1002	0.1003	0.1002	0.100	100.23
ADJ1000-E	500	0.4956	0.4996	0.4987	0.498	99.59
	1000	1.0034	1.0066	1.0051	1.005	100.50
	100	0.1016	0.1009	0.1003	0.101	100.93
ADJ1000-F	500	0.4962	0.4899	0.4950	0.494	98.74
	1000	0.9831	0.9885	0.9889	0.987	98.68
	100	0.0987	0.1006	~~0.1006~~ .1001	0.100	99.97
ADJ1000-G	500	0.4923	0.4940	0.4974 6/16/03	0.495	98.91
	1000	0.9854	0.9875	0.9870	0.987	98.66
	100	0.0981	0.0984	0.0987	0.098	98.40
ADJ1000-H	500	0.4906	0.4961	0.4904	0.492	98.47
	1000	0.9926	0.9896	0.9907	0.991	99.10
	100					
ADJ1000	500					
	1000					
	100					
ADJ1000	500			W 6/13/03		
	1000					
	100					
ADJ1000	500					
	1000					

6/13/03 L.Wright

FRM-247b (Rev 1/Sept 02)

Book/page: 03 072
010154

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 34 Thermometer #: 3271 diH20 Temperature (° C) 22

100 µL – 1000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	100	0.0990	0.0991	0.0993
ADJ1000-C	500	0.4902	0.4991	0.4956
	1000	0.9871	0.9832	0.9899
	100	0.1002	0.1004	0.1009
ADJ1000-D	500	0.4996	0.4984	0.4991
	1000	0.9905	0.9909	0.9871
	100	0.1002	0.1003	0.1002
ADJ1000-E	500	0.4956	0.4996	0.4987
Lab 34	1000	1.0034	1.0066	1.0051
	100	0.1016	0.1009	0.1003
ADJ1000-F	500	0.4962	0.4899	0.4950
	1000	0.9831	0.9885	0.9889
	100	0.0987	0.1006	0.1001
ADJ1000-G	500	0.4923	0.4940	0.4974
Lab 30	1000	0.9854	0.9875	0.9870
	100	0.0981	0.0984	0.0987
ADJ1000-H	500	0.4906	0.4961	0.4904
Lab 28	1000	0.9926	0.9896	0.9907
	100			
ADJ1000	500			
	1000			
	100			
ADJ1000	500		W 6/6/03	
	1000			
	100			
ADJ1000	500			
	1000			

Analyst: Laura Wright Date: 6/6/03

Reviewed by: Valen Alfa Date: 06/06/03

Book/page: 03 123

010155

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

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

V.W. Wright 6/13/03

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	0.5051	0.5025	0.5032	0.504	100.75
ADJ5000-C	2500	2.4899	2.4891	2.4886	2.489	99.57
	5000	4.9966	4.9919	4.9902	4.993	99.86
	500	0.5000	0.4999	0.4999	0.500	99.99
ADJ5000-G	2500	2.5167	2.5092	2.5161	2.514	100.56
	5000	5.0550	5.0439	5.0527	5.051	101.01
	500	0.4997	0.5001	0.4992	0.500	99.93
ADJ5000-H	2500	2.4889	2.4766	2.4980	2.488	99.51
	5000	5.0468	5.0439	5.0399	5.044	100.87
	500	0.5034	0.5036	0.5010	0.503	100.53
ADJ5000-I	2500	2.4797	2.4890	2.4762	2.482	99.27
	5000	5.0412	5.0089	5.0105	5.020	100.40
	500	0.5009	0.5009	0.5001	0.501	100.13
ADJ5000-J	2500	2.4875	2.4871	2.4860	2.487	99.47
	5000	5.0071	5.0010	5.0011	5.003	100.06
	500	0.5094	0.5056	0.5099	0.508	101.66
ADJ5000-K	2500	2.4990	2.4957	2.4985	2.498	99.91
	5000	5.0806	5.0209	5.0499	5.050	101.01
	500	0.4900	0.4963	0.4943	0.494	98.71
ADJ5000-L	2500	2.4677	2.4753	2.4666	2.470	98.79
	5000	4.9674	4.9790	4.9645	4.970	99.41
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					

VW 6/13/03

FRM-247c (Rev 2/Mar 03)

Book/page: 03 124

010156

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 34 Thermometer #: 3271 diH20 Temperature (° C) 22

500 µL – 5000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	500	0.5051	0.5025	0.5032
ADJ5000-C	2500	2.4899	2.4891	2.4886
	5000	4.9966	4.9919	4.9902
	500	0.5000	0.4999	0.4999
ADJ5000-G	2500	2.5167	2.5092	2.5161
Lab 28	5000	5.0550	5.0439	5.0527
	500	0.4997	0.5001	0.4992
ADJ5000-H	2500	2.4889	2.4766	2.4980
Lab 34	5000	5.0468	5.0439	5.0399
	500	0.5034	0.5036	0.5010
ADJ5000-I	2500	2.4797	2.4890	2.4762
Lab 28	5000	5.0412	5.0089	5.0105
	500	0.5009	0.5009	0.5001
ADJ5000-J	2500	2.4875	2.4871	2.4860
	5000	5.0071	5.0010	5.0011
	500	0.5094	0.5056	0.5099
ADJ5000-K	2500	2.4990	2.4957	2.4985
Lab 30	5000	5.0806	5.0209	5.0499
	500	0.4920	0.4963	0.4943
ADJ5000-L	2500	2.4677	2.4753	2.4666
Lab 29	5000	4.9674	4.9790	4.9645
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			

Analyst: Tamra Wright Date: 6/6/03

Reviewed by: Valerie Alfin Date: 06/16/03

FRM-244 (c) (Rev 3/Mar 03)

Book/page: 02 047

010157

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

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

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

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	20	0.0201	0.0200	0.0201	0.020	100.33
ADJ200-A	100	0.0996	0.1009	0.0992	0.100	99.90
	200	0.2018	0.2009	0.2000	0.201	100.45
	20					
ADJ200-B	100	Out of Service				
	200					
	20	0.0202	0.0201	0.0201	0.020	100.67
ADJ200-C	100	0.0994	0.0997	0.0993	0.099	99.47
	200	0.1989	0.1998	0.1988	0.199	99.58
	20	0.0201	0.0204	0.0202	0.020	101.17
ADJ200-D	100	0.0994	0.0990	0.0994	0.099	99.27
	200	0.1990	0.1992	0.1992	0.199	99.57
	20	0.0202	0.0204	0.0200	0.020	101.00
ADJ200-E	100	0.0998	0.1001	0.0997	0.100	99.87
	200	0.2008	0.2003	0.1996	0.200	100.12
	20	0.0204	0.0202	0.0198	0.020	100.67
ADJ200-G	100	0.0998	0.0989	0.0992	0.099	99.30
	200	0.1994	0.1990	0.1983	0.199	99.45
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					

FRM-247a (Rev 1/Sept 02)

Book/page: 02 048

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010158

Balance #: 16 Thermometer #: G011 diH20 Temperature (C) 21

20 µL – 200 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	20	.0201	.0200	.0201
ADJ200-A	100	.0996	.1004	.0992
	200	.2018	.2009	.2000
	20			
ADJ200-B	100	OUT	OF	Service
	200			
	20	.0202	.0201	.0201
ADJ200-C	100	.0994	.0997	.0993
	200	.1989	.1998	.1988
	20	.0201	.0204	.0202
ADJ200-D	100	.0994	.0990	.0994
	200	.1996	.1992	.1992
	20	.0202	.0204	.0200
ADJ200-E	100	.0998	.1001	.0997
	200	.2008	.2003	.1996
	20	.0204	.0202	.0198
ADJ200-G	100	.0998	.0989	.0992
	200	.1994	.1990	.1983
	20			
ADJ200	100			
	200			
	20			
ADJ200	100			
	200			
	20			
ADJ20	100			
	200			

3-14-03

Analyst: John Wilks Date: 3-14-03

Reviewed by: Laura Wright Date: 3/17/03

Book/page: 02 099

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

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

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

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	100	0.0991	0.0999	0.0998	0.100	99.60
ADJ1000-C	500	0.4994	0.4988	0.4991	0.499	99.82
	1000	1.0066	1.0012	1.0065	1.005	100.48
	100	0.1000	0.0990	0.0993	0.099	99.43
ADJ1000-D	500	0.4987	0.4988	0.4981	0.499	99.71
	1000	0.9940	0.9939	0.9921	0.993	99.33
	100	0.0981	0.0991	0.0986	0.099	98.60
ADJ1000-E	500	0.4958	0.4949	0.4955	0.495	99.08
	1000	1.0026	0.9982	0.9987	1.000	99.98
	100	0.0982	0.0992	0.0989	0.099	98.77
ADJ1000-F	500	0.4939	0.4947	0.4918	0.493	98.69
	1000	0.9946	0.9972	1.0002	0.997	99.73
	100	0.1016	0.1018	0.1017	0.102	101.70
ADJ1000-G	500	0.5013	0.5013	0.4978	0.500	100.03
	1000	1.0002	1.0001	1.0127	1.004	100.43
	100	0.1008	0.1003	0.1006	0.101	100.57
ADJ1000-H	500	0.4987	0.4994	0.4991	0.499	99.81
	1000	1.0060	0.9998	1.0019	1.003	100.26
	100					
ADJ1000	500					
	1000					
	100					
ADJ1000	500					
	1000					
	100					
ADJ1000	500					
	1000					

FRM-247b (Rev 1/Sept 02)

Book/page: 02 100

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010160

Balance #: 16 Thermometer #: G011 diH20 Temperature (C) 21

	Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
100 µL – 1000 µL		100	.0991	.0999	.0998
	ADJ1000-C	500	.4994	.4988	.4991
		1000	1.0066	1.0012	1.0065
		100	.1000	.0990	.0993
	ADJ1000-D	500	.4987	.4988	.4981
		1000	.9940	.9939	.9921
		100	.0981	.0991	.0986
	ADJ1000-E	500	.4958	.4949	.4955
		1000	1.0026	.9982	.9987
		100	.0982	.0992	.0989
	ADJ1000-F	500	.4939	.4947	.4918
		1000	.9946	.9972	1.0002
		100	.1016	.1018	.1017
	ADJ1000-G	500	.5013	.5013	.4978
		1000	1.0002	1.0001	1.0127
		100	.1008	.1003	.1006
	ADJ1000-H	500	.4987	.4994	.4991
		1000	1.0060	.9998	1.0019
		100			
	ADJ1000	500			
		1000			
		100			
	ADJ1000	500			
		1000			
		100			
	ADJ1000	500			
		1000			

JW 3-17-03

NOTE: Calibration was performed 3-14-03, entered 3-17-03 JW

Analyst: John Wells Date: 3-17-03

Reviewed by: Laura Wright Date: 3/17/03

Book/page: 02 151

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

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

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

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	500	0.5061	0.5047	0.5052	0.505	101.07
ADJ5000-C	2500	2.5100	2.5184	2.5030	2.510	100.42
	5000	4.9989	5.0148	5.0186	5.011	100.22
	500					
ADJ5000-E	2500	OUT	OF	ORDER		
	5000					
	500					
ADJ5000-F	2500	OUT	OF	ORDER		
	5000					
	500	0.5040	0.5049	0.5056	0.505	100.97
ADJ5000-G	2500	2.5098	2.5074	2.5093	2.509	100.35
	5000	5.0521	5.0329	5.0210	5.035	100.71
	500	0.5042	0.5031	0.5038	0.504	100.74
ADJ5000-H	2500	2.5372	2.5326	2.5179	2.529	101.17
	5000	5.0511	5.0354	5.0401	5.042	100.84
	500	0.5034	0.5051	0.5044	0.504	100.86
ADJ5000-I	2500	2.4987	2.5052	2.5034	2.502	100.10
	5000	5.0115	5.0141	5.0092	5.012	100.23
	500	0.4972	0.4983	0.4992	0.498	99.65
ADJ5000-J	2500	2.4989	2.5011	2.4966	2.499	99.95
	5000	4.9982	4.9974	4.9847	4.993	99.87
	500	0.5032	0.5018	0.5036	0.503	100.57
ADJ5000-K	2500	2.5014	2.5031	2.5000	2.502	100.06
	5000	5.0101	5.0076	5.0260	5.015	100.29
	500	0.5000	0.5031	0.4983	0.500	100.09
ADJ5000-L	2500	2.4981	2.5060	2.5016	2.502	100.08
	5000	5.0414	5.0296	5.0136	5.028	100.56
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					

FRM-247c (Rev 1/Sept 02)

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SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010162

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	.5061	.5047	.5052
ADJ5000-C	2500	2.5100	2.5184	2.5030
	5000	4.9989	5.0148	5.0186
	500			
ADJ5000-E	2500	OUT	OF	SERVICE
	5000			
	500			
ADJ5000-F	2500	OUT	OF	SERVICE
	5000			
	500	.5040	.5049	.5056
ADJ5000-G	2500	2.5098	2.5074	2.5093
	5000	5.0521	5.0329	5.0210
	500	.5042	.5031	.5038
ADJ5000-H	2500	2.5372	2.5326	2.5179
	5000	5.0511	5.0354	5.0401
	500	.5034	.5051	.5044
ADJ5000-I	2500	2.4987	2.5052	2.5034
	5000	5.0115	5.0141	5.0092
	500	.4972	.4983	.4992
ADJ5000-J	2500	2.4989	2.5011	2.4966
	5000	4.9982	4.9974	4.9847
	500	.5032	.5018	.5036
ADJ5000-K	2500	2.5014	2.5031	2.5000
	5000	5.0101	5.0076	5.0260
	500	.5000	.5031	.4983
ADJ5000-L	2500	2.4981	2.5060	2.5016
	5000	5.0414	5.0296	5.0136
	500			
ADJ5000	2500			
	5000		3-17-03	
	500			
ADJ5000	2500			
	5000			

NOTE: Calibration performed 3-14-03, entered on 3-17-03 gw

Analyst: John Wilks Date: 3-17-03

Reviewed by: Laura Wright Date: 3/17/03

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Book/Page: 03 009

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

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

LWright 6/16/03

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	1.0198	1.0199	1.0105	1.02	101.67
TMA1	1000	0.9941	0.9956	0.9959	1.00	99.52
TMA2	1000	1.0150	1.0081	1.0102	1.01	101.11
TMA3	1000	1.0069	1.0055	0.9982	1.00	100.35
TMA6	1000	1.0163	1.0101	1.0062	1.01	101.09
TMB1	900	0.9057	0.8988	0.8997	0.90	100.16
TMC1	800	0.7999	0.8001	0.8000	0.80	100.00
TMDD1	750	0.7475	0.7531	0.7511	0.75	100.08
TMD1	700	0.6928	0.6944	0.6960	0.69	99.20
TMD2	700	0.7073	0.7059	0.7081	0.71	101.01
TME1	600	0.6020	0.5982	0.5991	0.60	99.96
TMF2	500	0.4995	0.5002	0.5001	0.50	99.99
TMF5	500					
ICF1	500	0.5048	0.5056	0.5030	0.50	100.89
L30-500	500	0.4988	0.5013	0.5031	0.50	100.21
TMG3	400	0.4050	0.3962	0.3981	0.40	99.94
TMH1	300	0.3022	0.3019	0.3019	0.30	100.67
TMH2	300	0.2975	0.3001	0.2991	0.30	99.63
TMJ1	250	0.2482	0.2484	0.2491	0.25	99.43
TMJ2	250	0.2488	0.2497	0.2499	0.25	99.79
TMJ3	250	0.2509	0.2513	0.2508	0.25	100.40
TMK2	200	0.2018	0.2008	0.2016	0.20	100.70
TML1	150	0.1494	0.1495	0.1498	0.15	99.71
TMM1	120	0.1201	0.1204	0.1204	0.12	100.25
TMN3	100	0.0990	0.0990	0.0990	0.10	99.00
ICN1	100	0.1013	0.0999	0.0998	0.10	100.33
TMQ1	80	0.0802	0.0801	0.0801	0.08	100.17
TMR1	70					
TMS1	60					
LAB-30A	50	0.0499	0.0498	0.0494	0.05	99.40
TMU1	40	0.0396	0.0399	0.0398	0.04	99.42
TMU2	40	0.0400	0.0401	0.0401	0.04	100.17
TMV1	30	0.0298	0.0299	0.0299	0.03	99.56
L30-20	20	0.0199	0.0200	0.0200	0.02	99.83
TMW1	25	0.0248	0.0249	0.0250	0.02	99.60
TMY1	15	0.0149	0.0150	0.0149	0.01	99.56

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

Balance #: 16834 Thermometer #: G-058 diH20 Temperature (°C): _____

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
Lab30	1000	1.0198	1.0199	1.0105
TMA1	1000	0.9941	0.9956	0.9959
TMA2	1000	1.0150	1.0081	1.0102
TMA3	1000	1.0069	1.0055	0.9982
TMA6	1000	1.0163	1.0101	1.0062
TMB1	900	0.9057	0.8988	0.8997
TMC1	800	0.7999	0.8001	0.8000
TMDD1	750	0.7475	0.7531	0.7511
TMD1	700	0.6928	0.6944	0.6960
TMD2	700	0.7073	0.7059	0.7081
TME1	600	0.6020	0.5982	0.5991
TMF2	500	0.4995	0.5002	0.5001
TMF5	500	not found		
ICF1	500	0.5048	0.5056	0.5030
L30-500	500	0.4988	0.5013	0.5031
TMG3	400	0.4050	0.3962	0.3981
TMH1	300	0.3022	0.3019	0.3019
TMH2	300	0.3975	0.3001	0.2991
TMJ1	250	0.2482	0.2484	0.2491
TMJ2	250	0.2488	0.2497	0.2499
TMJ3	250	0.2509	0.2513	0.2508
TMK2	200	0.2018	0.2008	0.2016
TML1	150	0.01494	0.1495	0.1498
TMM1	120	0.1201	0.1204	0.1204
TMN3	100	0.0990	0.0990	0.0990
ICN1	100	0.1013	0.0999	0.0998
TMQ1	80	0.0802	0.0801	0.0801
TMR1	70	> not found.		
TMS1	60			
LAB-30A	50	0.0499	0.0498	0.0494
TMU1	40	0.0396	0.0399	0.0398
TMU2	40	0.0400	0.0401	0.0401
TMV1	30	0.0499298	0.020099	0.020099
L30-20	20	0.0199	0.0200	0.0200
TMW1	25	0.0248	0.0249	0.0250
TMY1	15	0.0149	0.0150	0.0149

Analyst: Laura Wright Date: 5/30/03

Reviewed by: Vala Alfa Date: 06/16/03

FRM-243b (Rev 3/Mar 03)

Book/page: 03 019

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

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

L. Wright 6/13/03

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
	20	0.0199	0.0200	0.0197	0.020	99.33
ADJ200-A	100	0.0988	0.0987	0.0983	0.099	98.60
	200	0.1966	0.1968	0.1961	0.197	98.25
	20	0.0203	0.0204	0.0202	0.020	101.50
ADJ200-C	100	0.0992	0.0992	0.0993	0.099	99.23
	200	0.1996	0.1998	0.1996	0.200	99.83
	20	0.0199	0.0195	0.0199	0.020	98.83
ADJ200-D	100	0.0989	0.0998	0.0996	0.099	99.43
	200	0.1966	0.1960	0.1968	0.196	98.23
	20	0.0201	0.0202	0.0202	0.020	100.83
ADJ200-E	100	0.0990	0.0990	0.0995	0.099	99.17
	200	0.1984	0.1986	0.1988	0.199	99.30
	20	0.0197	0.0199	0.0198	0.020	99.00
ADJ200-G	100	0.0982	0.0983	0.0980	0.098	98.17
	200	0.2004	0.1993	0.2001	0.200	99.97
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					

WP 6/13/03

FRM-247a (Rev 2/Mar 03)

Book/page: 03 020

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010166

Balance #: 34 Thermometer #: 3271 diH20 Temperature (° C) _____

20 µL – 200 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	20	0.0199	0.0200	0.0197
ADJ200-A	100	0.0988	0.0987	0.0983
Lab 34	200	0.1966	0.1968	0.1961
	20	0.0203	0.0204	0.0202
ADJ200-C	100	0.0992	0.0992	0.0993
Lab 28	200	0.1996	0.1998	0.1996
	20	0.0199	0.0195	0.0199
ADJ200-D	100	0.0989	0.0998	0.0996
	200	0.1966	0.1960	0.1968
	20	0.0201	0.0202	0.0202
ADJ200-E	100	0.0990	0.0990	0.0995
	200	0.1984	0.1986	0.1988
	20	0.0197	0.0199	0.0198
ADJ200-G	100	0.0982	0.0983	0.0980
Lab 29	200	0.2004	0.1993	0.2001
	20			
ADJ200	100			
	200			
	20			
ADJ200	100			
	200			
	20			
ADJ200	100			
	200			
	20			
ADJ200	100			
	200			

LW 6/6/03

Analyst: Laura Wright Date: 6/6/03

Reviewed by: Valli Elgin Date: 06/16/03

Book/page: 03 071

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

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

L.Wright 6/13/03

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	0.0990	0.0991	0.0993	0.099	99.13
ADJ1000-C	500	0.4902	0.4991	0.4956	0.495	98.99
	1000	0.9871	0.9832	0.9899	0.987	98.67
	100	0.1002	0.1004	0.1009	0.101	100.50
ADJ1000-D	500	0.4996	0.4984	0.4991	0.499	99.81
	1000	0.9905	0.9909	0.9871	0.990	98.95
	100	0.1002	0.1003	0.1002	0.100	100.23
ADJ1000-E	500	0.4956	0.4996	0.4987	0.498	99.59
	1000	1.0034	1.0066	1.0051	1.005	100.50
	100	0.1016	0.1009	0.1003	0.101	100.93
ADJ1000-F	500	0.4962	0.4899	0.4950	0.494	98.74
	1000	0.9831	0.9885	0.9889	0.987	98.68
	100	0.0987	0.1006	~~0.1006~~ .100	0.100	99.97
ADJ1000-G	500	0.4923	0.4940	0.4974 6/14/03	0.495	98.91
	1000	0.9854	0.9875	0.9870	0.987	98.66
	100	0.0981	0.0984	0.0987	0.098	98.40
ADJ1000-H	500	0.4906	0.4961	0.4904	0.492	98.47
	1000	0.9926	0.9896	0.9907	0.991	99.10
	100					
ADJ1000	500					
	1000					
	100					
ADJ1000	500					
	1000					
	100					
ADJ1000	500					
	1000					

LW 6/13/03

6/13/03 L.Wright

FRM-247b (Rev 1/Sept 02)

Book/page: 03 072

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010168

Balance #: 34 Thermometer #: 3271 diH20 Temperature (° C) 22

100 µL – 1000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	100	0.0990	0.0991	0.0993
ADJ1000-C	500	0.4902	0.4991	0.4956
	1000	0.9871	0.9832	0.9899
	100	0.1002	0.1004	0.1009
ADJ1000-D	500	0.4996	0.4984	0.4991
	1000	0.9905	0.9909	0.9871
	100	0.1002	0.1003	0.1002
ADJ1000-E	500	0.4956	0.4996	0.4987
Lab 34	1000	1.0034	1.0066	1.0051
	100	0.1016	0.1009	0.1003
ADJ1000-F	500	0.4962	0.4899	0.4950
	1000	0.9831	0.9885	0.9889
	100	0.0987	0.1006	0.1001
ADJ1000-G	500	0.4923	0.4940	0.4974
Lab 30	1000	0.9854	0.9875	0.9870
	100	0.0981	0.0984	0.0987
ADJ1000-H	500	0.4906	0.4961	0.4904
Lab 28	1000	0.9926	0.9896	0.9907
	100			
ADJ1000	500			
	1000			
	100			
ADJ1000	500			
	1000			
	100			
ADJ1000	500			
	1000			

W 6/16/03

Analyst: Laura Wright Date: 6/6/03

Reviewed by: Valen Alfa Date: 06/06/03

Book/page: 03 123

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

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

V.W. Wright 6/13/03

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	0.5051	0.5025	0.5032	0.504	100.75
ADJ5000-C	2500	2.4899	2.4891	2.4886	2.489	99.57
	5000	4.9966	4.9919	4.9902	4.993	99.86
	500	0.5000	0.4999	0.4999	0.500	99.99
ADJ5000-G	2500	2.5167	2.5092	2.5161	2.514	100.56
	5000	5.0550	5.0439	5.0527	5.051	101.01
	500	0.4997	0.5001	0.4992	0.500	99.93
ADJ5000-H	2500	2.4889	2.4766	2.4980	2.488	99.51
	5000	5.0468	5.0439	5.0399	5.044	100.87
	500	0.5034	0.5036	0.5010	0.503	100.53
ADJ5000-I	2500	2.4797	2.4890	2.4762	2.482	99.27
	5000	5.0412	5.0089	5.0105	5.020	100.40
	500	0.5009	0.5009	0.5001	0.501	100.13
ADJ5000-J	2500	2.4875	2.4871	2.4860	2.487	99.47
	5000	5.0071	5.0010	5.0011	5.003	100.06
	500	0.5094	0.5056	0.5099	0.508	101.66
ADJ5000-K	2500	2.4990	2.4957	2.4985	2.498	99.91
	5000	5.0806	5.0209	5.0499	5.050	101.01
	500	0.4900	0.4963	0.4943	0.494	98.71
ADJ5000-L	2500	2.4677	2.4753	2.4666	2.470	98.79
	5000	4.9674	4.9790	4.9645	4.970	99.41
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					

VW 6/13/03

FRM-247c (Rev 2/Mar 03)

Book/page: 03 124

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010170

Balance #: 34 Thermometer #: 3271 diH20 Temperature (° C) 22

500 µL – 5000 µL

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
	500	0.5051	0.5025	0.5032
ADJ5000-C	2500	2.4899	2.4891	2.4886
	5000	4.9966	4.9919	4.9902
	500	0.5000	0.4999	0.4999
ADJ5000-G	2500	2.5167	2.5092	2.5161
Lab 28	5000	5.0550	5.0439	5.0527
	500	0.4997	0.5001	0.4992
ADJ5000-H	2500	2.4889	2.4766	2.4980
Lab 34	5000	5.0468	5.0439	5.0399
	500	0.5034	0.5036	0.5010
ADJ5000-I	2500	2.4797	2.4890	2.4762
Lab 28	5000	5.0412	5.0089	5.0105
	500	0.5009	0.5009	0.5001
ADJ5000-J	2500	2.4875	2.4871	2.4860
	5000	5.0071	5.0010	5.0011
	500	0.5094	0.5056	0.5099
ADJ5000-K	2500	2.4990	2.4957	2.4985
Lab 30	5000	5.0806	5.0209	5.0499
	500	0.4920	0.4963	0.4943
ADJ5000-L	2500	2.4677	2.4753	2.4666
Lab 29	5000	4.9674	4.9790	4.9645
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			

Analyst: Dawna Wright Date: 6/6/03

Reviewed by: Valerie Alfin Date: 06/16/03

FRM-244 (c) (Rev 3/Mar 03)

010171

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 030604-8
SRR: 24405
SDG: 227265
CASE: CNWRA
VTSR: June 04, 2003
PROJECT#: 06002.01.081

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	SN: 99-J5D52618
5/31/03	2.0000	2.0000	LW	"
6/01/03	2.0000	2.0000	LW	"
6/02/03	2.0000	2.0000	LW	"
6/03/03	2.0000	2.0000	LW	"
6/4/03	2.0000	2.0000	JR	"
6/5/03	2.0000	2.0000	LW	"
6/6/03	2.0000	2.0000	LW	"
6/7/03	2.0000	2.0000	LW	"
6/9/03	2.0000	2.0000	LW	"
6-11-03	2.0000	1.9999	[illegible]	"

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:
19	28	0068597	±0.05	
Date	Std Wt (g)	Recorded Wt (g)	Operator	
6/02/03	2 Trials 10.00	10.00	MW	Sn:99-J50624-6
6/03/03	10.00	10.00	MW	"
6/4/03	10.00	10.00	LR	"
6/5/03	10.00	10.00	MW	"
6/6/03	10.00	10.00	MW	"
6/7/03	10.00	10.00	MW	"
6/9/03	10.00	10.00	MW	"
6-10-03	10.00	10.00	[illegible]	"
6-11-03	10.00	10.00	[illegible]	"
6/12/03	10.00	10.00	MW	"

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:
34	28	1116031935	±0.0005	
Date	Std Wt (g)	Recorded Wt (g)	Operator	
6/01/03	2.0000	2.0000	LW	SN: 99-J50526-15
6/02/03	2.0000	2.0001	LW	"
6/02/03	2.0000	2.0000	LW	"
6/3/03	2.0000	2.0000	LW	"
6/4/03	2.0000	2.0000	JR	"
6/5/03	2.0000	2.0000	LW	"
6/6/03	2.0000	2.0000	LW	"
6/7/03	2.0000	2.0000	LW	"
6/9/03	2.0000	2.0000	LW	"
6-10-03	2.0000	2.0001	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)

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Southwest Research Institute
Division 01
BALANCE VERIFICATION LOG

BALANCE #	LAB #:	SERIAL #:	TOLERANCE:	COMMENTS:
34	28	1116031935	±0.0005	
Date	Std Wt (g)	Recorded Wt (g)	Operator	
3-12-03	2.0000	2.0000	[illegible]	SN:99550526-15
3-13-03	2.0000	1.9999	[illegible]	"
3/14/03	2.0000	2.0000	MW	"
3/17/03	2.0000	2.0000	MW	"
3-18-03	2.0000	2.0001	[illegible]	"
3/19/03	2.0000	2.0000	MW	"
3/20/03	2.0000	2.0000	MW	"
3/21/03	2.0000	2.0000	MW	"
3/24/03	2.0000	2.0000	MW	"
3-25-03	2.0000	2.0000	[illegible]	"

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
4/11/03

FRM-112 (Rev 1/Dec 99)

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	
6/01/03	2.0000	2.0000	LW	SN: 99-J50526-15
6/02/03	2.0000	2.0001	LW	"
6/02/03	2.0000	2.0000	LW	"
6/3/03	2.0000	2.0000	LW	"
6/4/03	2.0000	2.0000	JR	"
6/5/03	2.0000	2.0000	LW	"
6/6/03	2.0000	2.0000	LW	"
6/7/03	2.0000	2.0000	LW	"
6/9/03	2.0000	2.0000	LW	"
6-10-03	2.0000	2.0001	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)

010177

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 030604-8
SRR: 24405
SDG: 227265
CASE: CNWRA
VTSR: June 04, 2003
PROJECT#: 06002.01.081

DI Water Verification

D.I. WATER SYSTEM NOTEBOOK 01 025
METALS LAB # 010178
SOUTHWEST RESEARCH INSTITUTE

DATE	INITIALS	READING (M OHMS)	SET PT./ QC LT. Green=OK	CALL FOR Service LT. Green=OK	USAGE (GALS)	COMMENTS
5/7/03	DR	18.0	✓	✓	49890.0	7:06 p.m.
5/8/03	DR	18.0	✓	✓	49901.9	7:45 p.m.
5/9/03	DR	18.0	✓	✓	49913.7	7:00 pm.
5/12/03	DR	18.0	✓	✓	49932.6	8:52 p.m.
5/13/03	DR	18.0	✓	✓	49946.1	6:46 p.m.
5/14/03	DR	18.0	✓	✓	49960.9	5:35 p.m.
5/15/03	DR	18.0	✓	✓	49977.2	6:20 p.m.
5/16/03	DR	18.0	✓	✓	49989.1	6:05 pm
5/19/03	DR	18.0	✓	✓	50004.4	7:23 p.m.
5/20/03	DR	18.0	✓	✓	50034.8	9:50 pm
5/21/03	DR	18.0	✓	✓	50050.9	6:50 pm
5/22/03	DR	18.0	✓	✓	50068.8	7:26 pm
		Reviewed By RSS			5/22/03	
5/23/03	DR	18.0	✓	✓	50072.9	5:58 pm.
5/27/03	DR	18.0	✓	✓	50084.0	7:19 p.m.
5/28/03	DR	18.0	✓	✓	50094.5	6:41 pm
5/29/03	DR	18.0	✓	✓	50106.6	6:20 p.m.
5/30/03	DR	18.0	✓	yellow	50127.4	6:42 p.m. Red Reg/P.O.
6/2/03	DR	18.0	✓	yellow	50136.8	6 p.m. U.S. Filter Called.
6/3/03	DR	18.0	✓	✓	50140.3	tank exchange. Back online 11:30 a.m.
6/4/03	DR	18.0	✓	✓	50159.0	6:36 p.m.
6/5/03	DR	18.0	✓	✓	50180.4	8:05 pm.
6/6/03	DR	18.0	✓	✓	50193.7	5:01 p.m
6/9/03	DR	18.0	✓	✓	50218.3	10:26 p.m.
6/10/03	DR	18.0	✓	✓	50227.7	5:20 pm
6/11/03	DR	18.0	✓	✓	50238.6	5:48 p.m.
6/12/03	DR	18.0	✓	✓	50251.9	6:04 pm
6/13/03	DR	18.0	✓	✓	50258.9	3 p.m.
6/15/03	DR	18.0	✓	✓	50258.9	6:01 pm. Water off? why?
	Power Broken Feeding DI WATER SYSTEM				FLIPPED DOWN weekend. 6/16/03	
6/16/03	DR	18.0	✓	✓	50259.3	8:30 A.M.
		Reviewed by RSpos 6/16/03				

D.I. WATER SYSTEM NOTEBOOK 01 025
METALS LAB
SOUTHWEST RESEARCH INSTITUTE

010179

DATE	INITIALS	READING (M OHMS)	SET PT./ QC LT. Green=OK	CALL FOR Service LT. Green=OK	USAGE (GALS)	COMMENTS
5/7/03	DR	18.0	✓	✓	49890.0	7:06 p.m.
5/8/03	DR	18.0	✓	✓	49901.9	7:45 p.m.
5/9/03	DR	18.0	✓	✓	49913.7	7:00 pm.
5/12/03	DR	18.0	✓	✓	49932.6	8:52 p.m.
5/13/03	DR	18.0	✓	✓	49946.1	6:46 p.m.
5/14/03	DR	18.0	✓	✓	49960.9	5:35 p.m.
5/15/03	DR	18.0	✓	✓	49977.2	6:20 p.m.
5/16/03	DR	18.0	✓	✓	49989.1	6:05 pm
5/19/03	DR	18.0	✓	✓	50004.4	7:23 p.m.
5/20/03	DR	18.0	✓	✓	50034.8	9:50 pm
5/21/03	DR	18.0	✓	✓	50050.9	6:50 pm
5/22/03	DR	18.0	✓	✓	50068.8	7:26 pm
		Reviewed By RSS			5/22/03	
5/23/03	DR	18.0	✓	✓	50079.9	5:25 pm.
5/27/03	DR	18.0	✓	✓	50084.0	7:19 p.m.
5/28/03	DR	18.0	✓	✓	50094.5	6:41 pm
5/29/03	DR	18.0	✓	✓	50106.6	6:20 p.m.
5/30/03	DR	18.0	✓	yellow	50121.4	6:42 p.m. Red Lep/P.S.
6/2/03	DR	18.0	✓	yellow	50136.8	6 p.m. U.S. Filter failed.
6/3/03	DR	18.0	✓	✓	50140.3	tank exchange. Back on line 11:30 a.m.
6/4/03	DR	18.0	✓	✓	50159.0	6:36 p.m.
6/5/03	DR	18.0	✓	✓	50180.4	8:05 pm.
6/6/03	DR	18.0	✓	✓	50193.7	8:01 p.m
6/9/03	DR	18.0	✓	✓	50218.3	10:26 p.m.
6/10/03	DR	18.0	✓	✓	50227.7	5:20 pm
6/11/03	DR	18.0	✓	✓	50238.6	5:48 p.m.
6/12/03	DR	18.0	✓	✓	50251.9	6:04 pm
6/13/03	DR	18.0	✓	✓	50258.9	3 p.m.
6/15/03	DR	18.0	✓	✓	50258.9	6:01 pm. water off? why?
	Power Breaker Feeding DI WATER SYSTEM Flipped on weekend. DR 6/16/03					
6/16/03	DR	18.0	✓	✓	50259.3	8:30 A.M.
		Reviewed by RSS 6/16/03				
6/17/03	DR	18.0	✓	✓	50274.0	7:32 pm
6/18/03	DR	18.0	✓	✓	50285.9	6:40 p.m.

010180

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 030604-8
SRR: 24405
SDG: 227265
CASE: CNWRA
VTSR: June 04, 2003
PROJECT#: 06002.01.081

SURVEILLANCE REPORTS
From Division 30