

**SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT**

CLIENT: Division 20

TASK ORDER: 031205-4

SRR: 25287

SDG: 238656

CASE: CNWRA

VTSR: December 05, 2003

PROJECT#: 06002.01.071

FINAL REPORT

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010001

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 12/05/03

Matrix: Water

Project No.: 20.06002.01.071

SRR: 25287

TO: 031205-4

Sample ID	Lab System ID	Calcium Results (mg/L)	Potassium Results (mg/L)	Sodium Results (mg/L)
Prep Blank	----	<2	<2	<2
Lab Control	----	201	197	198
True Value	----	200	200	200
Recovery	----	101%	98.5%	99.0%
SOLA21C	238656	<2	4462	7488
Duplicate result	238656	<2	4488	7534
RPD	238656	0.00%	0.58%	0.61%
SOLA25CDEC	238657	<2	5766	7394
Spike result	238657	199	6868	8482
Spike added	238657	200	1000	1000
Recovery	238657	99.5%	110%	109%
SOLA25C Dup	238658	<2	3716	7135
SOLA50C	238659	<2	8102	6651
SOLA50CDEC	238660	<2	8234	6604
SOLA70C	238661	<2	9976	6074
SOLA70CDEC	238662	<2	9275	6210
SOLB21C	238663	10824	<2	82.8
SOLB25CDEC	238664	11674	<2	152
SOLB50C	238665	11244	<2	142
SOLB50CDEC	238666	11268	<2	181
SOLB70C	238667	11035	<2	230
SOLB70C Dup	238668	11259	<2	199
SOLB70CDEC	238669	11120	<2	237
SOLC25C	238670	10650	1061	<2
SOLC25CDEC	238671	10612	1469	<2
SOLC50C	238672	11017	1470	<2
SOLC50CDEC	238673	10983	1965	<2
SOLC70C	238674	11069	1847	<2
SOLC70CDEC	238675	10909	2465	<2

Reporting Limit:

2 mg/L

2 mg/L

2 mg/L

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010002

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 12/05/03

Matrix: Water

Project No.: 20.06002.01.071

SRR: 25287

TO: 031205-4

Sample ID	Lab System ID	Chloride Results (mg/L)	Nitrate-N Results (mg/L)
Prep Blank	----	<0.1	<0.1
Lab Control	----	199	85.2
True Value	----	200	90.4
Recovery	----	99.5%	94.2%
Prep Blank	----	<0.1	<0.1
Lab Control	----	200	85.7
True Value	----	200	90.4
Recovery	----	100%	94.8%
SOLA21C	238656	5790	3890
Duplicate result	238656	5753	3887
RPD	238656	0.64%	0.08%
Spike result	238656	7810	4742
Spike added	238656	2000	904
Recovery	238656	101%	94.2%
SOLA25CDEC	238657	5698	4277
SOLA25C Dup	238658	5564	3618
SOLA50C	238659	5319	5047
SOLA50CDEC	238660	5389	5124
SOLA70C	238661	4994	5586
SOLA70CDEC	238662	5141	5450
SOLB21C	238663	18797	<100
SOLB25CDEC	238664	21163	<100
SOLB50C	238665	20637	<100
SOLB50CDEC	238666	20635	<100
SOLB70C	238667	20248	<100
SOLB70C Dup	238668	20814	<100
SOLB70CDEC	238669	20846	<100
SOLC25C	238670	20519	<100
SOLC25CDEC	238671	20742	<100
SOLC50C	238672	21800	<100
SOLC50CDEC	238673	21679	<100
SOLC70C	238674	22005	<100
SOLC70CDEC	238675	22131	<100

Reporting Limit (System IDs 238656-238662):	100 mg/L	100 mg/L
Reporting Limit (System IDs 238663-238675):	200 mg/L	100 mg/L

**SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT**

CLIENT: Division 20

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SDG: 238656

CASE: CNWRA

VTSR: December 05, 2003

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SAMPLE ANALYSIS DATA SHEET

010001

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 12/05/03

Matrix: Water

Project No.: 20.06002.01.071

SRR: 25287

TO: 031205-4

Sample ID	Lab System ID	Calcium Results (mg/L)	Potassium Results (mg/L)	Sodium Results (mg/L)
Prep Blank	----	<2	<2	<2
Lab Control	----	201	197	198
True Value	----	200	200	200
Recovery	----	101%	98.5%	99.0%
SOLA21C	238656	<2	4462	7488
Duplicate result	238656	<2	4488	7534
RPD	238656	0.00%	0.58%	0.61%
SOLA25CDEC	238657	<2	5766	7394
Spike result	238657	199	6868	8482
Spike added	238657	200	1000	1000
Recovery	238657	99.5%	110%	109%
SOLA25C Dup	238658	<2	3716	7135
SOLA50C	238659	<2	8102	6651
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SOLA70C	238661	<2	9976	6074
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SOLB21C	238663	10824	<2	82.8
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SOLB70C Dup	238668	11259	<2	199
SOLB70CDEC	238669	11120	<2	237
SOLC25C	238670	10650	1061	<2
SOLC25CDEC	238671	10612	1469	<2
SOLC50C	238672	11017	1470	<2
SOLC50CDEC	238673	10983	1965	<2
SOLC70C	238674	11069	1847	<2
SOLC70CDEC	238675	10909	2465	<2

Reporting Limit:

2 mg/L

2 mg/L

2 mg/L

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010002

Lab Name: Southwest Research Institute

Client: Division 20

Lab Code: SwRI

Date Received: 12/05/03

Matrix: Water

Project No.: 20.06002.01.071

SRR: 25287

TO: 031205-4

Sample ID	Lab System ID	Chloride Results (mg/L)	Nitrate-N Results (mg/L)
Prep Blank	----	<0.1	<0.1
Lab Control	----	199	85.2
True Value	----	200	90.4
Recovery	----	99.5%	94.2%
Prep Blank	----	<0.1	<0.1
Lab Control	----	200	85.7
True Value	----	200	90.4
Recovery	----	100%	94.8%
SOLA21C	238656	5790	3890
Duplicate result	238656	5753	3887
RPD	238656	0.64%	0.08%
Spike result	238656	7810	4742
Spike added	238656	2000	904
Recovery	238656	101%	94.2%
SOLA25CDEC	238657	5698	4277
SOLA25C Dup	238658	5564	3618
SOLA50C	238659	5319	5047
SOLA50CDEC	238660	5389	5124
SOLA70C	238661	4994	5586
SOLA70CDEC	238662	5141	5450
SOLB21C	238663	18797	<100
SOLB25CDEC	238664	21163	<100
SOLB50C	238665	20637	<100
SOLB50CDEC	238666	20635	<100
SOLB70C	238667	20248	<100
SOLB70C Dup	238668	20814	<100
SOLB70CDEC	238669	20846	<100
SOLC25C	238670	20519	<100
SOLC25CDEC	238671	20742	<100
SOLC50C	238672	21800	<100
SOLC50CDEC	238673	21679	<100
SOLC70C	238674	22005	<100
SOLC70CDEC	238675	22131	<100

Reporting Limit (System IDs 238656-238662): 100 mg/L 100 mg/L

Reporting Limit (System IDs 238663-238675): 200 mg/L 100 mg/L

**SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 031205-4
SRR: 25287
SDG: 238656
CASE: CNWRA
VTSR: December 05, 2003
PROJECT#: 06002.01.071**

Task Orders/01-QPP-015

Laboratory Task Order**010003**

TO #: 031205-4 Revision: 1

SDG: 238656
VTSR: 12/05/03
CASE: DIV. 20 - CNWRASRR #'s: 25287
Client(s): DIV 20Project(s): 06002.01.071
Manager(s): DAMMANN, MIKE
To PM: 12/31/03
To QA: 01/06/04
To Client: 01/07/04**Instructions**

DIVISION 20 - CNWRA. 28-day TAT listed on COC (subject to change). Point of Contact is Miriam Juckett (ext. 3266). Analysis for Anions (Cl-, NO3-) and Cations (Ca+, K+, Na+) by ICP. Work is 10 CFR 50, Part 21, Appendix B. CONTAC Charlie Butcher (ext. 5928, pager 271-5172) before starting ANY WORK on this task order. CONTACT PM WITH ANY QUESTIONS.
revision 1: updated task order (dr010504)

Documents Related to this task order: 8031

Test: DIL-DILUTION
Section: METALPREP

Holding: 28 days from CED

Prep, Dilution

Cnt: 20

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
238656		1	Water	SOLA21C	12 Nov 03	10 Dec 03
238657		1	Water	SOLA25CDEC	01 Dec 03	29 Dec 03
238658		1	Water	SOLA25C Dup	05 Dec 03	02 Jan 04
238659		1	Water	SOLA50C	10 Nov 03	08 Dec 03
238660		1	Water	SOLA50CDEC	25 Nov 03	23 Dec 03
238661		1	Water	SOLA70C	30 Oct 03	27 Nov 03
238662		1	Water	SOLA70CDEC	25 Nov 03	23 Dec 03
238663		1	Water	SOLB21C	10 Nov 03	08 Dec 03
238664		1	Water	SOLB25CDEC	01 Dec 03	29 Dec 03
238665		1	Water	SOLB50C	10 Nov 03	08 Dec 03
238666		1	Water	SOLB50CDEC	25 Nov 03	23 Dec 03
238667		1	Water	SOLB70C	30 Oct 03	27 Nov 03
238668		1	Water	SOLB70C Dup	11 Nov 03	09 Dec 03
238669		1	Water	SOLB70CDEC	25 Nov 03	23 Dec 03
238670		1	Water	SOLC25C	19 Nov 03	17 Dec 03
238671		1	Water	SOLC25CDEC	01 Dec 03	29 Dec 03
238672		1	Water	SOLC50C	19 Nov 03	17 Dec 03
238673		1	Water	SOLC50CDEC	25 Nov 03	23 Dec 03
238674		1	Water	SOLC70C	20 Oct 03	17 Nov 03
238675		1	Water	SOLC70CDEC	24 Nov 03	22 Dec 03

Test: IC-SWRI
Section: WETCHEM

Holding: 28 days from CED

Ion Chromatography by SwRI Method

Cnt: 20

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
238656		1	Water	SOLA21C	12 Nov 03	10 Dec 03
238657		1	Water	SOLA25CDEC	01 Dec 03	29 Dec 03
238658		1	Water	SOLA25C Dup	05 Dec 03	02 Jan 04
238659		1	Water	SOLA50C	10 Nov 03	08 Dec 03
238660		1	Water	SOLA50CDEC	25 Nov 03	23 Dec 03
238661		1	Water	SOLA70C	30 Oct 03	27 Nov 03
238662		1	Water	SOLA70CDEC	25 Nov 03	23 Dec 03
238663		1	Water	SOLB21C	10 Nov 03	08 Dec 03
238664		1	Water	SOLB25CDEC	01 Dec 03	29 Dec 03
238665		1	Water	SOLB50C	10 Nov 03	08 Dec 03
238666		1	Water	SOLB50CDEC	25 Nov 03	23 Dec 03
238667		1	Water	SOLB70C	30 Oct 03	27 Nov 03
238668		1	Water	SOLB70C Dup	11 Nov 03	09 Dec 03
238669		1	Water	SOLB70CDEC	25 Nov 03	23 Dec 03

Laboratory Task Order

TO #: 031205-4 Revision: 1

010004

SDG: 238656
 VTSR: 12/05/03
 CASE: DIV. 20 - CNWRA

SRR #'s: 25287
 Client(s): DIV 20

Project(s): 06002.01.071
 Manager(s): DAMMANN, MIKE
 To PM: 12/31/03
 To QA: 01/06/04
 To Client: 01/07/04

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
238670		1	Water	SOLC25C	19 Nov 03	17 Dec 03
238671		1	Water	SOLC25CDEC	01 Dec 03	29 Dec 03
238672		1	Water	SOLC50C	19 Nov 03	17 Dec 03
238673		1	Water	SOLC50CDEC	25 Nov 03	23 Dec 03
238674		1	Water	SOLC70C	20 Oct 03	17 Nov 03
238675		1	Water	SOLC70CDEC	24 Nov 03	22 Dec 03

Test: ICP-SWRI
 Section: METALS

Holding: 180 days from CED

ICP Analysis by SwRI Method

Cnt: 20

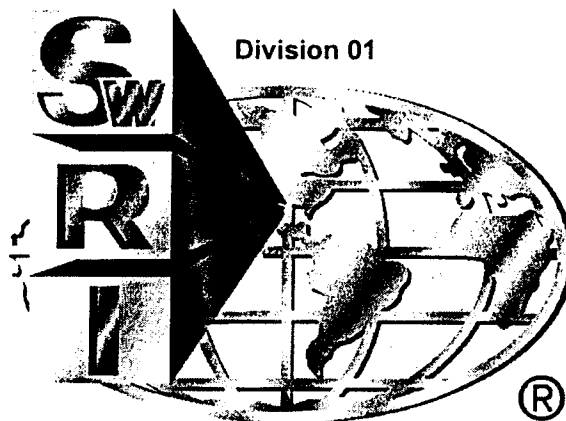
System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
238656		1	Water	SOLA21C	12 Nov 03	10 May 04
238657		1	Water	SOLA25CDEC	01 Dec 03	29 May 04
238658		1	Water	SOLA25C Dup	05 Dec 03	02 Jun 04
238659		1	Water	SOLA50C	10 Nov 03	08 May 04
238660		1	Water	SOLA50CDEC	25 Nov 03	23 May 04
238661		1	Water	SOLA70C	30 Oct 03	27 Apr 04
238662		1	Water	SOLA70CDEC	25 Nov 03	23 May 04
238663		1	Water	SOLB21C	10 Nov 03	08 May 04
238664		1	Water	SOLB25CDEC	01 Dec 03	29 May 04
238665		1	Water	SOLB50C	10 Nov 03	08 May 04
238666		1	Water	SOLB50CDEC	25 Nov 03	23 May 04
238667		1	Water	SOLB70C	30 Oct 03	27 Apr 04
238668		1	Water	SOLB70C Dup	11 Nov 03	09 May 04
238669		1	Water	SOLB70CDEC	25 Nov 03	23 May 04
238670		1	Water	SOLC25C	19 Nov 03	17 May 04
238671		1	Water	SOLC25CDEC	01 Dec 03	29 May 04
238672		1	Water	SOLC50C	19 Nov 03	17 May 04
238673		1	Water	SOLC50CDEC	25 Nov 03	23 May 04
238674		1	Water	SOLC70C	20 Oct 03	17 Apr 04
238675		1	Water	SOLC70CDEC	24 Nov 03	22 May 04

010005

01-QPP-015
Division 01
Revision 4
November 2002

Document No. 3

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IF STAMP IS NOT RED, THIS DOCUMENT IS UNCONTROLLED



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**

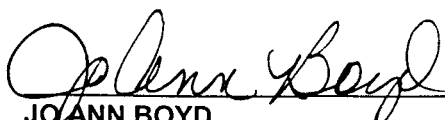
SOUTHWEST RESEARCH INSTITUTE
Chemistry and Chemical Engineering Division
6220 CULEBRA ROAD, SAN ANTONIO, TEXAS 78238

010006

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

Quality Assurance Manager

(210) 522-2169

10/30/02

DATE



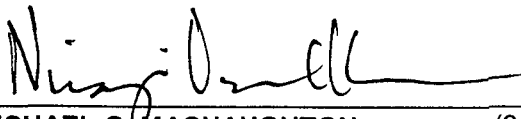
REZA KARIMI

Director, Department of Analytical and Environmental Chemistry

(210) 522-2412

10/30/02

DATE



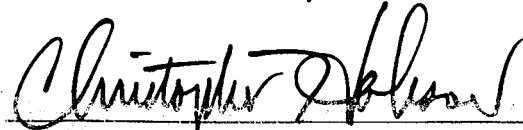
MICHAEL G. MACNAUGHTON

Vice President, Chemistry and Chemical Engineering Division

(210) 522-5162

10/30/02

DATE



CHRISTOPHER HOBSON

Quality Assurance Engineer

(210) 522-5838

10/30/02

DATE

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

1.0 INTRODUCTION

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

2.0 SCOPE

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

3.0 REFERENCES

- 3.1 *SwRI Quality System Manual – 2000*
- 3.2 *10 CFR 50, Appendix B, ASME NQA-1*
- 3.3 *SwRI Program Quality Plan (PQP-Nuclear), Nuclear Services*
- 3.4 *01-QAP-004, Quality Assurance Plan for Analytical and Environmental Services*

4.0 APPLICABLE SECTIONS OF SwRI PROGRAM QUALITY PLAN (PQP-NUCLEAR)**4.1 Indoctrination and Training**

- 4.1.1 Personnel performing duties affecting quality shall receive quality training to the *SwRI Program Quality Plan (PQP-Nuclear)*, Nuclear Services prior to performing any work on projects for nuclear utilities. Institute Quality Systems (IQS) personnel shall perform this training and documentation shall be evident in the personnel training files maintained in Division Quality Assurance.
- 4.1.2 Indoctrination and training of personnel shall be conducted in accordance with **SOP-01-18.1**, *Qualification and Training*.

4.2 Qualification of Personnel

- 4.2.1 Testing personnel shall be designated as qualified to perform applicable project activities as specified in **SOP-01-18.1**, *Qualification and Training*.
- 4.2.2 During the performance of each testing process, testing personnel shall have access to the necessary documented procedures, i.e., QPP, QAP, Work Order, Division Quality System Standard Operating Procedures (SOPs), and applicable test/analytical procedures (TAPs) available for ready reference.
- 4.2.3 Any person who has not performed testing activities associated with any particular method being used for nuclear utilities projects for a period of one year shall be reevaluated prior to the conduct of the test.
- 4.2.4 Quality Assurance personnel witnessing the testing process for nuclear utilities shall have documented evidence of qualifications maintained by Institute Quality Systems.

4.3 Design Control

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

4.4 Right of Access

- 4.4.1 Procurement documents shall provide for access to the suppliers' facilities and records for surveillance, inspection, or audit by SwRI and clients.
- 4.4.2 Where appropriate, quality clause **Q32** shall be noted on the procurement documents to indicate that right of access for inspection and surveillance of activities associated with the order shall be afforded to SwRI and clients.

4.5 Control of Supplier-Generated Documents

- 4.5.1 Client documents shall be controlled in accordance with procedures under **SOP-01-5.0**, *Document and Data Control*, depending on the type of document supplied. These procedures provide the requirements for the preparation, review, approval, issue, distribution, and revision of documents controlled by the Chemistry and Chemical Engineering Division.
- 4.5.2 Documents may be controlled as Plans or Work Instructions and shall be accessible through the Division Intranet link, **Contract Requirements** as PDF files.
- 4.5.3 Nationally recognized test methods shall be of the most current issue or as specified in the purchase order. Work orders shall identify the applicable test methods to be used on the nuclear project.

4.6 Acceptance of Services Only

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

4.7 Commercial Grade Items

- 4.7.1 Where an item is to be incorporated into a test or deliverable to a client, and that item is not subject to design or specification requirements that are unique to nuclear facilities, used in applications other than 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 to 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 be 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

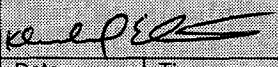
Revision 4

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
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 031205-4
SRR: 25287
SDG: 238656
CASE: CNWRA
VTSR: December 05, 2003
PROJECT#: 06002.01.071**

Chain of Custody/Login Paperwork

Shipper Name/ Address		SAMPLE LIST/CHAIN OF CUSTODY												Requested Turnaround:			
Client		Southwest Research Institute Chemistry and Chemical Engineering Division 6220 Culebra Road San Antonio, Texas 78238-5166												☐ 2 Weeks ☐ 3 Weeks ☒ Other: <u>4 weeks</u>			
		Client Purchase Order/Other ID						Site/Zone ID						SwRI Contact <u>Mike Dammann</u>			
		Analyses Requested												REMARKS			
Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers	Anions CO_3^{2-} NO_3^- by IC	Cations Ca^{2+} , K^+ , Na^+ by ICP									REMARKS	
SOLA21C	11/12/03		W		1	✓	✓								Intact	Preservation a = HCl to pH <2 b = HNO ₃ to pH <2 c = H ₂ SO ₄ to pH <2 d = NaOH to pH >12 e = Cool (4°C ± 2°C) f = Other (specify) none	
SOLB21C	11/10/03															Nuclear Safety	
SOLC25C	11/19/03															Related - use	
SOLA50C	11/10/03															appropriate QA	
SOLB50C	11/10/03															procedures	
SOLC50C	11/19/03																
SOLA70C	10/30/03															POC Miriam	
SOLB70C	10/30/03															Juckett x3266	
SOLC70C	11/20/03															fax 5184	
SOLB70CDUP	11/11/03																
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		Relinquished by (Print/Signature) <u>Miriam Juckett</u> / Miriam Juckett		Date 12/5/03		Time 0950		SwRI Project#: 20.06002.01.071							
				Received by (Print/Signature)		Date		Time		Received by SwRI Lab: (Signature)							
				Relinquished by (Print/Signature)		Date		Time									
				Received by (Print/Signature)		Date		Time		Date 12/5/03		Time 0950					
				Relinquished by (Print/Signature)		Date		Time		Samples Disposed: Date		Time					
Temp: <u>22°C</u>		Therm #: <u>025</u>															
Comments:																	

Shipper Name/ Address	MIRIAM JUCKETT CNLURA - DIV 20/Building 57						SAMPLE LIST/CHAIN OF CUSTODY Southwest Research Institute Chemistry and Chemical Engineering Division 6220 Culebra Road San Antonio, Texas 78238-5166										Requested Turnaround: ☐ 2 Weeks ☐ 3 Weeks ☒ Other: <u>4 weeks</u>	
	Client							Client Purchase Order/Other ID					Site/Zone ID					SwRI Contact <u>Mike Dammann</u>
Analyses Requested										REMARKS								
Sample ID	Sample Collection Date (mm/dd/yy)	Sample Collection Time	Matrix Type	Sample Type	# of Containers	Anions CO_3^{2-} and NO_3^- by IC	Cations Na^+ , K^+ and Ca^{2+} by ICP											
✓ SOLA70CDEC	11/25/03	✓	W		1	✓	✓											intact
✓ SOLB70CDEC	11/25/03	✓																Nuclear Safety Related-use appropriate QA procedures POC Miriam Juckett x3266 fax 5784
✓ SOLC70CDEC	11/24/03	✓																
✓ SOLA50CDEC	11/25/03	✓																
✓ SOLB50CDEC	11/25/03	✓																
✓ SOLC50CDEC	11/25/03	✓																
✓ SOLA25CDEC	12/1/03	✓																
✓ SOLB25CDEC	12/1/03	✓																
✓ SOLC25CDEC	12/1/03	✓																
✓ SOLA25CDUP	12/5/03	✓																
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		Relinquished by (Print/Signature) <u>Miriam Juckett / miriam juckett</u>		Date 12/5/03		Time 0950		SwRI Project#: 20.06 002.01.071								
				Received by (Print/Signature) <u>[Signature]</u>		Date 12/5/03		Time 0950		Received by SwRI Lab: (Signature) <u>[Signature]</u>								
				Relinquished by (Print/Signature)		Date		Time		Date 12/5/03								
				Received by (Print/Signature)		Date		Time		Time 0950								
Temp: <u>22°C</u>		Therm #: <u>026</u>		Relinquished by (Print/Signature)		Date		Time		Samples Disposed: Date								
Comments:				Relinquished by (Print/Signature)		Date		Time		Time 0950								
				Relinquished by (Print/Signature)		Date		Time		Samples Disposed by:								



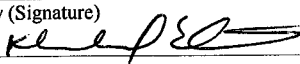
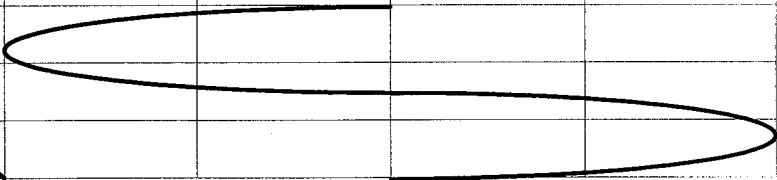
Southwest Research Institute
LOG-IN CHECKLIST
 Sample Receipt Report No.: **25285**

010016

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 1/2 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: <i>[Signature]</i>	Date: 12/05/03	Time: 11:42 AM	

SAMPLE LOG-IN SHEET

010017

Lab Name Southwest Research Institute			Page 1 of 1	
Received By (Print Name) KHALED EDRISI			Log-in Date 12/05/2003	
Received By (Signature) 				
Case Number CNWRA		Sample Delivery Group No.		SAS Number N/A
Remarks: 06002.01.071		Remarks: Condition of Sample Shipment, etc		
		EPA Sample #	Sample Tag #	Assigned Lab #
1. Custody Seal(s)	Present Absent Intact/Broken	SOLA21C	None	238656
2. Custody Seal Nos.	N/A	SOLA25CDEC	None	238657
		SOLA25C Dup	None	238658
3. Chain-of Custody Records	Present Absent*	SOLA50C	None	238659
4. Traffic Reports or Packing Lists	Present Absent	SOLA50CDEC	None	238660
5. Airbill	Airbill/Sticker Present Absent*	SOLA70C	None	238661
6. Airbill No.	HAND DELIVERED	SOLA70CDEC	None	238662
		SOLB21C	None	238663
7. Sample Tags	Present Absent	SOLB25CDEC	None	238664
Sample Tag Numbers	Listed Not listed on Chain of Custody	SOLB50C	None	238665
		SOLB50CDEC	None	238666
8. Sample Condition	Intact Broken*/ Leaking	SOLB70C	None	238667
9. Cooler Temperature	22.0C	SOLB70C Dup	None	238668
10. Does Information on custody records, traffic reports, and sample tags agree?	Yes No*	SOLB70CDEC	None	238669
		SOLC25C	None	238670
11. Date Received at Lab	12/05/2003	SOLC25CDEC	None	238671
12. Time Received	09:50:00	SOLC50C	None	238672
		SOLC50CDEC	None	238673
Sample Transfer		SOLC70C	None	238674
Fraction Inorganics	Fraction	SOLC70CDEC	None	238675
Area # Inorg 3	Area #			
By KHALED EDRISI	By			
On 12/05/2003	On			

* Contact SMO and attach record of resolution

Reviewed By CYNTHIA A. SAUCEDA	Logbook No.	Sample Receipt (25287)
Date 12/08/2003	Logbook Page No.	4911 (SECTION 2 OF 4)

**SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 031205-4
SRR: 25287
SDG: 238656
CASE: CNWRA
VTSR: December 05, 2003
PROJECT#: 06002.01.071**

Copies of Login Book

Sample Login Book

Dec 05, 2003

010018

SwRI Login Area
Division 1

Sample Receipt: 25287		Project: 06002.01.071	Client: DIV 20
VTSR Date: Dec 05, 2003		VTSR Time: 09:50:00	Manager: DAMMANN, MIKE
System ID	Customer Sample ID	Matrix	
238656	SOLA21C	Water	
238657	SOLA25CDEC	Water	
238658	SOLA25C Dup	Water	
238659	SOLA50C	Water	
238660	SOLA50CDEC	Water	
238661	SOLA70C	Water	
238662	SOLA70CDEC	Water	
238663	SOLB21C	Water	
238664	SOLB25CDEC	Water	
238665	SOLB50C	Water	
238666	SOLB50CDEC	Water	
238667	SOLB70C	Water	
238668	SOLB70C Dup	Water	
238669	SOLB70CDEC	Water	
238670	SOLC25C	Water	
238671	SOLC25CDEC	Water	
238672	SOLC50C	Water	
238673	SOLC50CDEC	Water	
238674	SOLC70C	Water	
238675	SOLC70CDEC	Water	

Sample Receipt: 25288		Project: 06053.03.010	Client: Chemtech Consult
VTSR Date: Dec 05, 2003		VTSR Time: 09:50:00	Manager: QUARDERER, SHRADDHA
System ID	Customer Sample ID	Matrix	
238676	LV-GW-CCA2-MNA	Groundwater	
238677	LV-GW-PZ6D-MNA	Groundwater	

Sample Receipt: 25289		Project: 10079.04.006	Client: Banner & Witcoff
VTSR Date: Dec 05, 2003		VTSR Time: 10:50:00	Manager: TAN, CK
System ID	Customer Sample ID	Matrix	
238679	000479.00119 Two-Cycle Engine Oil	Oil	

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 031205-4
SRR: 25287
SDG: 238656
CASE: CNWRA
VTSR: December 05, 2003
PROJECT#: 06002.01.071

RAW DATA

Div 20
to#031205-4
06002.01.071

system id	date	time	elem	results	qual	units	rl	tv	rec	ug/ml	df	mg/l
238656	12/09/03	16:23:02	Ca317	2	U	mg/L	2			0.0730	10	0.73
238656d	12/09/03	16:26:00	Ca317	2	U	mg/L	2			0.0455	10	0.455
238657	12/09/03	16:28:26	Ca317	2	U	mg/L	2			0.0383	10	0.383
238657s	12/09/03	16:31:23	Ca317	199		mg/L	2	200	99.4%	19.8774	10	198.774
238658	12/09/03	16:34:18	Ca317	2	U	mg/L	2			0.0564	10	0.564
238659	12/09/03	16:37:16	Ca317	2	U	mg/L	2			0.0321	10	0.321
238660	12/09/03	16:40:12	Ca317	2	U	mg/L	2			0.0647	10	0.647
238661	12/09/03	16:43:09	Ca317	2	U	mg/L	2			0.0685	10	0.685
238662	12/09/03	16:55:08	Ca317	2	U	mg/L	2			0.0403	10	0.403
238663 df50	12/10/03	14:28:07	Ca317	10824		mg/L	2			216.4810	50	10824.05
238664 df50	12/10/03	14:31:03	Ca317	11674		mg/L	2			233.4864	50	11674.32
238665 df50	12/10/03	14:34:00	Ca317	11244		mg/L	2			224.8894	50	11244.47
238666 df50	12/10/03	14:36:27	Ca317	11268		mg/L	2			225.3653	50	11268.265
238667 df50	12/10/03	14:39:22	Ca317	11035		mg/L	2			220.6905	50	11034.525
238668 df50	12/10/03	14:42:19	Ca317	11259		mg/L	2			225.1837	50	11259.185
238669 df50	12/10/03	14:45:16	Ca317	11120		mg/L	2			222.3914	50	11119.57
238670 df50	12/10/03	14:48:13	Ca317	10650		mg/L	2			213.0092	50	10650.46
238671 df50	12/10/03	14:51:10	Ca317	10612		mg/L	2			212.2337	50	10611.685
238672 df50	12/10/03	15:03:08	Ca317	11017		mg/L	2			220.3470	50	11017.35
238673 df50	12/10/03	15:06:05	Ca317	10983		mg/L	2			219.6575	50	10982.875
238674 df50	12/10/03	15:09:02	Ca317	11069		mg/L	2			221.3784	50	11068.92
238675 df50	12/10/03	15:11:28	Ca317	10909		mg/L	2			218.1896	50	10909.48
lcsW-M09W2	12/09/03	16:20:06	Ca317	201		mg/L	2	200	100.6%	20.1125	10	201.125
pbw-M09W2	12/09/03	16:17:09	Ca317	2	U	mg/L	2			0.0193	10	0.193
238656 df50	12/10/03	13:53:02	K 766	4462		mg/L	2			89.2476	50	4462.38
238656d df50	12/10/03	13:55:29	K 766	4488		mg/L	2			89.7651	50	4488.255
238657 df50	12/10/03	13:58:26	K 766	5766		mg/L	2			115.3201	50	5766.005
238657s df50	12/10/03	14:01:23	K 766	6868		mg/L	2	1000	110.2%	137.3603	50	6868.015
238658 df100	12/10/03	14:04:20	K 766	3716		mg/L	2			37.1600	100	3716
238659 df100	12/10/03	14:07:17	K 766	8102		mg/L	2			81.0219	100	8102.19
238660 df100	12/10/03	14:10:14	K 766	8234		mg/L	2			82.3440	100	8234.4
238661 df200	12/10/03	14:13:11	K 766	9976		mg/L	2			49.8824	200	9976.48
238662 df200	12/10/03	14:25:10	K 766	9275		mg/L	2			46.3764	200	9275.28
238663	12/18/03		K 766	2	U	mg/L	2			0.0685	10	0.685
238664	12/18/03		K 766	2	U	mg/L	2			0.0821	10	0.821
238665	12/18/03		K 766	2	U	mg/L	2			0.0739	10	0.739
238666	12/18/03		K 766	2	U	mg/L	2			0.1692	10	1.692
238667	12/18/03		K 766	2	U	mg/L	2			0.0877	10	0.877

Range
12/19/03



5 mm-04

12/31/03

010019

Div 20
to#031205-4
06002.01.071

system id	date	time	elem	results	qual	units	rl	tv	rec	ug/ml	df	mg/l
238668	12/18/03		K 766	2	U	mg/L	2			0.1192	10	1.192
238669	12/18/03		K 766	2	U	mg/L	2			0.1509	10	1.509
238670 df50	12/10/03	14:48:13	K 766	1061		mg/L	2			21.2258	50	1061.29
238671 df50	12/10/03	14:51:10	K 766	1469		mg/L	2			29.3755	50	1468.775
238672 df50	12/10/03	15:03:08	K 766	1470		mg/L	2			29.3988	50	1469.94
238673 df50	12/10/03	15:06:05	K 766	1965		mg/L	2			39.3044	50	1965.22
238674 df50	12/10/03	15:09:02	K 766	1847		mg/L	2			36.9321	50	1846.605
238675 df50	12/10/03	15:11:28	K 766	2465		mg/L	2			49.3050	50	2465.25
lcsW-M09W2	12/09/03	16:20:06	K 766	197		mg/L	2	200	98.7%	19.7323	10	197.323
pbw-M09W2	12/09/03	16:17:09	K 766	2	U	mg/L	2			0.0195	10	0.195
238656 df50	12/10/03	13:53:02	Na589	7488		mg/L	2			149.7542	50	7487.71
238656d df50	12/10/03	13:55:29	Na589	7534		mg/L	2			150.6749	50	7533.745
238657 df50	12/10/03	13:58:26	Na589	7394		mg/L	2			147.8791	50	7393.955
238657s df50	12/10/03	14:01:23	Na589	8482		mg/L	2	1000	108.8%	169.6343	50	8481.715
238658 df100	12/10/03	14:04:20	Na589	7135		mg/L	2			71.3530	100	7135.3
238659 df100	12/10/03	14:07:17	Na589	6651		mg/L	2			66.5122	100	6651.22
238660 df100	12/10/03	14:10:14	Na589	6604		mg/L	2			66.0363	100	6603.63
238661 df200	12/10/03	14:13:11	Na589	6074		mg/L	2			30.3705	200	6074.1
238662 df200	12/10/03	14:25:10	Na589	6210		mg/L	2			31.0475	200	6209.5
238663 df50	12/10/03	14:28:07	Na589	82.8		mg/L	2			1.6559	50	82.795
238664 df50	12/10/03	14:31:03	Na589	152		mg/L	2			3.0395	50	151.975
238665 df50	12/10/03	14:34:00	Na589	142		mg/L	2			2.8324	50	141.62
238666 df50	12/10/03	14:36:27	Na589	181		mg/L	2			3.6136	50	180.68
238667 df50	12/10/03	14:39:22	Na589	230		mg/L	2			4.5932	50	229.66
238668 df50	12/10/03	14:42:19	Na589	199		mg/L	2			3.9772	50	198.86
238669 df50	12/10/03	14:45:16	Na589	237		mg/L	2			4.7460	50	237.3
238670	12/09/03	17:18:13	Na589	2	U	mg/L	2			0.1604	10	1.604
238671	12/09/03	17:21:10	Na589	2	U	mg/L	2			0.1694	10	1.694
238672	12/09/03	17:33:08	Na589	2	U	mg/L	2			0.1508	10	1.508
238673	12/09/03	17:36:05	Na589	2	U	mg/L	2			0.1345	10	1.345
238674	12/09/03	17:39:02	Na589	2	U	mg/L	2			0.1490	10	1.49
238675	12/09/03	17:41:29	Na589	2	U	mg/L	2			0.1521	10	1.521
lcsW-M09W2	12/09/03	16:20:06	Na589	198		mg/L	2	200	99.2%	19.8312	10	198.312
pbw-M09W2	12/09/03	16:17:09	Na589	2	U	mg/L	2			0.0057	10	0.057

010020

TRACE METALS PREPARATORY LABORATORY DIGESTION LOG

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

BOOK / PAGE: 55 149

CLIENT(S): Div 20

TASK ORDER(S): 031265-4 SDG(S): 238656 **010021**

PROJECT NO(S): 06002.01-071

METHOD: 3005A 3050B 3050B-7.5 3010A 3020A 7760A 7740A HClO₄ H₂SO₄ Sb

Microwave Fusion Teflon Rock OTHER 10 dilutions

MATRIX: Water Soil Biota Solid Liquid TCLP Ext OTHER

INSTRUMENT: GFAA ICP ICP-MS IC FLAA HYDRIDE OTHER

ACID INORG #: HNO₃# ** HCl# ** H₂SO₄# HClO₄# HF#

INTERNAL STD: Sc @ 10 PPM Be @ 10 PPM SOURCE: 10 INORG# 4331 EXP: 12/04 AMT: 50uL

Oven/Hotplate ID: Temperature (°C):

SAMPLE IDENTIFICATION	pH	WT (g)	I.V. (mL)	F.V. (mL)	
PBW-m09w2			5	5	
LCSW-m09w2 *			5		
238656			500uL		
8656d					
8657					
8657⑤ *					
8658					
8659					
8660					
8661					
8662					
8663					
8664					
8665					
8666					
8667					
8668					
8669					
8670					
8671					
8672					
8673					
8674					
✓ 8675			↓	↓	
* Spike 50uL Spike 1	Spec# 4306	Exp. 10/04			
↓ 20uL I-CAL	Spec# 4245	Exp. 9/04			
** -RLB-02-034-01	1% HNO ₃ / 5% HCL	Exp. 3/04			
PBW and LCSW are prepared as 5mLs - **					LOCATION:
10 dilutions are prepared as 500uL sample : 4.5 mLs - **					N/A

PREPARED BY: John J. Willes

DATE: 12-9-03

REVIEWED BY: [Signature]

DATE: 12-9-03

DISPOSAL INT/DATE/LOC:

Trace Metals Reagent Logbook

010022

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS 78228

BOOK / PAGE: 02 034

Reagent I.D.:	Preparation Description:	Prep Date:	Exp Date:	Initials:
RLB-02-034-01	170 HNO ₃ / 580 HCL	12-8-03	3-8-04	jeu
↓	to a 250ml Nalgene bottle add 100mls li water, add 2.5mls HNO ₃ inorg # 4300, add 12.5mls HCL inorg # 4336, F.V. to 250mls with li water	↓	↓	↓
RLB-02-034-02	Dissolve 9.5 G of L-Ascorbic Acid Inorg # 4272 and 18.75 G of KI Inorg # 3758 in 125 mL reagent water containing 18.75 ml of HCL Inorg # 4337. Make fresh as needed. Adjust ratio of reagents if larger volume is required.	12-4-03	12-4-03	BV
		↓	↓	↓
RLB-02-034-03	Reductant: 0.5% Na BH ₄ 0.05% NaOH Dissolve 5.0 G of NaBH ₄ Inorg # 3861 and 0.5 G of NaOH IO # 2449 in 1 L of reagent water.	12-4-03	12-4-03	BV
		↓	↓	↓
RLB-02-034-04	Dissolve 9.5 G of L-Ascorbic Acid Inorg # 4272 and 18.75 G of KI Inorg # 3758 in 125 mL reagent water containing 18.75 ml of HCL Inorg # 4337. Make fresh as needed. Adjust ratio of reagents if larger volume is required.	12-11-03	12-12-03	BV
		↓	↓	↓
RLB-02-034-05	Reductant: 0.5% Na BH ₄ 0.05% NaOH Dissolve 5.0 G of NaBH ₄ Inorg # 3861 and 0.5 G of NaOH IO # 2449 in 1 L of reagent water.	12-11-03	12-12-03	BV
		↓	↓	↓
RLB-02-034-06	Reductant: 0.5% Na BH ₄ 0.05% NaOH Dissolve 5.0 G of NaBH ₄ Inorg # 3861 and 0.5 G of NaOH IO # 2449 in 1 L of reagent water.	12-12-03	12-13-03	BV
		↓	↓	↓
RLB-02-034-07	170 HNO ₃ / 580 HCL	12-23-03	3-23-04	jeu
↓	to a 250ml Nalgene bottle add 100mls li water, add 2.5mls HNO ₃ inorg # 4343, add 12.5ml HCL inorg # 4337, F.V. to 250mls with li water	↓	↓	↓

SOUTHWEST RESEARCH INSTITUTE

6220 Culebra Rd
San Antonio, Texas 78228

010023

SPECTRO ICP DAILY LOG

ANALYST SalDATE 12-9-03POWER: 1200

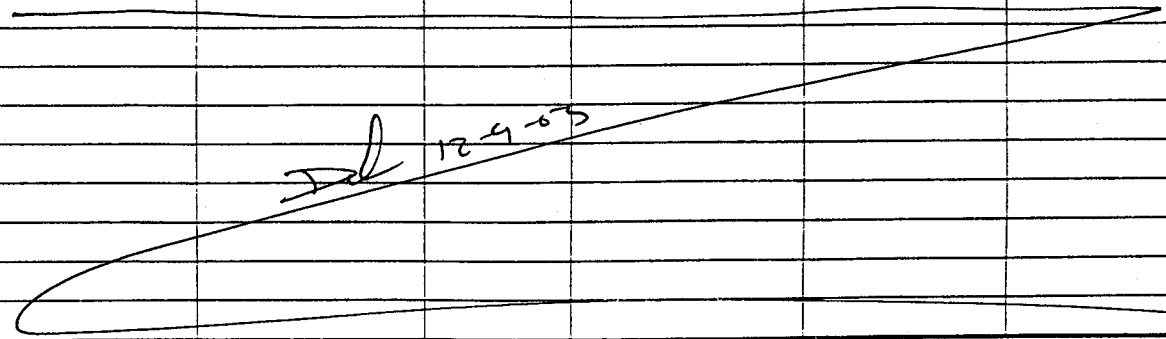
FLOWS:

Aux 40
Coolant 61
Mass Flow Controller 1053

CURRENT	PROPOSED	
4087	5037	Na
4863	4760	Fe
4992	4922	Sr

QC PREP DATE:	
CCV/ICV	03425
CRI	03601
ICSA	03424
ICSAB	03606

CLP STD1 SC	03405
CLP STD2 SC	
CLP STD3 SC	
CLP STD4 SC	
CLP STD5 SC	
BLK SC	03421

FILE	CLIENT	TO#	PROJECT NO.	METHOD	PREP PAGE
031209	INTEL	031124-3	06355.19.006	Ca Mg Na	55 146
031209A	Div 20	031205-4	06002.01.171	Ca K Na	55 149
					

COMMENTS: _____

MAINTENANCE:

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

REVIEWED BY:

CardunaDATE: 12/31/03

SOUTHWEST RESEARCH INSTITUTE

6220 Culebra Rd
San Antonio, Texas 78228

010024

SPECTRO ICP DAILY LOG

ANALYST DLDATE 12-10-03POWER: 1200

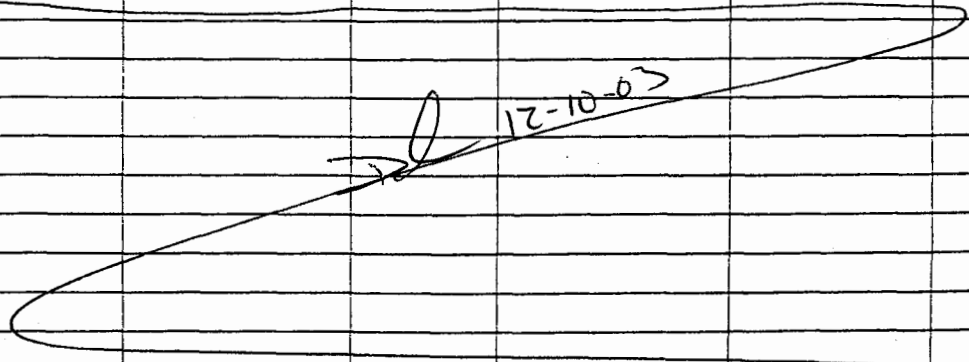
FLOWS:

Aux 40
Coolant 61
Mass Flow Controller 1054

CURRENT	PROPOSED	
5040	5073	Na
4759	4786	Fe
4971	4968	Sr

QC PREP DATE:	
CCV/ICV	03125
CRI	
ICSA	
ICSAB	

CLP STD1 SC	03105
CLP STD2 SC	
CLP STD3 SC	
CLP STD4 SC	
CLP STD5 SC	
BLK SC	03121

FILE	CLIENT	TO#	PROJECT NO.	METHOD	PREP PAGE
031210	DIV 20	0312054	06007.01.031	Ca, V, Na	55149
					

COMMENTS: _____

MAINTENANCE:

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

REVIEWED BY:

CardinaDATE: 12/31/03

18 092

SOUTHWEST RESEARCH INSTITUTE

6220 Culebra Rd

San Antonio, Texas 78228

010025

SPECTRO ICP DAILY LOG

ANALYST J. B. /

DATE 12-18-03

POWER: 1200

FLAWS:

Aux 40

Coolant 60

Mass Flow Controller 1054

CURRENT	PROPOSED	
5073	5103	Na
4786	4799	Fe
4968	5007	Sr

Na

Fe

Sr

QC PREP DATE:

CCV/ICV | 03m18 ✓

CRI

ICSA

ICSAB

CLP STD1 SC	03205
CLP STD2 SC	
CLP STD3 SC	
CLP STD4 SC	
CLP STD5 SC	
BLK SC	03m64

CLP STD1 SC

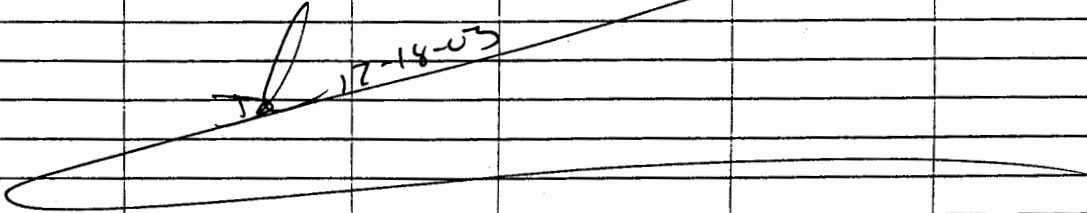
CLP STD2 SC

CLP STD3 SC

CLP STD4 SC

CLP STD5 SC

BLK SC

FILE	CLIENT	TO#	PROJECT NO.	METHOD	PREP PAGE
031218	Div 60	031205-4	06002.01.071	LNA	NA
					

COMMENTS: _____

MAINTENANCE:

OTHER:

Cleaned Torch: YES

Changed Pump Tubing: _____ YES

Cleaned Optics: YES

Polished Optics: ☒ YES

REVIEWED BY:

DATE: 12/31/03

ICP Calibration Blank/ICB/CCB Solution

ID: BLK- 03221

Date Prepared: 11-21-03

Prepared By: DL

Make up as needed in 1000ml volumetric flask.

Added ☒ 10 ml HNO₃ INORG #: 4299

010026

Added ☒ 50 ml HCL INORG #: 4289

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

ICP Calibration Blank/ICB/CCB Solution

ID: BLK-03M04

Date Prepared: 12/4/03

Prepared By: T.OB

Make up as needed in 1000ml volumetric flask.

Added ☒ 10 ml HNO₃ INORG #: 4299

Added ☒ 50 ml HCL INORG #: 4335

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

ICP Calibration Blank/ICB/CCB Solution

ID: BLK-03M31

Date Prepared: 12/31/03

Prepared By: T.OB

Make up as needed in 1000ml volumetric flask.

Added ☒ 10 ml HNO₃ INORG #: 4347

Added ☒ 50 ml HCL INORG #: 4339

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

ICP Calibration Blank/ICB/CCB Solution

ID: BLK-

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

CCV-03425

010027

Date Prepared: 11-25-03

Prepared By: DL

HNO3 INORG #: 4299

HCl INORG #: 4289

Make up as needed in 1000ml volumetric flask in 1% HNO3 AND 5% HCl.

Element	Std Conc (ppm)	Amt added	Check	Source	Inorg #	Stock Conc (ppm)	Exp Date
Sc	10	1ml	✓	INORGVENT	4262	10000	10-1-04
B	5	5ml	✓	SPEX	4139	1000	6-30-04
Li	5	5ml	✓	SPEX	4065	1000	5-15-04
Mo	5	5ml	✓	SPEX	4066	1000	5-15-04
P	5	5ml	✓	SPEX	4307	1000	10-30-04
Si	5	5ml	✓	SPEX	4232	1000	8-30-04
Ti	5	5ml	✓	SPEX	4234	1000	8-30-04
Sr	5	5ml	✓	SPEX	4308	1000	10-30-04
Sn	5	5ml	✓	SPEX	4141	1000	6-30-04
Bi	5	5ml	✓	SPEX	4138	1000	6-30-04
La	5	5ml	✓	SPEX	4064	1000	5-15-04
Y	5	5ml	✓	SPEX	4067	1000	5-15-04
Pd	1	1ml	✓	SPEX	3928	1000	1-15-04
S	1	1ml	✓	SPEX	4140	1000	6-30-04
Th	1	1ml	✓	SPEX	4233	1000	8-30-04
U	1	1ml	✓	SPEX	4142	1000	6-30-04
W	1	1ml	✓	SPEX	4212	1000	8-15-04
Zr	5	5ml	✓	SPEX	4213	1000	8-15-04
Na	10	1ml	✓	SPEX	3951	10000	2-15-04
ICV-2A	vary	10ml	✓	SPEX	4328	mix	11-30-04
ICV-2B	vary	1ml	✓	SPEX	4329	mix	11-30-04
ICV-2C	vary	10ml	✓	SPEX	4330	mix	11-30-04

Expiration Date: 1-15-04

ICP ICV/CCV SOLUTION

010028

CCV- 03M18

Date Prepared: 12-18-03

Prepared By: DL

HNO3 INORG #: 4343

HCl INORG #: 4337

Make up as needed in 1000ml volumetric flask in 1% HNO3 AND 5% HCl.

Element	Std Conc (ppm)	Amt added	Check	Source	Inorg #	Stock Conc (ppm)	Exp Date
Sc	10	1ml	✓	INORGVENT	4262	10000	10-1-04
B	5	5ml	✓	SPEX	4139	1000	6-30-04
Li	5	5ml	✓	SPEX	4065	1000	5-15-04
Mo	5	5ml	✓	SPEX	4066	1000	5-15-04
P	5	5ml	✓	SPEX	4367	1000	10-30-04
Si	5	5ml	✓	SPEX	4232	1000	8-30-04
Ti	5	5ml	✓	SPEX	4234	1000	8-30-04
Sr	5	5ml	✓	SPEX	4308	1000	10-30-04
Sn	5	5ml	✓	SPEX	4141	1000	6-30-04
Bi	5	5ml	✓	SPEX	4138	1000	6-30-04
La	5	5ml	✓	SPEX	4064	1000	5-15-04
Y	5	5ml	✓	SPEX	4067	1000	5-15-04
Pd	1	1ml	✓	SPEX	3928	1000	7-15-04
S	1	1ml	✓	SPEX	4140	1000	6-30-08
Th	1	1ml	✓	SPEX	4233	1000	8-30-04
U	1	1ml	✓	SPEX	4142	1000	6-30-04
W	1	1ml	✓	SPEX	4212	1000	8-18-04
Zr	5	5ml	✓	SPEX	4213	1000	8-15-04
Na	10	1ml	✓	SPEX	3951	10000	2-15-04
ICV-2A	vary	10ml	✓	SPEX	173445 4234A328	mix	11-30-04
ICV-2B	vary	1ml	✓	SPEX	4329	mix	11-30-04
ICV-2C	vary	10ml	✓	SPEX	4330	mix	11-30-04

Expiration Date: 1-15-04

ICP Calibration Standards

010029

Date Prepared: 11-5-03

Prepared By: *[Signature]*

HNO3 INORG #: 4296

HCl INORG #: 4293

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
11-5-03	STD1- 03205 DH	Al	50	2.50	✓	INORVENT	4220	10000	9-1-04
		Ca	50	2.50	✓	INORVENT	3900	10000	2-1-04
		Fe	50	2.50	3	INORVENT	3963	10000	3-1-04
		K	50	2.50	✓	INORVENT	4320	10000	12-1-04
		Mg	25	1.25	✓	INORVENT	4204	10000	8-1-04
		Na	50	2.50	✓	INORVENT	4205	10000	8-1-04
		Li	10	5.00	✓	INORVENT	4149	1000	7-1-04
		Sc	10	0.500	✓	INORVENT	4262	10000	10-1-04
11-5-03	STD2- 03205	Ba	10	5.00	✓	INORVENT	3971	1000	3-1-04
		Be	5	2.50	✓	INORVENT	4062	1000	6-1-04
		Cr	10	5.00	✓	INORVENT	4314	1000	12-1-04
		Cu	10	5.00	✓	INORVENT	3955	1000	3-1-04
		Ni	10	5.00	✓	INORVENT	3957	1000	3-1-04
		Sc	10	0.500	✓	INORVENT	4262	10000	10-1-04
11-5-03	STD3- 03205	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	4321	1000	12-1-04
		Zn	10	5.00	✓	INORVENT	4319	1000	12-1-04
		Sc	10	0.500	✓	INORVENT	4262	10000	10-1-04
11-5-03	STD4- 03205	Ag	2	1.00	✓	INORVENT	4222	1000	9-1-04
		As	10	5.00	✓	INORVENT	3999	1000	2-1-04
		Pb	10	5.00	✓	INORVENT	4313	1000	11-1-04
		Sb	10	5.00	✓	INORVENT	3953	1000	3-1-04
		Se	10	5.00	✓	INORVENT	4152	1000	7-1-04
		TL	10	5.00	✓	INORVENT	3922	1000	2-1-04
		Sc	10	0.500	✓	INORVENT	4262	10000	10-1-04
	STD5-	B	10	5.00		INORVENT		1000	
		Mo	10	5.00		INORVENT		1000	
		P	10	5.00		INORVENT		1000	
		Si	10	5.00		INORVENT		1000	
		Ti	10	5.00		INORVENT		1000	
		Sr	10	5.00		INORVENT		1000	
		Sn	10	5.00		INORVENT		1000	
		Bi	5	2.50		INORVENT		1000	
11-5-03	STD6- 03205	Sc	10	0.500		INORVENT		10000	
		La	10	5.00	✓	INORVENT	4221	1000	9-1-04
		Na	1	0.05	✓	INORVENT	4205	10000	8-1-04
		Pd	10	5.00	✓	INORVENT	3964	1000	3-1-04
		S	10	5.00	✓	INORVENT	4317	1000	12-1-04
		Th	10	5.00	✓	INORVENT	4283	1000	11-1-04
		U	10	5.00	✓	INORVENT	3974	1000	3-1-04
		W	5	2.50	✓	INORVENT	4203	1000	9-1-04
		Y	10	5.00	✓	INORVENT	4063	1000	6-1-04
		Zr	10	5.00	✓	INORVENT	3958	1000	3-1-04
		SC	10	0.500	✓	INORVENT	4262	10000	10-1-04

Expiration Dates:

STD1: 2-1-04

STD4: 2-1-04

STD2: 3-1-04

STD5:

STD3: 2-1-04

STD6: 3-1-04

ANALYSIS

PROJ. NO.	PROJECT	TO#	DATE	MATRIX	LOGBK PG
-----------	---------	-----	------	--------	----------

0600Z.01.071 Div 20 031205-4 129.03 Watch SS 149

[illegible]

INSTRUMENT: Spectro FILENAME: 031209A

INSTRUMENT DL: _____

BACKGROUND CORRECTED INTENSITIES

Identity 1 : BLK_SC Identity 2 : Type : STD

Weight : 1.0000 Volume : 1.00 Printed : 4:04:38 PM December 9, 2003

	Ca317	K_766	Na589	Sc361
# 1	149.0	3.5	17.5	5059.0
# 2	151.0	14.5	20.5	5011.0
Mean	150.0	9.0	19.0	5035.0
SD	1.4	7.8	2.1	33.9
%RSD	0.9	86.4	11.2	0.7

INTENSITIES

Identity 1 : BLK_SC Identity 2 : Type : STD

Weight : 1.0000 Volume : 1.00 Printed : 4:04:38 PM December 9, 2003

	Ca317	K_766	Na589	Sc361
# 1	0.0	0.0	0.0	5059.0
# 2	0.0	0.0	0.0	5011.0
Mean	0.0	0.0	0.0	5035.0
SD	0.0	0.0	0.0	33.9
%RSD	1.6	86.8	11.8	0.7

BACKGROUND CORRECTED INTENSITIES

Identity 1 : CLP_STD1_SC Identity 2 : Type : STD

Weight : 1.0000 Volume : 1.00 Printed : 4:07:30 PM December 9, 2003

	Ca317	K_766	Na589
# 1	12762.0	4974.5	25522.5
# 2	12744.0	4931.5	25334.5
Mean	12753.0	4953.0	25428.5
SD	12.7	30.4	132.9
%RSD	0.1	0.6	0.5

INTENSITIES

Identity 1 : CLP_STD1_SC Identity 2 : Type : STD

Weight : 1.0000 Volume : 1.00 Printed : 4:07:30 PM December 9, 2003

	Ca317	K_766	Na589
# 1	2.6	1.0	5.2
# 2	2.6	1.0	5.2
Mean	2.6	1.0	5.2
SD	0.0	0.0	0.0
%RSD	0.6	0.1	0.1

BACKGROUND CORRECTED INTENSITIES

Identity 1 : CLP_CCV_SC Identity 2 : Type : CV

Weight : 1.0000 Volume : 1.00 Printed : 4:10:24 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	5226.0	1955.0	15020.5	4902.0	4902.0
# 2	5200.0	1969.0	14982.5	4877.0	4877.0
Mean	5213.0	1962.0	15001.5	4889.5	4889.5
SD	18.4	9.9	26.9	17.7	17.7
%RSD	0.4	0.5	0.2	0.4	0.4

55mc4
12/18/03
DL

DL 12-9-03

APPARENT CONCENTRATIONS

Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
 Weight : 1.0000 Volume : 1.00 Printed : 4:10:24 PM December 9, 2003

010031

EVOLUTION by Micro-Active Australia Pty Ltd 4:17:36 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1	20.1080	19.6437	29.4626	4902.000	97.3553
# 2	20.1105	19.8868	29.5388	4877.000	96.8582
Mean	20.1092	19.7653	29.5007	4889.500	97.1068
SD	0.0018	0.1720	0.0539	17.678	0.3515
%RSD	0.0091	0.8700	0.1827	0.362	0.3620

Checking calibration verification ...

Identity 1 : CLP_CCV_SC Identity 2 :

Report name	Low limit	Value	High limit
Ca317	18.000	20.109	22.000
K_766	18.000	19.765	22.000
Na589	27.000	29.501	33.000

BACKGROUND CORRECTED INTENSITIES

Identity 1 : Calibration blank Identity 2 : Type : CB

Weight : 1.0000 Volume : 1.00 Printed : 4:14:24 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	151.0	12.5	39.5	5047.0	5047.0
# 2	153.0	16.5	41.5	4990.0	4990.0
Mean	152.0	14.5	40.5	5018.5	5018.5
SD	1.4	2.8	1.4	40.3	40.3
%RSD	0.9	19.5	3.5	0.8	0.8

APPARENT CONCENTRATIONS

Identity 1 : Calibration blank Identity 2 : Type : CB

Weight : 1.0000 Volume : 1.00 Printed : 4:14:24 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1	0.0025	0.0341	0.0390	5047.000 H	100.2386
# 2	0.0169	0.0752	0.0437	4990.000	99.1052
Mean	0.0097	0.0546	0.0414	5018.500	99.6719
SD	0.0102	0.0290	0.0033	40.305	0.8015
%RSD	105.3121	53.1458	8.0649	0.803	0.8041

Checking calibration blank ...

Identity 1 : Calibration blank Identity 2 :

Report name	CRDL	Value
Ca317	0.100	0.010
K_766	0.100	0.055
Na589	0.050	0.041
Sc361	0.000	99.672

BACKGROUND CORRECTED INTENSITIES

Identity 1 : pbw-M09W2 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 4:17:18 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	149.0	13.0	23.0	4823.5	4823.5
# 2	147.0	8.0	19.0	4790.5	4790.5
Mean	148.0	10.5	21.0	4807.0	4807.0
SD	1.4	3.5	2.8	23.3	23.3
%RSD	0.9	33.3	13.3	0.5	0.5

APPARENT CONCENTRATIONS

Identity 1 : pbw-M09W2 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:17:18 PM December 9, 2003

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	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1	0.0213	0.0449	0.0096	4823.500	95.7944
# 2	0.0174 L	-0.0058	0.0019	4790.500	95.1382
Mean	0.0193	0.0195	0.0057	4807.000	95.4663
SD	0.0028	0.0359	0.0055	23.335	0.4640
%RSD	14.5235	183.4882	95.5413	0.485	0.4860

BACKGROUND CORRECTED INTENSITIES

Identity 1 : lcsW-M09W2 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:20:12 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	5081.0	1909.5	9831.0	4765.0	4765.0
# 2	5079.0	1907.5	9832.0	4763.0	4763.0
Mean	5080.0	1908.5	9831.5	4764.0	4764.0
SD	1.4	1.4	0.7	1.4	1.4
%RSD	0.0	0.1	0.0	0.0	0.0

APPARENT CONCENTRATIONS

Identity 1 : lcsW-M09W2 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:20:12 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1	20.1122	19.7385	19.8260	4765.000	94.6311
# 2	20.1128	19.7261	19.8364	4763.000	94.5914
Mean	20.1125	19.7323	19.8312	4764.000	94.6113
SD	0.0004	0.0088	0.0073	1.414	0.0281
%RSD	0.0019	0.0446	0.0369	0.030	0.0297

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238656 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:23:04 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	162.0	47078.0	389898.5	4821.0	4821.0
# 2	160.0	46699.0	385859.5	4776.0	4776.0
Mean	161.0	46888.5	387879.0	4798.5	4798.5
SD	1.4	268.0	2856.0	31.8	31.8
%RSD	0.9	0.6	0.7	0.7	0.7

APPARENT CONCENTRATIONS

Identity 1 : 238656 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:23:04 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1	0.0740 H	483.0603 H	778.5557	4821.000	95.7447
# 2	0.0720 H	483.6864 H	777.7502	4776.000	94.8499
Mean	0.0730 H	483.3734 H	778.1529	4798.500	95.2973
SD	0.0014	0.4427	0.5696	31.820	0.6327
%RSD	1.9208	0.0916	0.0732	0.663	0.6640

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238656d Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:25:58 PM December 9, 2003

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	Ca317	K_766	Na589	Sc	Sc361
# 1	153.0	47144.0	389732.0	4805.0	4805.0
# 2	154.0	46759.0	387314.0	4748.0	4748.0
Mean	153.5	46951.5	388523.0	4776.5	4776.5
SD	0.7	272.2	1709.8	40.3	40.3
%RSD	0.5	0.6	0.4	0.8	0.8

APPARENT CONCENTRATIONS

Identity 1 : 238656d Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:25:58 PM December 9, 2003

	Ca317 ppm	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.0398 H	485.3487 H	780.8147	4805.000	95.4265
# 2	0.0513 H	487.1645 H	785.2861	4748.000	94.2931
Mean	0.0455 H	486.2566 H	783.0504	4776.500	94.8598
SD	0.0081	1.2840	3.1618	40.305	0.8015
%RSD	17.8637	0.2641	0.4038	0.844	0.8449

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238657 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:28:52 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	151.0	59785.5	381267.5	4807.5	4807.5
# 2	155.0	60151.5	384168.5	4825.5	4825.5
Mean	153.0	59968.5	382718.0	4816.5	4816.5
SD	2.8	258.8	2051.3	12.7	12.7
%RSD	1.8	0.4	0.5	0.3	0.3

APPARENT CONCENTRATIONS

Identity 1 : 238657 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:28:52 PM December 9, 2003

	Ca317 ppm	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.0314 H	615.1969 H	763.4584	4807.500	95.4762
# 2	0.0452 H	616.6544 H	766.3980	4825.500	95.8342
Mean	0.0383 H	615.9257 H	764.9282	4816.500	95.6552
SD	0.0098	1.0306	2.0787	12.728	0.2531
%RSD	25.5004	0.1673	0.2717	0.264	0.2646

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238657s Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:31:46 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	5004.0	61498.5	389282.5	4768.0	4768.0
# 2	5013.0	61208.5	386903.5	4734.0	4734.0
Mean	5008.5	61353.5	388093.0	4751.0	4751.0
SD	6.4	205.1	1682.2	24.0	24.0
%RSD	0.1	0.3	0.4	0.5	0.5

APPARENT CONCENTRATIONS

Identity 1 : 238657s Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 4:31:46 PM December 9, 2003

Ca317
ppm

K_766
ppm

Na589
ppm

Sc

Sc361
ppm

010034

# 1	19.7859 H	638.0697 H	785.9666	4768.000	94.6908
# 2	19.9690 H	639.6221 H	786.7738	4734.000	94.0147
Mean	19.8774 H	638.8459 H	786.3702	4751.000	94.3528
SD	0.1295	1.0977	0.5708	24.042	0.4781
%RSD	0.6515	0.1718	0.0726	0.506	0.5067

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238658 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 4:34:36 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	160.0	40336.5	373570.5	4859.5	4859.5
# 2	156.0	39957.5	371259.5	4804.5	4804.5
Mean	158.0	40147.0	372415.0	4832.0	4832.0
SD	2.8	268.0	1634.1	38.9	38.9
%RSD	1.8	0.7	0.4	0.8	0.8

APPARENT CONCENTRATIONS

Identity 1 : 238658 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 4:34:36 PM December 9, 2003

	Ca317 ppm	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.0608 H	410.5945 H	740.0400	4859.500	96.5102
# 2	0.0520 H	411.3929 H	743.8814	4804.500	95.4166
Mean	0.0564 H	410.9937 H	741.9607	4832.000	95.9634
SD	0.0063	0.5646	2.7163	38.891	0.7733
%RSD	11.0872	0.1374	0.3661	0.805	0.8059

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238659 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 4:37:32 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	152.0	86129.5	354936.0	4880.5	4880.5
# 2	154.0	85679.5	353527.0	4850.5	4850.5
Mean	153.0	85904.5	354231.5	4865.5	4865.5
SD	1.4	318.2	996.3	21.2	21.2
%RSD	0.9	0.4	0.3	0.4	0.4

APPARENT CONCENTRATIONS

Identity 1 : 238659 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 4:37:32 PM December 9, 2003

	Ca317 ppm	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.0263 H	873.0591 H	700.0978	4880.500	96.9278
# 2	0.0380 H	873.8693 H	701.6316	4850.500	96.3313
Mean	0.0321 H	873.4642 H	700.8647	4865.500	96.6295
SD	0.0083	0.5729	1.0845	21.213	0.4218
%RSD	25.8412	0.0656	0.1547	0.436	0.4365

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238660 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 4:40:24 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	160.0	87205.5	350670.5	4848.5	4848.5
# 2	160.0	86718.5	348813.5	4811.5	4811.5

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Mean	160.0	86962.0	349742.0	4830.0	4830.0
SD	0.0	344.4	1313.1	26.2	26.2
%RSD	0.0	0.4	0.4	0.5	0.5

APPARENT CONCENTRATIONS

Identity 1 : 238660 Identity 2 : pg55-149 Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 4:40:24 PM December 9, 2003

	Ca317 ppm	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.0623 H	889.8019 H	696.2492	4848.500	96.2915
# 2	0.0672 H	891.6372 H	697.8880	4811.500	95.5558
Mean	0.0647 H	890.7196 H	697.0686	4830.000	95.9236
SD	0.0035	1.2978	1.1588	26.163	0.5202
%RSD	5.3800	0.1457	0.1662	0.542	0.5423

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238661 Identity 2 : pg55-149 Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 4:43:18 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	162.0	105576.5	324195.5	4859.5	4859.5
# 2	162.0	105694.5	325011.5	4864.5	4864.5
Mean	162.0	105635.5	324603.5	4862.0	4862.0
SD	0.0	83.4	577.0	3.5	3.5
%RSD	0.0	0.1	0.2	0.1	0.1

APPARENT CONCENTRATIONS

Identity 1 : 238661 Identity 2 : pg55-149 Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 4:43:18 PM December 9, 2003

	Ca317 ppm	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.0688 H	1074.8304 H	642.2237	4859.500	96.5102
# 2	0.0681 H	1074.9257 H	643.1785	4864.500	96.6097
Mean	0.0685 H	1074.8781 H	642.7011	4862.000	96.5600
SD	0.0005	0.0674	0.6751	3.536	0.0703
%RSD	0.6867	0.0063	0.1050	0.073	0.0728

BACKGROUND CORRECTED INTENSITIES

Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
 Weight : 1.0000 Volume : 1.00 Printed : 4:48:24 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	5312.0	1974.0	14936.0	4971.0	4971.0
# 2	5264.0	1960.0	14954.0	4910.0	4910.0
Mean	5288.0	1967.0	14945.0	4940.5	4940.5
SD	33.9	9.9	12.7	43.1	43.1
%RSD	0.6	0.5	0.1	0.9	0.9

APPARENT CONCENTRATIONS

Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
 Weight : 1.0000 Volume : 1.00 Printed : 4:48:24 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
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	ppm	ppm	ppm	ppm	ppm
# 1	20.1565	19.5589	28.8895	4971.000	98.7274
# 2	20.2244	19.6619	29.2842	4910.000	97.5144

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Mean	20.1905	19.6104	29.0868	4940.500	98.1209
SD	0.0480	0.0728	0.2791	43.134	0.8577
%RSD	0.2378	0.3715	0.9594	0.873	0.8741

Checking calibration verification ...

Identity 1 : CLP_CCV_SC Identity 2 :

Report name	Low limit	Value	High limit
Ca317	18.000	20.190	22.000
K_766	18.000	19.610	22.000
Na589	27.000	29.087	33.000

BACKGROUND CORRECTED INTENSITIES

Identity 1 : Calibration blank Identity 2 : Type : CB

Weight : 1.0000 Volume : 1.00 Printed : 4:52:22 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	148.0	24.5	53.5	5090.0	5090.0
# 2	151.0	16.5	53.5	5056.0	5056.0
Mean	149.5	20.5	53.5	5073.0	5073.0
SD	2.1	5.7	0.0	24.0	24.0
%RSD	1.4	27.6	0.0	0.5	0.5

APPARENT CONCENTRATIONS

Identity 1 : Calibration blank Identity 2 : Type : CB

Weight : 1.0000 Volume : 1.00 Printed : 4:52:22 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 L	-0.0139	0.1497	0.0649	5090.000 H	101.0937
# 2	0.0014	0.0730	0.0655	5056.000 H	100.4176
Mean L	-0.0062	0.1114	0.0652	5073.000 H	100.7556
SD	0.0108	0.0542	0.0005	24.042	0.4781
%RSD	174.1051	48.6891	0.7380	0.474	0.4745

Checking calibration blank ...

Identity 1 : Calibration blank Identity 2 :

Report name	CRDL	Value
Ca317	0.100	-0.006
K_766	0.100	0.111 Contaminated
Na589	0.050	0.065 Contaminated
Sc361	0.000	100.756

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238662 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 4:55:16 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	154.0	99695.0	335917.5	4862.5	4862.5
# 2	155.0	99541.0	333597.5	4833.5	4833.5
Mean	154.5	99618.0	334757.5	4848.0	4848.0
SD	0.7	108.9	1640.5	20.5	20.5
%RSD	0.5	0.1	0.5	0.4	0.4

APPARENT CONCENTRATIONS

Identity 1 : 238662 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 4:55:16 PM December 9, 2003

	Ca317 ppm	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.0365 H 1014.3221	H 665.0355		4862.500	96.5699
# 2	0.0442 H 1018.8320	H 664.4049		4833.500	95.9932

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Mean	0.0403 H 1016.5771	H 664.7202		4848.000	96.2816
SD	0.0054	3.1890	0.4459	20.506	0.4078
%RSD	13.5065	0.3137	0.0671	0.423	0.4235

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238663 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:58:10 PM December 9, 2003

	Ca317 ppm	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	262961.0	78.0	4730.0	4731.5	4731.5
# 2	262487.0	79.0	4721.0	4704.5	4704.5
Mean	262724.0	78.5	4725.5	4718.0	4718.0
SD	335.2	0.7	6.4	19.1	19.1
%RSD	0.1	0.9	0.1	0.4	0.4

APPARENT CONCENTRATIONS

Identity 1 : 238663 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 4:58:10 PM December 9, 2003

	Ca317 ppm	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1 H 1077.8052		0.7272	9.5877	4731.500	93.9650
# 2 H 1082.0392		0.7424	9.6245	4704.500	93.4281
Mean H 1079.9222		0.7348	9.6061	4718.000	93.6966
SD	2.9939	0.0107	0.0260	19.092	0.3796
%RSD	0.2772	1.4625	0.2710	0.405	0.4052

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238664 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:01:04 PM December 9, 2003

	Ca317 ppm	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	280109.0	29.5	8252.5	4743.5	4743.5
# 2	279348.0	41.5	8237.5	4720.5	4720.5
Mean	279728.5	35.5	8245.0	4732.0	4732.0
SD	538.1	8.5	10.6	16.3	16.3
%RSD	0.2	23.9	0.1	0.3	0.3

APPARENT CONCENTRATIONS

Identity 1 : 238664 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:01:04 PM December 9, 2003

	Ca317 ppm	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1 H 1145.2219		0.2193	16.7124	4743.500	94.2036
# 2 H 1147.6766		0.3465	16.7634	4720.500	93.7463
Mean H 1146.4492		0.2829	16.7379	4732.000	93.9749
SD	1.7357	0.0900	0.0361	16.263	0.3234
%RSD	0.1514	31.8126	0.2155	0.344	0.3441

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238665 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:03:58 PM December 9, 2003

	Ca317 ppm	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
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# 1	270682.0	27.0	7769.5	4755.5	4755.5
# 2	269798.0	24.0	7731.5	4713.5	4713.5
Mean	270240.0	25.5	7750.5	4734.5	4734.5

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SD	625.1	2.1	26.9	29.7	29.7
%RSD	0.2	8.3	0.3	0.6	0.6

APPARENT CONCENTRATIONS

Identity 1 : 238665 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 5:03:58 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 H	1103.8663	0.1925	15.6924	4755.500	94.4422
# 2 H	1110.0684	0.1635	15.7549	4713.500	93.6071
Mean H	1106.9673	0.1780	15.7236	4734.500	94.0247
SD	4.3856	0.0205	0.0442	29.698	0.5905
%RSD	0.3962	11.5167	0.2812	0.627	0.6281

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238666 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 5:06:52 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	270627.0	37.5	9715.5	4739.0	4739.0
# 2	268841.0	35.5	9695.5	4712.0	4712.0
Mean	269734.0	36.5	9705.5	4725.5	4725.5
SD	1262.9	1.4	14.1	19.1	19.1
%RSD	0.5	3.9	0.1	0.4	0.4

APPARENT CONCENTRATIONS

Identity 1 : 238666 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 5:06:52 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 H	1107.4865	0.3031	19.7003	4739.000	94.1141
# 2 H	1106.4812	0.2843	19.7726	4712.000	93.5773
Mean H	1106.9838	0.2937	19.7365	4725.500	93.8457
SD	0.7109	0.0133	0.0511	19.092	0.3796
%RSD	0.0642	4.5160	0.2588	0.404	0.4045

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238667 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 5:09:46 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	264489.0	38.5	12315.0	4743.0	4743.0
# 2	261301.0	29.5	12154.0	4682.0	4682.0
Mean	262895.0	34.0	12234.5	4712.5	4712.5
SD	2254.3	6.4	113.8	43.1	43.1
%RSD	0.9	18.7	0.9	0.9	0.9

APPARENT CONCENTRATIONS

Identity 1 : 238667 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 5:09:46 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 H	1108.1415	0.3122	24.0600	4743.000	94.1937

# 2	H 1082.3268	0.2233	24.9547	4682.000	92.9807
Mean	H 1081.8842	0.2682	24.9573	4712.500	93.5872
SD	0.6260	0.0636	0.0038	43.134	0.8577
EVOLUTION by Micro-Active Australia Pty Ltd 5:18:42 PM December 9, 2003					
%RSD	0.0579	23.6920	0.0152	0.915	0.9165

010040

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238668 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:12:38 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	269196.0	43.0	10792.5	4776.0	4776.0
# 2	266818.0	21.0	10708.5	4725.0	4725.0
Mean	268007.0	32.0	10750.5	4750.5	4750.5
SD	1681.5	15.6	59.4	36.1	36.1
%RSD	0.6	48.6	0.6	0.8	0.8

APPARENT CONCENTRATIONS

Identity 1 : 238668 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:12:38 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 H 1093.0885		0.3570	21.7184	4776.000	94.8499
# 2 H 1095.1277		0.1315	21.7820	4725.000	93.8358
Mean H 1094.1081		0.2442	21.7502	4750.500	94.3428
SD	1.4420	0.1595	0.0450	36.062	0.7171
%RSD	0.1318	65.3032	0.2070	0.759	0.7601

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238669 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:15:32 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	264992.0	32.0	12603.5	4710.0	4710.0
# 2	264921.0	37.0	12658.5	4693.0	4693.0
Mean	264956.5	34.5	12631.0	4701.5	4701.5
SD	50.2	3.5	38.9	12.0	12.0
%RSD	0.0	10.2	0.3	0.3	0.3

APPARENT CONCENTRATIONS

Identity 1 : 238669 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:15:32 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 H 1091.0947		0.2477	25.7249	4710.000	93.5375
# 2 H 1094.7557		0.3016	25.9310	4693.000	93.1994
Mean H 1092.9252		0.2747	25.8279	4701.500	93.3685
SD	2.5887	0.0381	0.1458	12.021	0.2390
%RSD	0.2369	13.8837	0.5644	0.256	0.2560

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238670 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:18:26 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	253869.0	11201.0	94.5	4722.0	4722.0
# 2	252594.0	11145.0	97.5	4675.0	4675.0

Mean	253231.5	11173.0	96.0	4698.5	4698.5
SD	901.6	39.6	2.1	33.2	33.2
%RSD	0.4	0.4	2.2	0.7	0.7

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APPARENT CONCENTRATIONS

Identity 1 : 238670 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:18:26 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1	H 1042.6141	H 117.2745	0.1563	4722.000	93.7761
# 2	H 1047.8100	H 117.8617	0.1645	4675.000	92.8415
Mean	H 1045.2120	H 117.5681	0.1604	4698.500	93.3088
SD	3.6740	0.4152	0.0057	33.234	0.6608
%RSD	0.3515	0.3532	3.5775	0.707	0.7082

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238671 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:21:18 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	253820.0	15454.5	99.5	4706.0	4706.0
# 2	253641.0	15467.5	101.5	4700.0	4700.0
Mean	253730.5	15461.0	100.5	4703.0	4703.0
SD	126.6	9.2	1.4	4.2	4.2
%RSD	0.0	0.1	1.4	0.1	0.1

APPARENT CONCENTRATIONS

Identity 1 : 238671 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 5:21:18 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1	H 1045.9589	H 162.3927	0.1672	4706.000	93.4579
# 2	H 1046.5559	H 162.7370	0.1716	4700.000	93.3386
Mean	H 1046.2574	H 162.5649	0.1694	4703.000	93.3983
SD	0.4222	0.2434	0.0031	4.243	0.0844
%RSD	0.0403	0.1497	1.8185	0.090	0.0903

BACKGROUND CORRECTED INTENSITIES

Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 5:26:24 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	5160.0	1967.5	14911.0	4930.0	4930.0
# 2	5156.0	1968.5	14850.0	4905.0	4905.0
Mean	5158.0	1968.0	14880.5	4917.5	4917.5
SD	2.8	0.7	43.1	17.7	17.7
%RSD	0.1	0.0	0.3	0.4	0.4

APPARENT CONCENTRATIONS

Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 5:26:24 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1	19.7307	19.6570	29.0813	4930.000	97.9121
# 2	19.8184	19.7678	29.1099	4905.000	97.4150
Mean	19.7745	19.7124	29.0956	4917.500	97.6635

SD	0.0620	0.0783	0.0203	17.678	0.3515
%RSD	0.3136	0.3972	0.0697	0.359	0.3599

EVOLUTION by Micro-Active Australia Pty Ltd 5:36:10 PM December 9, 2003

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Checking calibration verification ...

Identity 1 : CLP_CCV_SC Identity 2 :

Report name	Low limit	Value	High limit
Ca317	18.000	19.775	22.000
K_766	18.000	19.712	22.000
Na589	27.000	29.096	33.000

BACKGROUND CORRECTED INTENSITIES

Identity 1 : Calibration blank Identity 2 : Type : CB

Weight : 1.0000 Volume : 1.00 Printed : 5:30:22 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	152.0	19.5	37.0	5096.0	5096.0
# 2	150.0	25.5	59.0	5026.0	5026.0
Mean	151.0	22.5	48.0	5061.0	5061.0
SD	1.4	4.2	15.6	49.5	49.5
%RSD	0.9	18.9	32.4	1.0	1.0

APPARENT CONCENTRATIONS

Identity 1 : Calibration blank Identity 2 : Type : CB

Weight : 1.0000 Volume : 1.00 Printed : 5:30:22 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1	0.0007	0.1009	0.0336	5096.000 H	101.2130
# 2	0.0010	0.1626	0.0767	5026.000	99.8210
Mean	0.0009	0.1317	0.0551	5061.000 H	100.5170
SD	0.0002	0.0436	0.0305	49.497	0.9842
%RSD	27.7308	33.1191	55.3017	0.978	0.9792

Checking calibration blank ...

Identity 1 : Calibration blank Identity 2 :

Report name	CRDL	Value
Ca317	0.100	0.001
K_766	0.100	0.132 Contaminated
Na589	0.050	0.055 Contaminated
Sc361	0.000	100.517

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238672 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 5:33:16 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	259850.0	15384.0	98.5	4688.0	4688.0
# 2	260080.0	15386.0	83.5	4675.0	4675.0
Mean	259965.0	15385.0	91.0	4681.5	4681.5
SD	162.6	1.4	10.6	9.2	9.2
%RSD	0.1	0.0	11.7	0.2	0.2

APPARENT CONCENTRATIONS

Identity 1 : 238672 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 5:33:16 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 H	1074.9352 H	162.2725	0.1659	4688.000	93.1000
# 2 H	1078.8805 H	162.7452	0.1356	4675.000	92.8415

Mean	H 1076.9078	H 162.5089	0.1508	4681.500	52.9708
SD	2.7898	0.3342	0.0214	9.192	0.1828
%RSD	0.2591	0.2057	14.2218	0.196	0.1966

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BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238673 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 5:36:10 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	259376.0	20469.5	92.0	4693.0	4693.0
# 2	258654.0	20347.5	74.0	4658.0	4658.0
Mean	259015.0	20408.5	83.0	4675.5	4675.5
SD	510.5	86.3	12.7	24.7	24.7
%RSD	0.2	0.4	15.3	0.5	0.5

APPARENT CONCENTRATIONS

Identity 1 : 238673 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 5:36:10 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 H 1071.8295	H 215.7142	0.1524	4693.000	93.1994	
# 2 H 1076.8799	H 216.0398	0.1166	4658.000	92.5035	
Mean H 1074.3547	H 215.8770	0.1345	4675.500	92.8515	
SD	3.5712	0.2303	0.0253	24.749	0.4921
%RSD	0.3324	0.1067	18.8120	0.529	0.5300

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238674 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 5:39:04 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	261160.0	19266.0	93.0	4691.5	4691.5
# 2	260039.0	19221.0	87.0	4655.5	4655.5
Mean	260599.5	19243.5	90.0	4673.5	4673.5
SD	792.7	31.8	4.2	25.5	25.5
%RSD	0.3	0.2	4.7	0.5	0.5

APPARENT CONCENTRATIONS

Identity 1 : 238674 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 5:39:04 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 H 1079.5508	H 203.0910	0.1545	4691.500	93.1696	
# 2 H 1083.2310	H 204.1839	0.1436	4655.500	92.4538	
Mean H 1081.3909	H 203.6375	0.1490	4673.500	92.8117	
SD	2.6023	0.7728	0.0077	25.456	0.5062
%RSD	0.2406	0.3795	5.1863	0.545	0.5454

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238675 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 5:41:58 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	256483.0	25561.0	85.0	4676.0	4676.0
# 2	255725.0	25598.0	98.0	4672.0	4672.0
Mean	256104.0	25579.5	91.5	4674.0	4674.0
SD	526.0	26.2	9.2	2.0	2.0
%RSD	0.2053	0.1024	10.0547	0.0428	0.0428

%RSD 0.2 0.1 10.0 0.1 0.1

APPARENT CONCENTRATIONS

Identity 1 : 238675 Identity 2 : pg55-149 Type : SAMPLE

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EVOLUTION by Micro-Active Australia Pty Ltd 5:51:16 PM December 9, 2003

Weight : 1.0000 Volume : 1.00 Printed : 5:41:58 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1	H 1063.7235	H 270.3717	0.1387	4676.000	92.8614
# 2	H 1061.4867	H 270.9951	0.1656	4672.000	92.7819
Mean	H 1062.6051	H 270.6834	0.1521	4674.000	92.8216
SD	1.5817	0.4408	0.0190	2.828	0.0562
%RSD	0.1489	0.1628	12.5198	0.061	0.0606

BACKGROUND CORRECTED INTENSITIES

Identity 1 : CLP_CCV_SC Identity 2 : Type : CV

Weight : 1.0000 Volume : 1.00 Printed : 5:47:00 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	5148.0	1963.5	15146.0	4964.0	4964.0
# 2	5110.0	1957.5	14917.0	4897.0	4897.0
Mean	5129.0	1960.5	15031.5	4930.5	4930.5
SD	26.9	4.2	161.9	47.4	47.4
%RSD	0.5	0.2	1.1	1.0	1.0

APPARENT CONCENTRATIONS

Identity 1 : CLP_CCV_SC Identity 2 : Type : CV

Weight : 1.0000 Volume : 1.00 Printed : 5:47:00 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1	19.5447	19.4819	29.3376	4964.000	98.5882
# 2	19.6694	19.6891	29.2893	4897.000	97.2559
Mean	19.6071	19.5855	29.3134	4930.500	97.9221
SD	0.0882	0.1465	0.0342	47.376	0.9421
%RSD	0.4499	0.7478	0.1165	0.961	0.9621

Checking calibration verification ...

Identity 1 : CLP_CCV_SC Identity 2 :

Report name	Low limit	Value	High limit
Ca317	18.000	19.607	22.000
K_766	18.000	19.586	22.000
Na589	27.000	29.313	33.000

BACKGROUND CORRECTED INTENSITIES

Identity 1 : Calibration blank Identity 2 : Type : CB

Weight : 1.0000 Volume : 1.00 Printed : 5:51:00 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	152.0	22.0	42.0	5074.5	5074.5
# 2	152.0	27.0	29.0	5024.5	5024.5
Mean	152.0	24.5	35.5	5049.5	5049.5
SD	0.0	3.5	9.2	35.4	35.4
%RSD	0.0	14.4	25.9	0.7	0.7

APPARENT CONCENTRATIONS

Identity 1 : Calibration blank Identity 2 : Type : CB

Weight : 1.0000 Volume : 1.00 Printed : 5:51:00 PM December 9, 2003

	Ca317	K_766	Na589	Sc	Sc361
--	-------	-------	-------	----	-------

	ppm	ppm	ppm	ppm	
# 1	0.0031	0.1261	0.0434	5074.500 H	100.7854
# 2	0.0089	0.1774	0.0192	5024.500	99.7912

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Mean	0.0060	0.1517	0.0313	5049.500 H	100.2883
SD	0.0041	0.0363	0.0171	35.355	0.7030
%RSD	67.7138	23.9372	54.4904	0.700	0.7010

Checking calibration blank ...

Identity 1 : Calibration blank Identity 2 :

Report name	CRDL	Value	
Ca317	0.100	0.006	
K_766	0.100	0.152	Contaminated
Na589	0.050	0.031	
Sc361	0.000	100.288	

ICP ANALYSIS

PROJ. NO.	PROJECT	TO#	DATE	MATRIX	LOGBK PG
06002.01.071	Div 20	0312054	12-10-03	Water	SS 149

INSTRUMENT: Spectro FILENAME: 031210

INSTRUMENT DL: _____

Keep last result visible enabled ...

Starting run ...

Creating high priority queue entries ...

BACKGROUND CORRECTED INTENSITIES

Identity 1 : BLK_SC Identity 2 : Type : STD

Weight : 1.0000 Volume : 1.00 Printed : 1:40:24 PM December 10, 2003

	Ca317	K_766	Na589	Sc361
# 1	147.0	15.0	48.0	4858.5
# 2	146.0	33.0	48.0	4776.5
Mean	146.5	24.0	48.0	4817.5
SD	0.7	12.7	0.0	58.0
%RSD	0.5	53.0	0.0	1.2

INTENSITIES

Identity 1 : BLK_SC Identity 2 : Type : STD

Weight : 1.0000 Volume : 1.00 Printed : 1:40:24 PM December 10, 2003

	Ca317	K_766	Na589	Sc361
# 1	0.0	0.0	0.0	4858.5
# 2	0.0	0.0	0.0	4776.5
Mean	0.0	0.0	0.0	4817.5
SD	0.0	0.0	0.0	58.0
%RSD	0.7	54.1	1.2	1.2

BACKGROUND CORRECTED INTENSITIES

Identity 1 : CLP_STD1_SC Identity 2 : Type : STD

Weight : 1.0000 Volume : 1.00 Printed : 1:43:16 PM December 10, 2003

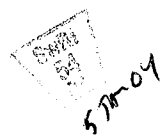
	Ca317	K_766	Na589
# 1	12315.0	5194.5	26217.0
# 2	12269.0	5161.5	26206.0
Mean	12292.0	5178.0	26211.5
SD	32.5	23.3	7.8
%RSD	0.3	0.5	0.0

INTENSITIES

Identity 1 : CLP_STD1_SC Identity 2 : Type : STD

Weight : 1.0000 Volume : 1.00 Printed : 1:43:18 PM December 10, 2003

	Ca317	K_766	Na589
# 1	2.5	1.1	5.3
# 2	2.5	1.1	5.3
Mean	2.5	1.1	5.3
SD	0.0	0.0	0.0
%RSD	0.1	0.1	0.3



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12/10/03

Handwritten signature 12-10-03

BACKGROUND CORRECTED INTENSITIES

Identity 1 : CLP_CCV_SC Identity 2 : Type : CV

Weight : 1.0000 Volume : 1.00 Printed : 1:46:10 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	4952.0	2019.0	15299.5	4871.5	4871.5
# 2	4913.0	2003.0	15050.5	4810.5	4810.5
Mean	4932.5	2011.0	15175.0	4841.0	4841.0
SD	27.6	11.3	176.1	43.1	43.1
%RSD	0.6	0.6	1.2	0.9	0.9

APPARENT CONCENTRATIONS

Identity 1 : CLP_CCV_SC Identity 2 : Type : CV

Weight : 1.0000 Volume : 1.00 Printed : 1:46:10 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1	19.9886	19.5559	29.4518	4871.500 H	101.1223
# 2	20.0855	19.6480	29.3395	4810.500	99.8545
Mean	20.0371	19.6019	29.3956	4841.000 H	100.4884
SD	0.0686	0.0652	0.0794	43.134	0.8965
%RSD	0.3421	0.3324	0.2701	0.891	0.8921

Checking calibration verification ...

Identity 1 : CLP_CCV_SC Identity 2 :

Report name	Low limit	Value	High limit
Ca317	18.000	20.037	22.000
K_766	18.000	19.602	22.000
Na589	27.000	29.396	33.000

BACKGROUND CORRECTED INTENSITIES

Identity 1 : Calibration blank Identity 2 : Type : CB

Weight : 1.0000 Volume : 1.00 Printed : 1:50:10 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	149.0	11.5	32.0	4917.5	4917.5
# 2	147.0	12.5	39.0	4860.5	4860.5
Mean	148.0	12.0	35.5	4889.0	4889.0
SD	1.4	0.7	4.9	40.3	40.3
%RSD	1.0	5.9	13.9	0.8	0.8

APPARENT CONCENTRATIONS

Identity 1 : Calibration blank Identity 2 : Type : CB

Weight : 1.0000 Volume : 1.00 Printed : 1:50:10 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 L	-0.0022 L	-0.1262 L	-0.0325	4917.500 H	102.0784
# 2 L	-0.0034 L	-0.1151 L	-0.0182	4860.500 H	100.8937
Mean L	-0.0028 L	-0.1207 L	-0.0254	4889.000 H	101.4860
SD	0.0008	0.0079	0.0101	40.305	0.8377
%RSD	28.7512	6.5253	39.7443	0.824	0.8254

Checking calibration blank ...

Identity 1 : Calibration blank Identity 2 :

Report name	CRDL	Value	
Ca317	0.100	-0.003	
K_766	0.100	-0.121	Contaminated
Na589	0.050	-0.025	

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Sc361 0.000 101.486

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238656 df50 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 1:53:04 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	146.0	9160.5	77894.5	4896.0	4896.0
# 2	146.0	9128.5	77582.5	4865.0	4865.0
Mean	146.0	9144.5	77738.5	4880.5	4880.5
SD	0.0	22.6	220.6	21.9	21.9
%RSD	0.0	0.2	0.3	0.4	0.4

APPARENT CONCENTRATIONS

Identity 1 : 238656 df50 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 1:53:04 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 L	-0.0120 H	89.1200 H	149.5790	4896.000 H	101.6315
# 2 L	-0.0081 H	89.3753 H	149.9294	4865.000 H	100.9872
Mean L	-0.0100 H	89.2476 H	149.7542	4880.500 H	101.3094
SD	0.0027	0.1805	0.2478	21.920	0.4556
%RSD	27.1605	0.2022	0.1655	0.449	0.4497

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238656d df50 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 1:55:58 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	143.0	9205.0	78169.5	4893.5	4893.5
# 2	144.0	9152.0	77940.5	4847.5	4847.5
Mean	143.5	9178.5	78055.0	4870.5	4870.5
SD	0.7	37.5	161.9	32.5	32.5
%RSD	0.5	0.4	0.2	0.7	0.7

APPARENT CONCENTRATIONS

Identity 1 : 238656d df50 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 1:55:58 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 L	-0.0241 H	89.6000 H	150.1841	4893.500 H	101.5795
# 2 L	-0.0143 H	89.9303 H	151.1658	4847.500 H	100.6235
Mean L	-0.0192 H	89.7651 H	150.6749	4870.500 H	101.1015
SD	0.0069	0.2336	0.6941	32.527	0.6760
%RSD	36.1578	0.2602	0.4607	0.668	0.6687

Keep last result visible enabled ...

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238657 df50 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 1:58:52 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	147.0	11875.5	77208.0	4909.0	4909.0
# 2	145.0	11795.5	76670.0	4874.0	4874.0

Mean	146.0	11835.5	76939.0	4891.5	4891.5
SD	1.4	56.6	380.4	24.7	24.7
%RSD	1.0	0.5	0.5	0.5	0.5

EVOLUTION by Micro-Active Australia Pty Ltd 2:07:50 PM December 10, 2003

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APPARENT CONCENTRATIONS

Identity 1 : 238657 df50 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 1:58:52 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 L	-0.0094 H	115.2973 H	147.8670	4909.000 H	101.9017
# 2 L	-0.0134 H	115.3430 H	147.8911	4874.000 H	101.1743
Mean L	-0.0114 H	115.3201 H	147.8791	4891.500 H	101.5380
SD	0.0028	0.0324	0.0170	24.749	0.5144
%RSD	24.5464	0.0281	0.0115	0.506	0.5066

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238657s df50 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 2:01:44 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	4786.0	14046.0	87958.0	4878.0	4878.0
# 2	4761.0	13987.0	87587.0	4852.0	4852.0
Mean	4773.5	14016.5	87772.5	4865.0	4865.0
SD	17.7	41.7	262.3	18.4	18.4
%RSD	0.4	0.3	0.3	0.4	0.4

APPARENT CONCENTRATIONS

Identity 1 : 238657s df50 Identity 2 : pg55-149 Type : SAMPLE 5mL sample stored with

Weight : 1.0000 Volume : 1.00 Printed : 2:01:46 PM December 10, 2003 200L ICAL-1 # 4245

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1	19.2713 H	137.2822 H	169.5394	4878.000 H	101.2574
# 2	19.2735 H	137.4384 H	169.7291	4852.000 H	100.7170
Mean	19.2724 H	137.3603 H	169.6343	4865.000 H	100.9872
SD	0.0015	0.1104	0.1341	18.385	0.3821
%RSD	0.0078	0.0804	0.0791	0.378	0.3784

DL 12-10-03

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238658 df100 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 2:04:40 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	147.0	3887.0	37655.0	4960.5	4960.5
# 2	148.0	3841.0	37296.0	4908.5	4908.5
Mean	147.5	3864.0	37475.5	4934.5	4934.5
SD	0.7	32.5	253.9	36.8	36.8
%RSD	0.5	0.8	0.7	0.7	0.7

APPARENT CONCENTRATIONS

Identity 1 : 238658 df100 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 2:04:40 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 L	-0.0157	37.1856 H	71.3188	4960.500 H	102.9720
# 2 L	-0.0052	37.1345 H	71.3873	4908.500 H	101.8913
Mean L	-0.0105	37.1600 H	71.3530	4934.500 H	102.4317

SD	0.0074	0.0361	0.0484	36.770	0.7642
%RSD	70.7993	0.0973	0.0679	0.745	0.7461

BACKGROUND CORRECTED INTENSITIES

EVOLUTION by Micro-Active Australia Pty Ltd 2:13:36 PM December 10, 2003

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Identity 1 : 238659 df100 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 2:07:34 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	144.0	8356.0	34786.5	4922.0	4922.0
# 2	142.0	8284.0	34455.5	4858.0	4858.0
Mean	143.0	8320.0	34621.0	4890.0	4890.0
SD	1.4	50.9	234.1	45.3	45.3
%RSD	1.0	0.6	0.7	0.9	0.9

APPARENT CONCENTRATIONS

Identity 1 : 238659 df100 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 2:07:34 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 L	-0.0234 H	80.8418 H	66.3947	4922.000 H	102.1719
# 2 L	-0.0239 H	81.2021 H	66.6297	4858.000 H	100.8417
Mean L	-0.0236 H	81.0219 H	66.5122	4890.000 H	101.5068
SD	0.0004	0.2548	0.1661	45.255	0.9406
%RSD	1.5918	0.3145	0.2498	0.925	0.9266

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238660 ~~df100~~ Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 2:10:28 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	148.0	8595.0	34865.0	4969.5	4969.5
# 2	144.0	8482.0	34557.0	4906.5	4906.5
Mean	146.0	8538.5	34711.0	4938.0	4938.0
SD	2.8	79.9	217.8	44.5	44.5
%RSD	1.9	0.9	0.6	0.9	0.9

APPARENT CONCENTRATIONS

Identity 1 : 238660 ~~df100~~ Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 2:10:28 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 L	-0.0127 H	82.3637 H	65.9078	4969.500 H	103.1591
# 2 L	-0.0215 H	82.3244 H	66.1647	4906.500 H	101.8497
Mean L	-0.0171 H	82.3440 H	66.0363	4938.000 H	102.5044
SD	0.0062	0.0278	0.1817	44.548	0.9259
%RSD	36.2331	0.0338	0.2751	0.902	0.9032

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238661 df200 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 2:13:22 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	148.0	5141.5	15919.0	4911.5	4911.5
# 2	143.0	5133.5	15787.0	4879.5	4879.5
Mean	145.5	5137.5	15853.0	4895.5	4895.5
SD	3.5	5.7	93.3	22.6	22.6
%RSD	2.4	0.1	0.6	0.5	0.5

APPARENT CONCENTRATIONS

Identity 1 : 238661 df200 Identity 2 : pg55-149 Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 2:13:22 PM December 10, 2003

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EVOLUTION by Micro-Active Australia Pty Ltd 2:22:42 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 L	-0.0056	49.7576	30.3978	4911.500 H	101.9537
# 2 L	-0.0224 H	50.0072	30.3432	4879.500 H	101.2886
Mean L	-0.0140	49.8824	30.3705	4895.500 H	101.6211
SD	0.0119	0.1765	0.0386	22.627	0.4703
%RSD	84.7409	0.3538	0.1270	0.462	0.4628

BACKGROUND CORRECTED INTENSITIES

Identity 1 : CLP_CCv_SC Identity 2 : Type : CV
 Weight : 1.0000 Volume : 1.00 Printed : 2:18:26 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	4931.0	2016.5	15168.0	4846.5	4846.5
# 2	4893.0	2007.5	15110.0	4805.5	4805.5
Mean	4912.0	2012.0	15139.0	4826.0	4826.0
SD	26.9	6.4	41.0	29.0	29.0
%RSD	0.5	0.3	0.3	0.6	0.6

APPARENT CONCENTRATIONS

Identity 1 : CLP_CCv_SC Identity 2 : Type : CV
 Weight : 1.0000 Volume : 1.00 Printed : 2:18:26 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1	20.0070	19.6333	29.3489	4846.500 H	100.6027
# 2	20.0227	19.7134	29.4866	4805.500	99.7506
Mean	20.0149	19.6734	29.4178	4826.000 H	100.1767
SD	0.0111	0.0566	0.0973	28.991	0.6025
%RSD	0.0554	0.2879	0.3309	0.601	0.6015

Checking calibration verification ...

Identity 1 : CLP_CCv_SC Identity 2 :

Report name	Low limit	Value	High limit
Ca317	18.000	20.015	22.000
K_766	18.000	19.673	22.000
Na589	27.000	29.418	33.000

BACKGROUND CORRECTED INTENSITIES

Identity 1 : Calibration blank Identity 2 : Type : CB
 Weight : 1.0000 Volume : 1.00 Printed : 2:22:24 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	148.0	34.0	37.0	4879.0	4879.0
# 2	148.0	32.0	52.0	4808.0	4808.0
Mean	148.0	33.0	44.5	4843.5	4843.5
SD	0.0	1.4	10.6	50.2	50.2
%RSD	0.0	4.3	23.8	1.0	1.0

APPARENT CONCENTRATIONS

Identity 1 : Calibration blank Identity 2 : Type : CB
 Weight : 1.0000 Volume : 1.00 Printed : 2:22:24 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm

# 1	L	-0.0015	0.0949 L	-0.0224	4879.000 H	101.2782
# 2		0.0075	0.0799	0.0080	4808.000	99.8026

Mean		0.0030	0.0874 L	-0.0072	4843.500 H	100.5404
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EVOLUTION by Micro-Active Australia Pty Ltd 2:31:36 PM December 10, 2003

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SD		0.0064	0.0106	0.0215	50.205	1.0434
%RSD		213.8815	12.0950	299.0107	1.037	1.0378

Checking calibration blank ...

Identity 1 : Calibration blank Identity 2 :

Report name	CRDL	Value
Ca317	0.100	0.003
K_766	0.100	0.087
Na589	0.050	-0.007
Sc361	0.000	100.540

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238662 df200 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 2:25:20 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	146.0	4846.5	16378.0	4966.5	4966.5
# 2	147.0	4804.5	16353.0	4921.5	4921.5
Mean	146.5	4825.5	16365.5	4944.0	4944.0
SD	0.7	29.7	17.7	31.8	31.8
%RSD	0.5	0.6	0.1	0.6	0.6

APPARENT CONCENTRATIONS

Identity 1 : 238662 df200 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 2:25:20 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 L	-0.0205	46.3671	30.9295	4966.500 H	103.0967
# 2 L	-0.0110	46.3857	31.1654	4921.500 H	102.1615
Mean L	-0.0158	46.3764	31.0475	4944.000 H	102.6291
SD	0.0068	0.0131	0.1668	31.820	0.6613
%RSD	42.9520	0.0283	0.5372	0.644	0.6444

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238663 df50 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 2:28:12 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	51735.0	15.5	903.5	4843.5	4843.5
# 2	51575.0	21.5	890.5	4802.5	4802.5
Mean	51655.0	18.5	897.0	4823.0	4823.0
SD	113.1	4.2	9.2	29.0	29.0
%RSD	0.2	22.9	1.0	0.6	0.6

APPARENT CONCENTRATIONS

Identity 1 : 238663 df50 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 2:28:12 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 H	215.8944 L	-0.0851	1.6611	4843.500 H	100.5404
# 2 H	217.0675 L	-0.0241	1.6507	4802.500	99.6882
Mean H	216.4810 L	-0.0546	1.6559	4823.000 H	100.1143
SD	0.8295	0.0431	0.0074	28.991	0.6025
%RSD	0.3832	74.9568	0.4477	0.601	0.6019

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238664 df50 Identity 2 : pg55-149 Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 2:31:06 PM December 10, 2003
 EVOLUTION by Micro-Active Australia Pty Ltd 2:37:10 PM December 10, 2003

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	Ca317	K_766	Na589	Sc	Sc361
# 1	55671.0	21.0	1596.0	4830.5	4830.5
# 2	55848.0	27.0	1620.0	4825.5	4825.5
Mean	55759.5	24.0	1608.0	4828.0	4828.0
SD	125.2	4.2	17.0	3.5	3.5
%RSD	0.2	17.7	1.1	0.1	0.1

APPARENT CONCENTRATIONS

Identity 1 : 238664 df50 Identity 2 : pg55-149 Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 2:31:06 PM December 10, 2003

	Ca317 ppm	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1 H	232.9936 L	-0.0303	3.0145	4830.500 H	100.2702
# 2 H	233.9792	0.0293	3.0645	4825.500 H	100.1663
Mean H	233.4864 L	-0.0005	3.0395	4828.000 H	100.2182
SD	0.6969	0.0421	0.0354	3.536	0.0735
%RSD	0.2985	8394.6124	1.1634	0.073	0.0733

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238665 df50 Identity 2 : pg55-149 Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 2:34:00 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	53793.0	28.5	1503.0	4836.5	4836.5
# 2	53653.0	30.5	1501.0	4821.5	4821.5
Mean	53723.0	29.5	1502.0	4829.0	4829.0
SD	99.0	1.4	1.4	10.6	10.6
%RSD	0.2	4.8	0.1	0.2	0.2

APPARENT CONCENTRATIONS

Identity 1 : 238665 df50 Identity 2 : pg55-149 Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 2:34:00 PM December 10, 2003

	Ca317 ppm	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1 H	224.8330	0.0435	2.8298	4836.500 H	100.3949
# 2 H	224.9458	0.0642	2.8350	4821.500 H	100.0831
Mean H	224.8894	0.0538	2.8324	4829.000 H	100.2390
SD	0.0798	0.0146	0.0037	10.607	0.2204
%RSD	0.0355	27.1661	0.1296	0.220	0.2199

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238666 df50 Identity 2 : pg55-149 Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 2:36:54 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	54030.0	12.5	1914.0	4854.5	4854.5
# 2	53385.0	18.5	1883.0	4780.5	4780.5
Mean	53707.5	15.5	1898.5	4817.5	4817.5
SD	456.1	4.2	21.9	52.3	52.3
%RSD	0.8	27.4	1.2	1.1	1.1

APPARENT CONCENTRATIONS

Identity 1 : 238666 df50 Identity 2 : pg55-149 Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 2:36:54 PM December 10, 2003

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Ca317 K_766 Na589 Sc Sc361
 EVOLUTION by Micro-Active Australia Pty Ltd 2:45:50 PM December 10, 2003

		ppm		ppm		ppm		ppm
# 1	H	224.9866 L	-0.1150	3.6154	4854.500 H	100.7690		
# 2	H	225.7440 L	-0.0531	3.6118	4780.500	99.2310		
Mean	H	225.3653 L	-0.0840	3.6136	4817.500	100.0000		
SD		0.5355	0.0437	0.0025	52.326	1.0875		
%RSD		0.2376	52.0438	0.0702	1.086	1.0875		

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238667 df50 Identity 2 : pg55-149 Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 2:39:44 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	52924.0	17.0	2426.0	4849.5	4849.5
# 2	51844.0	20.0	2355.0	4746.5	4746.5
Mean	52384.0	18.5	2390.5	4798.0	4798.0
SD	763.7	2.1	50.2	72.8	72.8
%RSD	1.5	11.5	2.1	1.5	1.5

APPARENT CONCENTRATIONS

Identity 1 : 238667 df50 Identity 2 : pg55-149 Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 2:39:44 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	220.5964 L	-0.0705	4.6125	4849.500 H	100.6651
# 2	220.7846 L	-0.0367	4.5739	4746.500	98.5244
Mean	220.6905 L	-0.0536	4.5932	4798.000	99.5947
SD	0.1331	0.0239	0.0273	72.832	1.5137
%RSD	0.0603	44.6163	0.5942	1.518	1.5199

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238668 df50 Identity 2 : pg55-149 Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 2:42:38 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	54233.0	37.5	2096.5	4866.5	4866.5
# 2	53632.0	37.5	2093.5	4816.5	4816.5
Mean	53932.5	37.5	2095.0	4841.5	4841.5
SD	425.0	0.0	2.1	35.4	35.4
%RSD	0.8	0.0	0.1	0.7	0.7

APPARENT CONCENTRATIONS

Identity 1 : 238668 df50 Identity 2 : pg55-149 Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 2:42:38 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	225.2759	0.1301	3.9591	4866.500 H	101.0184
# 2	225.0916	0.1339	3.9953	4816.500	99.9792
Mean	225.1837	0.1320	3.9772	4841.500 H	100.4988
SD	0.1303	0.0027	0.0256	35.355	0.7348
%RSD	0.0579	2.0465	0.6438	0.730	0.7312

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238669 df50 Identity 2 : pg55-149 Type : SAMPLE

	Ca317	K_766	Na589	Sc	Sc361
# 1	53019.0	15.0	2485.0	4828.0	4828.0

EVOLUTION by Micro-Active Australia Pty Ltd 2:51:38 PM December 10, 2003

# 2	52796.0	18.0	2463.0	4790.0	4790.0
Mean	52907.5	16.5	2474.0	4809.0	4809.0
SD	157.7	2.1	15.6	26.9	26.9
%RSD	0.3	12.9	0.6	0.6	0.6

010055

APPARENT CONCENTRATIONS

Identity 1 : 238669 df50 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 2:45:32 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 H	221.9803 L	-0.0895	4.7484	4828.000 H	100.2182
# 2 H	222.8026 L	-0.0585	4.7436	4790.000	99.4285
Mean H	222.3914 L	-0.0740	4.7460	4809.000	99.8233
SD	0.5814	0.0220	0.0034	26.870	0.5585
%RSD	0.2614	29.7062	0.0714	0.559	0.5594

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238670 df50 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 2:48:26 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	51099.0	2164.0	44.5	4846.0	4846.0
# 2	50771.0	2180.0	38.5	4820.0	4820.0
Mean	50935.0	2172.0	41.5	4833.0	4833.0
SD	231.9	11.3	4.2	18.4	18.4
%RSD	0.5	0.5	10.2	0.4	0.4

APPARENT CONCENTRATIONS

Identity 1 : 238670 df50 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 2:48:26 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 H	213.1225	21.0890 L	-0.0073	4846.000 H	100.5923
# 2 H	212.8960	21.3626 L	-0.0186	4820.000 H	100.0520
Mean H	213.0092	21.2258 L	-0.0130	4833.000 H	100.3221
SD	0.1601	0.1934	0.0080	18.385	0.3821
%RSD	0.0752	0.9114	61.3131	0.380	0.3809

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238671 df50 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 2:51:20 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	50779.0	2993.0	41.5	4836.0	4836.0
# 2	50679.0	2998.0	27.5	4826.0	4826.0
Mean	50729.0	2995.5	34.5	4831.0	4831.0
SD	70.7	3.5	9.9	7.1	7.1
%RSD	0.1	0.1	28.7	0.1	0.1

APPARENT CONCENTRATIONS

Identity 1 : 238671 df50 Identity 2 : pg55-149 Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 2:51:20 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 H	212.2232	29.3201 L	-0.0130	4836.000 H	100.3845
# 2 H	212.2442	29.4309 L	-0.0401	4826.000 H	100.1767

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010056

Mean	H	212.2337	29.3755 L	-0.0266	4831.000 H	100.2806
SD		0.0149	0.0783	0.0192	7.071	0.1470
%RSD		0.0070	0.2665	72.1977	0.146	0.1466

BACKGROUND CORRECTED INTENSITIES

Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
 Weight : 1.0000 Volume : 1.00 Printed : 2:56:24 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	4947.0	1991.0	15141.0	4839.0	4839.0
# 2	4907.0	1996.0	15068.0	4780.0	4780.0
Mean	4927.0	1993.5	15104.5	4809.5	4809.5
SD	28.3	3.5	51.6	41.7	41.7
%RSD	0.6	0.2	0.3	0.9	0.9

APPARENT CONCENTRATIONS

Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
 Weight : 1.0000 Volume : 1.00 Printed : 2:56:24 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1	20.1060	19.4125	29.3421	4839.000 H	100.4468
# 2	20.1922	19.7050	29.5617	4780.000	99.2206
Mean	20.1491	19.5587	29.4519	4809.500	99.8337
SD	0.0609	0.2068	0.1553	41.719	0.8671
%RSD	0.3024	1.0575	0.5274	0.867	0.8685

Checking calibration verification ...

Identity 1 : CLP_CCV_SC Identity 2 :

Report name	Low limit	Value	High limit
Ca317	18.000	20.149	22.000
K_766	18.000	19.559	22.000
Na589	27.000	29.452	33.000

BACKGROUND CORRECTED INTENSITIES

Identity 1 : Calibration blank Identity 2 : Type : CB
 Weight : 1.0000 Volume : 1.00 Printed : 3:00:22 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	191.0	26.0	53.5	4926.0	4926.0
# 2	190.0	19.0	30.5	4817.0	4817.0
Mean	190.5	22.5	42.0	4871.5	4871.5
SD	0.7	4.9	16.3	77.1	77.1
%RSD	0.4	22.0	38.7	1.6	1.6

APPARENT CONCENTRATIONS

Identity 1 : Calibration blank Identity 2 : Type : CB
 Weight : 1.0000 Volume : 1.00 Printed : 3:00:22 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1	0.1695	0.0141	0.0084	4926.000 H	102.2550
# 2	0.1831 L	-0.0495 L	-0.0342	4817.000	99.9896
Mean	0.1763 L	-0.0177 L	-0.0129	4871.500 H	101.1223

%RSD 5.4445 254.4826 234.1967 1.582 1.5841

Checking calibration blank ...

EVOLUTION by Micro-Active Australia Pty Ltd 3:09:20 PM December 10, 2003

010057

Identity 1 : Calibration blank Identity 2 :
Report name CRDL Value
Ca317 0.100 0.176 Contaminated
K_766 0.100 -0.018
Na589 0.050 -0.013
Sc361 0.000 101.122

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238672 df50 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 3:03:16 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	53093.0	3024.5	37.5	4879.0	4879.0
# 2	52711.0	2998.5	23.5	4827.0	4827.0
Mean	52902.0	3011.5	30.5	4853.0	4853.0
SD	270.1	18.4	9.9	36.8	36.8
%RSD	0.5	0.6	32.5	0.8	0.8

APPARENT CONCENTRATIONS

Identity 1 : 238672 df50 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 3:03:16 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 H	219.9610	29.3680 L	-0.0214	4879.000 H	101.2782
# 2 H	220.7331	29.4297 L	-0.0479	4827.000 H	100.1974
Mean H	220.3470	29.3988 L	-0.0347	4853.000 H	100.7378
SD	0.5459	0.0436	0.0187	36.770	0.7642
%RSD	0.2478	0.1484	54.0442	0.758	0.7586

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238673 df50 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 3:06:08 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	52709.0	4028.0	38.0	4859.5	4859.5
# 2	52145.0	3961.0	46.0	4789.5	4789.5
Mean	52427.0	3994.5	42.0	4824.5	4824.5
SD	398.8	47.4	5.7	49.5	49.5
%RSD	0.8	1.2	13.5	1.0	1.0

APPARENT CONCENTRATIONS

Identity 1 : 238673 df50 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 3:06:10 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
	ppm	ppm	ppm		ppm
# 1 H	219.2443	39.3491 L	-0.0202	4859.500 H	100.8729
# 2 H	220.0707	39.2596 L	-0.0034	4789.500	99.4181
Mean H	219.6575	39.3044 L	-0.0118	4824.500 H	100.1455
SD	0.5843	0.0633	0.0119	49.497	1.0287
%RSD	0.2660	0.1611	100.8208	1.026	1.0272

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238674 df50 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 3:09:02 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	52962.0	3767.0	59.0	4833.5	4833.5
# 2	52647.0	3738.0	28.0	4809.5	4809.5

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Mean	52804.5	3752.5	43.5	4821.5	4821.5
SD	222.7	20.5	21.9	17.0	17.0
%RSD	0.4	0.5	50.4	0.4	0.4

APPARENT CONCENTRATIONS

Identity 1 : 238674 df50 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 3:09:04 PM December 10, 2003

		Ca317	K_766	Na589		Sc	Sc361
		ppm	ppm	ppm			ppm
# 1	H	221.4880	36.9832	0.0211		4833.500	100.3325
# 2	H	221.2687	36.8809 L	-0.0390		4809.500	99.8337
Mean	H	221.3784	36.9321 L	-0.0089		4821.500	100.0831
SD		0.1550	0.0723	0.0425		16.971	0.3527
%RSD		0.0700	0.1957	475.4601		0.352	0.3524

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238675 df50 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 3:11:56 PM December 10, 2003

		Ca317	K_766	Na589		Sc	Sc361
# 1		51959.0	5014.0	48.0		4823.5	4823.5
# 2		51765.0	4954.0	38.0		4785.5	4785.5
Mean		51862.0	4984.0	43.0		4804.5	4804.5
SD		137.2	42.4	7.1		26.9	26.9
%RSD		0.3	0.9	16.4		0.6	0.6

APPARENT CONCENTRATIONS

Identity 1 : 238675 df50 Identity 2 : pg55-149 Type : SAMPLE
Weight : 1.0000 Volume : 1.00 Printed : 3:11:56 PM December 10, 2003

		Ca317	K_766	Na589		Sc	Sc361
		ppm	ppm	ppm			ppm
# 1	H	217.7335	49.4073 L	-0.0001		4823.500	100.1247
# 2	H	218.6456	49.2027 L	-0.0190		4785.500	99.3349
Mean	H	218.1896	49.3050 L	-0.0096		4804.500	99.7298
SD		0.6450	0.1447	0.0134		26.870	0.5585
%RSD		0.2956	0.2934	139.6991		0.559	0.5600

BACKGROUND CORRECTED INTENSITIES

Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 3:17:00 PM December 10, 2003

		Ca317	K_766	Na589		Sc	Sc361
# 1		4930.0	2004.5	15086.5		4818.5	4818.5
# 2		4860.0	1982.5	14895.5		4735.5	4735.5
Mean		4895.0	1993.5	14991.0		4777.0	4777.0
SD		49.5	15.6	135.1		58.7	58.7
%RSD		1.0	0.8	0.9		1.2	1.2

APPARENT CONCENTRATIONS

Identity 1 : CLP_CCV_SC Identity 2 : Type : CV
Weight : 1.0000 Volume : 1.00 Printed : 3:17:00 PM December 10, 2003

		Ca317	K_766	Na589		Sc	Sc361
		ppm	ppm	ppm			ppm

# 1	20.1227	19.6299	29.3609	4818.500 H	100.0208
# 2	20.1865	19.7562	29.4977	4735.500	98.2957
Mean	20.1546	19.6930	29.4293	4777.000	99.1583
EVOLUTION by Micro-Active Australia Pty Ltd 3:27:40 PM December 10, 2003					
SD	0.0452	0.0893	0.0967	58.690	1.2198
XRSD	0.2241	0.4537	0.3287	1.229	1.2301

010059

Checking calibration verification ...

Identity 1 : CLP_CCV_SC Identity 2 :

Report name	Low limit	Value	High limit
Ca317	18.000	20.155	22.000
K_766	18.000	19.693	22.000
Na589	27.000	29.429	33.000

BACKGROUND CORRECTED INTENSITIES

Identity 1 : Calibration blank Identity 2 : Type : CB

Weight : 1.0000 Volume : 1.00 Printed : 3:21:00 PM December 10, 2003

	Ca317	K_766	Na589	Sc	Sc361
# 1	194.0	22.5	7.0	4910.5	4910.5
# 2	194.0	12.5	37.0	4826.5	4826.5
Mean	194.0	17.5	22.0	4868.5	4868.5
SD	0.0	7.1	21.2	59.4	59.4
XRSD	0.0	40.4	96.4	1.2	1.2

APPARENT CONCENTRATIONS

Identity 1 : Calibration blank Identity 2 : Type : CB

Weight : 1.0000 Volume : 1.00 Printed : 3:21:00 PM December 10, 2003

	Ca317 ppm	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.1844 L	-0.0191 L	-0.0803	4910.500 H	101.9329
# 2	0.1983 L	-0.1142 L	-0.0216	4826.500 H	100.1871
Mean	0.1914 L	-0.0667 L	-0.0510	4868.500 H	101.0600
SD	0.0099	0.0673	0.0415	59.397	1.2345
XRSD	5.1498	100.9147	81.4464	1.220	1.2215

Checking calibration blank ...

Identity 1 : Calibration blank Identity 2 :

Report name	CRDL	Value	
Ca317	0.100	0.191	Contaminated
K_766	0.100	-0.067	
Na589	0.050	-0.051	Contaminated
Sc361	0.000	101.060	

ICP ANALYSIS

PROJ. NO.	PROJECT	TO#	DATE	MATRIX	LOGBK PG
06002.01.071	Div 20	031205-4	12-18-03	Water	NA

INSTRUMENT: Spectro FILENAME: 031218

INSTRUMENT DL: _____

010060

EVOLUTION by Micro-Active Australia Pty Ltd 10:27:16 AM December 18, 2003

Keep last result visible enabled ...

Starting run ...

Creating high priority queue entries ...

BACKGROUND CORRECTED INTENSITIES

Identity 1 : BLK_SC Identity 2 : Type : STD

Weight : 1.0000 Volume : 1.00 Printed : 10:22:36 AM December 18, 2003

	K_766	Na589	Sc361
# 1	21.5	24.0	4692.0
# 2	20.5	16.0	4498.0
Mean	21.0	20.0	4595.0
SD	0.7	5.7	137.2
%RSD	3.4	28.3	3.0

INTENSITIES

Identity 1 : BLK_SC Identity 2 : Type : STD

Weight : 1.0000 Volume : 1.00 Printed : 10:22:36 AM December 18, 2003

	K_766	Na589	Sc361
# 1	0.0	0.0	4692.0
# 2	0.0	0.0	4498.0
Mean	0.0	0.0	4595.0
SD	0.0	0.0	137.2
%RSD	0.4	25.4	3.0

BACKGROUND CORRECTED INTENSITIES

Identity 1 : CLP_STD1_SC Identity 2 : Type : STD

Weight : 1.0000 Volume : 1.00 Printed : 10:25:44 AM December 18, 2003

	K_766	Na589
# 1	5247.0	26774.5
# 2	5150.0	26289.5
Mean	5198.5	26532.0
SD	68.6	342.9
%RSD	1.3	1.3

INTENSITIES

Identity 1 : CLP_STD1_SC Identity 2 : Type : STD

Weight : 1.0000 Volume : 1.00 Printed : 10:25:44 AM December 18, 2003

	K_766	Na589
# 1	1.1	5.6
# 2	1.1	5.7
Mean	1.1	5.6
SD	0.0	0.0
%RSD	0.3	0.3



57m07

Handwritten signature
12/19/03

Handwritten signature 12-18-03

010061

BACKGROUND CORRECTED INTENSITIES

Identity 1 : CLP_CCV_SC Identity 2 : Type : CV

Weight : 1.0000 Volume : 1.00 Printed : 10:28:52 AM December 18, 2003

	K_766	Na589	Sc	Sc361
# 1	2098.0	15933.5	4805.0	4805.0
# 2	2053.0	15759.5	4751.0	4751.0
Mean	2075.5	15846.5	4778.0	4778.0
SD	31.8	123.0	38.2	38.2
%RSD	1.5	0.8	0.8	0.8

APPARENT CONCENTRATIONS

Identity 1 : CLP_CCV_SC Identity 2 : Type : CV

Weight : 1.0000 Volume : 1.00 Printed : 10:28:52 AM December 18, 2003

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	19.6082	29.3486	4805.000 H	104.5762
# 2	19.4036	29.3581	4751.000 H	103.3994
Mean	19.5059	29.3533	4778.000 H	103.9878
SD	0.1447	0.0067	38.184	0.8321
%RSD	0.7418	0.0228	0.799	0.8002

Checking calibration verification ...

Identity 1 : CLP_CCV_SC Identity 2 :

Report name	Low limit	Value	High limit
K_766	18.000	19.506	22.000
Na589	27.000	29.353	33.000

BACKGROUND CORRECTED INTENSITIES

Identity 1 : Calibration blank Identity 2 : Type : CB

Weight : 1.0000 Volume : 1.00 Printed : 10:33:08 AM December 18, 2003

	K_766	Na589	Sc	Sc361
# 1	20.0	29.0	4788.5	4788.5
# 2	19.0	-2.0	4702.5	4702.5
Mean	19.5	13.5	4745.5	4745.5
SD	0.7	21.9	60.8	60.8
%RSD	3.6	162.4	1.3	1.3

APPARENT CONCENTRATIONS

Identity 1 : Calibration blank Identity 2 : Type : CB

Weight : 1.0000 Volume : 1.00 Printed : 10:33:08 AM December 18, 2003

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1 L	-0.0179	0.0151	4788.500 H	104.2166
# 2 L	-0.0240 L	-0.0423	4702.500 H	102.3426
Mean L	-0.0210 L	-0.0136	4745.500 H	103.2796
SD	0.0044	0.0406	60.811	1.3252
%RSD	20.8725	298.1611	1.281	1.2831

Checking calibration blank ...

Identity 1 : Calibration blank Identity 2 :

K_766	0.100	-0.021
Na589	0.050	-0.014
Sc361	0.000	103.280

BACKGROUND CORRECTED INTENSITIES

EVOLUTION by Micro-Active Australia Pty Ltd 10:42:48 AM December 18, 2003

010062

Identity 1 : pbw-031218 Identity 2 : Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 10:36:16 AM December 18, 2003

	K_766	Na589	Sc	Sc361
# 1	31.5	43.5	4819.5	4819.5
# 2	36.5	23.5	4735.5	4735.5
Mean	34.0	33.5	4777.5	4777.5
SD	3.5	14.1	59.4	59.4
%RSD	10.4	42.2	1.2	1.2

APPARENT CONCENTRATIONS

Identity 1 : pbw-031218 Identity 2 : Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 10:36:16 AM December 18, 2003

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.0892	0.0414	4819.500 H	104.8921
# 2	0.1424	0.0054	4735.500 H	103.0617
Mean	0.1158	0.0234	4777.500 H	103.9769
SD	0.0376	0.0255	59.397	1.2943
%RSD	32.4723	108.7666	1.243	1.2448

BACKGROUND CORRECTED INTENSITIES

Identity 1 : lcsu-031218 Identity 2 : Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 10:39:24 AM December 18, 2003

	K_766	Na589	Sc	Sc361
# 1	2059.5	10576.5	4838.0	4838.0
# 2	2030.5	10387.5	4741.0	4741.0
Mean	2045.0	10482.0	4789.5	4789.5
SD	20.5	133.6	68.6	68.6
%RSD	1.0	1.3	1.4	1.4

APPARENT CONCENTRATIONS

Identity 1 : lcsu-031218 Identity 2 : Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 10:39:24 AM December 18, 2003

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	19.1119	19.3353	4838.000 H	105.2953
# 2	19.2295	19.3784	4741.000 H	103.1815
Mean	19.1707	19.3568	4789.500 H	104.2384
SD	0.0832	0.0305	68.589	1.4946
%RSD	0.4340	0.1574	1.432	1.4339

SML Blank spiked with 200 ICA-1 #4245
Del 12-18-03

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238663 df10 Identity 2 : Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 10:42:32 AM December 18, 2003

	K_766	Na589	Sc	Sc361
# 1	21.0	4784.5	4461.5	4461.5
# 2	33.0	4779.5	4428.5	4428.5
Mean	27.0	4782.0	4445.0	4445.0
SD	8.5	3.5	23.3	23.3
%RSD	31.4	0.1	0.5	0.5

APPARENT CONCENTRATIONS

Identity 1 : 238663 df10 Identity 2 : Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 10:42:32 AM December 18, 2003
 EVOLUTION by Micro-Active Australia Pty Ltd 10:52:18 AM December 18, 2003

010063

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.0062	9.4652	4461.500	97.0909
# 2	0.1308	9.5260	4428.500	96.3718
Mean	0.0685	9.4956	4445.000	96.7313
SD	0.0881	0.0430	23.335	0.5085
%RSD	128.6064	0.4529	0.525	0.5257

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238664 df10 Identity 2 : Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 10:45:38 AM December 18, 2003

	K_766	Na589	Sc	Sc361
# 1	24.0	8673.0	4502.0	4502.0
# 2	33.0	8620.0	4443.0	4443.0
Mean	28.5	8646.5	4472.5	4472.5
SD	6.4	37.5	41.7	41.7
%RSD	22.3	0.4	0.9	0.9

APPARENT CONCENTRATIONS

Identity 1 : 238664 df10 Identity 2 : Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 10:45:38 AM December 18, 2003

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.0345	17.0342	4502.000	97.9734
# 2	0.1297	17.1552	4443.000	96.6877
Mean	0.0821	17.0947	4472.500	97.3306
SD	0.0673	0.0856	41.719	0.9091
%RSD	81.9464	0.5005	0.933	0.9340

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238665 df10 Identity 2 : Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 10:48:48 AM December 18, 2003

	K_766	Na589	Sc	Sc361
# 1	32.0	8133.0	4553.5	4553.5
# 2	24.0	7997.0	4470.5	4470.5
Mean	28.0	8065.0	4512.0	4512.0
SD	5.7	96.2	58.7	58.7
%RSD	20.2	1.2	1.3	1.3

APPARENT CONCENTRATIONS

Identity 1 : 238665 df10 Identity 2 : Type : SAMPLE
 Weight : 1.0000 Volume : 1.00 Printed : 10:48:48 AM December 18, 2003

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
# 1	0.1115	15.7901	4553.500	99.0957
# 2	0.0362	15.8144	4470.500	97.2870
Mean	0.0739	15.8023	4512.000	98.1913
SD	0.0532	0.0172	58.690	1.2789
%RSD	72.0649	0.1086	1.301	1.3025

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238666 df10 Identity 2 : Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 10:51:54 AM December 18, 2003

EVOLUTION by Micro-Active Australia Pty Ltd 10:58:28 AM December 18, 2003

010064

	K_766	Na589	Sc	Sc361
# 1	42.5	10187.5	4534.5	4534.5
# 2	32.5	10057.5	4498.5	4498.5
Mean	37.5	10122.5	4516.5	4516.5
SD	7.1	91.9	25.5	25.5
%RSD	18.9	0.9	0.6	0.6

APPARENT CONCENTRATIONS

Identity 1 : 238666 df10 Identity 2 : Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 10:51:54 AM December 18, 2003

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	0.2179	19.8718	4534.500	98.6816
# 2	0.1205	19.7750	4498.500	97.8971
Mean	0.1692	19.8234	4516.500	98.2894
SD	0.0689	0.0684	25.456	0.5547
%RSD	40.7367	0.3452	0.564	0.5644

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238667 df10 Identity 2 : Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 10:55:04 AM December 18, 2003

	K_766	Na589	Sc	Sc361
# 1	32.0	12847.5	4568.0	4568.0
# 2	27.0	12741.5	4501.0	4501.0
Mean	29.5	12794.5	4534.5	4534.5
SD	3.5	75.0	47.4	47.4
%RSD	12.0	0.6	1.0	1.0

APPARENT CONCENTRATIONS

Identity 1 : 238667 df10 Identity 2 : Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 10:55:04 AM December 18, 2003

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1	0.1105	24.8863	4568.000	99.4116
# 2	0.0648	25.0486	4501.000	97.9516
Mean	0.0877	24.9675	4534.500	98.6816
SD	0.0323	0.1148	47.376	1.0324
%RSD	36.8451	0.4597	1.045	1.0462

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238668 df10 Identity 2 : Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 10:58:12 AM December 18, 2003

	K_766	Na589	Sc	Sc361
# 1	31.0	11310.5	4551.0	4551.0
# 2	34.0	11130.5	4485.0	4485.0
Mean	32.5	11220.5	4518.0	4518.0
SD	2.1	127.3	46.7	46.7
%RSD	6.5	1.1	1.0	1.0

APPARENT CONCENTRATIONS

Identity 1 : 238668 df10 Identity 2 : Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 10:58:12 AM December 18, 2003

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
--	--------------	--------------	----	--------------

EVOLUTION by Micro-Active Australia Pty Ltd 11:08:48 AM December 18, 2003 10065

# 1	0.1017	21.9864	4551.000	99.0412
# 2	0.1366	21.9548	4485.000	97.6030
Mean	0.1192	21.9706	4518.000	98.3221
SD	0.0247	0.0223	46.669	1.0170
%RSD	20.7100	0.1016	1.033	1.0343

BACKGROUND CORRECTED INTENSITIES

Identity 1 : 238669df10 Identity 2 : Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 11:01:20 AM December 18, 2003

	K_766	Na589	Sc	Sc361
--	-------	-------	----	-------

# 1	40.0	13456.0	4593.0	4593.0
# 2	32.0	13262.0	4518.0	4518.0
Mean	36.0	13359.0	4555.5	4555.5
SD	5.7	137.2	53.0	53.0
%RSD	15.7	1.0	1.2	1.2

APPARENT CONCENTRATIONS

Identity 1 : 238669df10 Identity 2 : Type : SAMPLE

Weight : 1.0000 Volume : 1.00 Printed : 11:01:20 AM December 18, 2003

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
--	--------------	--------------	----	--------------

# 1	0.1878	25.9247	4593.000	99.9564
# 2	0.1140	25.9752	4518.000	98.3221
Mean	0.1509	25.9500	4555.500	99.1392
SD	0.0522	0.0357	53.033	1.1557
%RSD	34.5749	0.1375	1.164	1.1657

BACKGROUND CORRECTED INTENSITIES

Identity 1 : CLP_CCV_SC Identity 2 : Type : CV

Weight : 1.0000 Volume : 1.00 Printed : 11:06:40 AM December 18, 2003

	K_766	Na589	Sc	Sc361
--	-------	-------	----	-------

# 1	2076.5	15880.5	4884.5	4884.5
# 2	2056.5	15743.5	4797.5	4797.5
Mean	2066.5	15812.0	4841.0	4841.0
SD	14.1	96.9	61.5	61.5
%RSD	0.7	0.6	1.3	1.3

APPARENT CONCENTRATIONS

Identity 1 : CLP_CCV_SC Identity 2 : Type : CV

Weight : 1.0000 Volume : 1.00 Printed : 11:06:40 AM December 18, 2003

	K_766 ppm	Na589 ppm	Sc	Sc361 ppm
--	--------------	--------------	----	--------------

# 1	19.0859	28.7742	4884.500 H	106.3086
# 2	19.2466	29.0436	4797.500 H	104.4127
Mean	19.1663	28.9089	4841.000 H	105.3606
SD	0.1136	0.1905	61.518	1.3406
%RSD	0.5928	0.6590	1.271	1.2724

Checking calibration verification ...

Identity 1 : CLP_CCV_SC Identity 2 :

Report name	Low limit	Value	High limit
K_766	18.000	19.166	22.000
Na589	27.000	28.909	33.000

EVOLUTION by Micro-Active Australia Pty Ltd 11:18:50 AM December 18, 2003

BACKGROUND CORRECTED INTENSITIES

010066

Identity 1 : Calibration blank Identity 2 : Type : CB
 Weight : 1.0000 Volume : 1.00 Printed : 11:10:54 AM December 18, 2003

	K_766	Na589	Sc	Sc361
# 1	22.0	42.5	4848.0	4848.0
# 2	21.0	33.5	4768.0	4768.0
Mean	21.5	38.0	4808.0	4808.0
SD	0.7	6.4	56.6	56.6
%RSD	3.3	16.7	1.2	1.2

APPARENT CONCENTRATIONS

Identity 1 : Calibration blank Identity 2 : Type : CB
 Weight : 1.0000 Volume : 1.00 Printed : 11:10:54 AM December 18, 2003

	K_766	Na589	Sc	Sc361
	ppm	ppm		ppm
# 1 L	-0.0015	0.0391	4848.000 H	105.5132
# 2 L	-0.0075	0.0237	4768.000 H	103.7699
Mean L	-0.0045	0.0314	4808.000 H	104.6415
SD	0.0043	0.0109	56.569	1.2327
%RSD	95.3916	34.7297	1.177	1.1780

Checking calibration blank ...

Identity 1 : Calibration blank Identity 2 :

Report name	CRDL	Value
K_766	0.100	-0.004
Na589	0.050	0.031
Sc361	0.000	104.642

Division 20
06002.01.071
TO# 031205-4

Analyst: RSpies/AMS
METHOD 300

Handwritten: 5/11/14, Richard H., 12/31/03

Date
Analyzed

010067

System ID	Analyte	Conc. mg/L	RESULT mg/L	Qual	DL	TV	%REC %RPD
12/26/03	238656	CHLORIDE	5789.847	5790		100	
12/26/03	238656	NITRATE-N	3890.440	3890		100	
12/26/03	238656D	CHLORIDE	5752.542	5753		100	0.65%
12/26/03	238656D	NITRATE-N	3886.988	3887		100	0.09%
12/26/03	238656S	CHLORIDE	7810.034	7810		100	2000 101%
12/26/03	238656S	NITRATE-N	4742.469	4742		100	904 94.3%
12/26/03	238657	CHLORIDE	5698.459	5698		100	
12/26/03	238657	NITRATE-N	4277.151	4277		100	
12/26/03	238658	CHLORIDE	5563.555	5564		100	
12/26/03	238658	NITRATE-N	3617.905	3618		100	
12/26/03	238659	CHLORIDE	5319.186	5319		100	
12/26/03	238659	NITRATE-N	5046.546	5047		100	
12/26/03	238660	CHLORIDE	5389.137	5389		100	
12/26/03	238660	NITRATE-N	5124.177	5124		100	
12/26/03	238661	CHLORIDE	4993.646	4994		100	
12/26/03	238661	NITRATE-N	5586.416	5586		100	
12/26/03	238662	CHLORIDE	5140.745	5141		100	
12/26/03	238662	NITRATE-N	5449.851	5450		100	
12/29/03	238663	CHLORIDE	18796.731	18797		200	
12/26/03	238663	NITRATE-N	0.000	100	U	100	
12/29/03	238664	CHLORIDE	21163.161	21163		200	
12/26/03	238664	NITRATE-N	0.000	100	U	100	
12/29/03	238665	CHLORIDE	20637.348	20637		200	
12/26/03	238665	NITRATE-N	0.000	100	U	100	
12/29/03	238666	CHLORIDE	20635.002	20635		200	
12/26/03	238666	NITRATE-N	0.000	100	U	100	
12/29/03	238667	CHLORIDE	20248.270	20248		200	
12/26/03	238667	NITRATE-N	0.000	100	U	100	
12/29/03	238668	CHLORIDE	20814.231	20814		200	
12/26/03	238668	NITRATE-N	0.000	100	U	100	
12/29/03	238669	CHLORIDE	20845.714	20846		200	
12/26/03	238669	NITRATE-N	0.000	100	U	100	
12/29/03	238670	CHLORIDE	20518.758	20519		200	
12/26/03	238670	NITRATE-N	0.000	100	U	100	
12/29/03	238671	CHLORIDE	20742.067	20742		200	
12/26/03	238671	NITRATE-N	0.000	100	U	100	
12/29/03	238672	CHLORIDE	21799.869	21800		200	
12/26/03	238672	NITRATE-N	0.000	100	U	100	
12/29/03	238673	CHLORIDE	21678.640	21679		200	
12/26/03	238673	NITRATE-N	0.000	100	U	100	
12/29/03	238674	CHLORIDE	22005.032	22005		200	
12/26/03	238674	NITRATE-N	0.000	100	U	100	
12/29/03	238675	CHLORIDE	22130.692	22131		200	
12/26/03	238675	NITRATE-N	0.000	100	U	100	

U = UNDETECTED

Division 20
06002.01.071
TO# 031205-4

Analyst: RSpies/AMS
Method: EPA 300

010068

QC DATA

Date Analyzed	System ID	Analyte	Conc. mg/L	RESULT mg/L	Qual	MDL	TV	%Rec/RP	SOURCE
12/26/03	ICV	CHLORIDE	198.607	199		0.1	200	99.3%	SPEX 24-79AS
12/26/03	ICV	NITRATE-N	85.206	85.2		0.1	90.4	94.3%	SPEX 24-79AS
12/29/03	ICV	CHLORIDE	199.781	200		0.1	200	99.9%	SPEX 24-79AS
12/29/03	ICV	NITRATE-N	85.657	85.7		0.1	90.4	94.8%	SPEX 24-79AS
12/26/03	ICB	CHLORIDE	0.022	0.1	U	0.1			
12/26/03	ICB	NITRATE-N	0.000	0.1	U	0.1			
12/29/03	ICB	CHLORIDE	0.018	0.1	U	0.1			
12/29/03	ICB	NITRATE-N	0.000	0.1	U	0.1			

U = UNDETECTED

Southwest Research Institute
 Dionex DX500 Ion Chromatography Daily Log

010069

Analyst: RSpiesDate: 10/30/03Conductivity: 17.5

Client	Project #	TO #	Analytical Method
Curve	—	—	300/9056

Loop: 40ulMethod: anions 031030Column: AS14: 015724Calibration: 10/30/03Comments: 015-02087

ICV/CCV/MS:

1st Source: SPEX (inorg)2nd Source: Nitrite - NLot #: 24-79ASLot #: 43-01-104CCV Conc: 1:20CCV Conc: 1:20MS Conc: —MS Conc: —

✓ ELUENT SOLUTION PREP:

1.0

mM Sodium Bicarbonate

&

3.5

FV = 2.0L DI H2O

mM Sodium Carbonate

Weight: 0.168gNaHCO₃Weight: 0.7419gNa₂CO₃Source: AldrichSource: Alfa AesarLot: 15308EILot: # 166M34Other Eluent:
☒ mA-Autoregen (ASRS)
Other Regen:

✓ AMS
12/14/03

Work continued from Page

RSS 10/30/03

010070

SWRI®

85-01-1C4 + 15 ppm Anions

3 ml 80-01-1C4 + 1 ml DI H₂O.

85-02-1C4 10 ppm Anions

2 ml 80-01-1C4 + 2 ml DI H₂O.

85-03-1C4 5 ppm Anions

2 ml 85-02-1C4 + 2 ml DI H₂O.

85-04-1C4 1 ppm Anions

1 ml 85-03-1C4 + 4 ml DI H₂O.

85-05-1C4 0.5 ppm Anions

2 ml 85-04-1C4 + 2 ml DI H₂O.

85-06-1C4 0.1 ppm Anions

1 ml 85-05-1C4 + 4 ml DI H₂O.

85-07-1C4 0 ppm Anions

DI H₂O.

Balance: 16

Eppendorf: 5000 L

1000 H

R Squared

J. Sprer

am2

11/17/03

10/30/03

Work continued from Page

010071

SwRI®

80-01-IC4

20ppm Anions Std

anion	Std Vol (ml)	Std Conc	Std Weight	Spec Source	Cy's D Date
Fluoride	1.0	1000	3895	23-109AS	01/15/2004
Chloride	1.0	1000	3860	23-38AS	12/15/2003
Nitrite-N	3.3	304	4107	23-23AS	5/30/2004
Bromide	1.0	1000	4106	23-52AS	5/30/2004
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	7-149VY	5/30/2004

FV = 50.0 ml

80-02-IC4

15ppm

3ml 80-01-IC4 + 1ml DI H₂O

80-03-IC4

10ppm

2ml 80-01-IC4 + 2ml DI H₂O

80-04-IC4

5ppm

1ml 80-01-IC4 + 3ml DI H₂O

80-05-IC4

1.0ppm

1ml 80-04-IC4 + 4ml DI H₂O

80-06-IC4

0.5ppm

2ml 80-05-IC4 + 2ml DI H₂O

80-07-IC4

0.1ppm

1ml 80-06-IC4 + 4ml DI H₂O

80-08-IC4

0ppm

DI H₂O

Balance: 34

Eppendorfs: 5000 J
1000 D

SIGNATURE

DATE

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE

10/3/03

10/27/03

Southwest Research Institute*MS 12/30/03*

Schedule File: C:\PeakNet\schedule\26DEC03.sch

Line	Sample	Sample Type	Level	Method	Data File	Dilution
1	ICV	Sample		anions031030.met	031226_001.dxd	20
2	ICB	Sample		anions031030.met	031226_002.dxd	1
3	238656	Sample		anions031030.met	031226_003.dxd	1000
4	238656D	Sample		anions031030.met	031226_004.dxd	1000
5	238656S	Sample		anions031030.met	031226_005.dxd	1000
6	238657	Sample		anions031030.met	031226_006.dxd	1000
7	238658	Sample		anions031030.met	031226_007.dxd	1000
8	238659	Sample		anions031030.met	031226_008.dxd	1000
9	238660	Sample		anions031030.met	031226_009.dxd	1000
10	238661	Sample		anions031030.met	031226_010.dxd	1000
11	238662	Sample		anions031030.met	031226_011.dxd	1000
12	238663	Sample		anions031030.met	031226_012.dxd	1000
13	CCV	Sample		anions031030.met	031226_013.dxd	20
14	CCB	Sample		anions031030.met	031226_014.dxd	1
15	238664	Sample		anions031030.met	031226_015.dxd	1000
16	238665	Sample		anions031030.met	031226_016.dxd	1000
17	238666	Sample		anions031030.met	031226_017.dxd	1000
18	238667	Sample		anions031030.met	031226_018.dxd	1000
19	238668	Sample		anions031030.met	031226_019.dxd	1000
20	238669	Sample		anions031030.met	031226_020.dxd	1000
21	238670	Sample		anions031030.met	031226_021.dxd	1000
22	238671	Sample		anions031030.met	031226_022.dxd	1000
23	238672	Sample		anions031030.met	031226_023.dxd	1000
24	238673	Sample		anions031030.met	031226_024.dxd	1000
25	CCV	Sample		anions031030.met	031226_025.dxd	20
26	CCB	Sample		anions031030.met	031226_026.dxd	1
27	238674	Sample		anions031030.met	031226_027.dxd	1000
28	238675	Sample		anions031030.met	031226_028.dxd	1000
29	CCV	Sample		anions031030.met	031226_029.dxd	20
30	CCB	Sample		anions031030.met	031226_030.dxd	1
31	239184	Sample		anions031030.met	031226_031.dxd	20
32	239184D	Sample		anions031030.met	031226_032.dxd	20
33	239184S	Sample		anions031030.met	031226_033.dxd	20
34	239184	Sample		anions031030.met	031226_034.dxd	1
35	239184D	Sample		anions031030.met	031226_035.dxd	1
36	239184S	Sample		anions031030.met	031226_036.dxd	1
37	CCV	Sample		anions031030.met	031226_037.dxd	20
38	CCB	Sample		anions031030.met	031226_038.dxd	1
39	CCB	Sample		astop.met	031226	1

Default Method Path: C:\PEAKNET\METHOD

Default Data Path: C:\PEAKNET\DATA\031226

Comment:

DIVISION 20 06002.01.071 TO# 031205-4

DIVISION 08 10286.01.001 TO# 031223-4

Southwest Research Institute
Dionex DX500 Ion Chromatography Daily Log

010073

Analyst: R SprusDate: 12/26/03Conductivity: 17.9

Client	Project #	TO #	Analytical Method
DIV 20.	06002.01.071	031205-4	300
DIV 08	10286.01.001	031223-4	↓

Loop: 40ulMethod: anions 03030Column: AS14# 015-02087Calibration: 10/30/03Comments: Division 20 dilutions and Division 08 Reanalyzed on 12/29/03 and 12/30/03

ICV/CCV/MS:

1st Source: SREX (Inorg # 4225)2nd Source: Nitrite NLot #: 24-T9ASLot #: 43-01-TC4CCV Conc: 1:20CCV Conc: 1:20MS Conc: 1:100MS Conc: 1:100

✓

ELUENT SOLUTION PREP:

1.0

mM Sodium Bicarbonate

&

3.5

FV = 2.0L DI H2O

mM Sodium Carbonate

Weight: 0.168g NaHCO₃Weight: 0.7419g Na₂CO₃Source: AldrichSource: Alfa AesarLot: 15308EILot: LO6M34

Other Eluent: _____

50

mA-Autoregen (ASRS)

Other Regen: _____

Balance # 116✓ AMS 12/31/03

Appendix: 5000J
1000H
200J

AMS 12/30/03

Schedule File: C:\PeakNet\schedule\29DEC03.sch

Line	Sample	Sample Type	Level	Method	Data File	Dilution
1	ICV	Sample		anions031030.met	031229_001.dxd	20
2	ICB	Sample		anions031030.met	031229_002.dxd	1
3	238663	Sample		anions031030.met	031229_003.dxd	2000
4	238664	Sample		anions031030.met	031229_004.dxd	2000
5	238665	Sample		anions031030.met	031229_005.dxd	2000
6	238666	Sample		anions031030.met	031229_006.dxd	2000
7	238667	Sample		anions031030.met	031229_007.dxd	2000
8	238668	Sample		anions031030.met	031229_008.dxd	2000
9	238669	Sample		anions031030.met	031229_009.dxd	2000
10	238670	Sample		anions031030.met	031229_010.dxd	2000
11	238671	Sample		anions031030.met	031229_011.dxd	2000
12	238672	Sample		anions031030.met	031229_012.dxd	2000
13	CCV	Sample		anions031030.met	031229_013.dxd	20
14	238673	Sample		anions031030.met	031229_014.dxd	1
15	238674	Sample		anions031030.met	031229_015.dxd	2000
16	238675	Sample		anions031030.met	031229_016.dxd	2000
17	CCV	Sample		anions031030.met	031229_017.dxd	20
18	CCB	Sample		anions031030.met	031229_018.dxd	1
19	238673	Sample		anions031030.met	031229_019.dxd	2000
20	237674	Sample		anions031030.met	031229_020.dxd	2000
21	238675	Sample		anions031030.met	031229_021.dxd	2000
22	CCV	Sample		anions031030.met	031229_022.dxd	20
23	CCB	Sample		anions031030.met	031229_023.dxd	1
24	CCB	Sample		astop.met	031229	1

*VOID
Mixed
CCB*Default Method Path: C:\PEAKNET\METHOD
Default Data Path: C:\PEAKNET\DATA\031229

Comment:

DIVISION 20 06002.01.071 TO# 031205-4 RERUNS

Southwest Research Institute
Dionex DX500 Ion Chromatography Daily Log

010075

Analyst: amsDate: 12/29/03Conductivity: 17.9

Client	Project #	TO #	Analytical Method
Division 20	06002, 01, 071	03005-4	300

Loop: 40ul Method: Anions 031030
 Column: AS14# 015-02087 Calibration: 10/30/03
 Comments: Dilutions from 12/26/03

ICV/CCV/MS:

1st Source: Spex (Inorg# 4225) 2nd Source: Nitrate - N
 Lot #: 24-79AS Lot #: 43-01-IC4
 CCV Conc: 1:20 CCV Conc: 1:20
 MS Conc: 4:100 ams NA MS Conc: NA
12/29/03

✓ ELUENT SOLUTION PREP: FV = 2.0L DI H2O
1.0 mM Sodium Bicarbonate & 3.5 mM Sodium Carbonate
 Weight: 0.1168 NaHCO₃ Weight: 0.7419 Na₂CO₃
 Source: Aldrich Source: Alfa Aesar
 Lot: 15308EI Lot: LO6m34

Other Eluent: _____

50 mA-Autoregen (ASRS)

Other Regen: _____

Balazs Ho
Richard Ho
12/31/03

Appendix: 5000 J
 1000 H
 200 J

Line	Sample	Sample Type	Level	Method	Data File	Dilution
1	0 PPM 85-07-IC4	Calibration St	1	anions031030.met	031030_001.dxd	1
2	0.1 PPM 85-06-IC4	Calibration St	2	anions031030.met	031030_002.dxd	1
3	0.5 PPM 85-05-IC4	Calibration St	3	anions031030.met	031030_003.dxd	1
4	1.0 PPM 85-04-IC4	Calibration St	4	anions031030.met	031030_004.dxd	1
5	5.0 PPM 85-03-IC4	Calibration St	5	anions031030.met	031030_005.dxd	1
6	10 PPM 85-02-IC4	Calibration St	6	anions031030.met	031030_006.dxd	1
7	15 PPM 85-01-IC4	Calibration St	7	anions031030.met	031030_007.dxd	1
8	20 PPM 80-01-IC4	Calibration St	8	anions031030.met	031030_008.dxd	1
9	ICV	Sample		anions031030.met	031030_009.dxd	20
10	ICB	Sample		anions031030.met	031030_010.dxd	1
11	ICB	Sample		astop.met	031030	1

010076

Default Method Path: C:\PEAKNET\METHOD

Default Data Path: c:\peaknet\data\031030

Comment:

OHD01.113 CURVE

1. Component:FLUORIDE

Standard:External Fit Type:Cubic

Origin:Include Calibration:Area

$r^2=0.999976$

$Amt=2.984691e-020*Resp^3+$

$-2.901006e-013*Resp^2+$

$4.405225e-006*Resp+0.05022$

2. Component:CHLORIDE

Standard:External Fit Type:Cubic

Origin:Include Calibration:Area

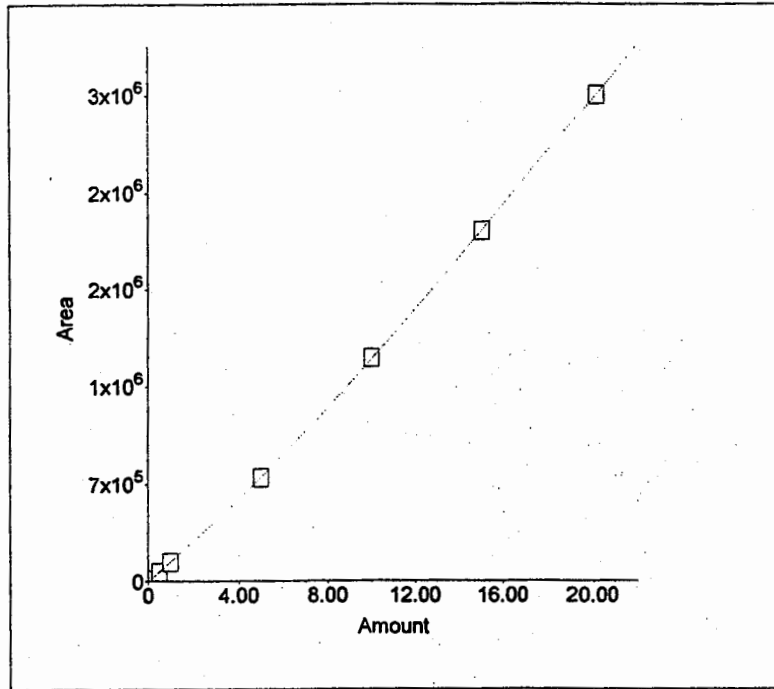
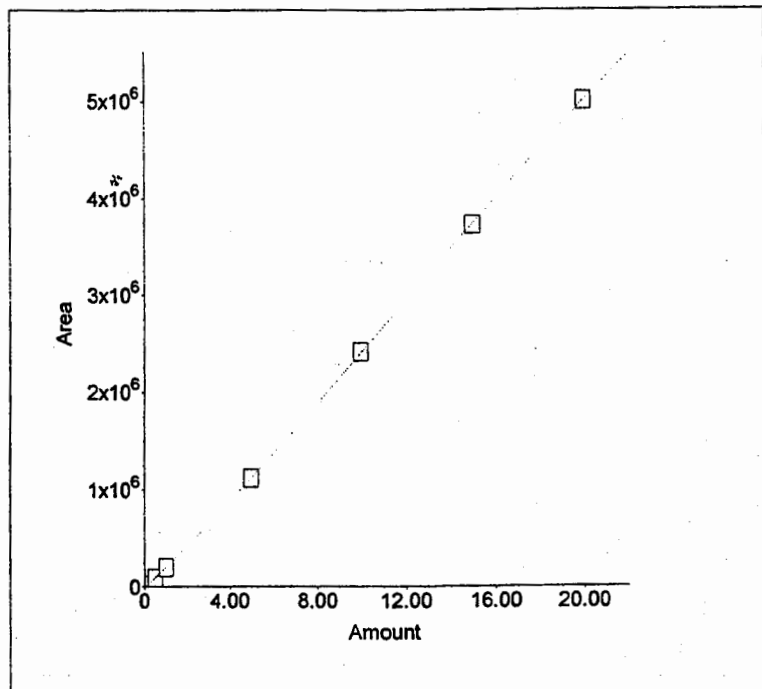
$r^2=0.999990$

$Amt=5.427475e-020*Resp^3+$

$-5.472456e-013*Resp^2+$

$6.655486e-006*Resp+0.01251$

010077



3. Component:NITRITE-N

Standard:External Fit Type:Cubic

Origin:Include Calibration:Area

$r^2=0.999995$

$Amt=1.005872e-020*Resp^3+$

$-1.354631e-013*Resp^2+$

$3.133897e-006*Resp+0.02617$

4. Component:BROMIDE

Standard:External Fit Type:Cubic

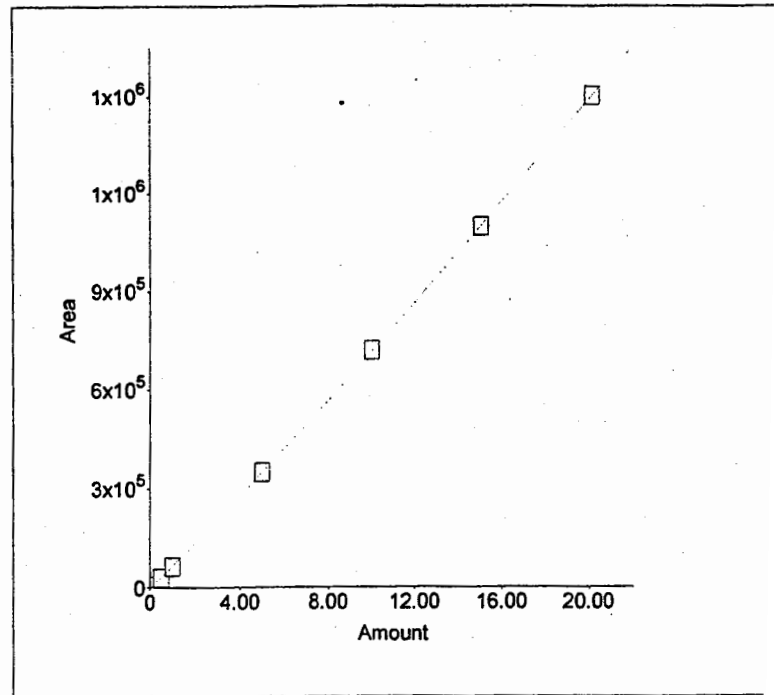
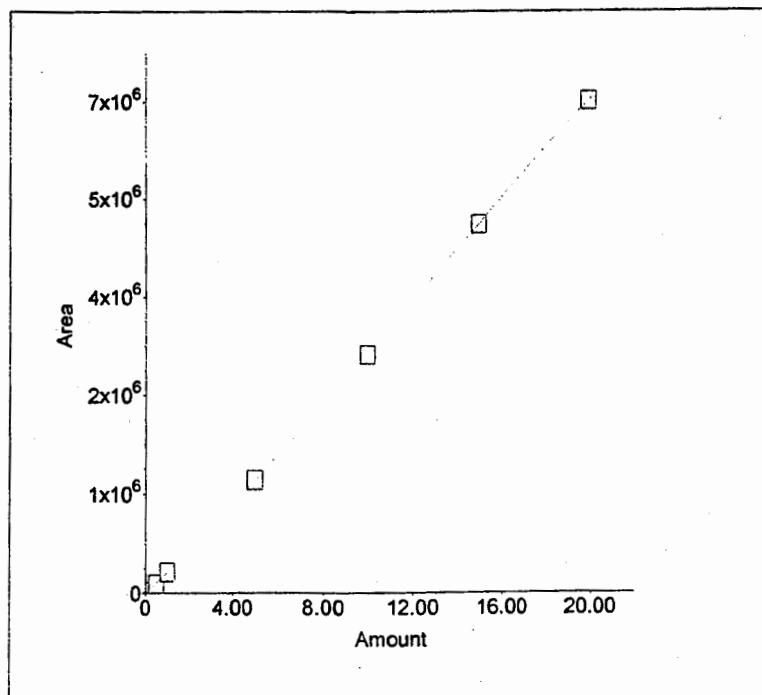
Origin:Include Calibration:Area

$r^2=0.999985$

$Amt=2.191831e-020*Resp^3+$

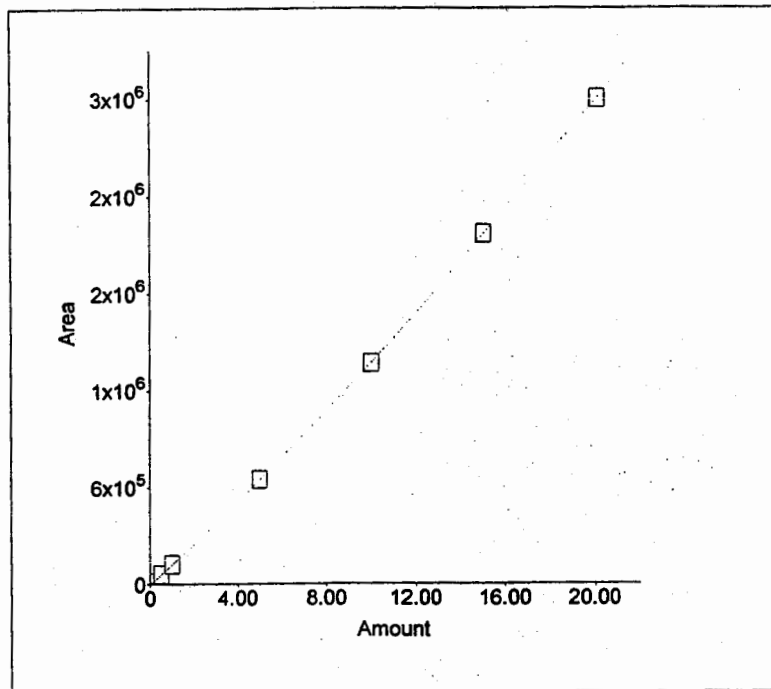
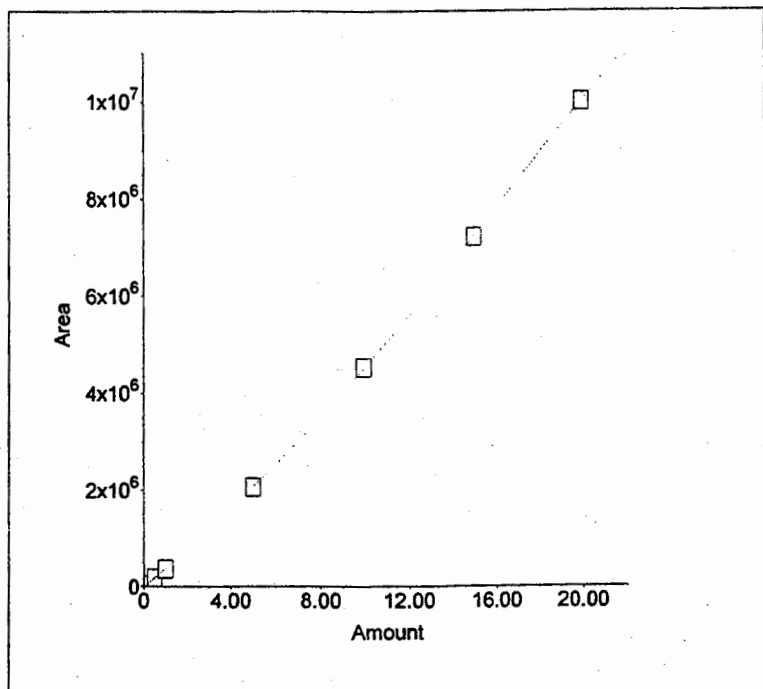
$-7.950348e-013*Resp^2+$

$1.405468e-005*Resp+0.04187$

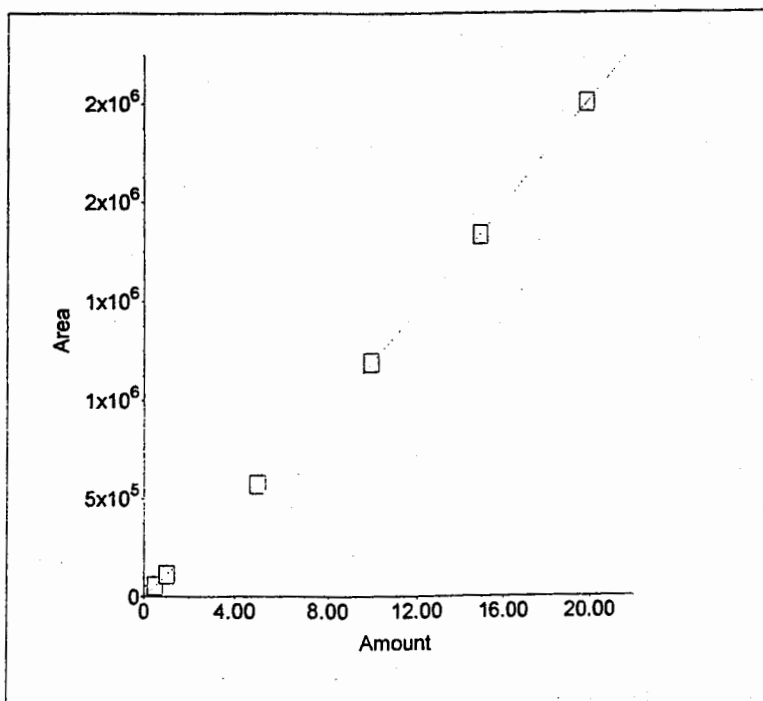


5. Component:NITRATE-N
 Standard:External Fit Type:Cubic
 Origin:Include Calibration:Area
 $r^2=0.999984$
 $Amt=4.360084e-021*Resp^3+$
 $-1.021898e-013*Resp^2+$
 $2.537407e-006*Resp+0.03026$

6. Component:PHOSPHATE-P
 Standard:External Fit Type:Cubic
 Origin:Include Calibration:Area
 $r^2=0.999996$
 $Amt=6.176937e-020*Resp^3+$ 010078
 $-6.092735e-013*Resp^2+$
 $7.325485e-006*Resp+0.005768$



7. Component:SULFATE
 Standard:External Fit Type:Cubic
 Origin:Include Calibration:Area
 $r^2=0.999994$
 $Amt=7.361815e-020*Resp^3+$
 $-5.793607e-013*Resp^2+$
 $8.645523e-006*Resp+0.006746$



Sample Name : 0 PPM 85-07-IC4

Dilution Factor : 1.00

Injection Number : 1

Data File Name : c:\peaknet\data\031030\031030_001.DXD

Method File Name : ...ANIONS031030.met

Schedule File Name : c:\peaknet\schedule\031030.sch

Date Time Collected : 10/30/03 6:24:36 PM

Date Time Updated : 10/31/03 9:57:42 AM

System Name : Dx-500

Detector Name : Conductivity Detector

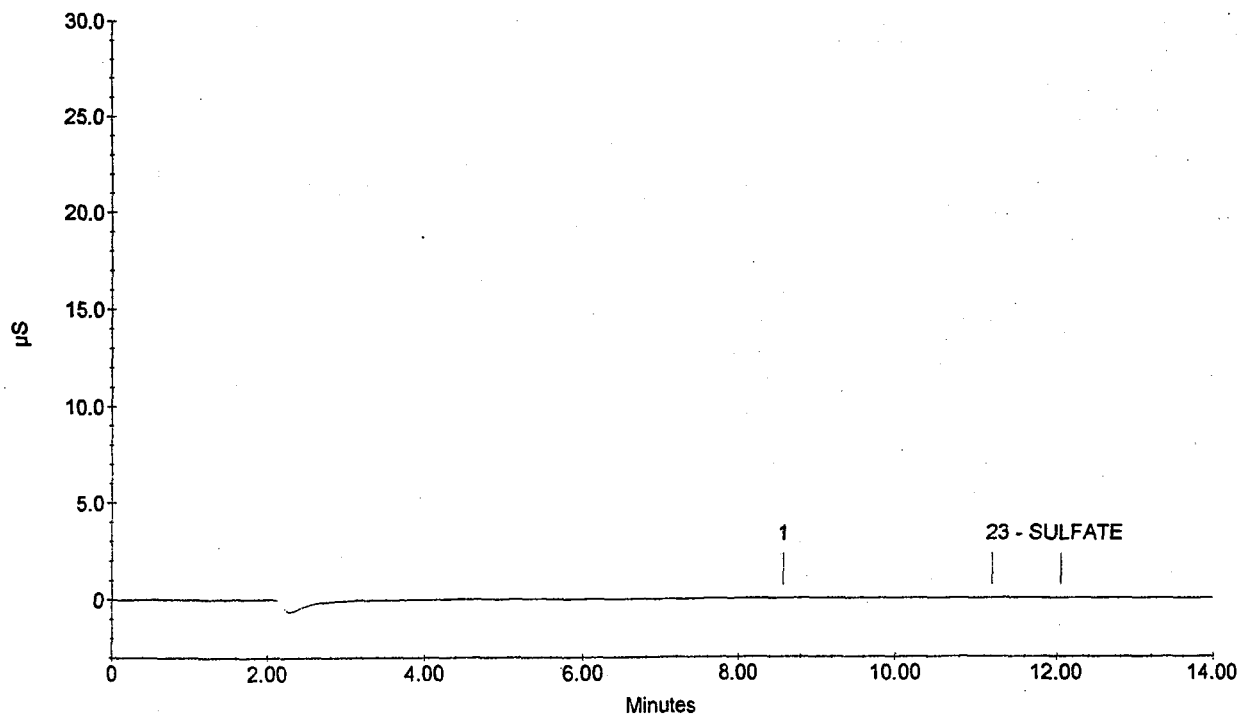
Column Type : AS14-#015724 AG14-#101809

System Operator : RSS

610079

Peak Information : All Components					
Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	8.57	CHLORIDE NITRITE-N BROMIDE NITRATE-N PHOSPHATE-P SULFATE	0.00	376	39
3	12.05		0.00	631	56

0 PPM 85-07-IC4



Sample Name : 0.1 PPM 85-06-IC4

Dilution Factor : 1.00

Injection Number : 2

Data File Name : c:\peaknet\data\031030\031030_002.DXD

Method File Name : ...ANIONS031030.met

Schedule File Name : c:\peaknet\schedule\031030.sch

Date Time Collected : 10/30/03 6:41:21 PM

Date Time Updated : 10/31/03 9:57:53 AM

System Name : Dx-500

Detector Name : Conductivity Detector

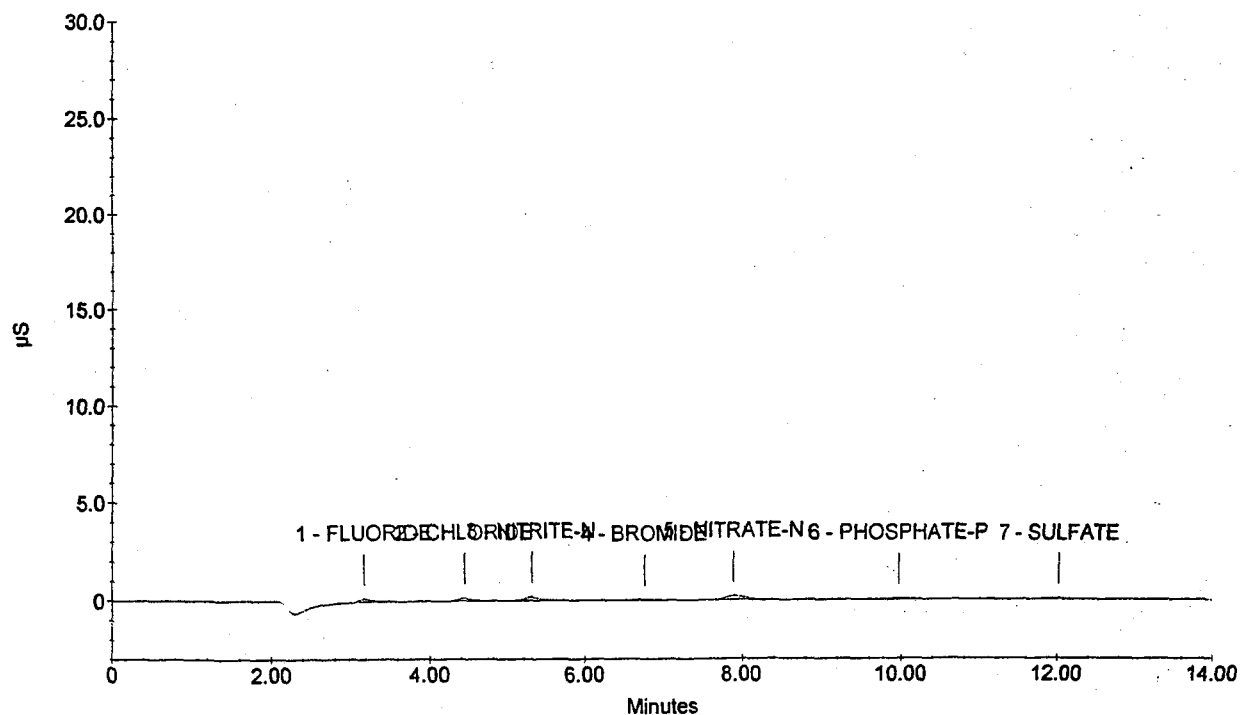
Column Type : AS14-#015724 AG14-#1018096

System Operator : RSS

010080

Peak Information : All Components					
Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	3.17	FLUORIDE	0.10	14484	1486
2	4.44	CHLORIDE	0.10	15462	1343
3	5.30	NITRITE-N	0.10	25780	1942
4	6.76	BROMIDE	0.10	5656	406
5	7.89	NITRATE-N	0.10	34592	1988
6	9.97	PHOSPHATE-P	0.10	12516	590
7	12.02	SULFATE	0.10	8446	366

0.1 PPM 85-06-IC4



Sample Name : 0.5 PPM 85-05-IC4

Dilution Factor : 1.00

Injection Number : 3

Data File Name : c:\peaknet\data\031030\031030_003.DXD

Method File Name : ...ANIONS031030.met

Schedule File Name : c:\peaknet\schedule\031030.sch

Date Time Collected : 10/30/03 6:58:15 PM

Date Time Updated : 10/31/03 9:58:07 AM

System Name : Dx-500

Detector Name : Conductivity Detector

Column Type : AS14-#015724 AG14-#1018096

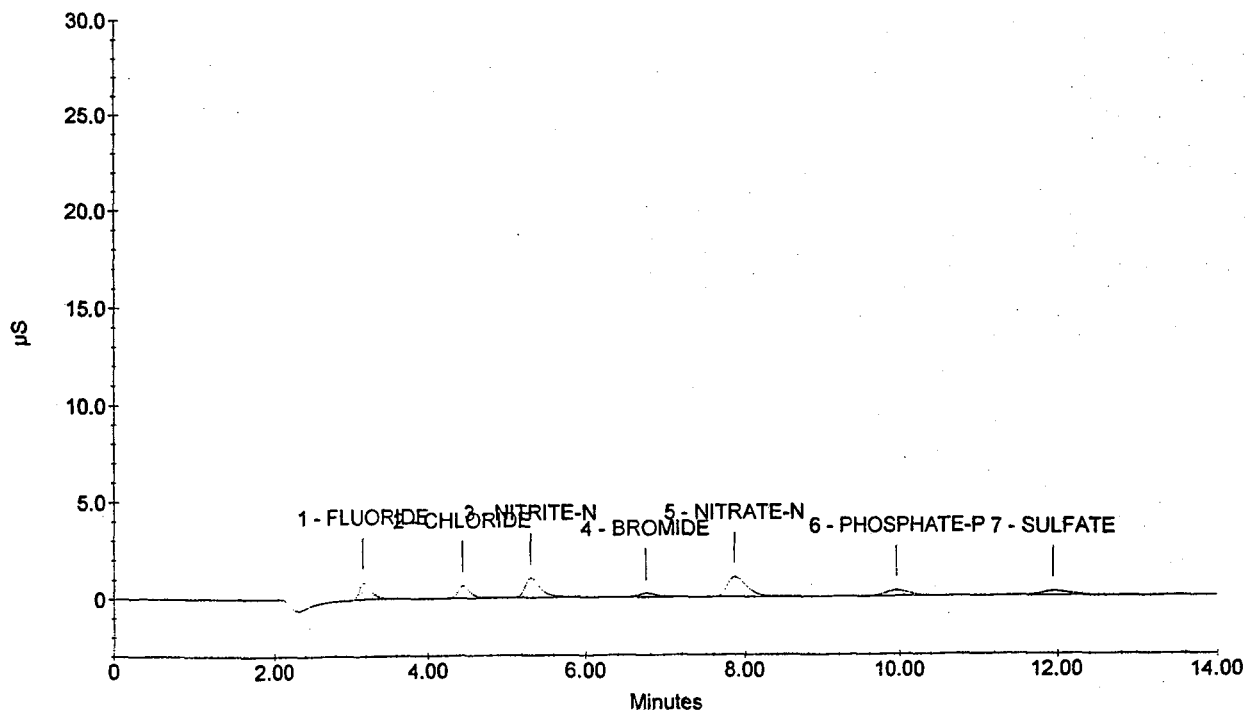
System Operator : RSS

010081

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	3.16	FLUORIDE	0.50	92844	8556
2	4.44	CHLORIDE	0.50	71306	6536
3	5.30	NITRITE-N	0.50	140709	10168
4	6.74	BROMIDE	0.50	30321	2017
5	7.86	NITRATE-N	0.50	182159	10194
6	9.96	PHOSPHATE-P	0.50	66576	2964
7	11.94	SULFATE	0.50	56932	2236

0.5 PPM 85-05-IC4



Sample Name : 1.0 PPM 85-04-IC4

Dilution Factor : 1.00

Injection Number : 4

Data File Name : c:\peaknet\data\031030\031030_004.DXD

Method File Name : ...ANIONS031030.met

Schedule File Name : c:\peaknet\schedule\031030.sch

Date Time Collected : 10/30/03 7:15:08 PM

Date Time Updated : 10/31/03 9:58:18 AM

System Name : Dx-500

Detector Name : Conductivity Detector

Column Type : AS14-#015724 AG14-#1018096

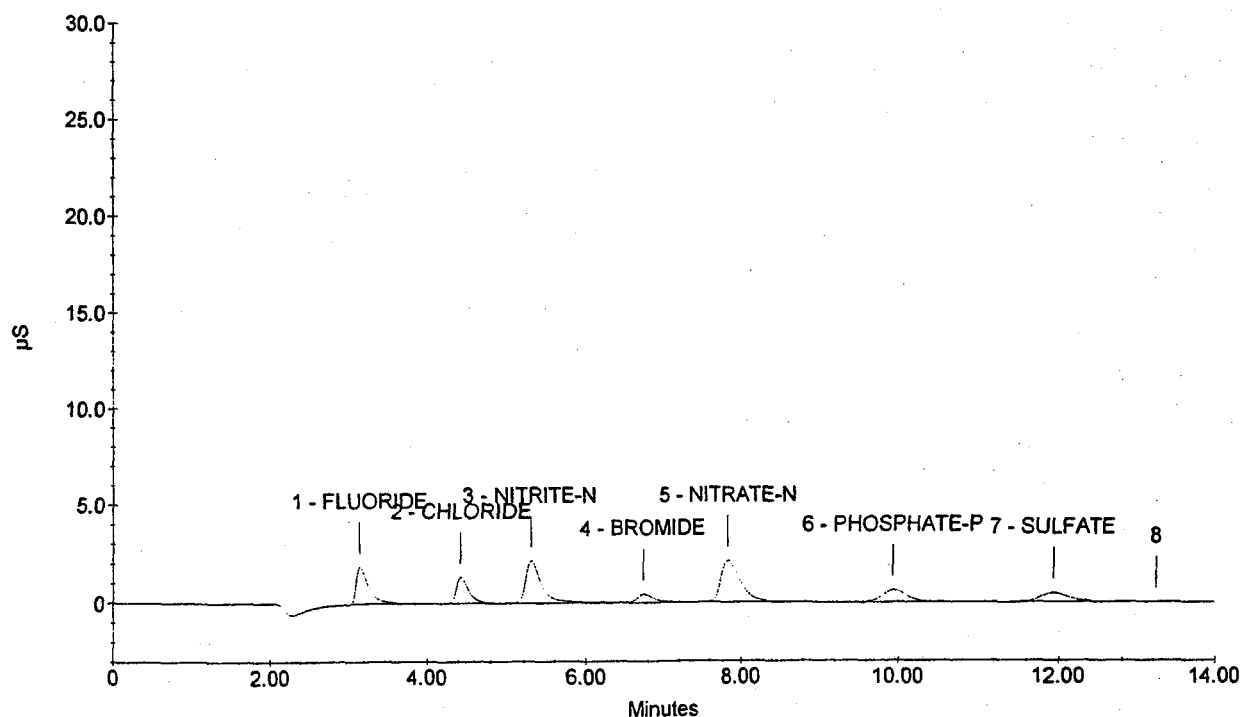
System Operator : RSS

010082

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	3.14	FLUORIDE	1.00	214218	18502
2	4.42	CHLORIDE	1.00	149359	13206
3	5.29	NITRITE-N	1.00	314128	21194
4	6.73	BROMIDE	1.00	65705	4222
5	7.82	NITRATE-N	1.00	373768	21017
6	9.93	PHOSPHATE-P	1.00	136984	6000
7	11.93	SULFATE	1.00	117341	4677

1.0 PPM 85-04-IC4



Sample Name : 5.0 PPM 85-03-IC4

Dilution Factor : 1.00

Injection Number : 5

Data File Name : c:\peaknet\data\031030\031030_005.DXD

Method File Name : ...ANIONS031030.met

Schedule File Name : c:\peaknet\schedule\031030.sch

Date Time Collected : 10/30/03 7:32:06 PM

Date Time Updated : 10/31/03 9:58:31 AM

System Name : Dx-500

Detector Name : Conductivity Detector

Column Type : AS14-#015724 AG14-#1018096

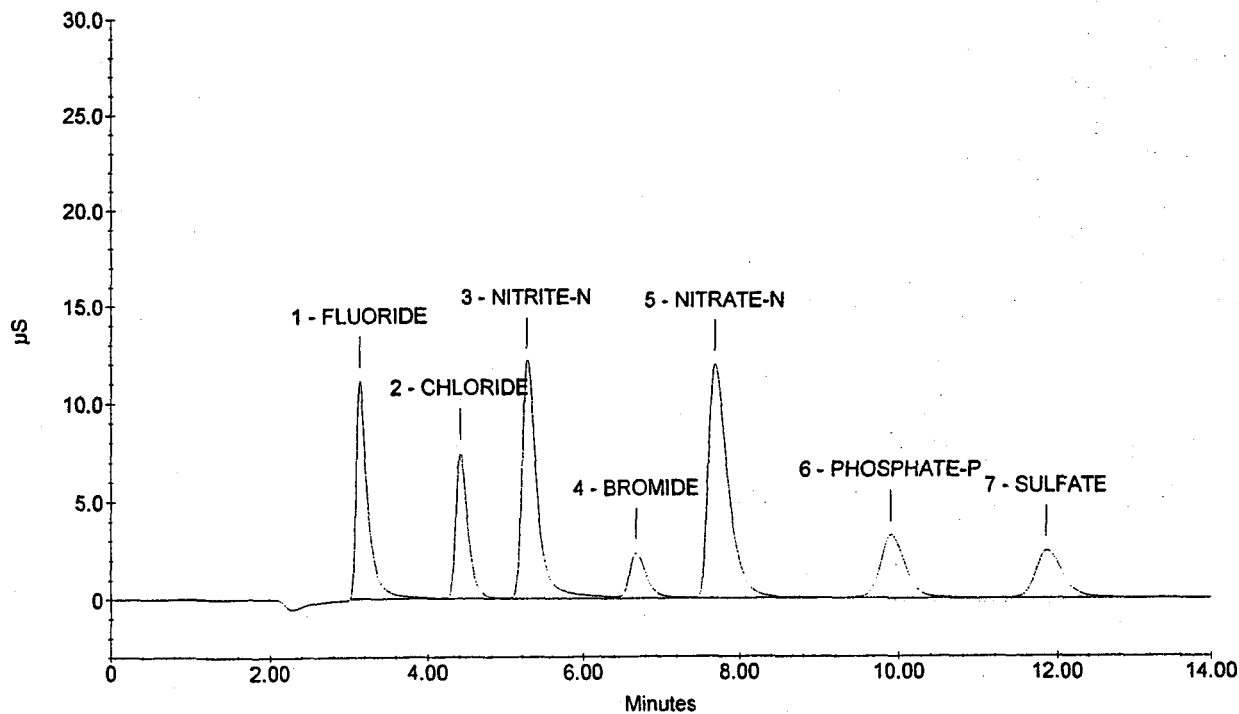
System Operator : RSS

010083

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	3.14	FLUORIDE	5.00	1200566	110997
2	4.41	CHLORIDE	5.00	792586	74186
3	5.26	NITRITE-N	5.00	1697948	120665
4	6.68	BROMIDE	5.00	359587	23105
5	7.68	NITRATE-N	5.00	2111690	118987
6	9.89	PHOSPHATE-P	5.00	725614	32369
7	11.85	SULFATE	5.00	596614	24245

5.0 PPM 85-03-IC4



Sample Name : 10 PPM 85-02-IC4

Dilution Factor : 1.00

Injection Number : 6

Data File Name : c:\peaknet\data\031030\031030_006.DXD

Method File Name : ...ANIONS031030.met

Schedule File Name : c:\peaknet\schedule\031030.sch

Date Time Collected : 10/30/03 7:48:55 PM

Date Time Updated : 10/31/03 9:58:42 AM

System Name : Dx-500

Detector Name : Conductivity Detector

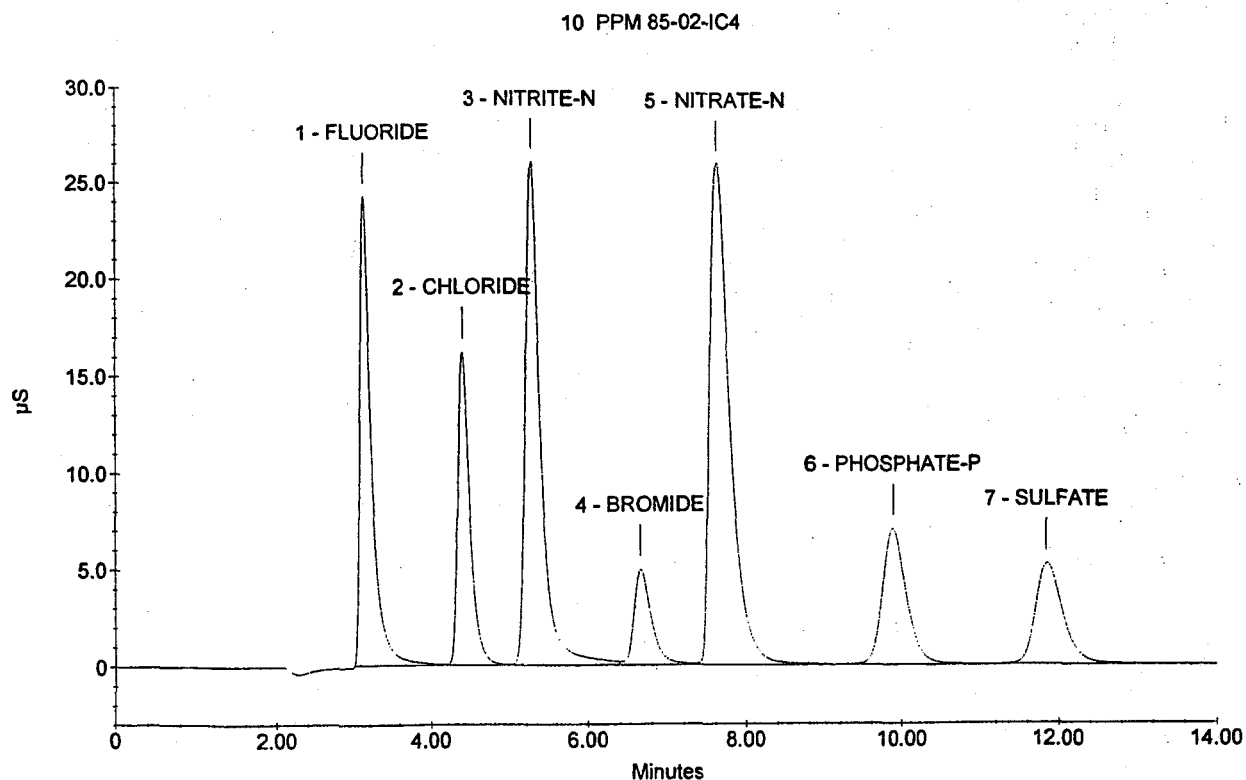
Column Type : AS14-#015724 AG14-#1018096

System Operator : RSS

010084

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	3.14	FLUORIDE	10.00	2596075	241702
2	4.41	CHLORIDE	10.00	1705862	161209
3	5.28	NITRITE-N	10.00	3591281	259305
4	6.65	BROMIDE	10.00	741215	48923
5	7.61	NITRATE-N	10.00	4644293	257786
6	9.88	PHOSPHATE-P	10.00	1523705	69799
7	11.84	SULFATE	10.00	1247201	51619



Sample Name : 15 PPM 85-01-IC4

Dilution Factor : 1.00

Injection Number : 7

Data File Name : c:\peaknet\data\031030\031030_007.DXD

Method File Name : ...ANIONS031030.met

Schedule File Name : c:\peaknet\schedule\031030.sch

Date Time Collected : 10/30/03 8:05:47 PM

Date Time Updated : 10/31/03 9:58:53 AM

System Name : Dx-500

Detector Name : Conductivity Detector

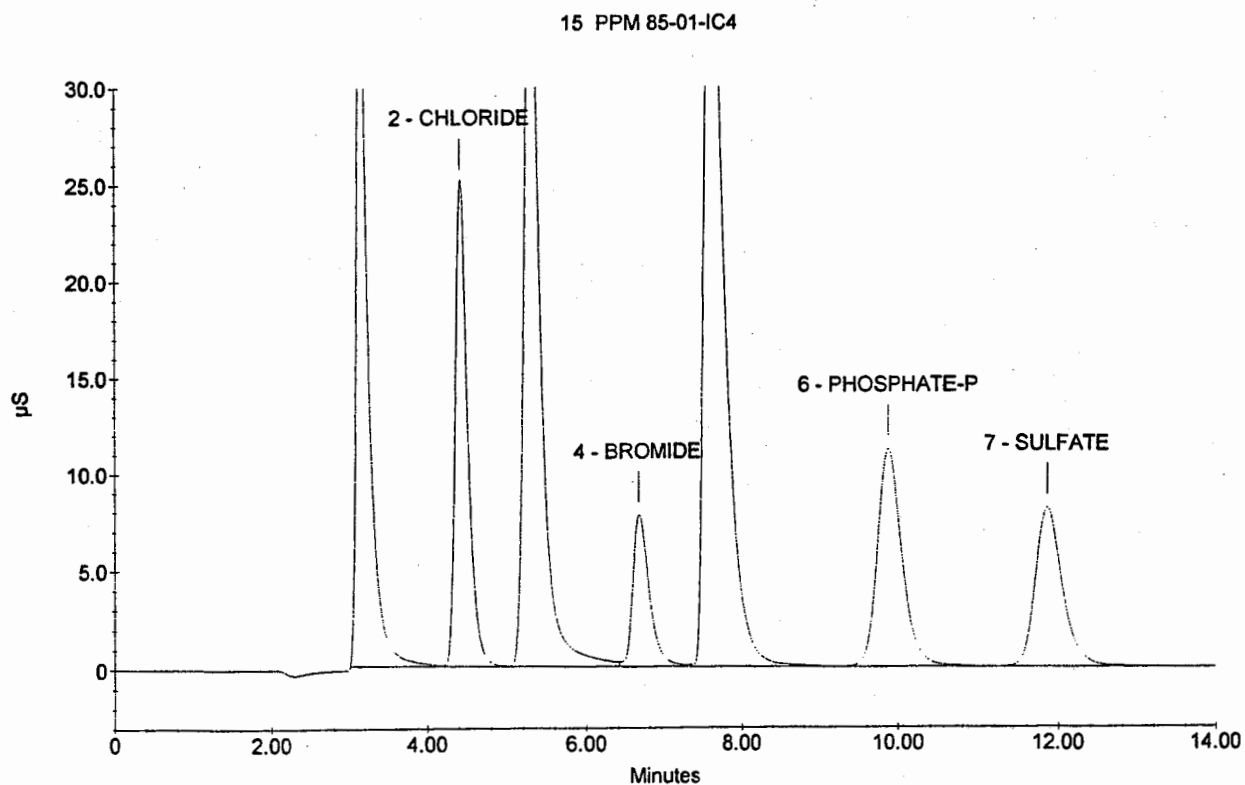
Column Type : AS14-#015724 AG14-#1018096

System Operator : RSS

010085

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	3.16	FLUORIDE	15.00	4006405	363037
2	4.42	CHLORIDE	15.00	2682107	249298
3	5.30	NITRITE-N	15.00	5562657	395494
4	6.65	BROMIDE	15.00	1132917	76551
5	7.58	NITRATE-N	15.00	7395306	400105
6	9.86	PHOSPHATE-P	15.00	2415488	111338
7	11.85	SULFATE	15.00	1918601	80830



Sample Name : 20 PPM 80-01-IC4

Dilution Factor : 1.00

Injection Number : 8

Data File Name : c:\peaknet\data\031030\031030_008.DXD

Method File Name : ...ANIONS031030.met

Schedule File Name : c:\peaknet\schedule\031030.sch

Date Time Collected : 10/30/03 8:22:35 PM

Date Time Updated : 10/31/03 9:59:05 AM

System Name : Dx-500

Detector Name : Conductivity Detector

Column Type : AS14-#015724 AG14-#1018096

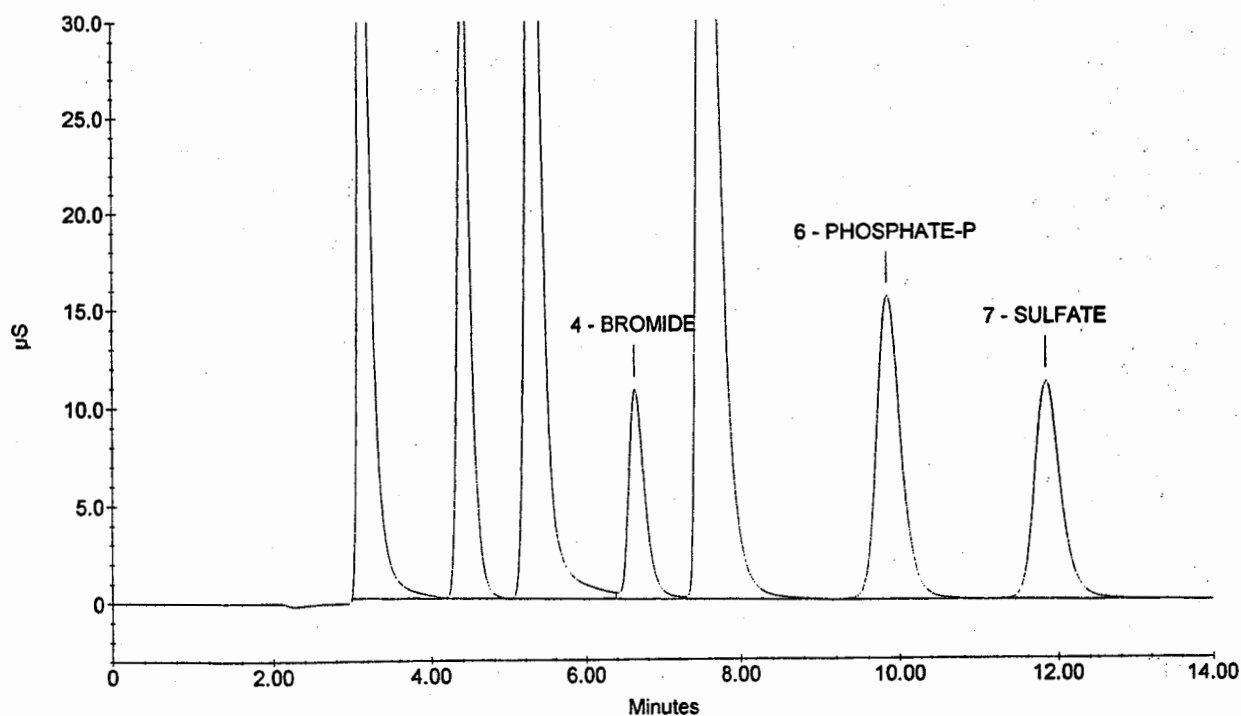
System Operator : RSS

010086

Peak Information : All Components

Peak Number	Peak Retention Time	Component Name	Concentration, ppm (ppm)	Peak Area	Peak Height
1	3.17	FLUORIDE	20.00	5382201	485927
2	4.42	CHLORIDE	20.00	3722909	337695
3	5.32	NITRITE-N	20.00	7445030	519303
4	6.62	BROMIDE	20.00	1550662	106930
5	7.53	NITRATE-N	20.00	10255207	549391
6	9.82	PHOSPHATE-P	20.00	3343532	154932
7	11.82	SULFATE	20.00	2619892	111430

20 PPM 80-01-IC4



Sample Name : ICV
 Dilution Factor : 20.00
 Injection Number : 9
 Data File Name : c:\peaknet\data\031030\031030_009.DXD
 Method File Name : ...ANIONS031030.met
 Schedule File Name : c:\peaknet\schedule\031030.sch

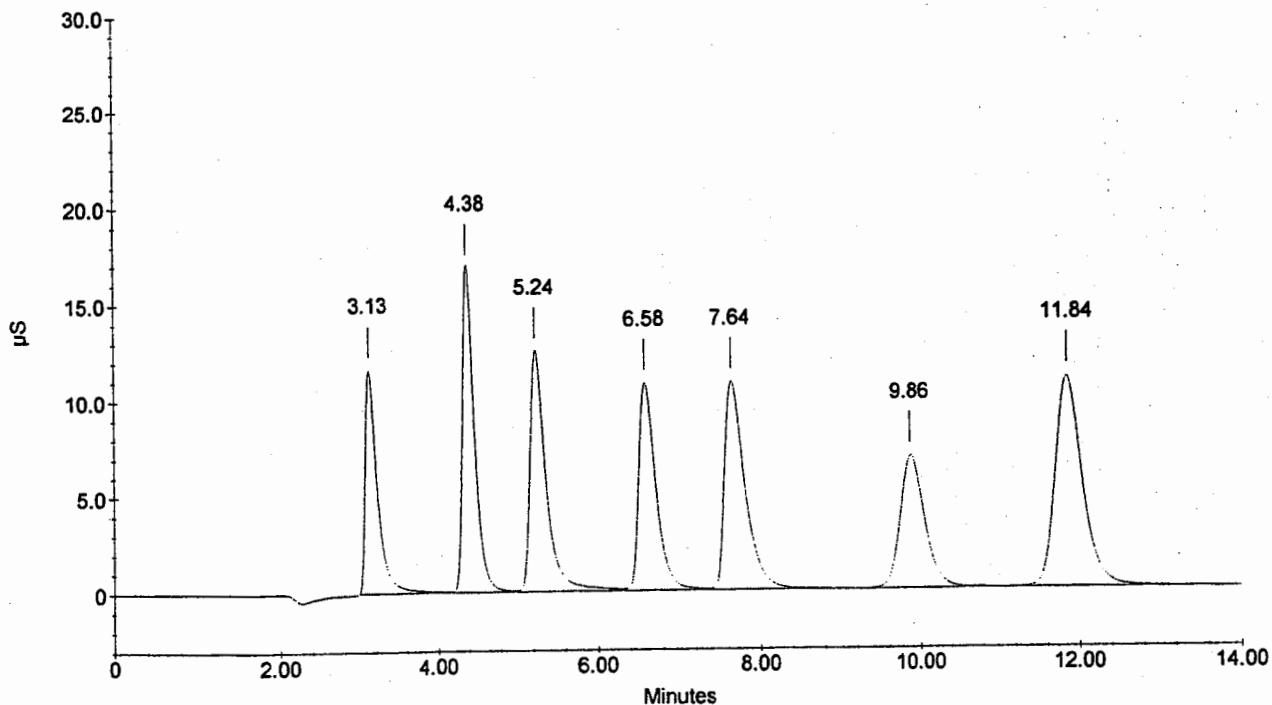
Date Time Collected : 10/30/03 8:39:26 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010087

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.13	FLUORIDE	103.430	116030	1252548	2	-1.26
2	4.38	CHLORIDE	209.480	168083	1788139	2	-0.90
3	5.24	NITRITE-N	101.967	124771	1731415	2	-1.50
4	6.58	BROMIDE	401.001	107834	1554418	2	-0.60
5	7.64	NITRATE-N	90.624	108083	1908595	2	1.42
6	9.86	PHOSPHATE-P	198.420	68962	1515130	2	0.41
7	11.84	SULFATE	394.867	110022	2583275	2	0.11
			---total(s)---				
0.00			1499.790		12333521		

ICV



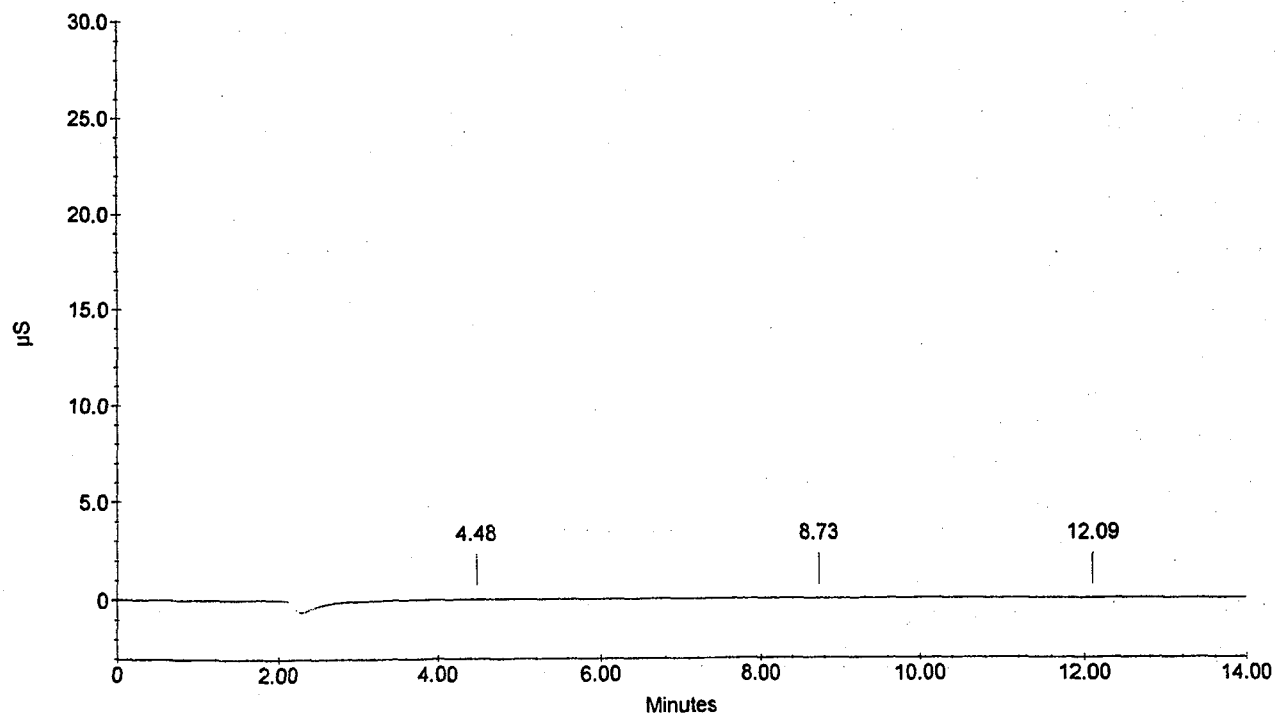
Sample Name : ICB
 Dilution Factor : 1.00
 Injection Number : 10
 Data File Name : c:\peaknet\data\031030\031030_010.DXD
 Method File Name : ...ANIONS031030.met
 Schedule File Name : c:\peaknet\schedule\031030.sch

Date Time Collected : 10/30/03 8:56:20 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010088

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.48	CHLORIDE	0.016	67	567	1	1.21
1	4.48	CHLORIDE	0.016	67	567	1	1.21
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
3	12.09	SULFATE	0.015	57	962	1	2.26
---total(s)---							
	0.00		0.048		2096		

ICB



010089
R Spores

Schedule File: C:\PeakNet\schedule\031030.sch

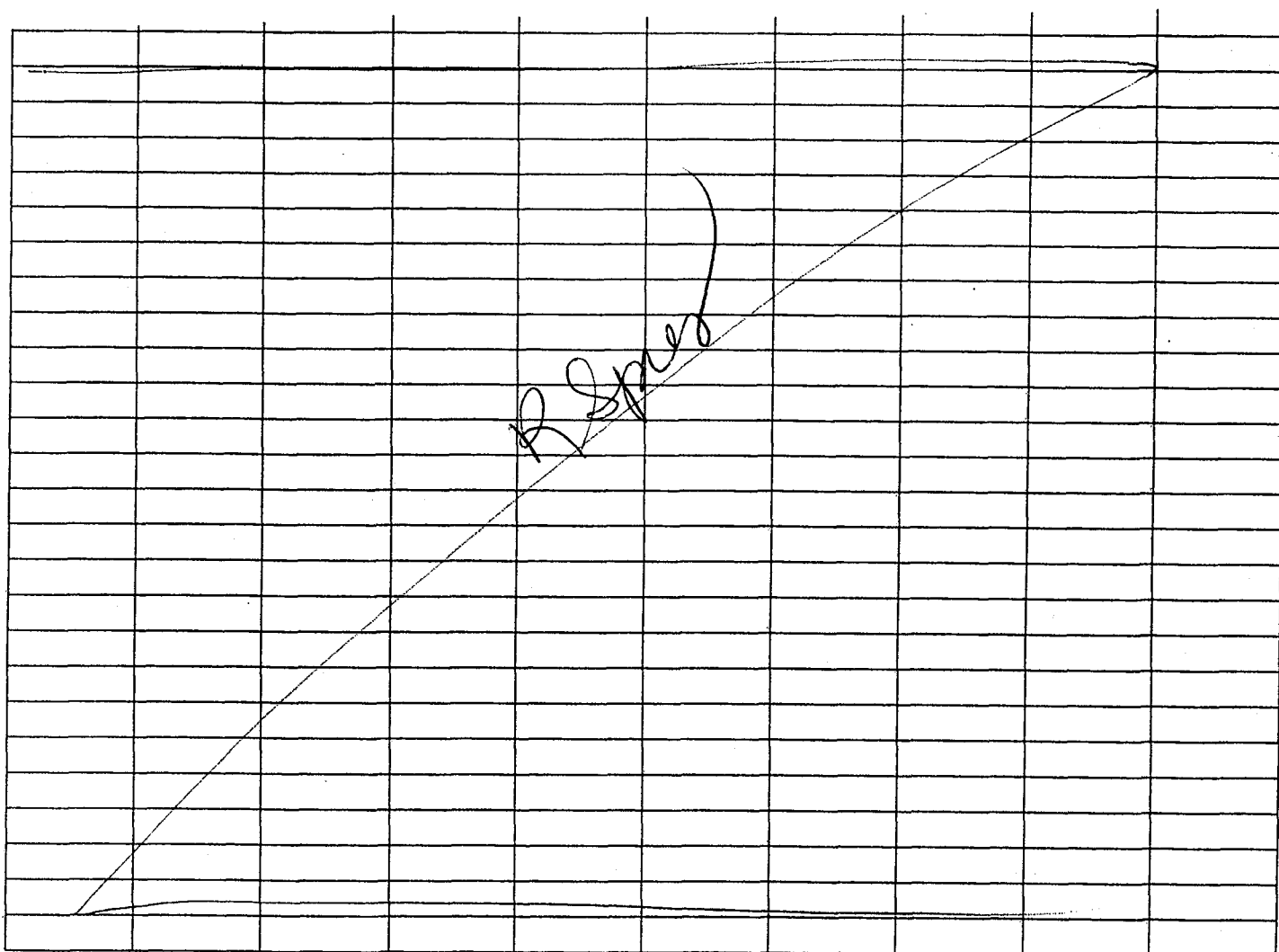
Line	Sample	Sample Type	Level	Method	Data File	Dilution
1	0 PPM 85-07-IC4	Calibration St	1	anions031030.met	031030_001.dxd	1
2	0.1 PPM 85-06-IC4	Calibration St	2	anions031030.met	031030_002.dxd	1
3	0.5 PPM 85-05-IC4	Calibration St	3	anions031030.met	031030_003.dxd	1
4	1.0 PPM 85-04-IC4	Calibration St	4	anions031030.met	031030_004.dxd	1
5	5.0 PPM 85-03-IC4	Calibration St	5	anions031030.met	031030_005.dxd	1
6	10 PPM 85-02-IC4	Calibration St	6	anions031030.met	031030_006.dxd	1
7	15 PPM 85-01-IC4	Calibration St	7	anions031030.met	031030_007.dxd	1
8	20 PPM 80-01-IC4	Calibration St	8	anions031030.met	031030_008.dxd	1
9	ICV	Sample		anions031030.met	031030_009.dxd	20
10	ICB	Sample		anions031030.met	031030_010.dxd	1
11	ICB	Sample		astop.met	031030	1

Default Method Path: C:\PEAKNET\METHOD

Default Data Path: c:\peaknet\data\031030

Comment:

OHD01.113 CURVE



Line	Sample	Sample Type	Level	Method	Data File	Dilution
1	ICV	Sample		anions031030.met	031226_001.dxd	20
2	ICB	Sample		anions031030.met	031226_002.dxd	1
3	238656	Sample		anions031030.met	031226_003.dxd	1000
4	238656D	Sample		anions031030.met	031226_004.dxd	1000
5	238656S	Sample		anions031030.met	031226_005.dxd	1000
6	238657	Sample		anions031030.met	031226_006.dxd	1000
7	238658	Sample		anions031030.met	031226_007.dxd	1000
8	238659	Sample		anions031030.met	031226_008.dxd	1000
9	238660	Sample		anions031030.met	031226_009.dxd	1000
10	238661	Sample		anions031030.met	031226_010.dxd	1000
11	238662	Sample		anions031030.met	031226_011.dxd	1000
12	238663	Sample		anions031030.met	031226_012.dxd	1000
13	CCV	Sample		anions031030.met	031226_013.dxd	20
14	CCB	Sample		anions031030.met	031226_014.dxd	1
15	238664	Sample		anions031030.met	031226_015.dxd	1000
16	238665	Sample		anions031030.met	031226_016.dxd	1000
17	238666	Sample		anions031030.met	031226_017.dxd	1000
18	238667	Sample		anions031030.met	031226_018.dxd	1000
19	238668	Sample		anions031030.met	031226_019.dxd	1000
20	238669	Sample		anions031030.met	031226_020.dxd	1000
21	238670	Sample		anions031030.met	031226_021.dxd	1000
22	238671	Sample		anions031030.met	031226_022.dxd	1000
23	238672	Sample		anions031030.met	031226_023.dxd	1000
24	238673	Sample		anions031030.met	031226_024.dxd	1000
25	CCV	Sample		anions031030.met	031226_025.dxd	20
26	CCB	Sample		anions031030.met	031226_026.dxd	1
27	238674	Sample		anions031030.met	031226_027.dxd	1000
28	238675	Sample		anions031030.met	031226_028.dxd	1000
29	CCV	Sample		anions031030.met	031226_029.dxd	20
30	CCB	Sample		anions031030.met	031226_030.dxd	1
31	239184	Sample		anions031030.met	031226_031.dxd	20
32	239184D	Sample		anions031030.met	031226_032.dxd	20
33	239184S	Sample		anions031030.met	031226_033.dxd	20
34	239184	Sample		anions031030.met	031226_034.dxd	1
35	239184D	Sample		anions031030.met	031226_035.dxd	1
36	239184S	Sample		anions031030.met	031226_036.dxd	1
37	CCV	Sample		anions031030.met	031226_037.dxd	20
38	CCB	Sample		anions031030.met	031226_038.dxd	1
39	CCB	Sample		astop.met	031226	1

010090

Default Method Path: C:\PEAKNET\METHOD

Default Data Path: C:\PEAKNET\DATA\031226

Comment:

DIVISION 20 06002.01.071 TO# 031205-4

DIVISION 08 10286.01.001 TO# 031223-4

ICV/CCV Source Spex 24-79AS (Dnorg# 4225)

FI 100 mg/L

Cl 200

Br 400

NO₃N 90.4PO₄P 191SO₄ 400NO₂-N Source 43-01-IC4 100mg/L

- MS Spiked 0.05 ml Spex and 43-01-IC4 into 5ml sample
and 5 ml of diluted sample.

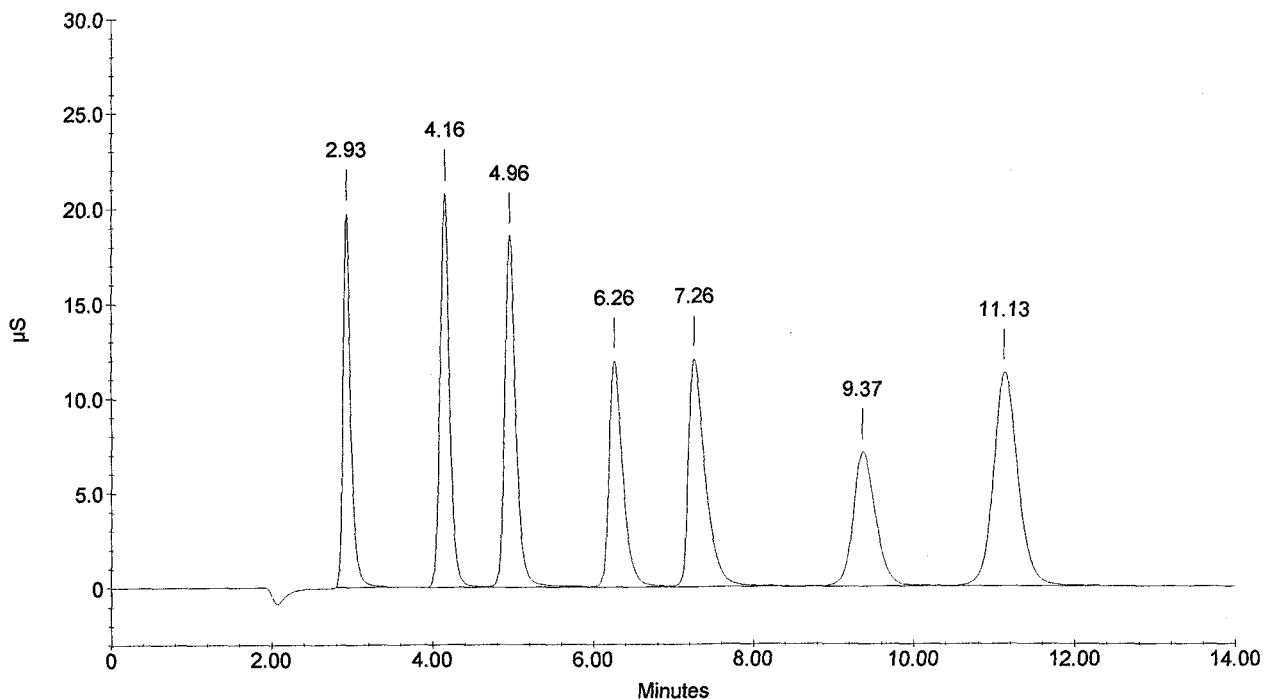
Sample Name : ICV
 Dilution Factor : 20.00
 Injection Number : 1
 Data File Name : c:\peaknet\data\031226\031226_001.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 1:11:10 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010091

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	2.93	FLUORIDE	107.155	196724	1301432	1	-7.57
2	4.16	CHLORIDE	198.607	207404	1684516	2	-6.03
3	4.96	NITRITE-N	105.587	184523	1797223	2	-6.77
4	6.26	BROMIDE	371.146	119191	1428229	2	-5.44
5	7.26	NITRATE-N	85.206	120148	1785702	2	-3.54
6	9.37	PHOSPHATE-P	183.101	70681	1386356	2	-4.61
7	11.13	SULFATE	367.267	112444	2389742	2	-5.86
			---total(s)---				
0.00			1418.069		11773201		

ICV



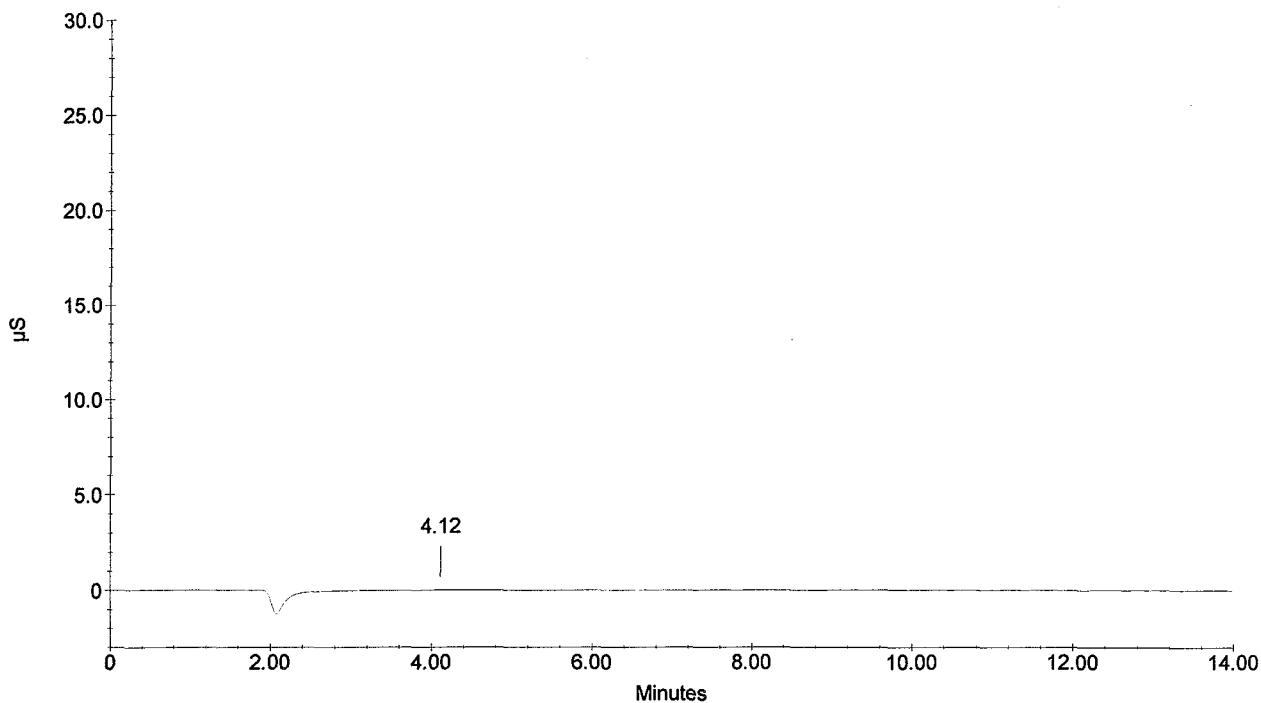
Sample Name : ICB
 Dilution Factor : 1.00
 Injection Number : 2
 Data File Name : c:\peaknet\data\031226\031226_002.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 1:27:57 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018066
 System Operator : RSS

10092

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	4.12	CHLORIDE	0.022	104	1395	1	-6.93
1	4.12	CHLORIDE	0.022	104	1395	1	-6.93
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
	0.00		---total(s)---				
			0.044		2790		

ICB



Sample Name : 238656

Dilution Factor : 1000.00

Injection Number : 3

Data File Name : ...031226_003.DXD

Method File Name : C:\PeakNet\method\ANIONS031030.met

Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 1:44:42 PM

System Name : Dx-500

Detector Name : Conductivity Detector

Column Type : AS14-#015724 AG14-#1018096

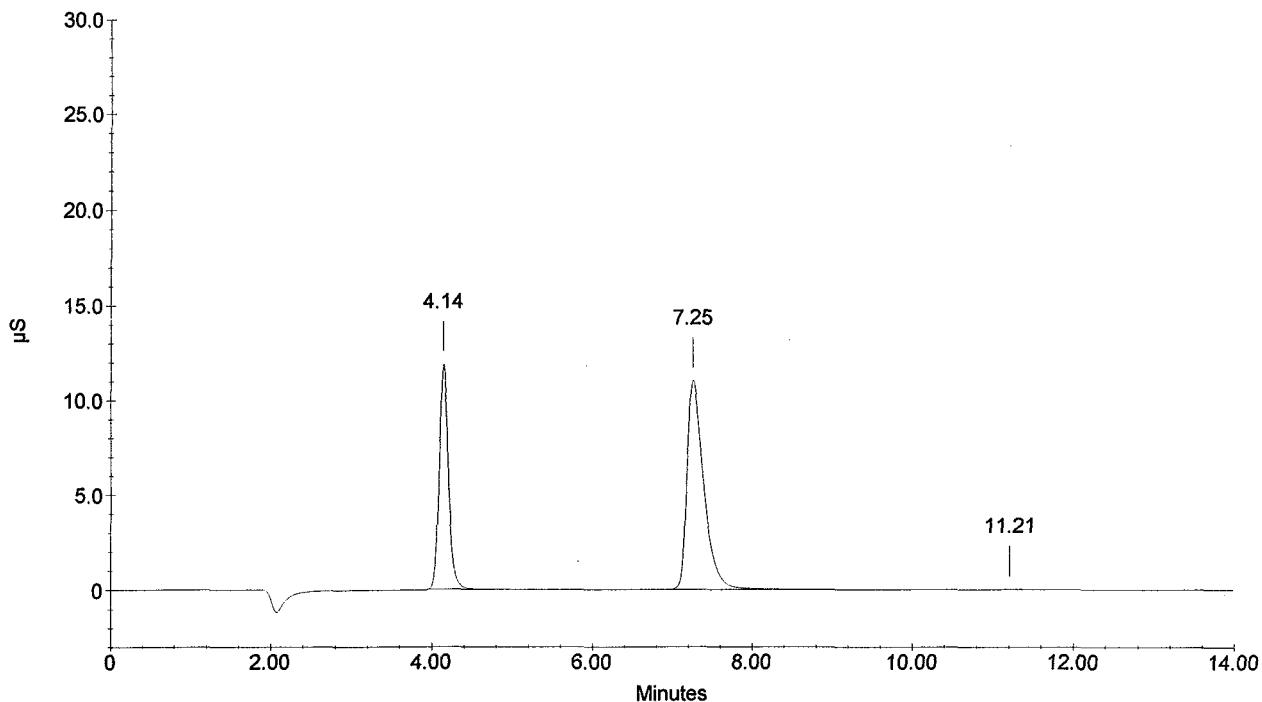
System Operator : RSS

010093

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.14	CHLORIDE	5789.847	118206	933010	1	-6.26
1	4.14	CHLORIDE	5789.847	118206	933010	1	-6.26
		NITRITE-N					
		BROMIDE					
2	7.25	NITRATE-N	3890.440	109806	1619657	1	-3.72
		PHOSPHATE-P					
3	11.21	SULFATE	27.921	121	2450	1	-5.16
			---total(s)---				
0.00			15498.055		3488126		

238656



Sample Name : 238656D

Dilution Factor : 1000.00

Injection Number : 4

Data File Name : ...031226_004.DXD

Method File Name : C:\PeakNet\method\ANIONS031030.met

Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 2:01:27 PM

System Name : Dx-500

Detector Name : Conductivity Detector

Column Type : AS14-#015724 AG14-#1018096

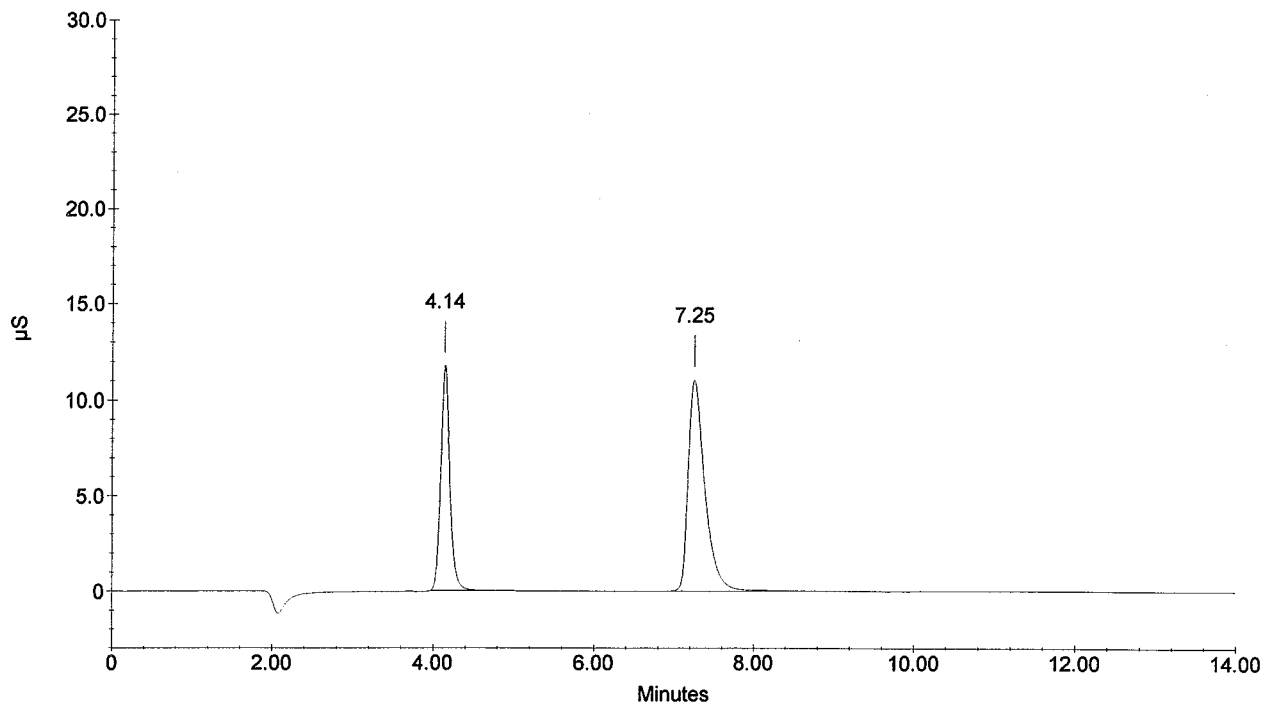
System Operator : RSS

010094

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	4.14	CHLORIDE	5752.542	117330	926554	1	-6.26
1	4.14	CHLORIDE	5752.542	117330	926554	1	-6.26
		NITRITE-N					
		BROMIDE					
2	7.25	NITRATE-N	3886.988	110345	1618117	1	-3.72
		PHOSPHATE-P					
		SULFATE					
0.00			---total(s)---	15392.072	3471225		

238656D



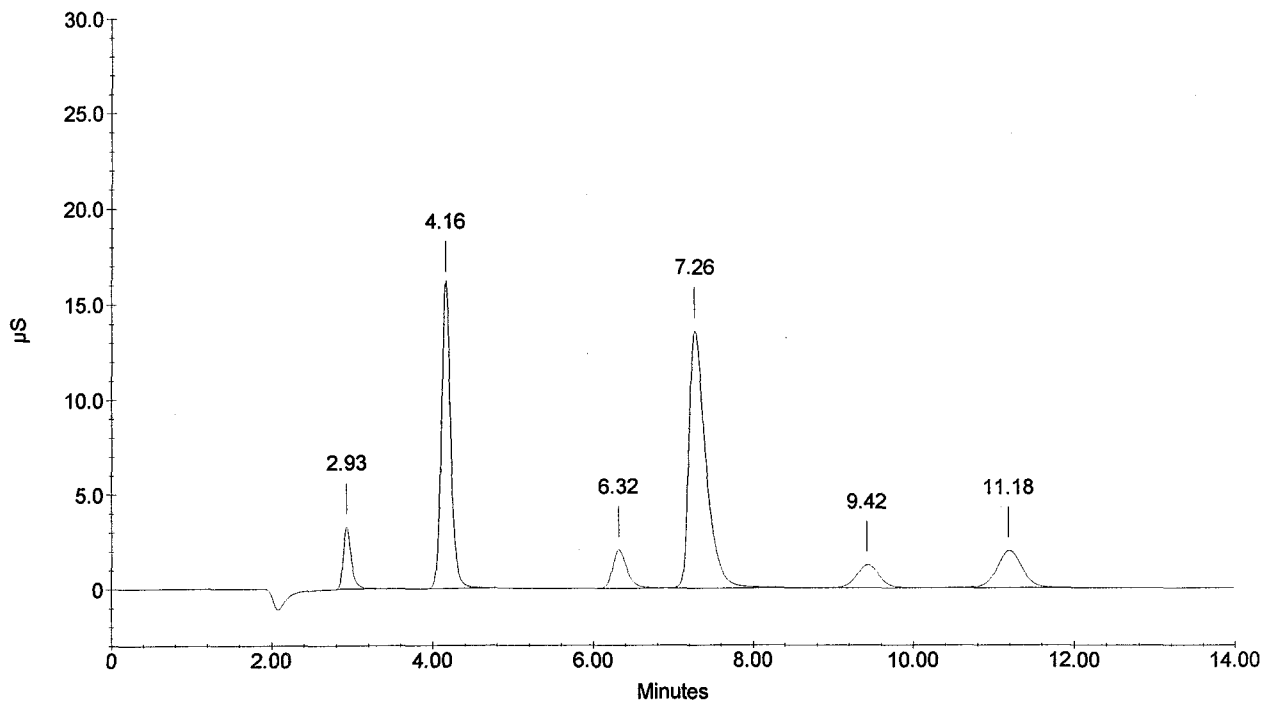
Sample Name : 238656S
 Dilution Factor : 1000.00
 Injection Number : 5
 Data File Name : c:\peaknet\data\031226\031226_005.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 2:18:10 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010095

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	2.93	FLUORIDE	1029.316	32869	225529	1	-7.57
2	4.16	CHLORIDE	✓7810.034	159285	1291107	1	-5.96
		NITRITE-N					
3	6.32	BROMIDE	3563.882	20306	254224	2	-4.58
4	7.26	NITRATE-N	✓4742.469	135204	2005171	2	-3.54
5	9.42	PHOSPHATE-P	1744.964	12030	242175	2	-4.04
6	11.18	SULFATE	3591.419	19582	426138	1	-5.39
			---total(s)---				
0.00			22482.084		4444344		

238656S



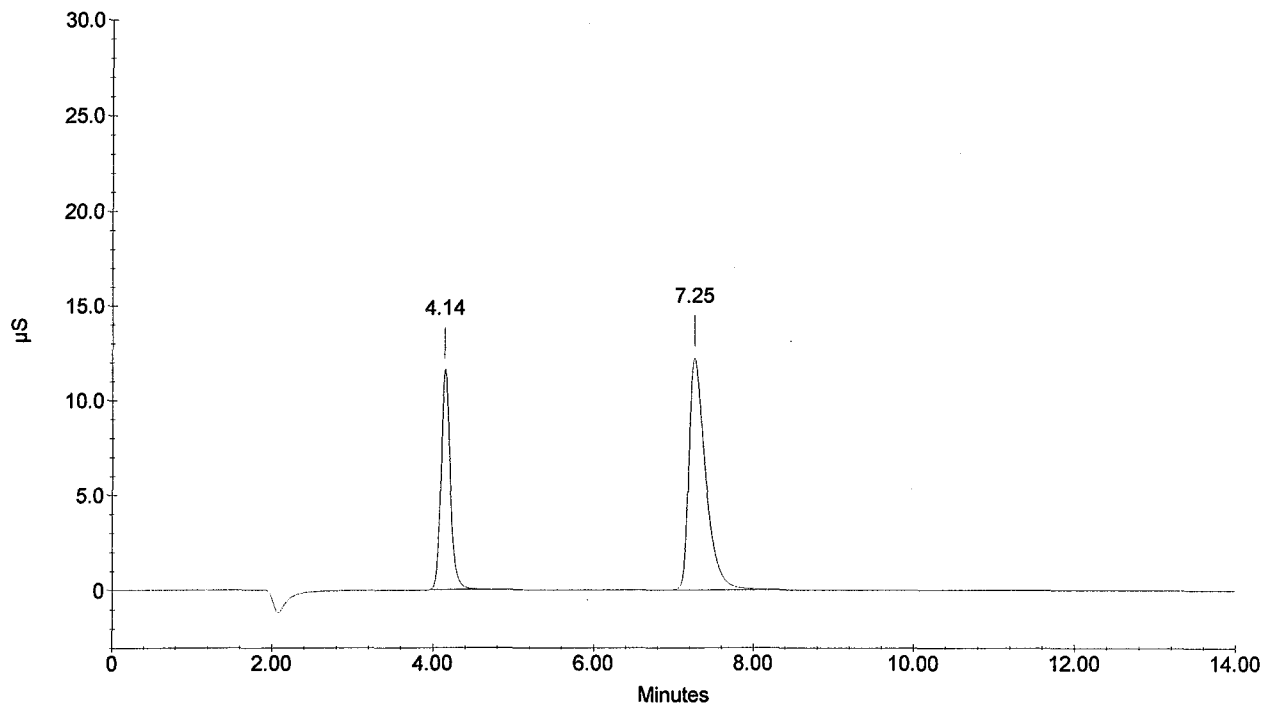
Sample Name : 238657
 Dilution Factor : 1000.00
 Injection Number : 6
 Data File Name : c:\peaknet\data\031226\031226_006.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 2:35:00 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

10096

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	4.14	CHLORIDE	✓5698.459	114732	917205	1	-6.26
1	4.14	CHLORIDE	5698.459	114732	917205	1	-6.26
		NITRITE-N					
		BROMIDE					
2	7.25	NITRATE-N	✓4277.151	121455	1793323	1	-3.72
		PHOSPHATE-P					
		SULFATE					
0.00			---total(s)---				
			15674.069		3627733		

238657



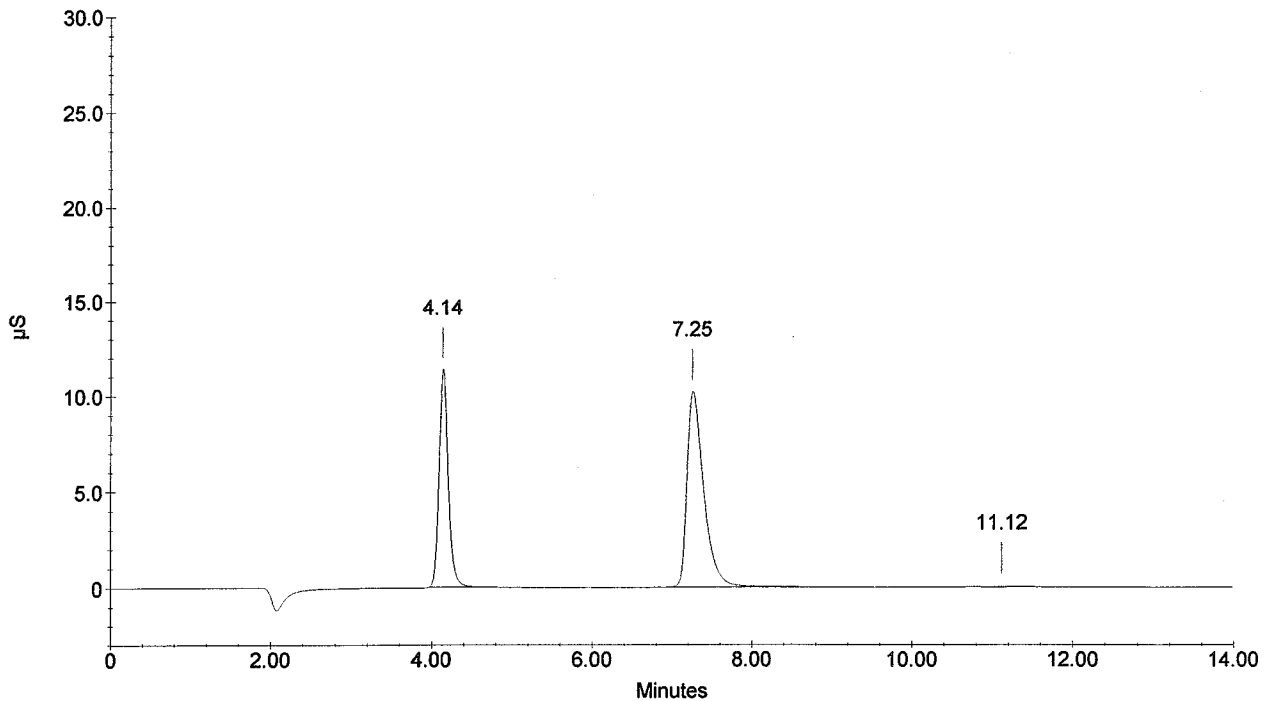
Sample Name : 238658
 Dilution Factor : 1000.00
 Injection Number : 7
 Data File Name : c:\peaknet\data\031226\031226_007.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 2:51:42 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010097

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	4.14	CHLORIDE	✓5563.555	112534	893937	1	-6.26
1	4.14	CHLORIDE	5563.555	112534	893937	1	-6.26
		NITRITE-N					
		BROMIDE					
2	7.25	NITRATE-N	✓3617.905	101167	1498562	1	-3.72
		PHOSPHATE-P					
3	11.12	SULFATE	11.276	47	524	1	-5.95
	0.00		---total(s)---				
			14756.291		3286960		

238658



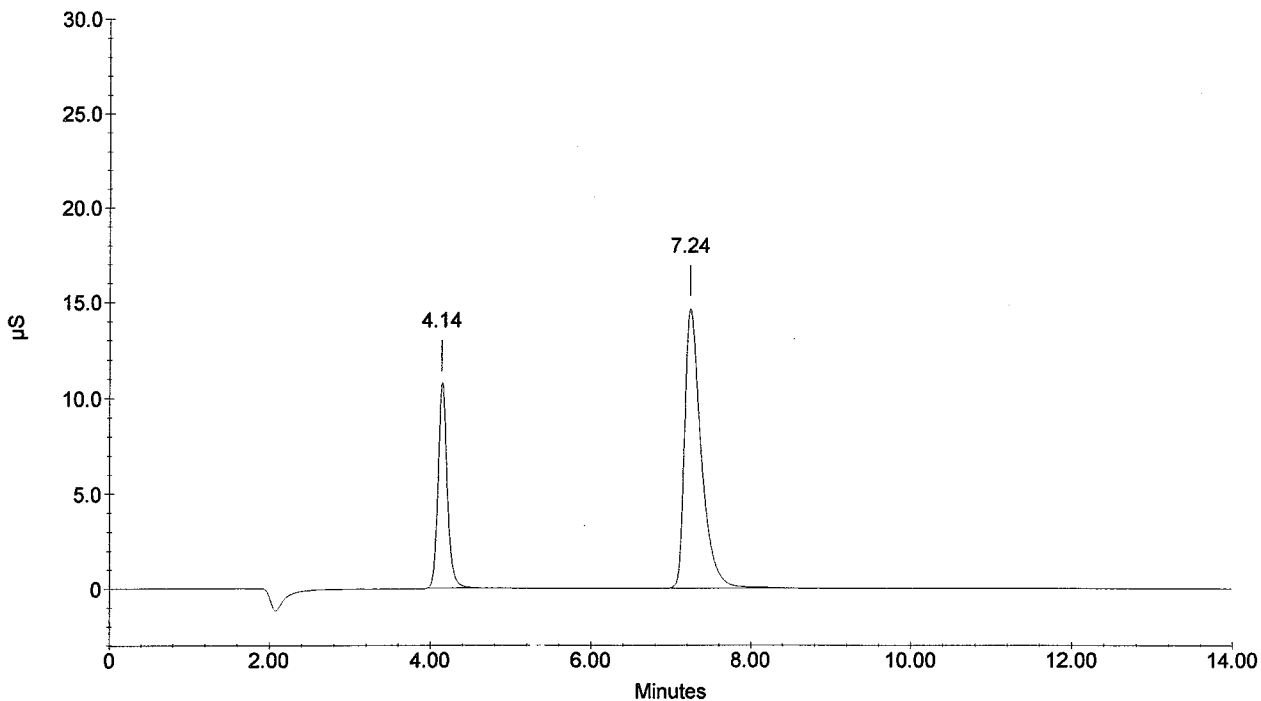
Sample Name : 238659
Dilution Factor : 1000.00
Injection Number : 8
Data File Name : c:\peaknet\data\031226\031226_008.DXD
Method File Name : c:\peaknet\method\anions031030.met
Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 3:08:25 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#015724 AG14-#1018096
System Operator : RSS

010098

Peak Information : All Components								
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta	
1	4.14	CHLORIDE	✓ 5319.186	106537	851979	1	-6.26	
1	4.14	CHLORIDE	5319.186	106537	851979	1	-6.26	
		NITRITE-N						
		BROMIDE						
2	7.24	NITRATE-N	✓ 5046.546	146057	2145323	1	-3.90	
		PHOSPHATE-P						
		SULFATE						
0.00			---total(s)---					
			15684.919		3849281			

238659



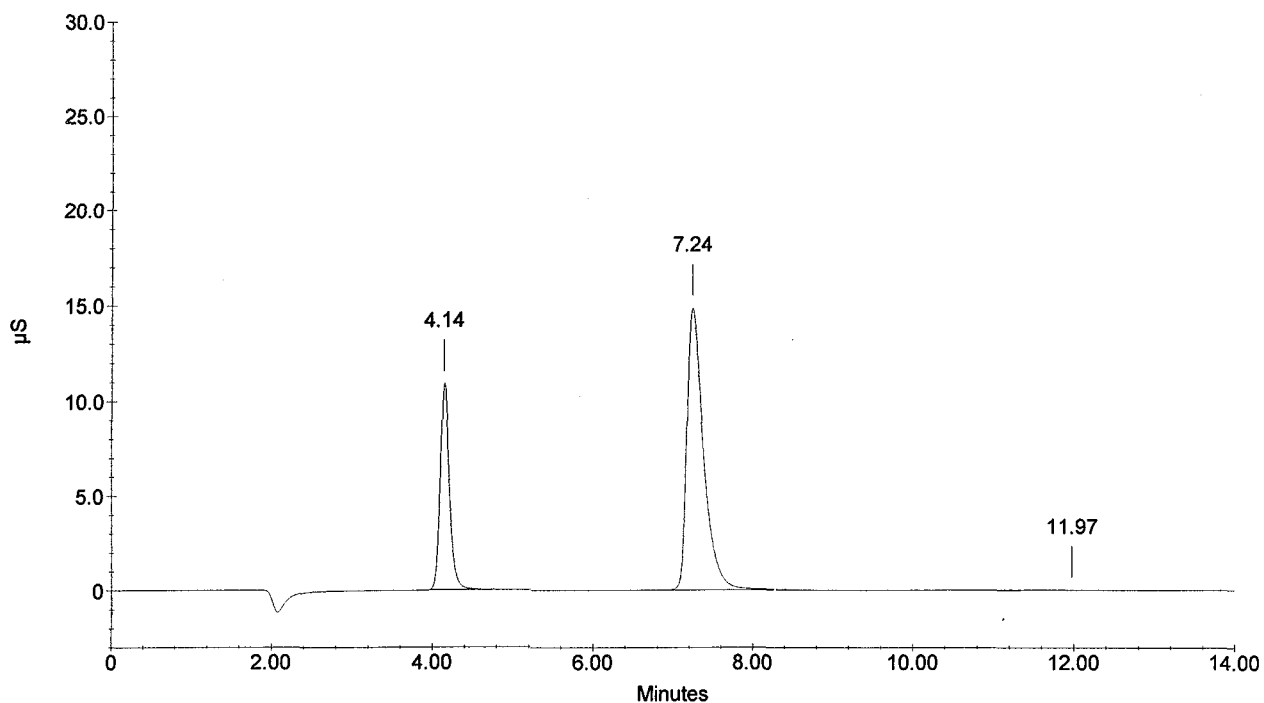
Sample Name : 238660
 Dilution Factor : 1000.00
 Injection Number : 9
 Data File Name : c:\peaknet\data\031226\031226_009.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 3:25:09 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

10099

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	4.14	CHLORIDE	✓5389.137	108368	863964	1	-6.26
1	4.14	CHLORIDE	5389.137	108368	863964	1	-6.26
		NITRITE-N					
		BROMIDE					
2	7.24	NITRATE-N	✓5124.177	148092	2181322	1	-3.90
		PHOSPHATE-P					
3	11.97	SULFATE	36.110	48	3397	1	1.27
			---total(s)---				
0.00			15938.560		3912648		

238660



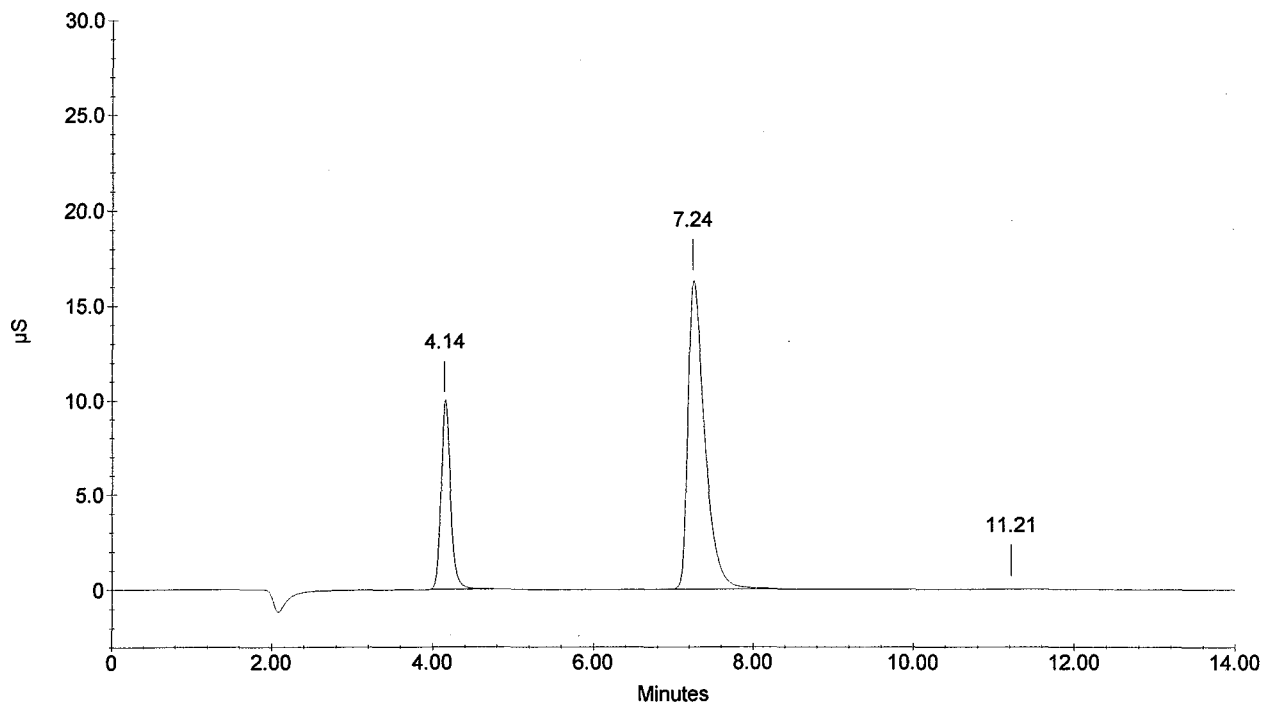
Sample Name : 238661
 Dilution Factor : 1000.00
 Injection Number : 10
 Data File Name : c:\peaknet\data\031226\031226_010.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 3:41:54 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010100

Peak information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	4.14	CHLORIDE	✓4993.646	97151	796464	1	-6.26
1	4.14	CHLORIDE	4993.646	97151	796464	1	-6.26
		NITRITE-N					
		BROMIDE					
2	7.24	NITRATE-N	✓5586.416	161439	2397512	1	-3.90
		PHOSPHATE-P					
3	11.21	SULFATE	14.958	61	950	1	-5.16
0.00			---total(s)---				
			15588.665		3991391		

238661



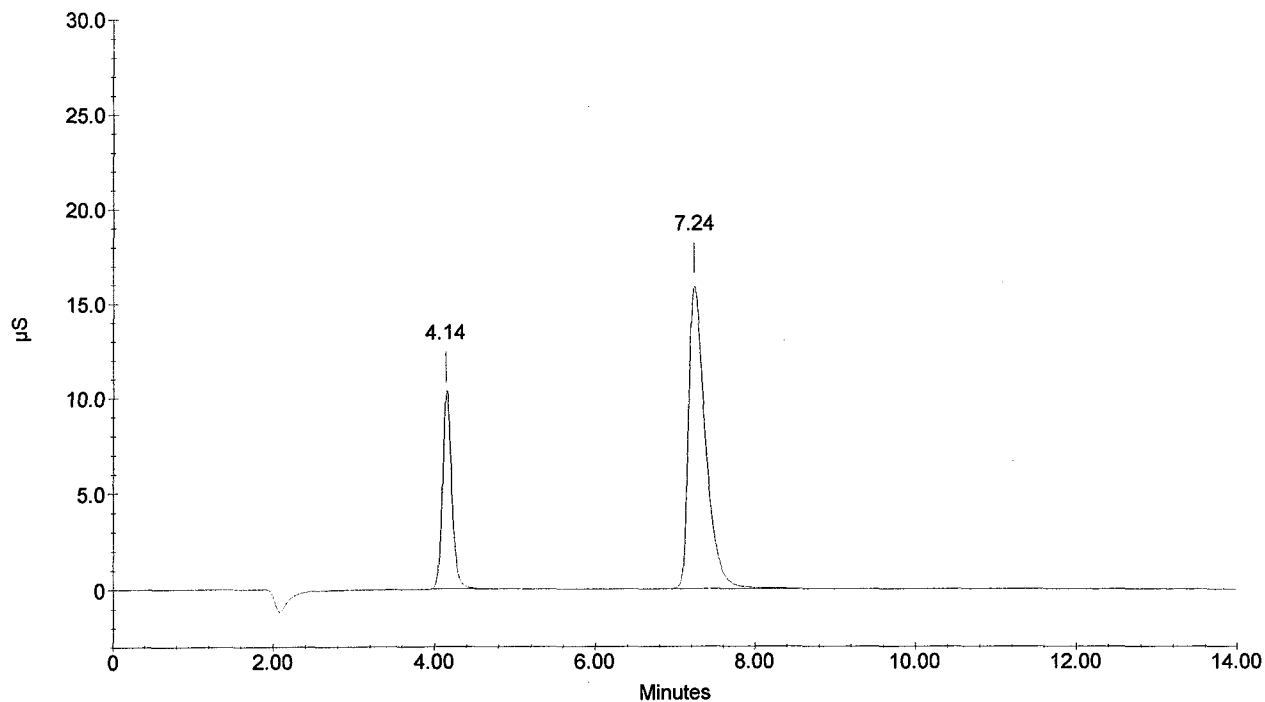
Sample Name : 238662
 Dilution Factor : 1000.00
 Injection Number : 11
 Data File Name : c:\peaknet\data\031226\031226_011.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 3:58:36 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010101

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.14	CHLORIDE	✓5140.745	100741	821496	1	-6.26
1	4.14	CHLORIDE	5140.745	100741	821496	1	-6.26
		NITRITE-N					
		BROMIDE					
2	7.24	NITRATE-N	✓5449.851	158373	2333312	1	-3.90
		PHOSPHATE-P					
		SULFATE					
0.00			---total(s)---				
			15731.341		3976303		

238662



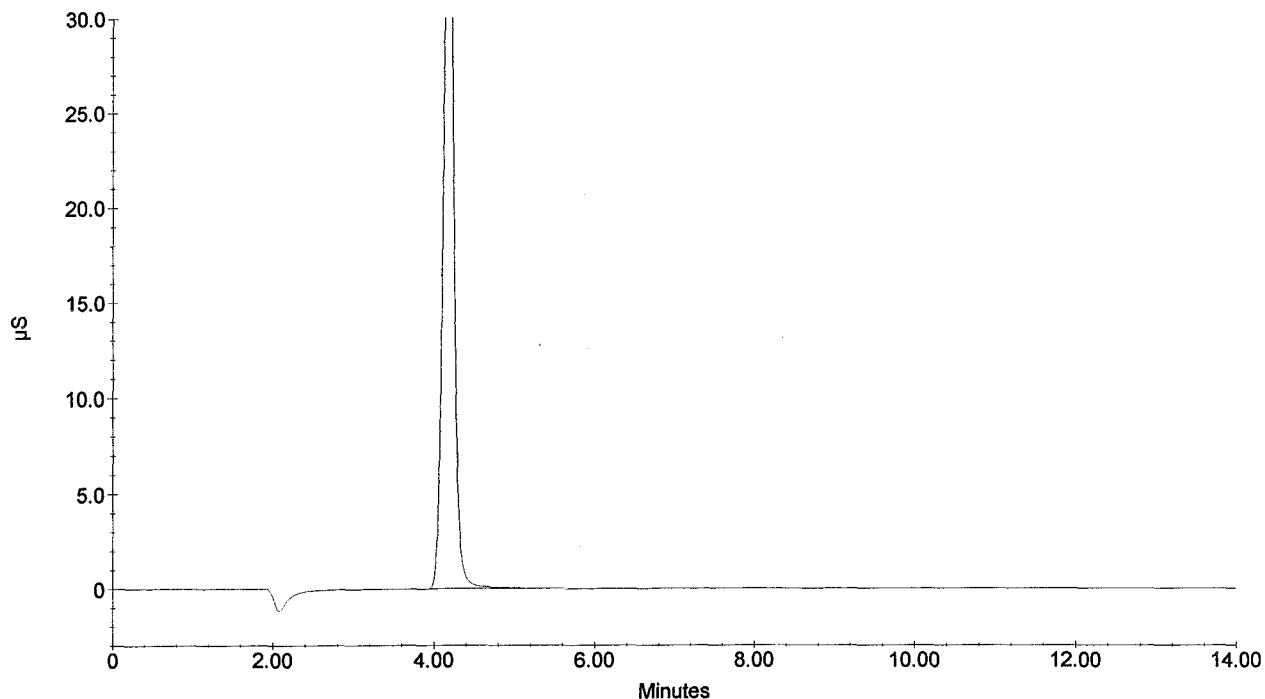
Sample Name : 238663
 Dilution Factor : 1000.00
 Injection Number : 12
 Data File Name : c:\peaknet\data\031226\031226_012.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 4:15:20 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010102

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.18	CHLORIDE	20359.383	455191	3795892	1	-5.35
1	4.18	CHLORIDE	20359.383	455191	3795892	1	-5.35
		NITRITE-N					
		BROMIDE					
		NITRATE-N ✓					
		PHOSPHATE-P					
		SULFATE					
0.00			---total(s)--- 40718.767		7591783		

238663



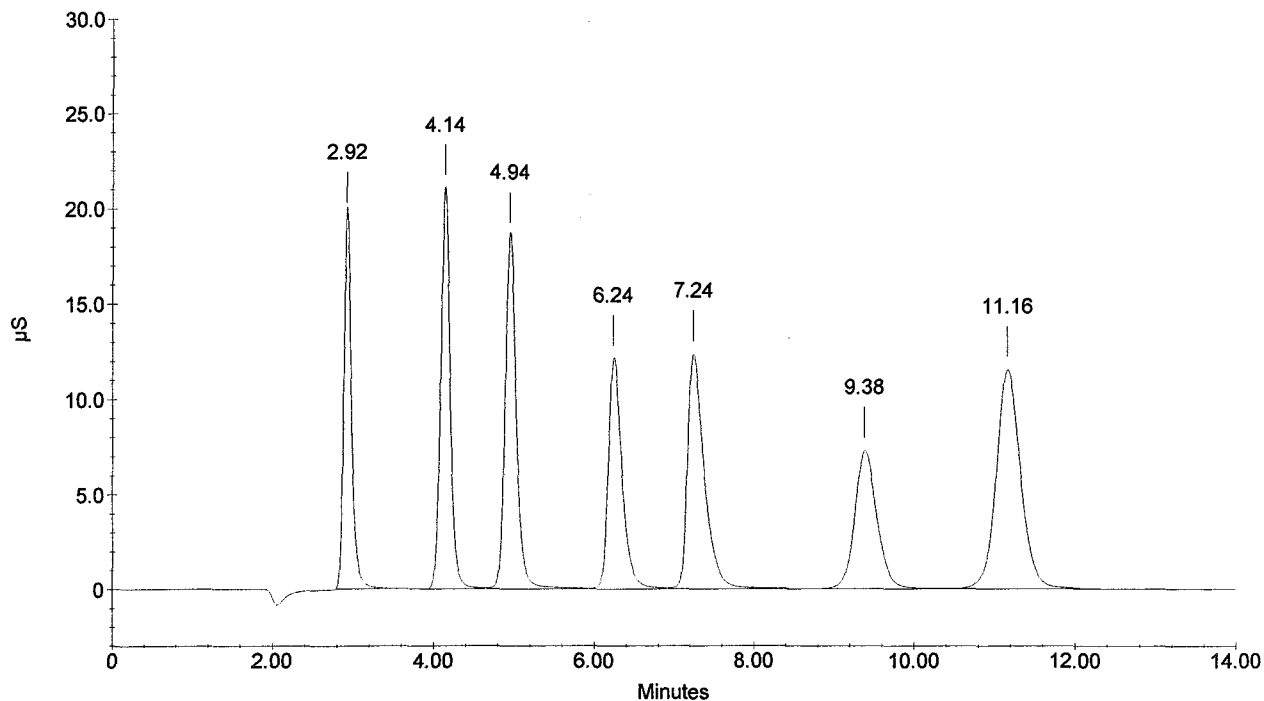
Sample Name : CCV
Dilution Factor : 20.00
Injection Number : 13
Data File Name : c:\peaknet\data\031226\031226_013.DXD
Method File Name : c:\peaknet\method\anions031030.met
Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 4:32:04 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#015724 AG14-#1018096
System Operator : RSS

010103

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	2.92	FLUORIDE	108.792	195853	1322973	1	-7.99
2	4.14	CHLORIDE	201.741	210183	1714271	2	-6.26
3	4.94	NITRITE-N BROMIDE	106.793	185283	1819213	2	-7.08
5	7.24	NITRATE-N	86.660	123239	1818575	2	-3.90
6	9.38	PHOSPHATE-P	186.782	72574	1417120	2	-4.45
7	11.16	SULFATE	374.275	115098	2438849	2	-5.61
			---total(s)---				
0.00			1065.042		10531001		

CCV



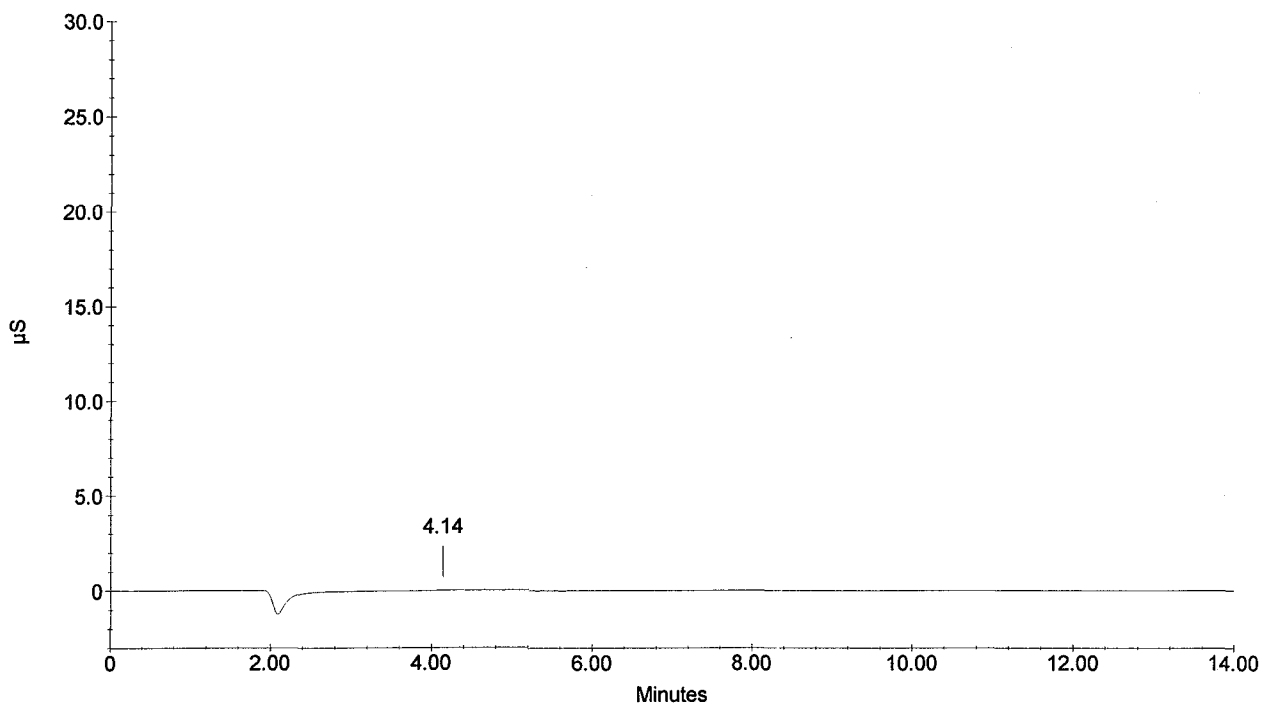
Sample Name : CCB
 Dilution Factor : 1.00
 Injection Number : 14
 Data File Name : c:\peaknet\data\031226\031226_014.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 4:48:49 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010104

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	4.14	CHLORIDE	0.017	89	644	1	-6.26
1	4.14	CHLORIDE	0.017	89	644	1	-6.26
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
0.00		---total(s)---					
		0.034		1288			

CCB



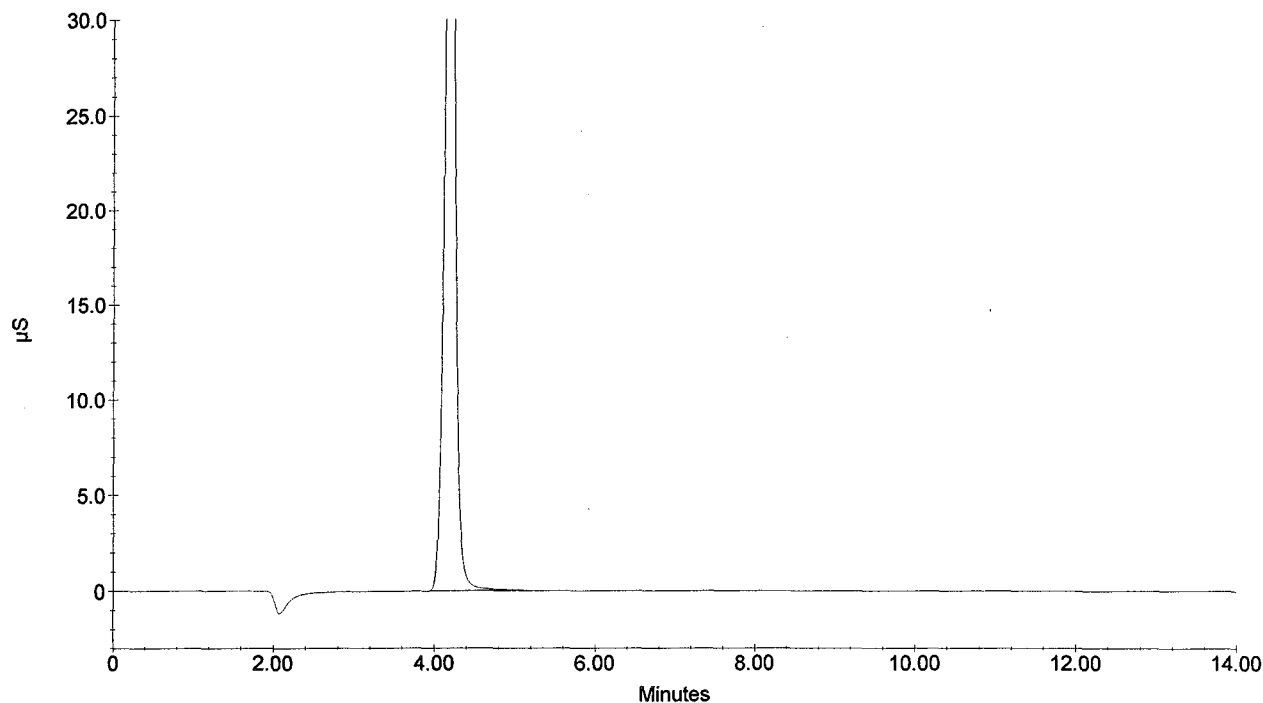
Sample Name : 238664
 Dilution Factor : 1000.00
 Injection Number : 15
 Data File Name : c:\peaknet\data\031226\031226_015.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 5:05:33 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010105

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.20	CHLORIDE	22437.135	504252	4221056	1	-5.05
1	4.20	CHLORIDE	22437.135	504252	4221056	1	-5.05
		NITRITE-N					
		BROMIDE					
		NITRATE-N ✓					
		PHOSPHATE-P					
		SULFATE					
0.00			---total(s)--- 44874.271		8442112		

238664



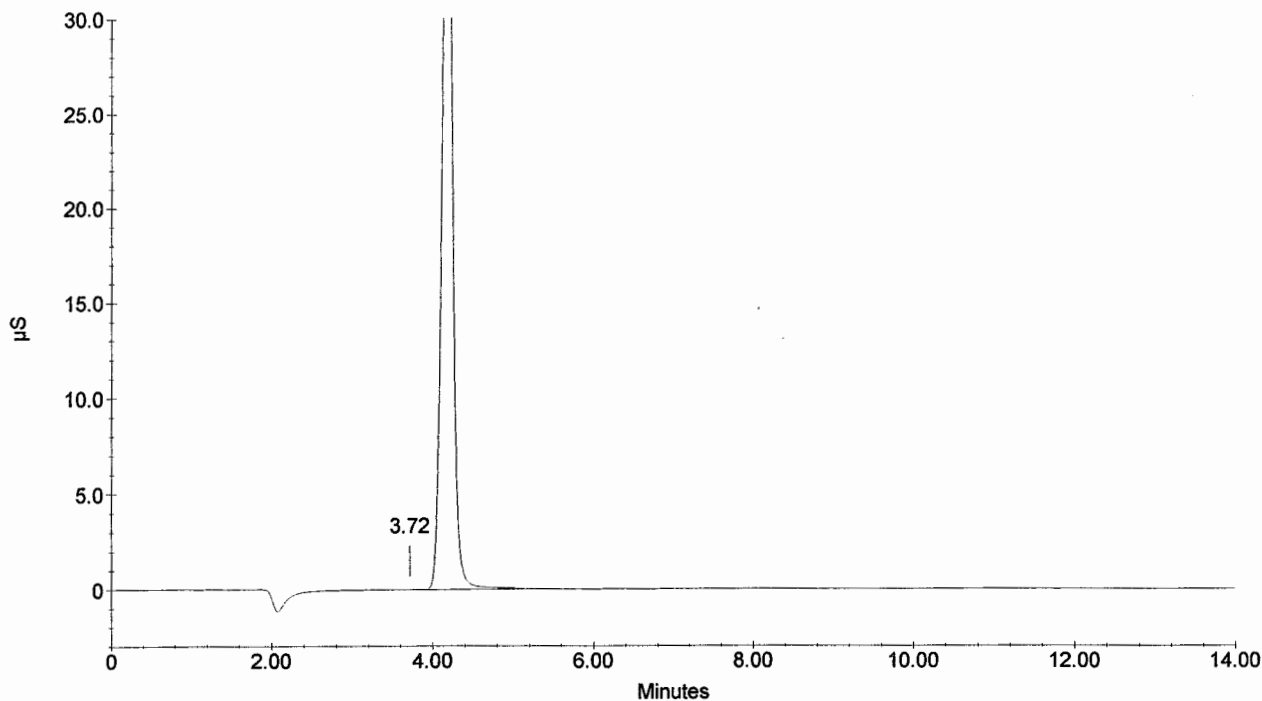
Sample Name : 238665
 Dilution Factor : 1000.00
 Injection Number : 16
 Data File Name : c:\peaknet\data\031226\031226_016.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 5:22:16 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010106

Peak Information : All Components								
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta	
1	3.72		0.000	123	2167	1		
2	4.18	CHLORIDE	21429.286	478303	4015800	1	-5.35	
		NITRITE-N						
		BROMIDE						
		NITRATE-N ✓						
		PHOSPHATE-P						
		SULFATE						
0.00			---total(s)---					
			21429.286		4017967			

238665



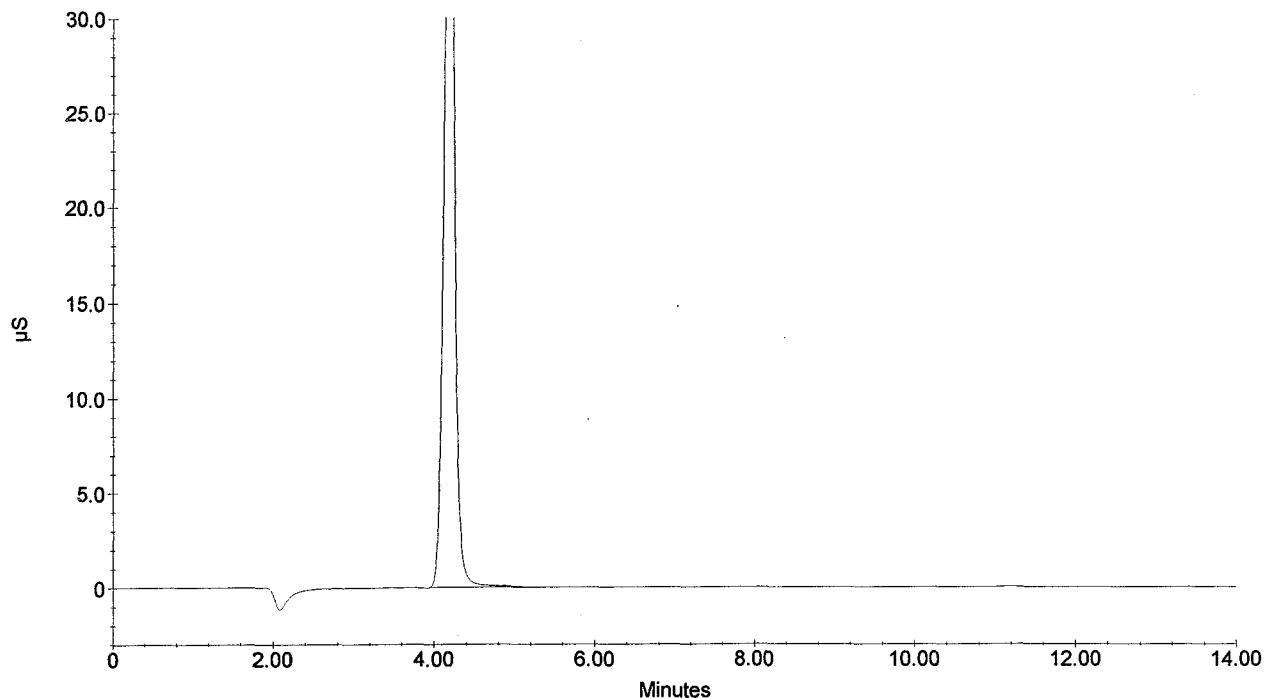
Sample Name : 238666
 Dilution Factor : 1000.00
 Injection Number : 17
 Data File Name : c:\peaknet\data\031226\031226_017.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 5:38:59 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010107

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.20	CHLORIDE	21556.239	486704	4041768	1	-5.05
1	4.20	CHLORIDE	21556.239	486704	4041768	1	-5.05
		NITRITE-N					
		BROMIDE					
		NITRATE-N ✓					
		PHOSPHATE-P					
		SULFATE					
0.00			---total(s)--- 43112.478		8083536		

238666



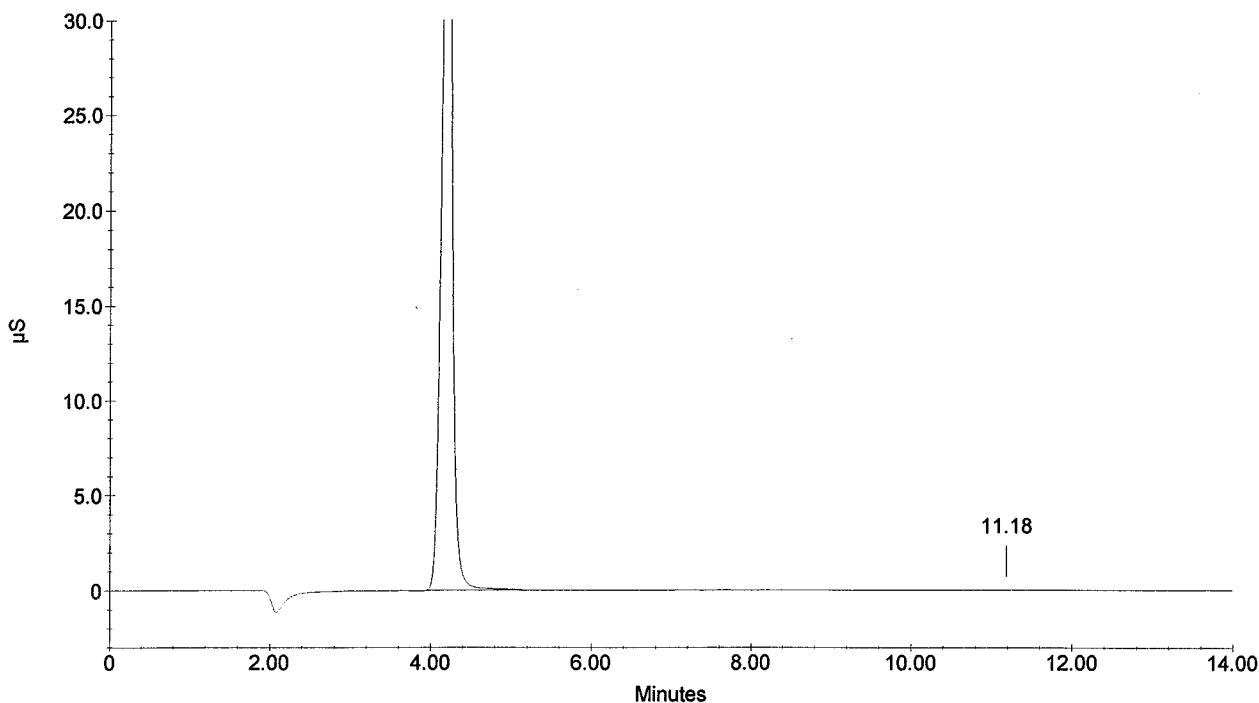
Sample Name : 238667
 Dilution Factor : 1000.00
 Injection Number : 18
 Data File Name : c:\peaknet\data\031226\031226_018.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 5:55:42 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010108

Peak Information : All Components								
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta	
1	4.20	CHLORIDE	21245.551	477580	3978166	1	-5.05	
1	4.20	CHLORIDE	21245.551	477580	3978166	1	-5.05	
		NITRITE-N						
		BROMIDE						
		NITRATE-N ✓						
		PHOSPHATE-P						
2	11.18	SULFATE	19.749	86	1504	1	-5.39	
0.00			---total(s)---					
			42510.852		7957836			

238667



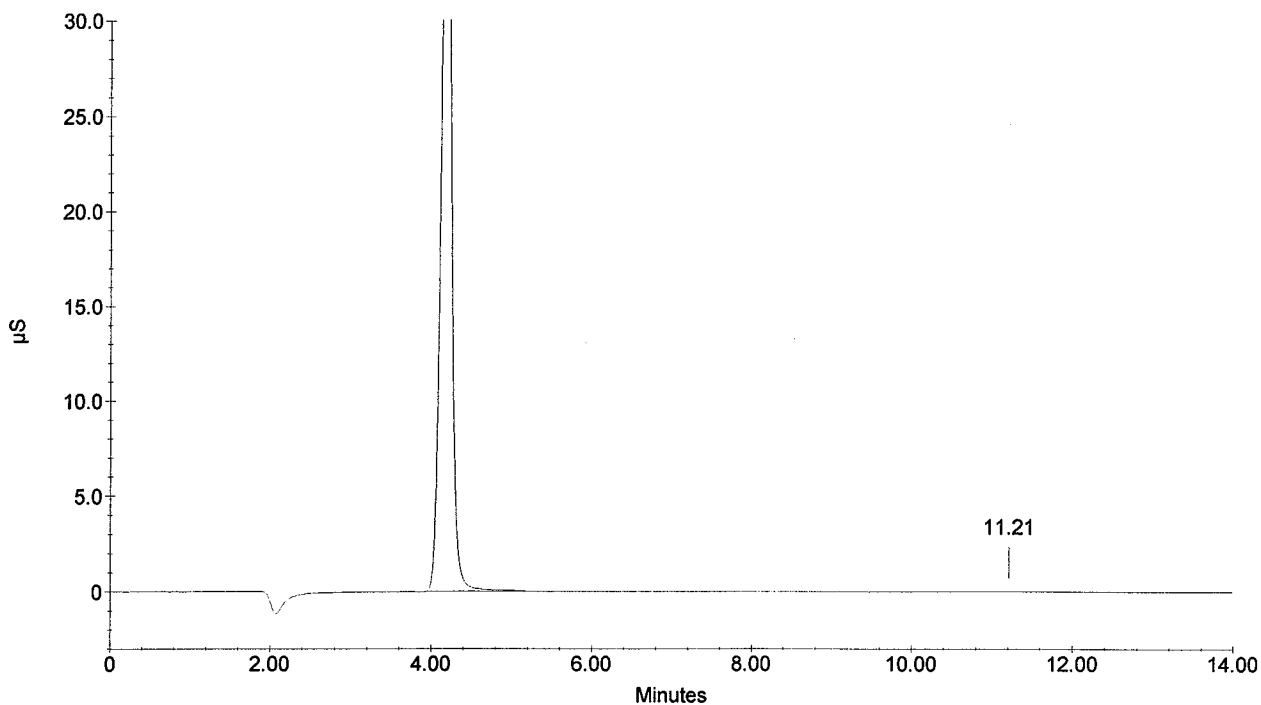
Sample Name : 238668
 Dilution Factor : 1000.00
 Injection Number : 19
 Data File Name : c:\peaknet\data\031226\031226_019.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 6:12:27 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010109

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	4.18	CHLORIDE	21419.449	479053	4013787	1	-5.35
1	4.18	CHLORIDE	21419.449	479053	4013787	1	-5.35
		NITRITE-N					
		BROMIDE					
		NITRATE-N ✓					
		PHOSPHATE-P					
2	11.21	SULFATE	11.746	64	578	1	-5.16
			---total(s)---				
0.00			42850.644		8028152		

238668



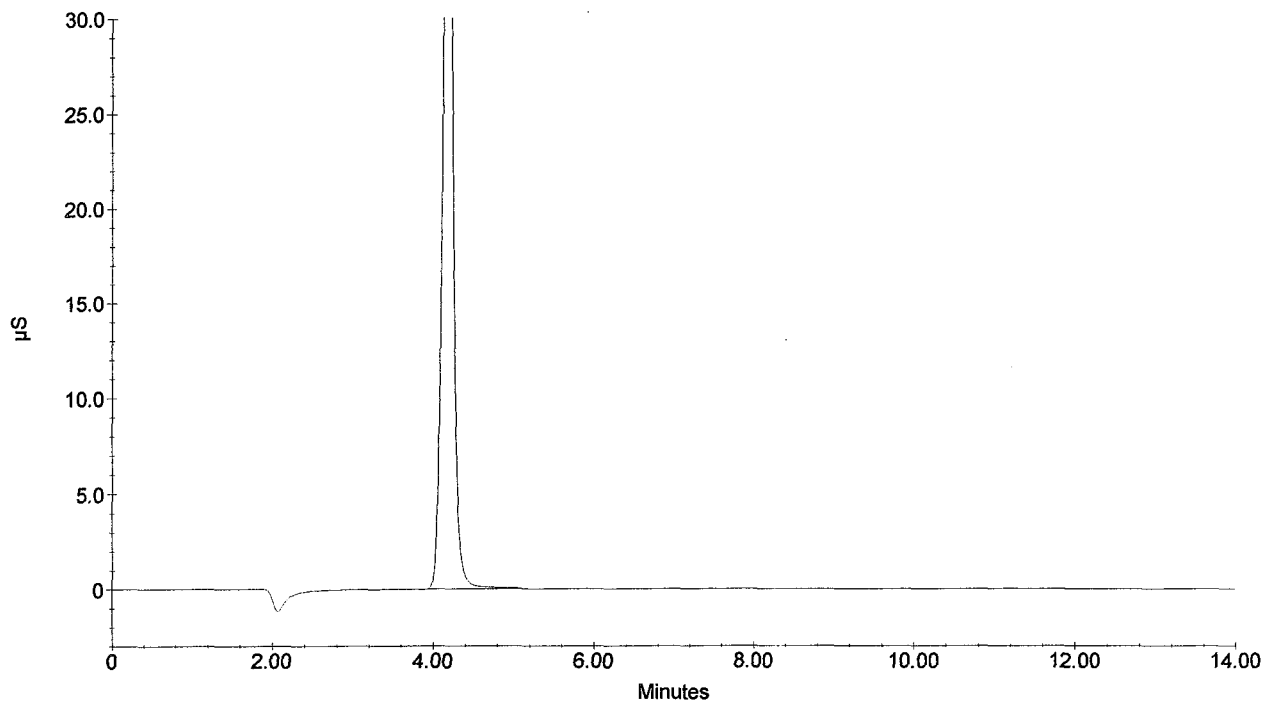
Sample Name : 238669
 Dilution Factor : 1000.00
 Injection Number : 20
 Data File Name : c:\peaknet\data\031226\031226_020.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 6:29:11 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010110

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.18	CHLORIDE	21642.263	484060	4059347	1	-5.35
1	4.18	CHLORIDE	21642.263	484060	4059347	1	-5.35
		NITRITE-N					
		BROMIDE					
		NITRATE-N ✓					
		PHOSPHATE-P					
		SULFATE					
0.00			---total(s)---	43284.527	8118694		

238669



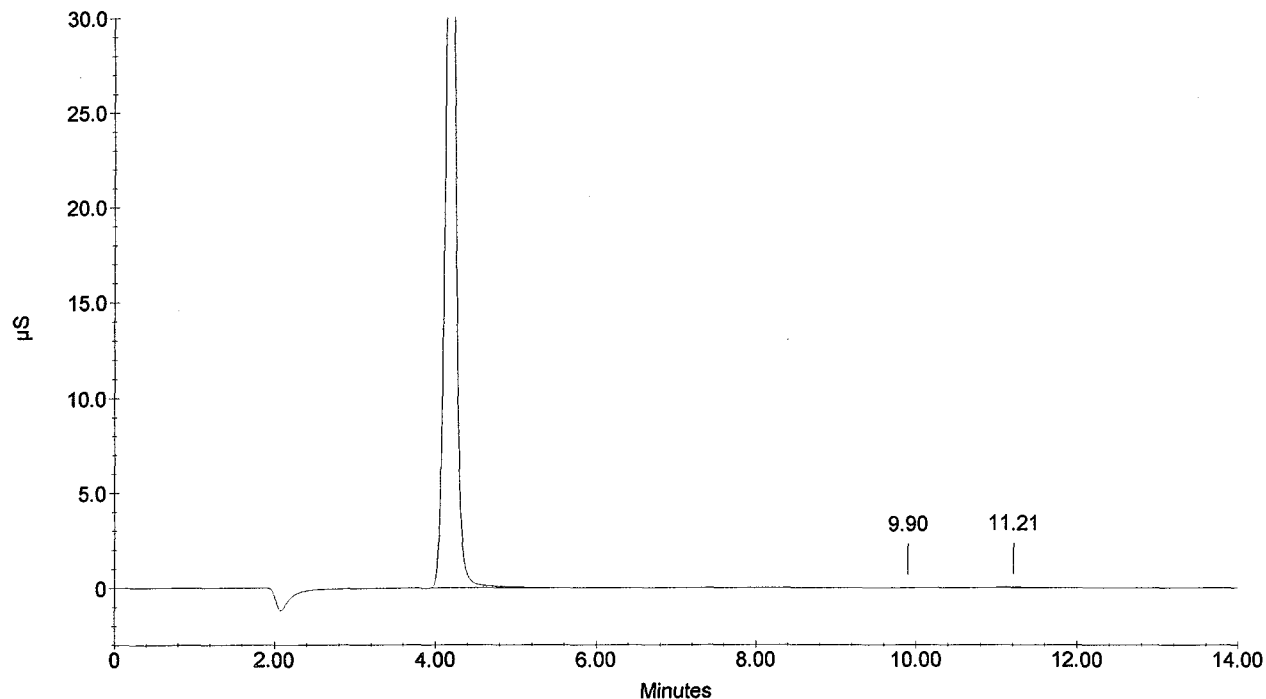
Sample Name : 238670
 Dilution Factor : 1000.00
 Injection Number : 21
 Data File Name : c:\peaknet\data\031226\031226_021.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 6:45:53 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010111

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.18	CHLORIDE	20850.824	462865	3897120	1	-5.35
1	4.18	CHLORIDE	20850.824	462865	3897120	1	-5.35
		NITRITE-N					
		BROMIDE					
		NITRATE-N ✓					
2	9.90	PHOSPHATE-P	9.407	47	497	1	0.85
3	11.21	SULFATE	73.370	388	7710	1	-5.16
			---total(s)---				
0.00			41784.425		7802448		

238670



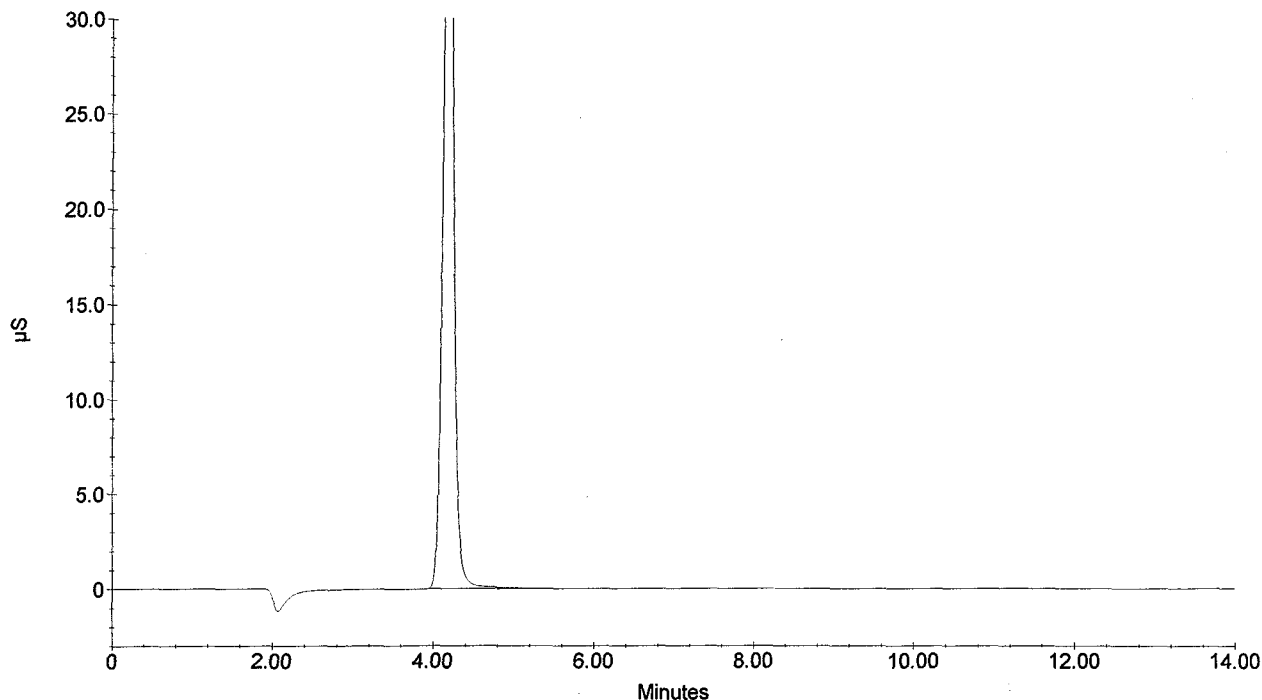
Sample Name : 238671
 Dilution Factor : 1000.00
 Injection Number : 22
 Data File Name : c:\peaknet\data\031226\031226_022.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 7:02:37 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010112

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.18	CHLORIDE	21429.066	475918	4015755	1	-5.35
1	4.18	CHLORIDE	21429.066	475918	4015755	1	-5.35
		NITRITE-N					
		BROMIDE					
		NITRATE-N ✓					
		PHOSPHATE-P					
		SULFATE					
0.00			---total(s)---	42858.131	8031510		

238671



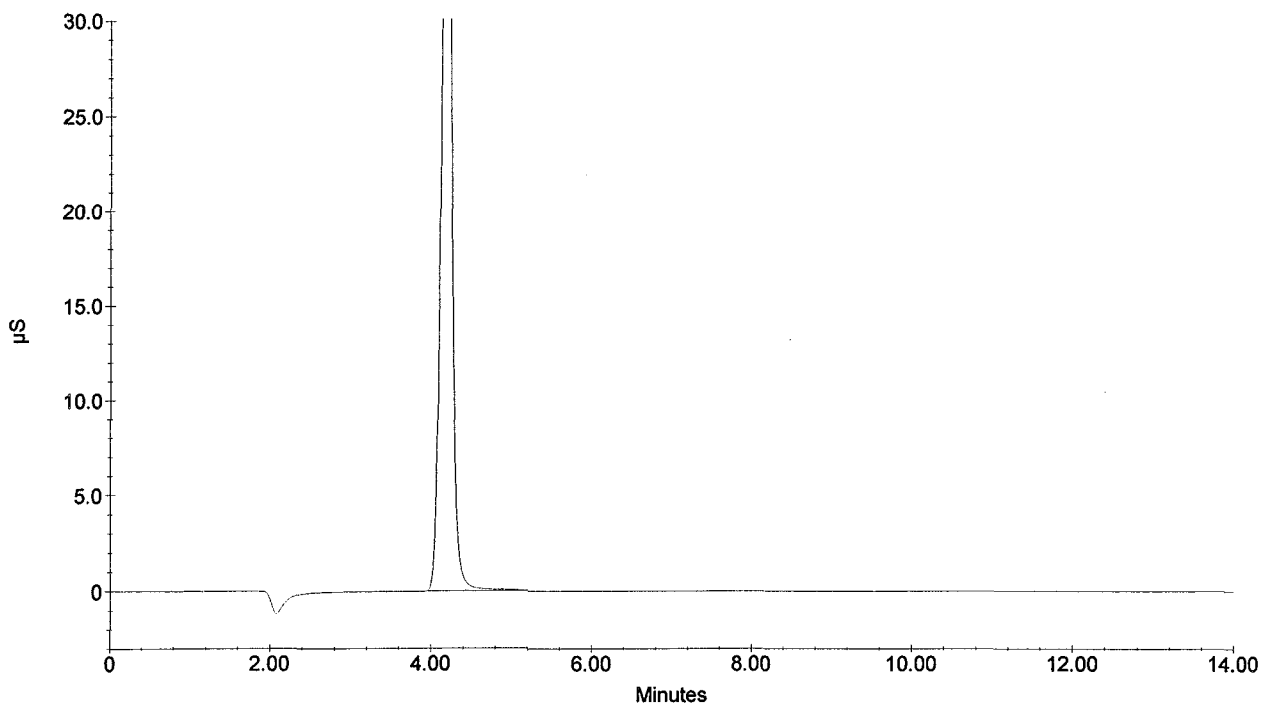
Sample Name : 238672
 Dilution Factor : 1000.00
 Injection Number : 23
 Data File Name : c:\peaknet\data\031226\031226_023.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 7:19:21 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010113

Peak Information : All Components								
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta	
1	4.18	CHLORIDE	21988.462	484480	4129943	1	-5.35	
1	4.18	CHLORIDE	21988.462	484480	4129943	1	-5.35	
		NITRITE-N						
		BROMIDE						
		NITRATE-N ✓						
		PHOSPHATE-P						
		SULFATE						
0.00			---total(s)---					
			43976.925		8259886			

238672



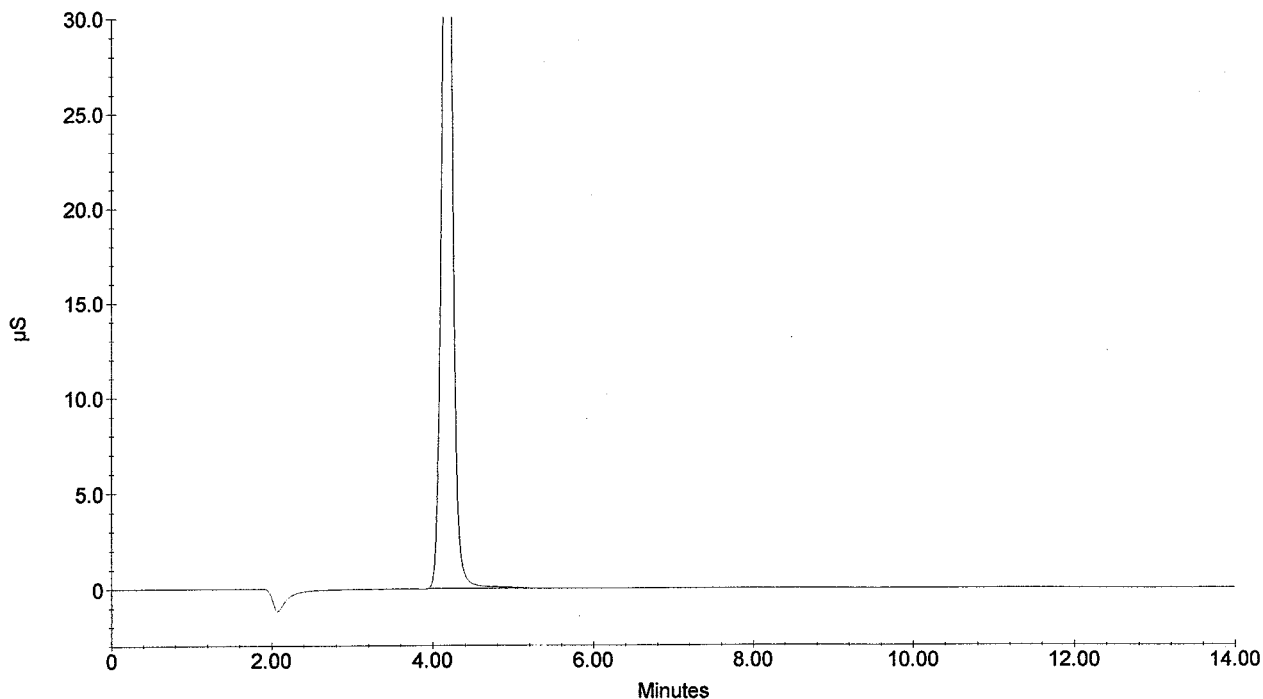
Sample Name : 238673
 Dilution Factor : 1000.00
 Injection Number : 24
 Data File Name : c:\peaknet\data\031226\031226_024.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 7:36:05 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010114

Peak Information : All Components								
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta	
1	4.20	CHLORIDE	22528.782	508847	4239611	1	-5.05	
1	4.20	CHLORIDE	22528.782	508847	4239611	1	-5.05	
		NITRITE-N						
		BROMIDE						
		NITRATE-N ✓						
		PHOSPHATE-P						
		SULFATE						
0.00			---total(s)---					
			45057.565		8479221			

238673



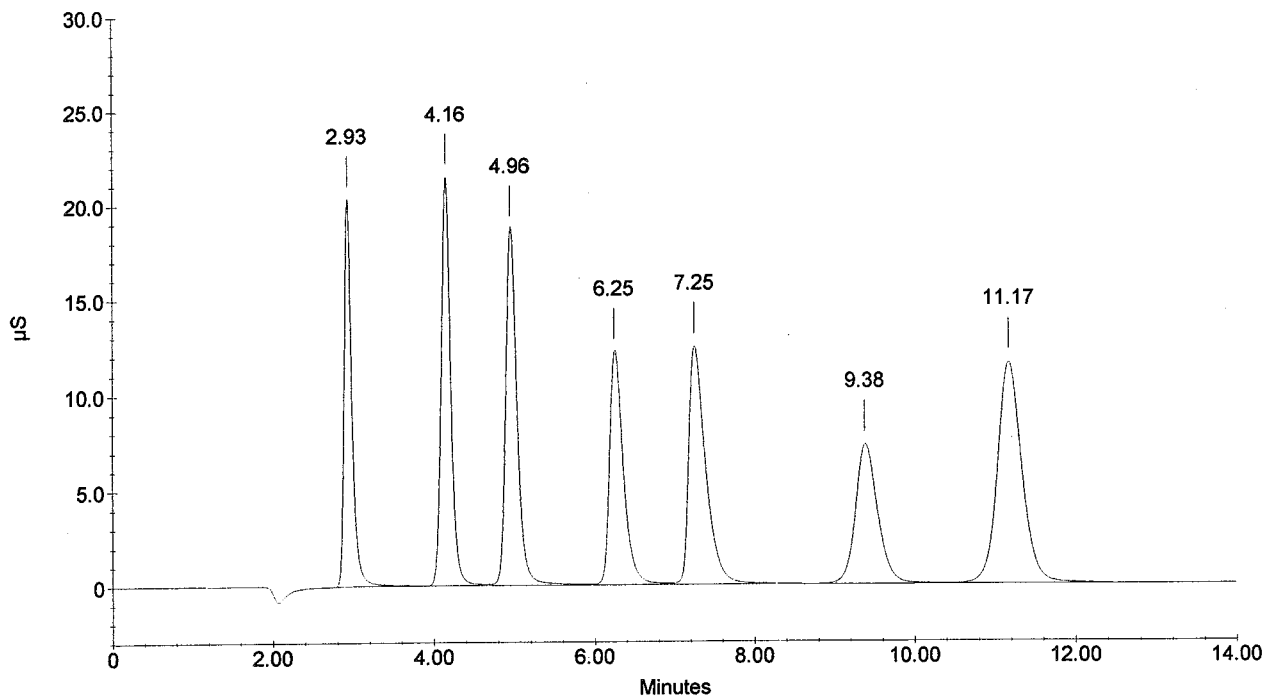
Sample Name : CCV
Dilution Factor : 20.00
Injection Number : 25
Data File Name : c:\peaknet\data\031226\031226_025.DXD
Method File Name : c:\peaknet\method\anions031030.met
Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 7:52:48 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#015724 AG14-#1018096
System Operator : RSS

010115

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	2.93	FLUORIDE	111.753	202829	1362066	2	-7.57
2	4.16	CHLORIDE	204.493	214214	1740479	2	-5.96
3	4.96	NITRITE-N BROMIDE	107.511	186699	1832330	2	-6.83
5	7.25	NITRATE-N	87.951	124588	1847841	2	-3.72
6	9.38	PHOSPHATE-P	188.574	73231	1432140	2	-4.45
7	11.17	SULFATE	377.290	115998	2459986	2	-5.50
			---total(s)---				
0.00			1077.573		10674841		

CCV



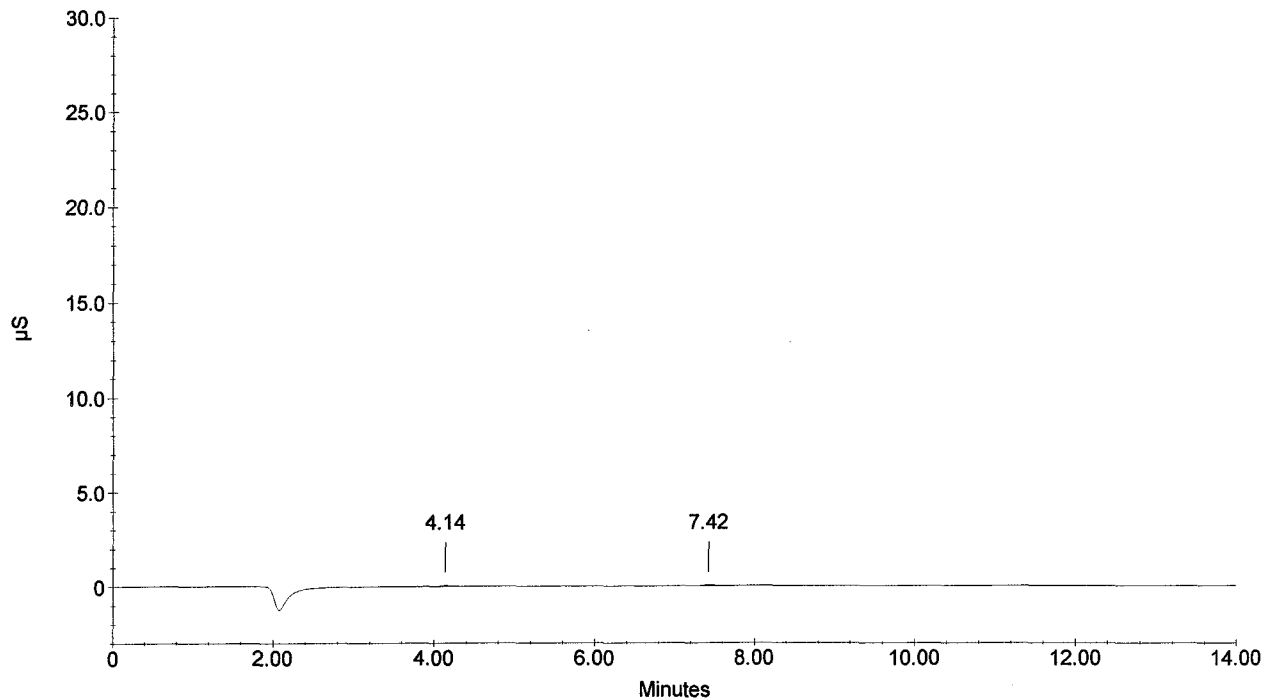
Sample Name : CCB
 Dilution Factor : 1.00
 Injection Number : 26
 Data File Name : c:\peaknet\data\031226\031226_026.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 8:09:33 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010116

Peak information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	4.14	CHLORIDE	0.033	400	3048	1	-6.26
1	4.14	CHLORIDE	0.033	400	3048	1	-6.26
		NITRITE-N					
		BROMIDE					
2	7.42	NITRATE-N	0.043	373	5029	1	-1.42
		PHOSPHATE-P					
		SULFATE					
			---total(s)---				
0.00			0.109		11125		

CCB



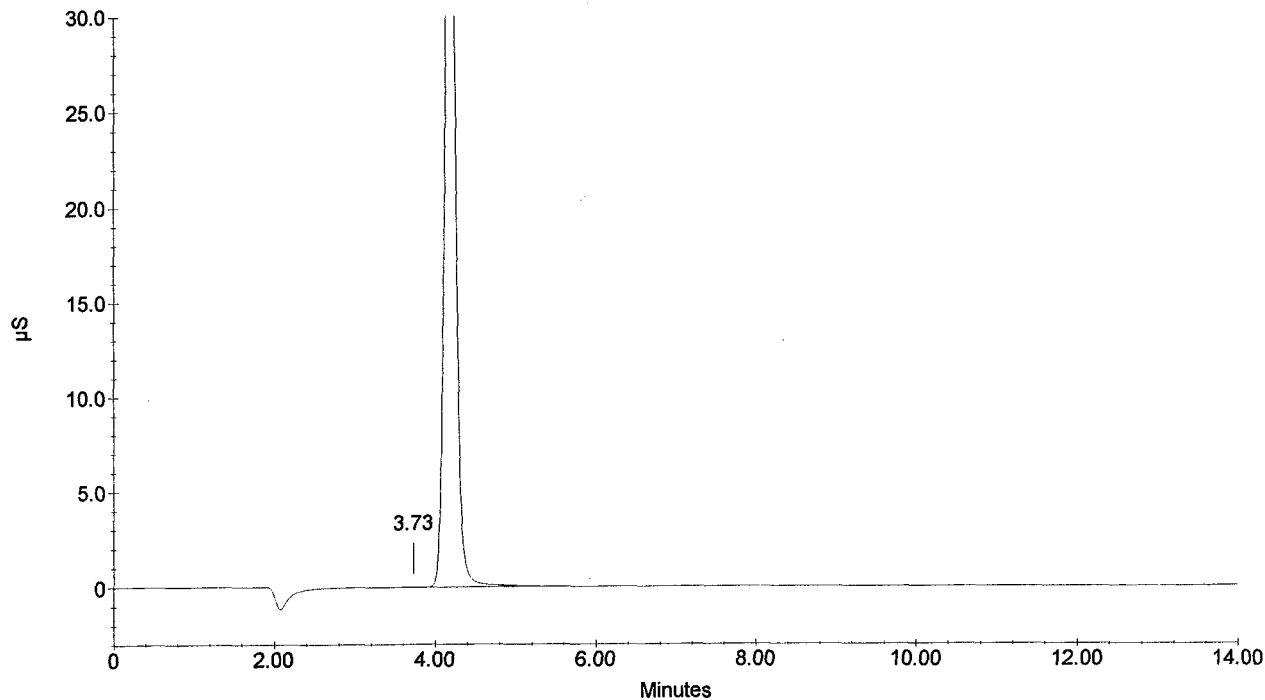
Sample Name : 238674
 Dilution Factor : 1000.00
 Injection Number : 27
 Data File Name : c:\peaknet\data\031226\031226_027.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 8:26:15 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010117

Peak Information : All Components								
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta	
1	3.73		0.000	119	2710	1		
2	4.20	CHLORIDE	22609.646	502025	4255966	1	-5.05	
		NITRITE-N						
		BROMIDE						
		NITRATE-N ✓						
		PHOSPHATE-P						
		SULFATE						
0.00			---total(s)---					
			22609.646		4258676			

238674



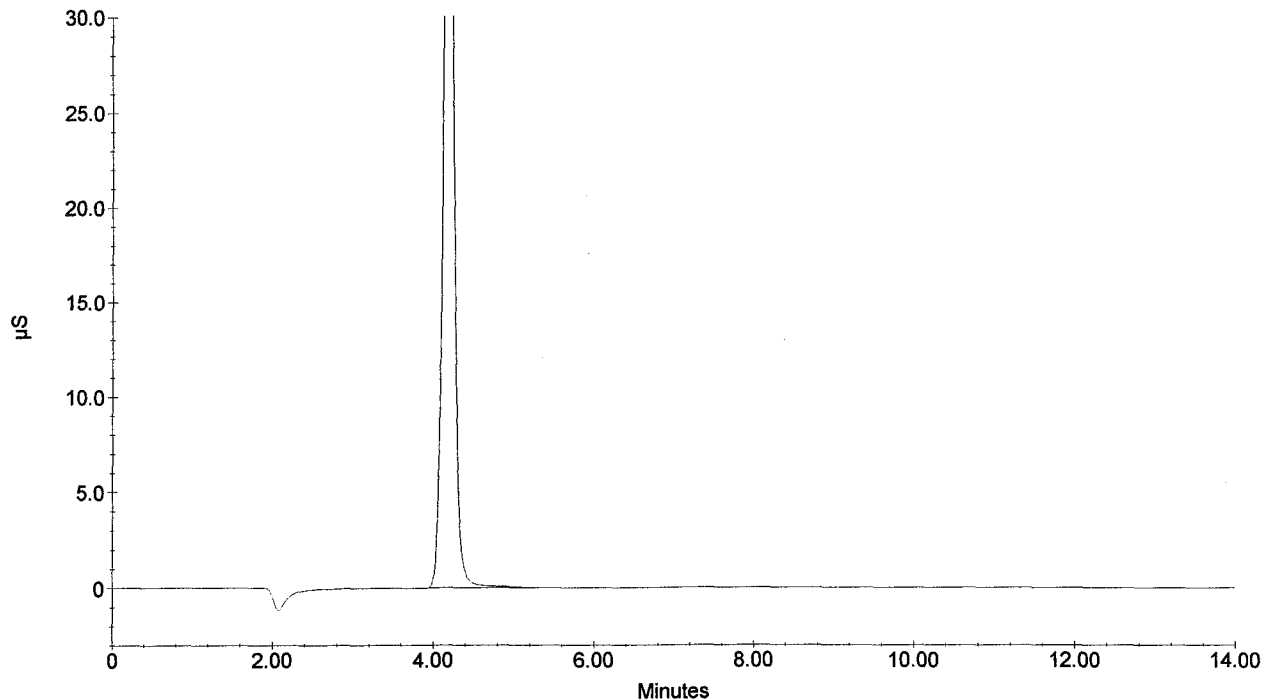
Sample Name : 238675
 Dilution Factor : 1000.00
 Injection Number : 28
 Data File Name : c:\peaknet\data\031226\031226_028.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 8:43:00 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010118

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.20	CHLORIDE	23087.987	521629	4352382	1	-5.05
1	4.20	CHLORIDE	23087.987	521629	4352382	1	-5.05
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
0.00			---total(s)---				
			46175.974		8704764		

238675



Sample Name : CCV
 Dilution Factor : 20.00
 Injection Number : 29
 Data File Name : c:\peaknet\data\031226\031226_029.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 8:59:43 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

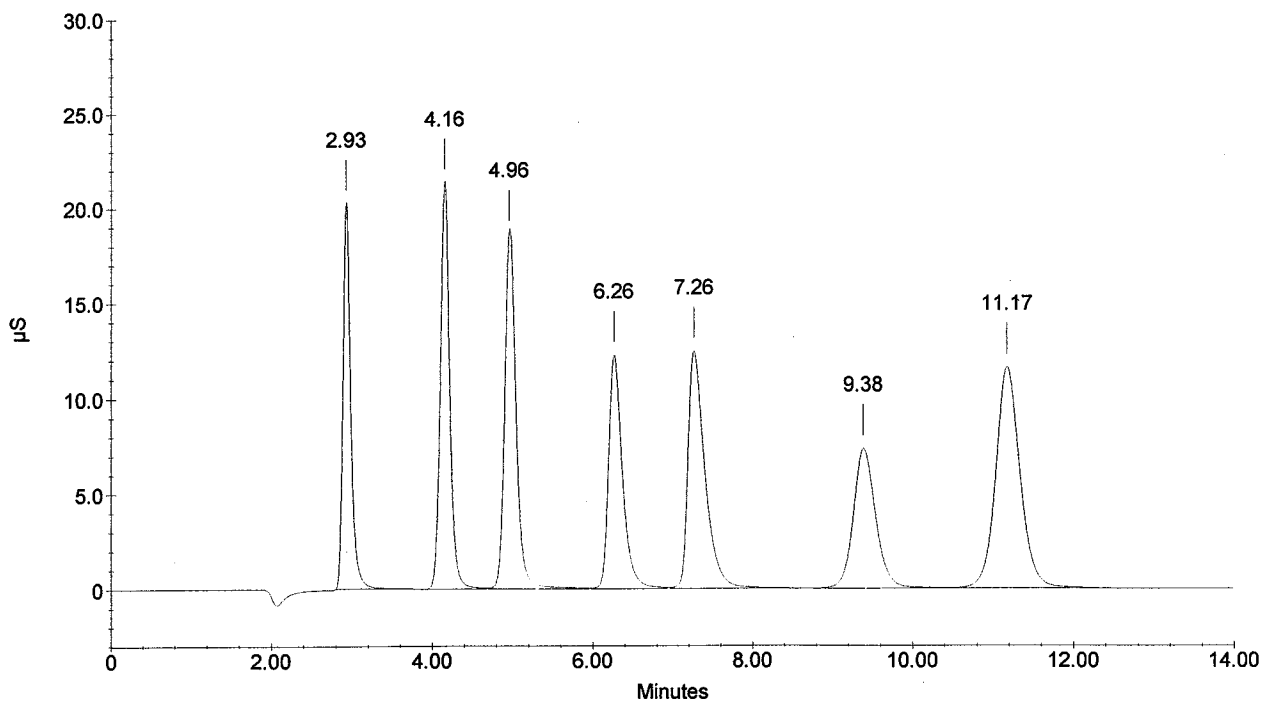
010119

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	2.93	FLUORIDE	110.017	202127	1339128	1	-7.57
2	4.16	CHLORIDE	204.108	213240	1736811	2	-5.96
3	4.96	NITRITE-N BROMIDE	108.143	186211	1843867	2	-6.83
5	7.26	NITRATE-N	87.806	124375	1844540	2	-3.54
6	9.38	PHOSPHATE-P	189.200	73529	1437397	2	-4.45
7	11.17	SULFATE	377.142	115895	2458945	2	-5.50

0.00	---total(s)--- 1076.416	10660688
------	----------------------------	----------

CCV



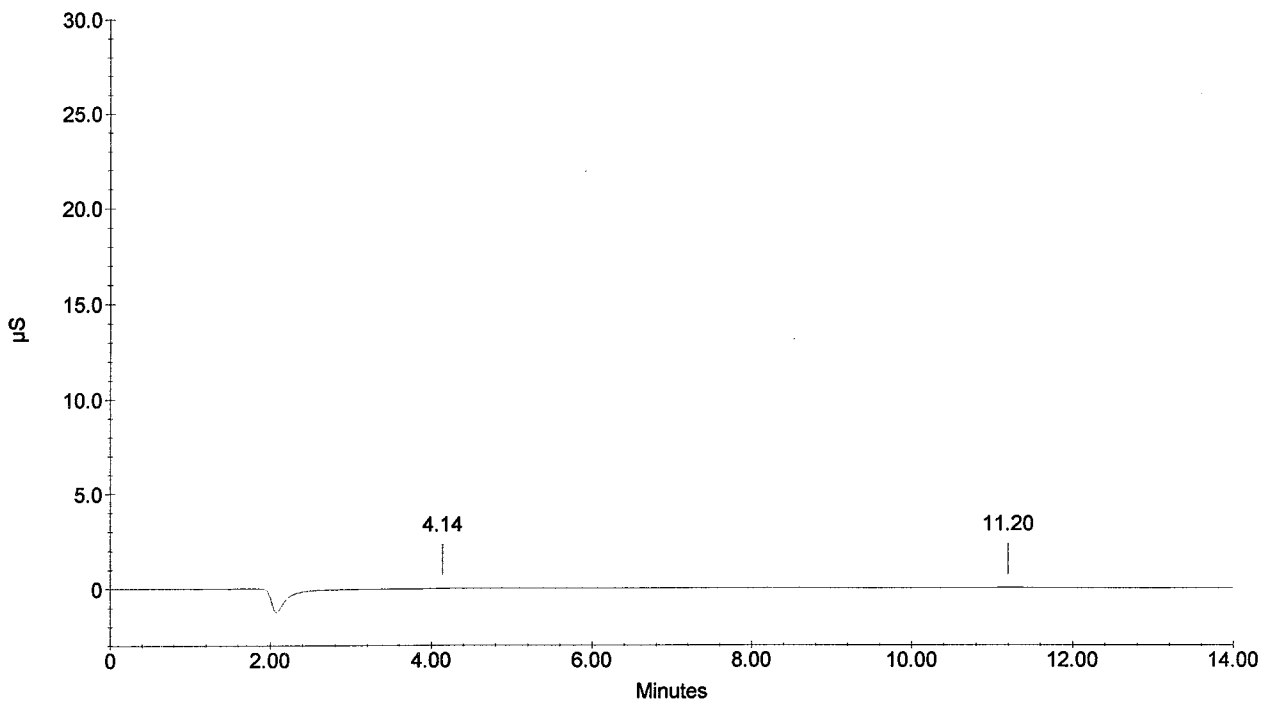
Sample Name : CCB
 Dilution Factor : 1.00
 Injection Number : 30
 Data File Name : c:\peaknet\data\031226\031226_030.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 9:16:28 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010120

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.14	CHLORIDE	0.022	170	1426	1	-6.26
1	4.14	CHLORIDE	0.022	170	1426	1	-6.26
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
2	11.20	SULFATE	0.036	192	3404	1	-5.27
			---total(s)---				
0.00			0.080		6256		

CCB



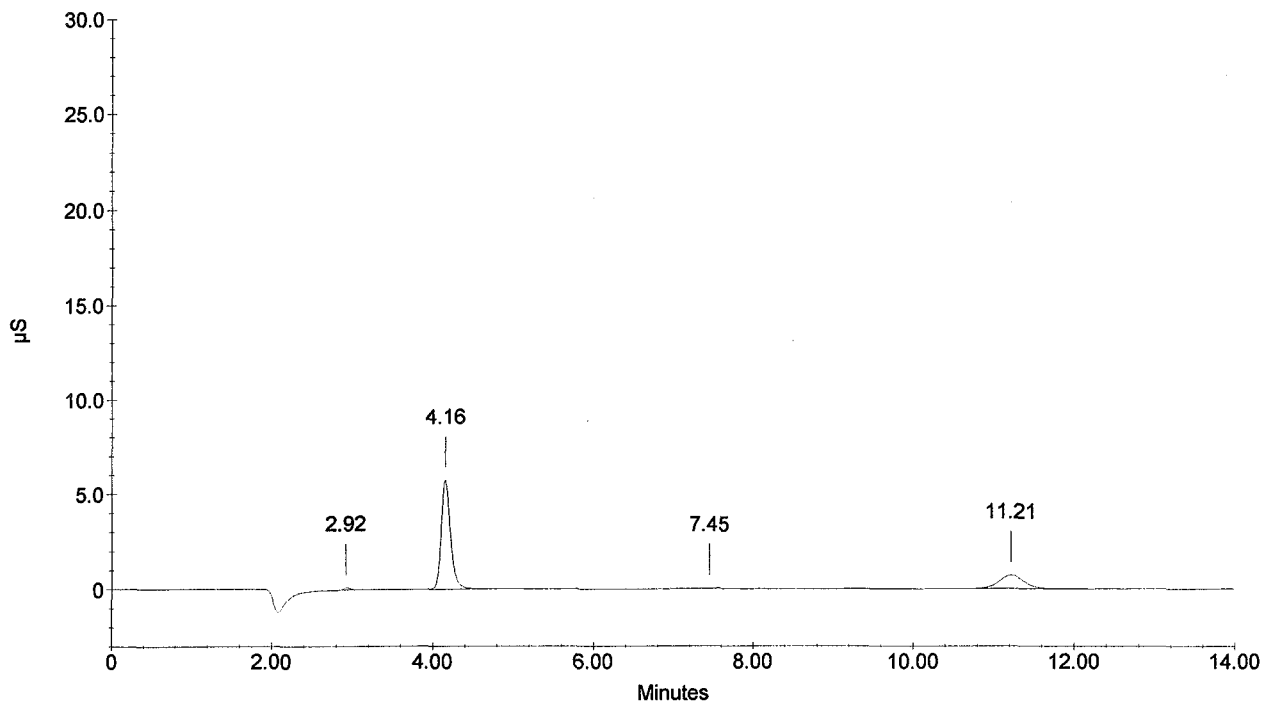
Sample Name : 239184
 Dilution Factor : 20.00
 Injection Number : 31
 Data File Name : c:\peaknet\data\031226\031226_031.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 9:33:11 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010121

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	2.92	FLUORIDE	1.594	1081	6694	1	-7.99
2	4.16	CHLORIDE NITRITE-N BROMIDE	59.435	57345	461333	1	-5.96
3	7.45	NITRATE-N PHOSPHATE-P	0.800	278	3850	1	-1.06
4	11.21	SULFATE	26.911	7052	156466	1	-5.16
			---total(s)---				
0.00			88.741		628343		

239184



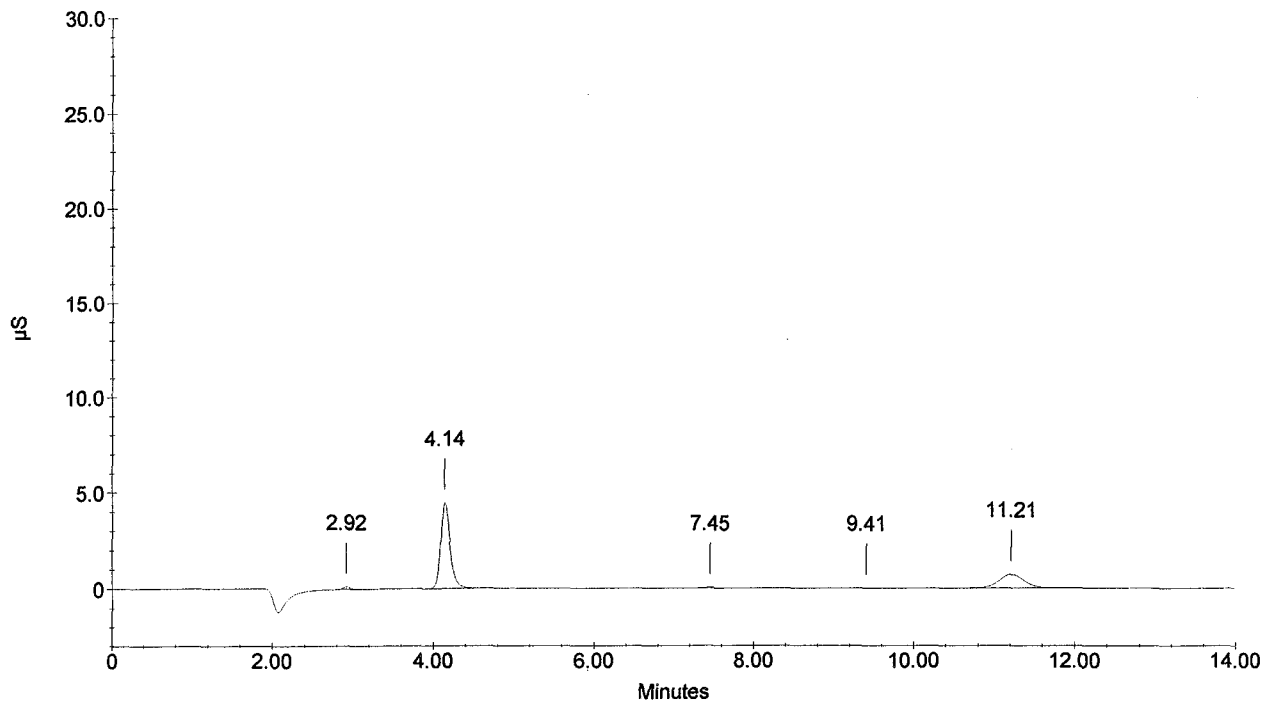
Sample Name : 239184D
 Dilution Factor : 20.00
 Injection Number : 32
 Data File Name : c:\peaknet\data\031226\031226_032.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 9:49:54 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010122

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	2.92	FLUORIDE	1.624	1157	7033	1	-7.99
2	4.14	CHLORIDE	46.498	44418	357581	1	-6.26
		NITRITE-N					
		BROMIDE					
3	7.45	NITRATE-N	0.795	271	3746	1	-1.06
4	9.41	PHOSPHATE-P	0.255	71	953	1	-4.18
5	11.21	SULFATE	26.433	7037	153642	1	-5.16
			---total(s)---				
	0.00		75.605		522955		

239184D



Sample Name : 239184S

Dilution Factor : 20.00

Injection Number : 33

Data File Name : c:\peaknet\data\031226\031226_033.DXD

Method File Name : c:\peaknet\method\anions031030.met

Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 10:06:38 PM

System Name : Dx-500

Detector Name : Conductivity Detector

Column Type : AS14-#015724 AG14-#1018096

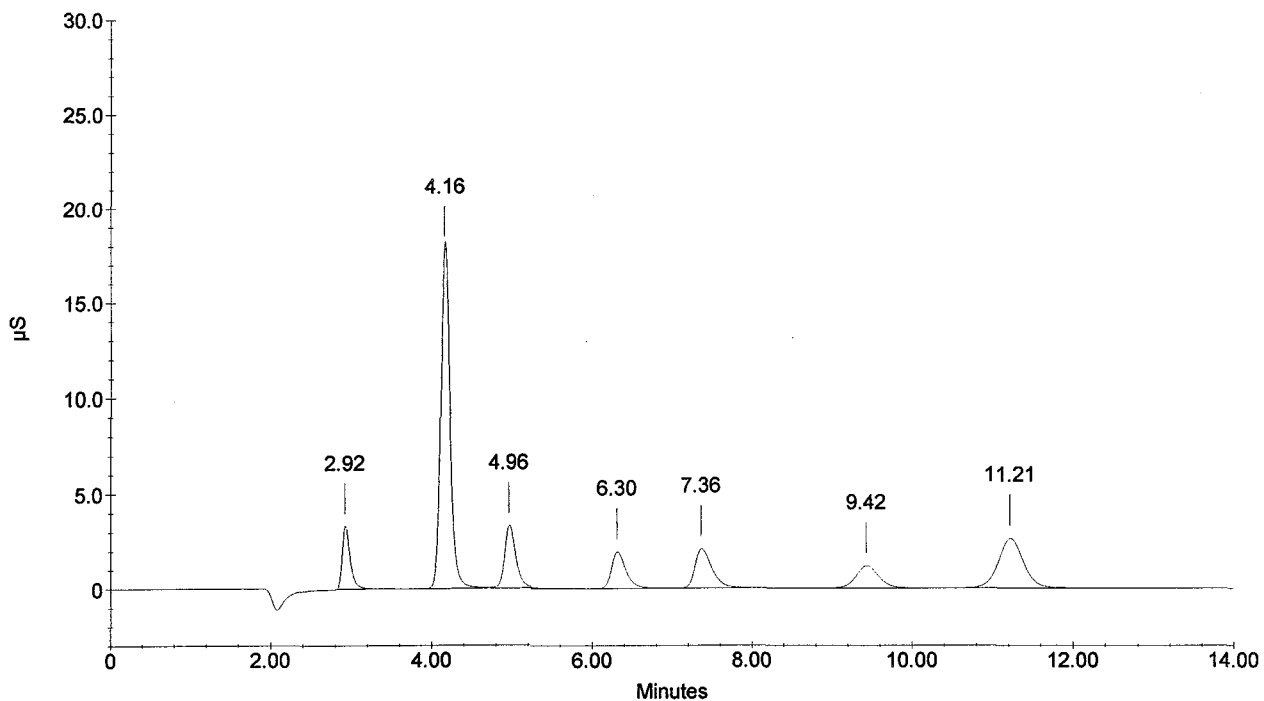
System Operator : RSS

010123

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	2.92	FLUORIDE	20.741	32556	227343	1	-7.99
2	4.16	CHLORIDE	172.848	177600	1443455	2	-5.96
3	4.96	NITRITE-N	20.769	32573	327543	2	-6.83
4	6.30	BROMIDE	68.805	19245	245176	2	-4.78
5	7.36	NITRATE-N	15.837	20644	303824	2	-2.30
6	9.42	PHOSPHATE-P	34.648	11834	240389	2	-4.04
7	11.21	SULFATE	96.083	26257	575469	2	-5.16
			---total(s)---				
0.00			429.733		3363199		

239184S



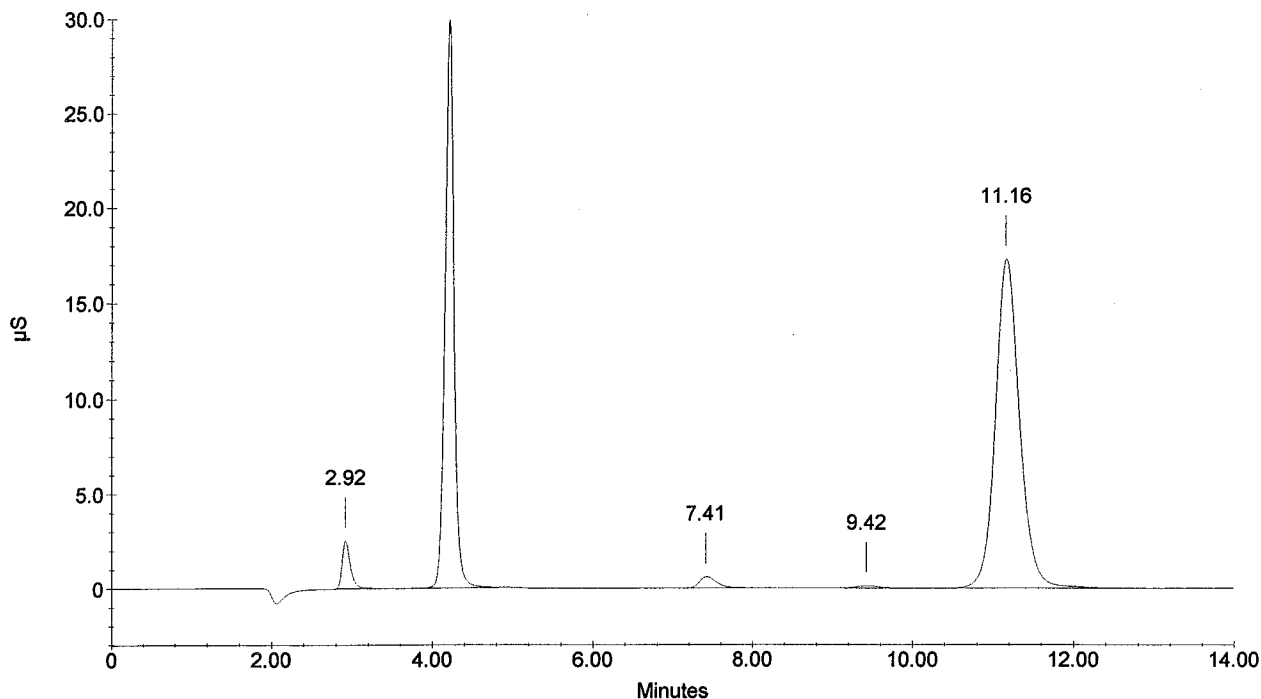
Sample Name : 239184
 Dilution Factor : 1.00
 Injection Number : 34
 Data File Name : c:\peaknet\data\031226\031226_034.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 10:23:23 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010124

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	2.92	FLUORIDE	0.821	25204	177007	1	-7.99
2	4.21	CHLORIDE	12.971	298676	2277087	1	-4.75
		NITRITE-N					
		BROMIDE					
3	7.41	NITRATE-N	0.249	5898	86613	1	-1.59
4	9.42	PHOSPHATE-P	0.178	1151	23595	1	-4.04
5	11.16	SULFATE	27.195	172336	3618884	1	-5.61
---total(s)---							
0.00			41.415		6183187		

239184



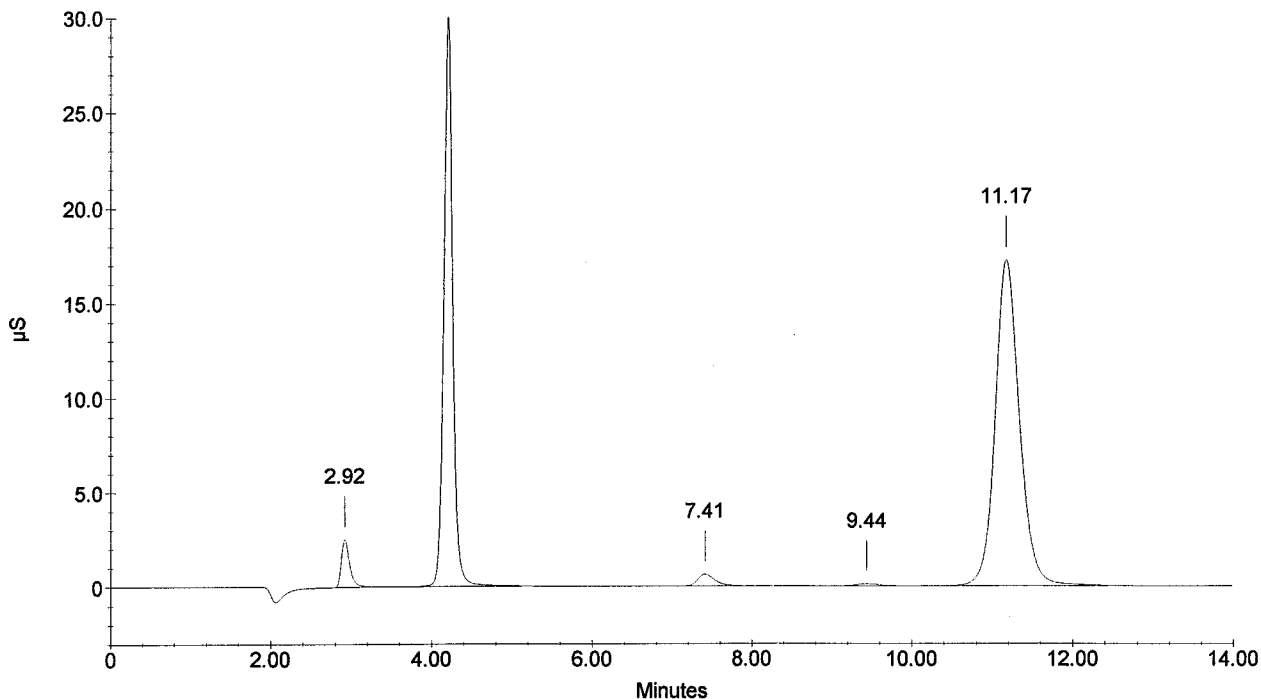
Sample Name : 239184D
 Dilution Factor : 1.00
 Injection Number : 35
 Data File Name : c:\peaknet\data\031226\031226_035.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 10:40:07 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

10125

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	2.92	FLUORIDE	0.823	25179	177400	1	-7.99
2	4.21	CHLORIDE	13.038	299861	2290478	1	-4.75
		NITRITE-N					
		BROMIDE					
3	7.41	NITRATE-N	0.263	6233	92144	1	-1.59
4	9.44	PHOSPHATE-P	0.176	1133	23301	1	-3.90
5	11.17	SULFATE	27.121	172013	3608788	1	-5.50
---total(s)---							
0.00			41.421	6192111			

239184D



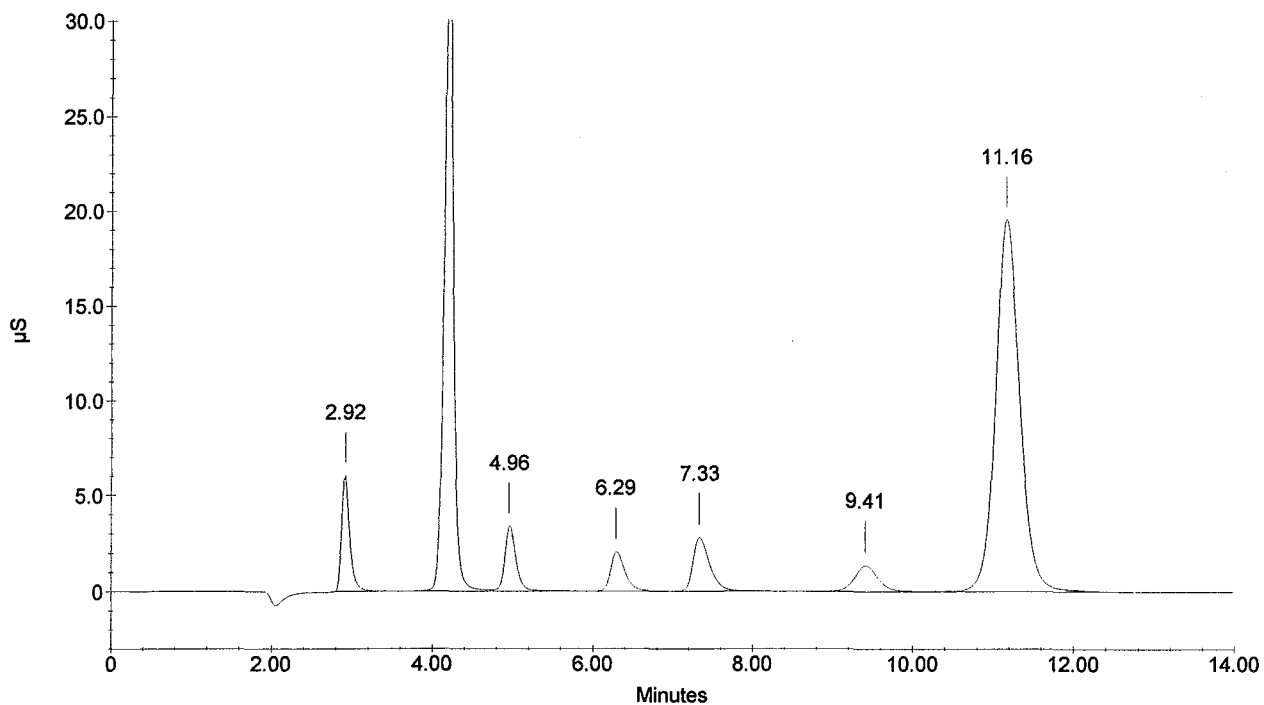
Sample Name : 239184S
 Dilution Factor : 1.00
 Injection Number : 36
 Data File Name : c:\peaknet\data\031226\031226_036.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 10:56:52 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010126

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	2.92	FLUORIDE	1.836	60135	416352	1	-7.99
2	4.20	CHLORIDE	14.682	338310	2622607	2	-5.05
3	4.96	NITRITE-N	1.047	33309	330325	2	-6.83
4	6.29	BROMIDE	3.554	20312	253514	2	-4.98
5	7.33	NITRATE-N	1.042	27766	405199	2	-2.66
6	9.41	PHOSPHATE-P	2.002	13511	278762	2	-4.18
7	11.16	SULFATE	30.629	195324	4079082	2	-5.61
			---total(s)---				
0.00			54.793		8385843		

239184S



Sample Name : CCV
 Dilution Factor : 20.00
 Injection Number : 37
 Data File Name : c:\peaknet\data\031226\031226_037.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 11:13:35 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

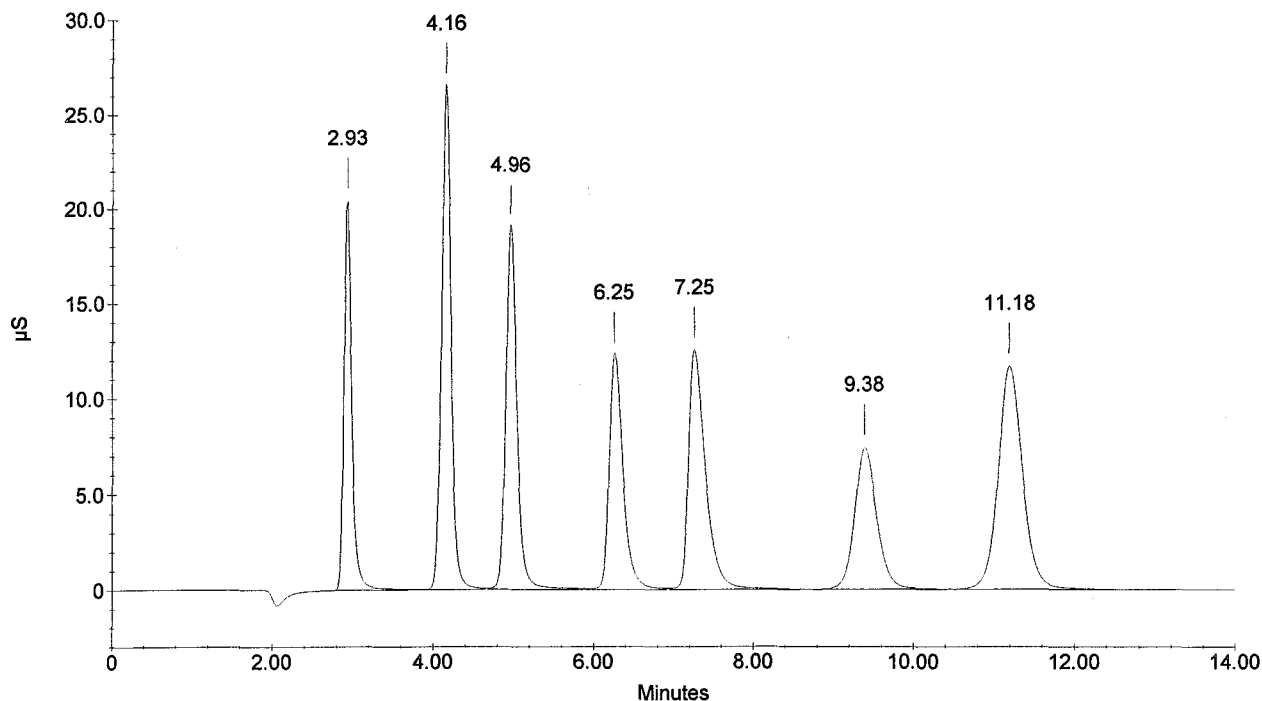
010127

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	2.93	FLUORIDE	112.102	203856	1366676	2	-7.57
2	4.16	CHLORIDE	246.778	264286	2151454	2	-5.96
3	4.96	NITRITE-N BROMIDE	109.317	189509	1865332	2	-6.83
5	7.25	NITRATE-N	88.315	124599	1856093	2	-3.72
6	9.38	PHOSPHATE-P	189.612	73721	1440855	2	-4.45
7	11.18	SULFATE	379.024	116212	2472141	2	-5.39

	---total(s)---	
0.00	1125.149	11152551

CCV



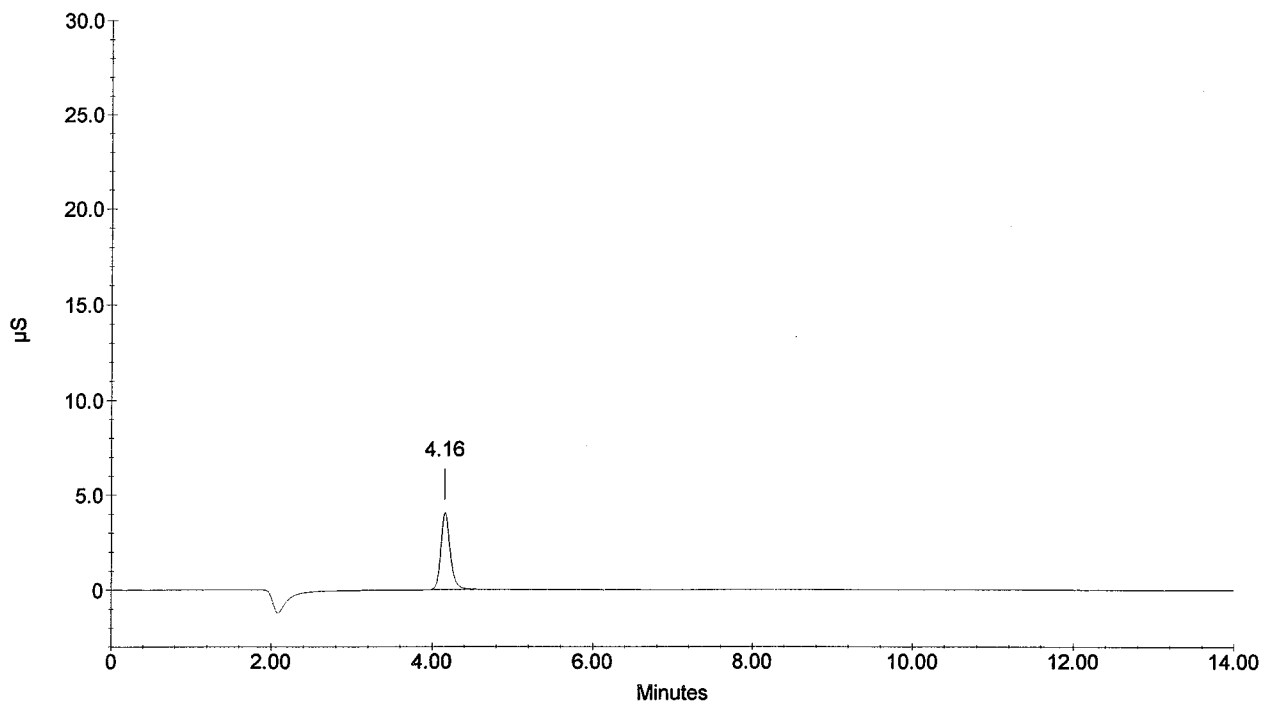
Sample Name : CCB
 Dilution Factor : 1.00
 Injection Number : 38
 Data File Name : c:\peaknet\data\031226\031226_038.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\26dec03.sch

Date Time Collected : 12/26/03 11:30:21 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : RSS

010128

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	4.16	CHLORIDE	2.120	40384	325018	1	-5.96
1	4.16	CHLORIDE	2.120	40384	325018	1	-5.96
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
0.00			---total(s)---				
			4.239		650037		

CCB



Line	Sample	Sample Type	Level	Method	Data File	Dilution
1	ICV	Sample		anions031030.met	031229_001.dxd	20
2	ICB	Sample		anions031030.met	031229_002.dxd	1
3	238663	Sample		anions031030.met	031229_003.dxd	2000
4	238664	Sample		anions031030.met	031229_004.dxd	2000
5	238665	Sample		anions031030.met	031229_005.dxd	2000
6	238666	Sample		anions031030.met	031229_006.dxd	2000
7	238667	Sample		anions031030.met	031229_007.dxd	2000
8	238668	Sample		anions031030.met	031229_008.dxd	2000
9	238669	Sample		anions031030.met	031229_009.dxd	2000
10	238670	Sample		anions031030.met	031229_010.dxd	2000
11	238671	Sample		anions031030.met	031229_011.dxd	2000
12	238672	Sample		anions031030.met	031229_012.dxd	2000
13	CCV	Sample		anions031030.met	031229_013.dxd	20
14	238673	Sample		anions031030.met	031229_014.dxd	1
15	238674	Sample		anions031030.met	031229_015.dxd	2000
16	238675	Sample		anions031030.met	031229_016.dxd	2000
17	CCV	Sample		anions031030.met	031229_017.dxd	20
18	CCB	Sample		anions031030.met	031229_018.dxd	1
19	238673	Sample		anions031030.met	031229_019.dxd	2000
20	237674	Sample		anions031030.met	031229_020.dxd	2000
21	238675	Sample		anions031030.met	031229_021.dxd	2000
22	CCV	Sample		anions031030.met	031229_022.dxd	20
23	CCB	Sample		anions031030.met	031229_023.dxd	1
24	CCB	Sample		astop.met	031229	1

010129

Default Method Path: C:\PEAKNET\METHOD

Default Data Path: C:\PEAKNET\DATA\031229

Comment:

DIVISION 20 06002.01.071 TO# 031205-4 RERUNS

ICV/CCV Source Spec 24-79AS (Dnorg# 4225)

Cl 200 mg/L

NO₃-N ~~9.0~~ 90.4 mg/L
ams
12/30/03ams
12/30/03

Line	Sample	Sample Type	Level	Method	Data File	Dilution	
1	ICV	Sample		anions031030.met	031229_001.dxd	20	010130
2	ICB	Sample		anions031030.met	031229_002.dxd	1	
3	238663	Sample		anions031030.met	031229_003.dxd	2000	
4	238664	Sample		anions031030.met	031229_004.dxd	2000	
5	238665	Sample		anions031030.met	031229_005.dxd	2000	
6	238666	Sample		anions031030.met	031229_006.dxd	2000	
7	238667	Sample		anions031030.met	031229_007.dxd	2000	
8	238668	Sample		anions031030.met	031229_008.dxd	2000	
9	238669	Sample		anions031030.met	031229_009.dxd	2000	
10	238670	Sample		anions031030.met	031229_010.dxd	2000	
11	238671	Sample		anions031030.met	031229_011.dxd	2000	
12	238672	Sample		anions031030.met	031229_012.dxd	2000	
13	CCV	Sample		anions031030.met	031229_013.dxd	20	
14	238673	Sample		anions031030.met	031229_014.dxd	1	
15	238674	Sample		anions031030.met	031229_015.dxd	2000	
16	238674	Sample		anions031030.met	031229_016.dxd	2000	
17	CCV	Sample		anions031030.met	031229_017.dxd	20	
18	CCB	Sample		anions031030.met	031229_018.dxd	1	
19	238673	Sample		anions031030.met	031229_019.dxd	2000	
20	237674	Sample		anions031030.met	031229_020.dxd	2000	
21	238675	Sample		anions031030.met	031229_021.dxd	2000	
22	CCV	Sample		anions031030.met	031229_022.dxd	20	
23	CCB	Sample		anions031030.met	031229_023.dxd	1	
24	CCB	Sample		astop.met	031229	1	

Default Method Path: C:\PEAKNET\METHOD

Default Data Path: C:\PEAKNET\DATA\031229

Comment:

DIVISION 20 06002.01.071 TO# 031205-4 RERUNS

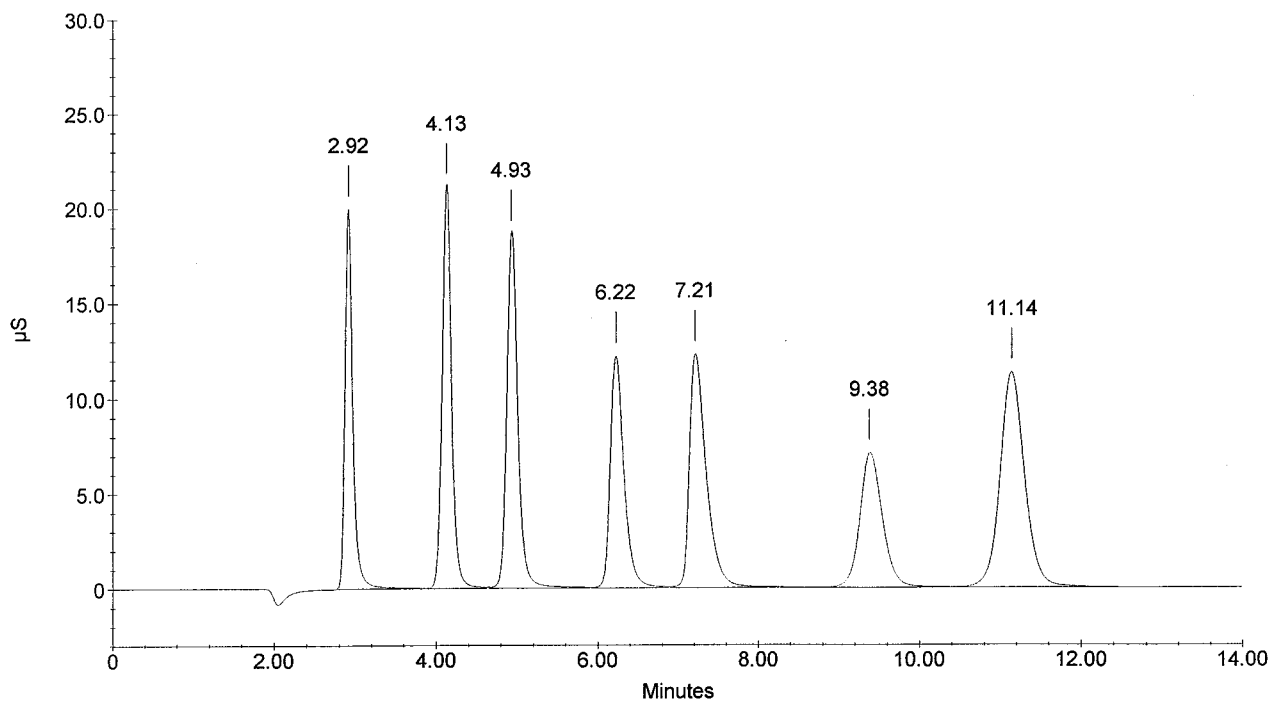
Sample Name : ICV
 Dilution Factor : 20.00
 Injection Number : 1
 Data File Name : c:\peaknet\data\031229\031229_001.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 11:55:35 AM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : AMS

010131

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	2.92	FLUORIDE	108.976	199541	1325400	2	-7.99
2	4.13	CHLORIDE	199.781	210887	1695647	2	-6.56
3	4.93	NITRITE-N BROMIDE	106.123	186275	1806999	2	-7.33
5	7.21	NITRATE-N	85.657	122632	1795907	2	-4.25
6	9.38	PHOSPHATE-P	183.314	70920	1388134	2	-4.45
7	11.14	SULFATE	368.445	113076	2397994	2	-5.72
			---total(s)---				
0.00			1052.296		10410080		

ICV



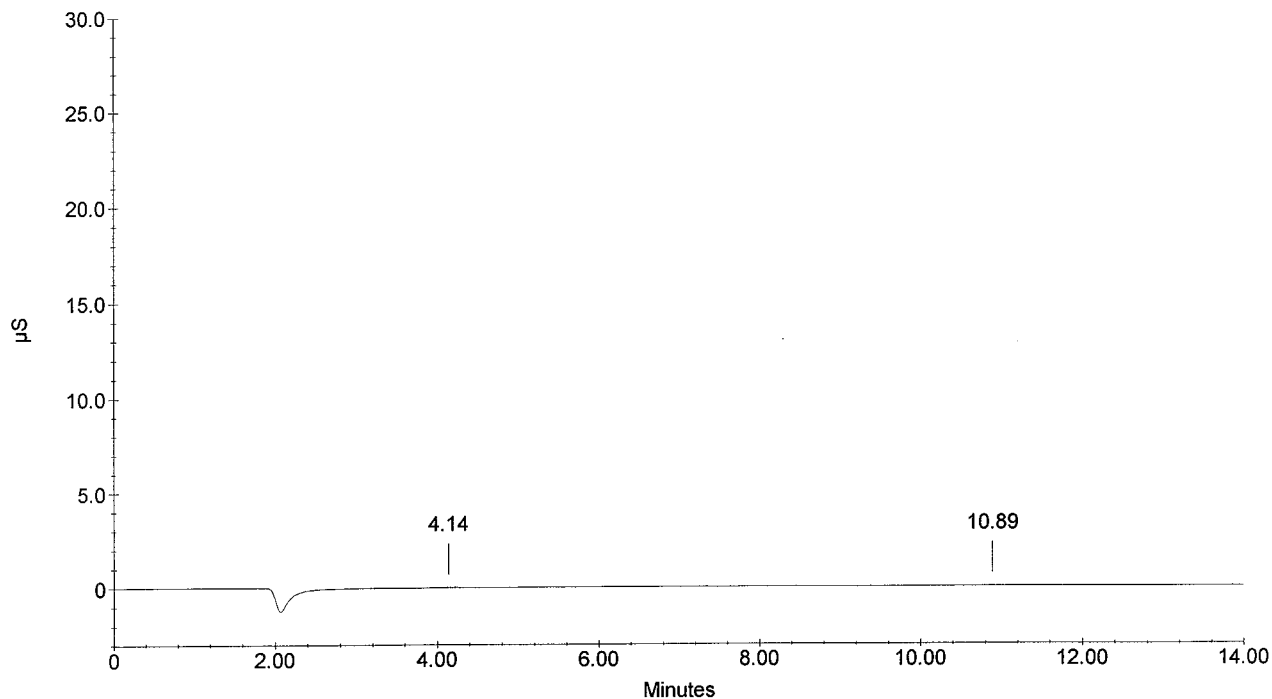
Sample Name : ICB
 Dilution Factor : 1.00
 Injection Number : 2
 Data File Name : c:\peaknet\data\031229\031229_002.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 12:12:19 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : AMS

010132

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.14	CHLORIDE	0.018	95	850	1	-6.26
1	4.14	CHLORIDE	0.018	95	850	1	-6.26
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
2	10.89	SULFATE	0.013	53	686	1	-7.87
---total(s)---							
	0.00		0.049		2386		

ICB



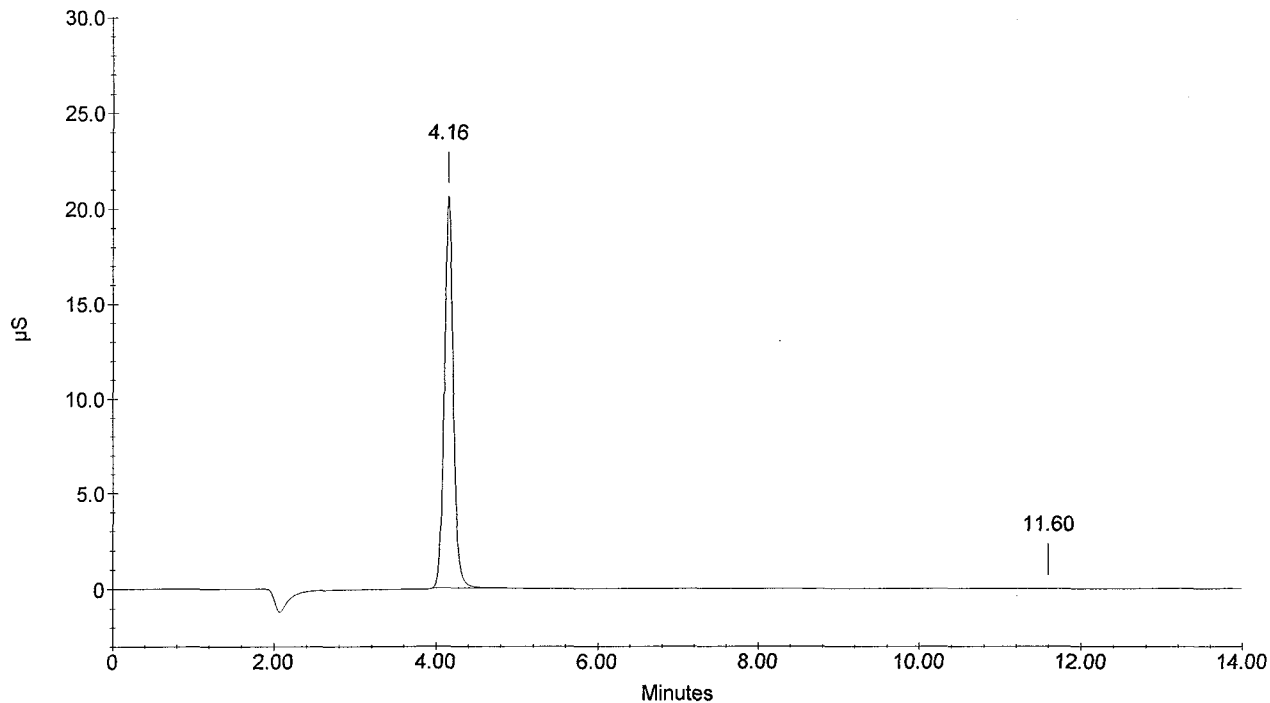
Sample Name : 238663
 Dilution Factor : 2000.00
 Injection Number : 3
 Data File Name : c:\peaknet\data\031229\031229_003.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 12:28:59 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : AMS

010133

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	4.16	CHLORIDE	18796.731	205862	1584173	1	-5.96
1	4.16	CHLORIDE	18796.731	205862	1584173	1	-5.96
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
2	11.60	SULFATE	22.871	46	543	1	-1.89
			---total(s)---				
0.00			37616.333		3168889		

238663



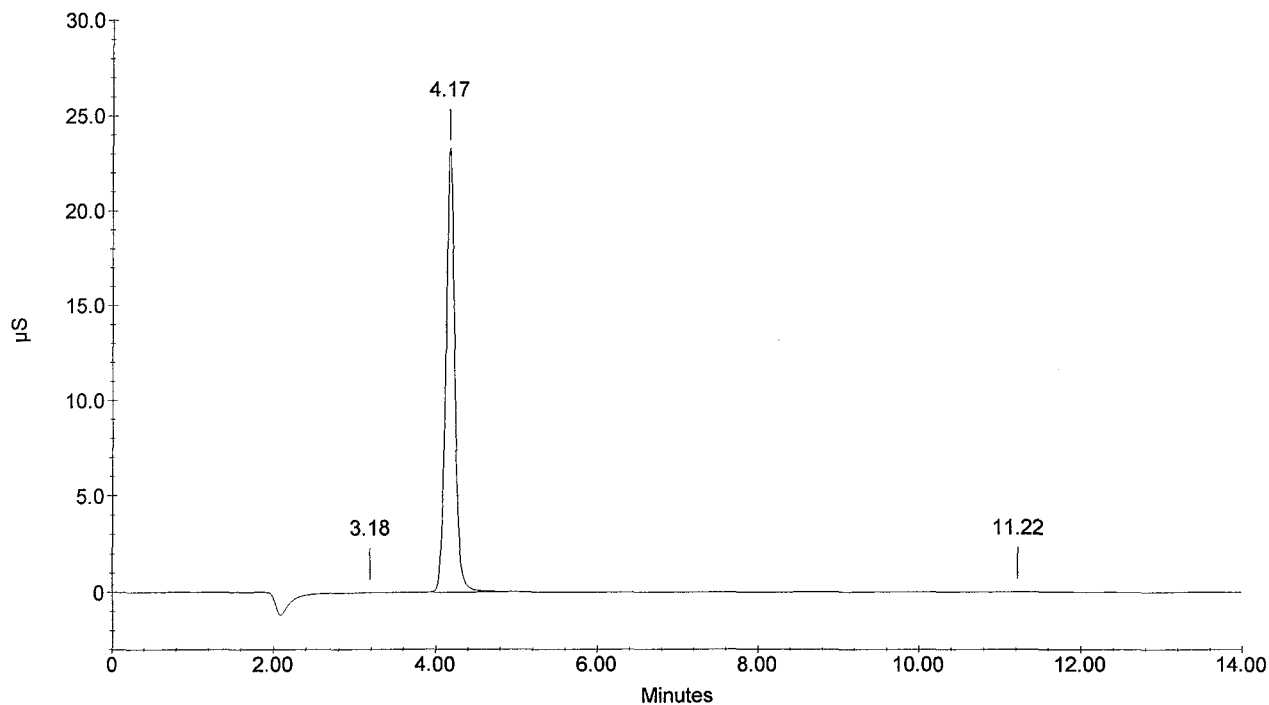
Sample Name : 238664
 Dilution Factor : 2000.00
 Injection Number : 4
 Data File Name : c:\peaknet\data\031229\031229_004.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 12:45:40 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : AMS

010134

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	3.18	FLUORIDE	104.675	36	480	1	0.42
2	4.17	CHLORIDE	21163.161	230228	1808777	1	-5.66
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
3	11.22	SULFATE	32.669	75	1109	1	-5.05
			---total(s)---				
0.00			21300.506		1810367		

238664



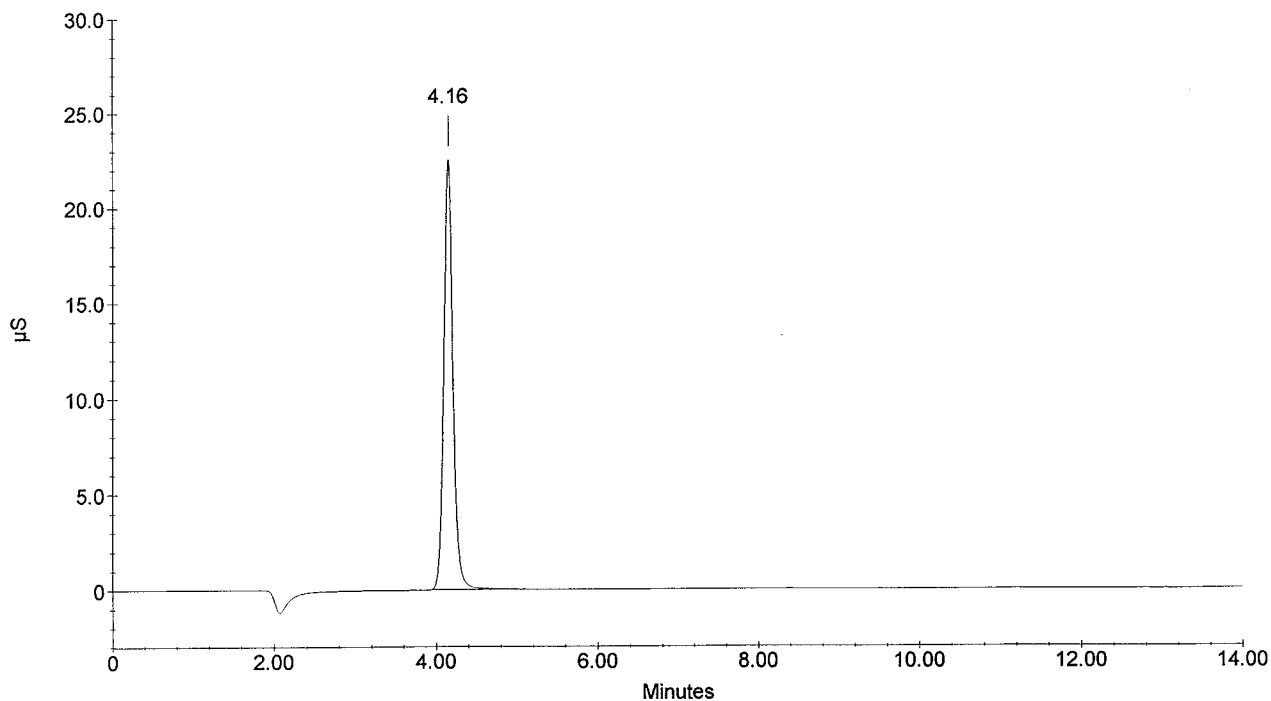
Sample Name : 238665
 Dilution Factor : 2000.00
 Injection Number : 5
 Data File Name : c:\peaknet\data\031229\031229_005.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 1:02:24 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : AMS

010135

Peak Information : All Components								
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta	
1	4.16	CHLORIDE	✓20637.348	225144	1758425	1	-5.96	
1	4.16	CHLORIDE	20637.348	225144	1758425	1	-5.96	
		NITRITE-N						
		BROMIDE						
		NITRATE-N						
		PHOSPHATE-P						
		SULFATE						
0.00			---total(s)---					
			41274.695		3516851			

238665



Sample Name : 238666
 Dilution Factor : 2000.00
 Injection Number : 6
 Data File Name : c:\peaknet\data\031229\031229_006.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\29dec03.sch

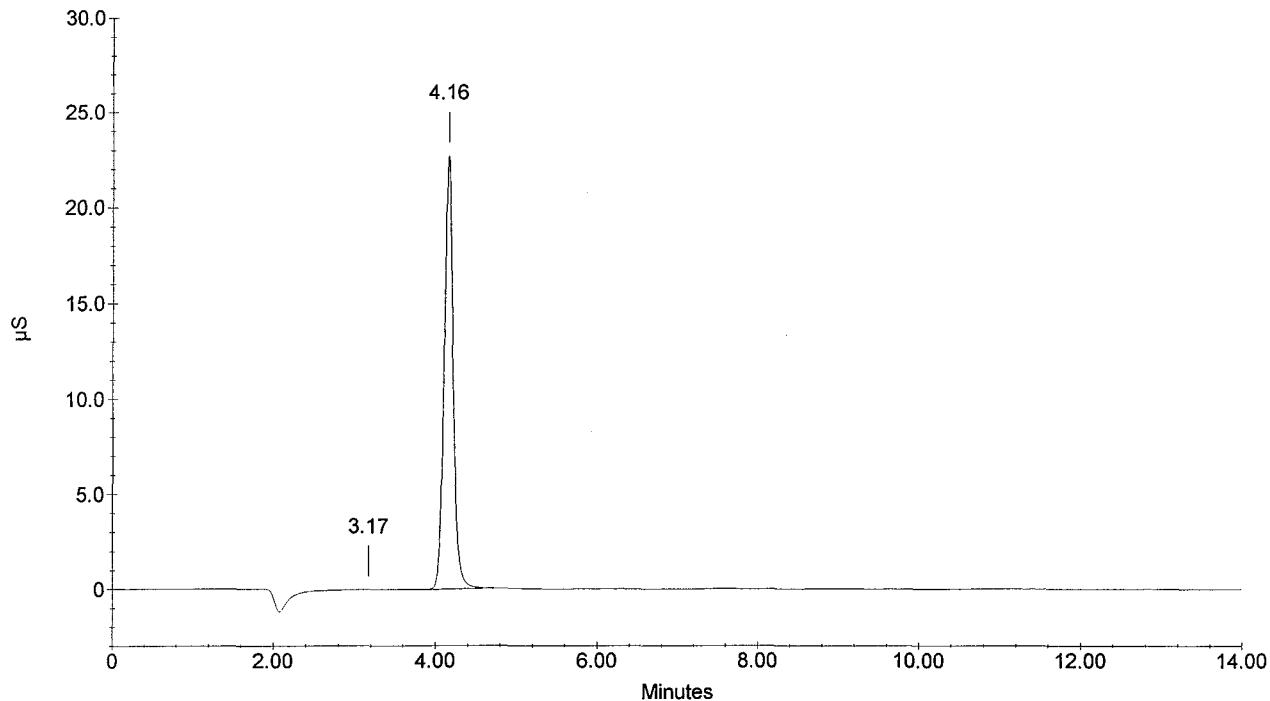
Date Time Collected : 12/29/03 1:19:07 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : AMS

010136

Peak Information : All Components

Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.17	FLUORIDE	106.221	62	656	1	0.00
2	4.16	CHLORIDE	✓ 20635.002	226770	1758201	1	-5.96
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
0.00			---total(s)--- 20741.222		1758857		

238666



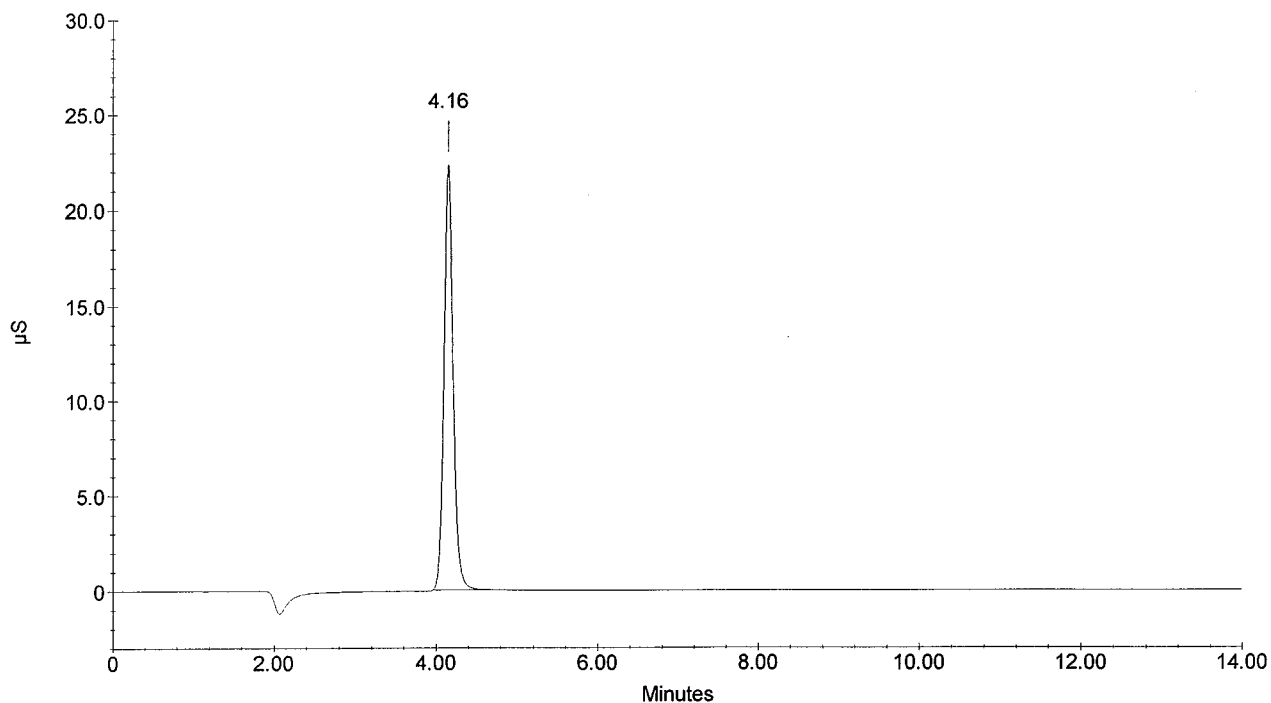
Sample Name : 238667
 Dilution Factor : 2000.00
 Injection Number : 7
 Data File Name : c:\peaknet\data\031229\031229_007.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 1:35:50 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : AMS

010137

Peak Information : All Components								
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta	
1	4.16	CHLORIDE	20248.270	222866	1721329	1	-5.96	
1	4.16	CHLORIDE	20248.270	222866	1721329	1	-5.96	
		NITRITE-N						
		BROMIDE						
		NITRATE-N						
		PHOSPHATE-P						
		SULFATE						
0.00			---total(s)---					
			40496.541		3442658			

238667



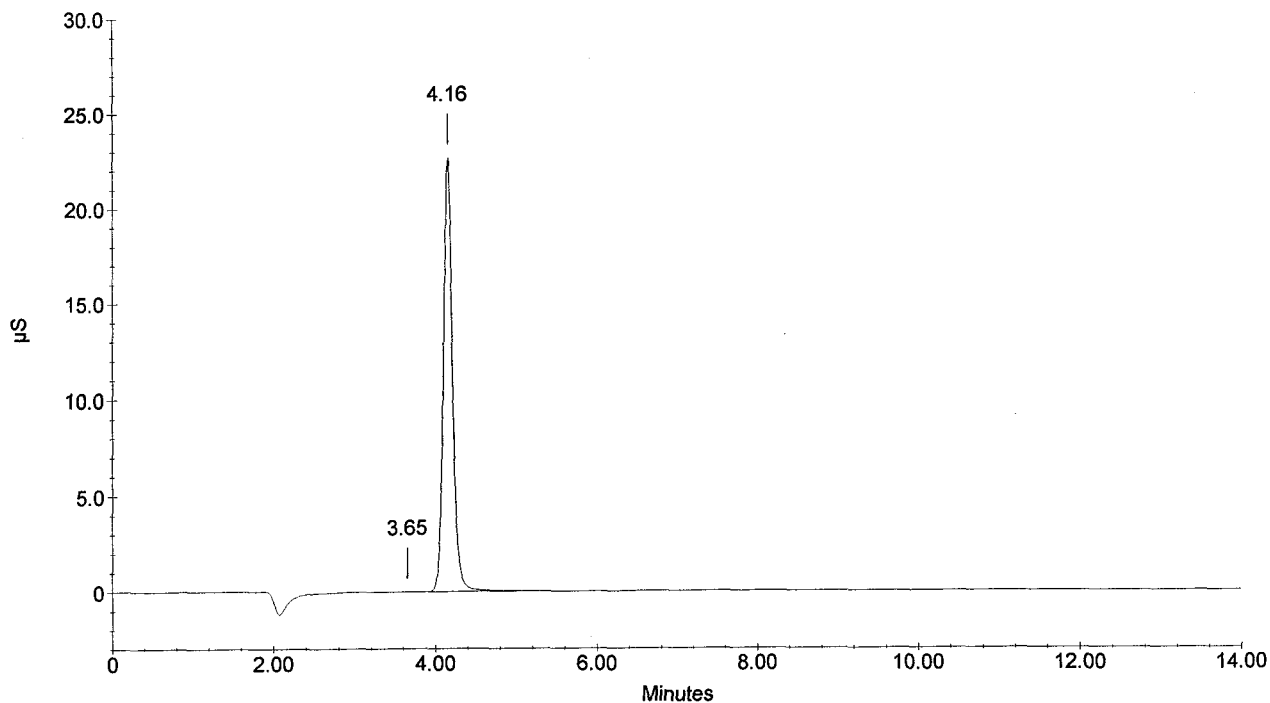
Sample Name : 238668
 Dilution Factor : 2000.00
 Injection Number : 8
 Data File Name : ...031229_008.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 1:52:28 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : AMS

010138

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	3.65		0.000	67	1547	1	
2	4.16	CHLORIDE NITRITE-N BROMIDE NITRATE-N PHOSPHATE-P SULFATE	20814.231	226647	1775336	1	-5.96
			---total(s)---				
0.00			20814.231		1776883		

238668



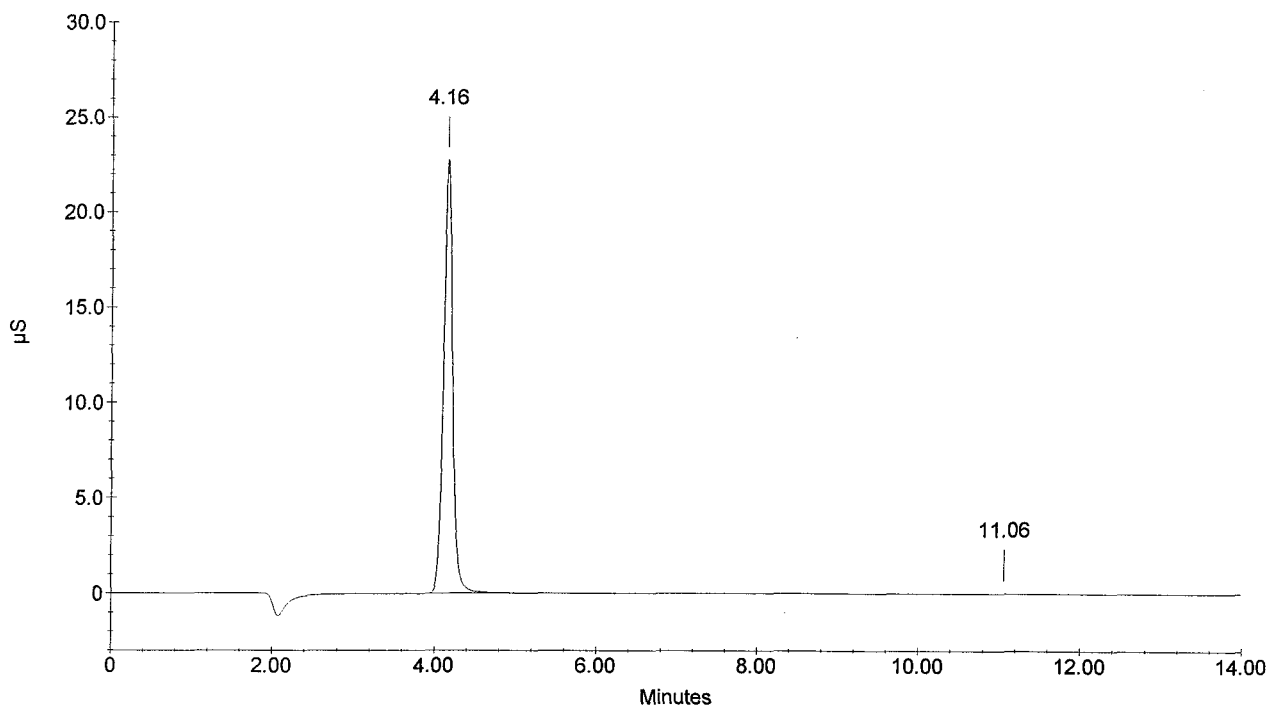
Sample Name : 238669
 Dilution Factor : 2000.00
 Injection Number : 9
 Data File Name : c:\peaknet\data\031229\031229_009.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 2:09:04 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : AMS

010139

Peak Information : All Components								
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta	
1	4.16	CHLORIDE	✓ 20845.714	226919	1778349	1	-5.96	
1	4.16	CHLORIDE	20845.714	226919	1778349	1	-5.96	
		NITRITE-N						
		BROMIDE						
		NITRATE-N						
		PHOSPHATE-P						
2	11.06	SULFATE	26.713	53	765	1	-6.40	
			---total(s)---					
0.00			41718.141		3557462			

238669



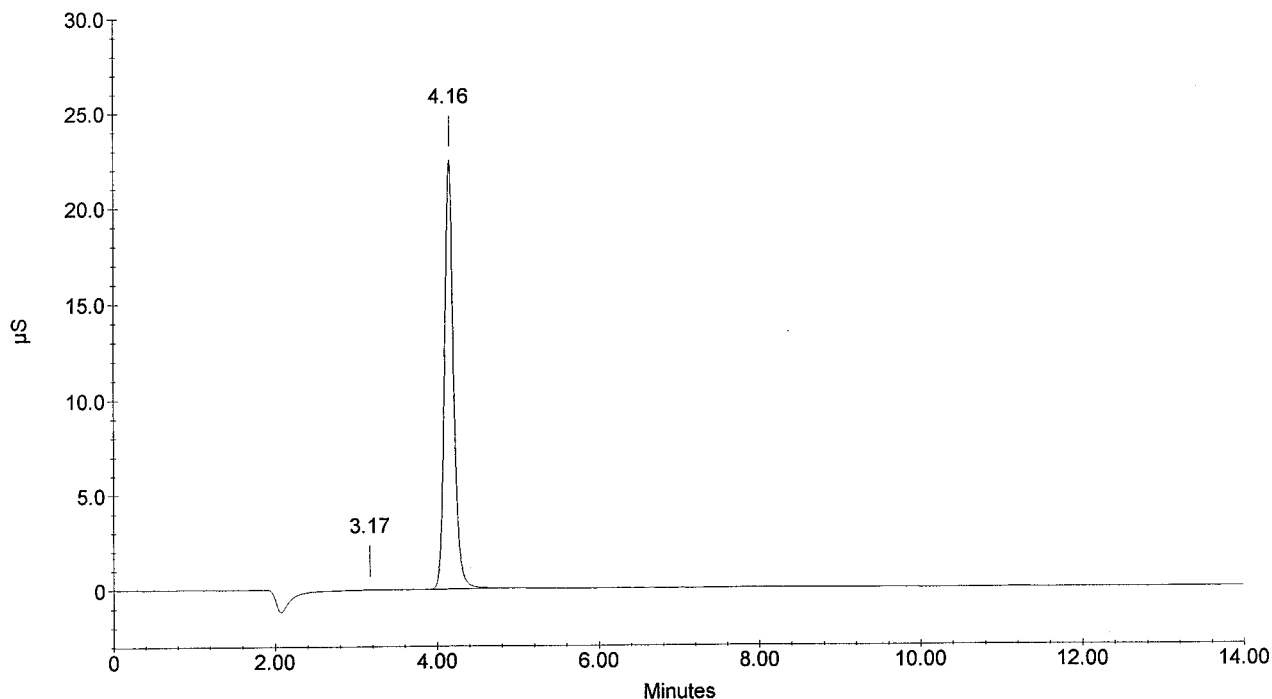
Sample Name : 238670
 Dilution Factor : 2000.00
 Injection Number : 10
 Data File Name : c:\peaknet\data\031229\031229_010.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 2:25:41 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : AMS

010140

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.17	FLUORIDE	115.974	248	1763	1	0.00
2	4.16	CHLORIDE	20518.758	224851	1747104	1	-5.96
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
0.00			---total(s)--- 20634.732		1748867		

238670



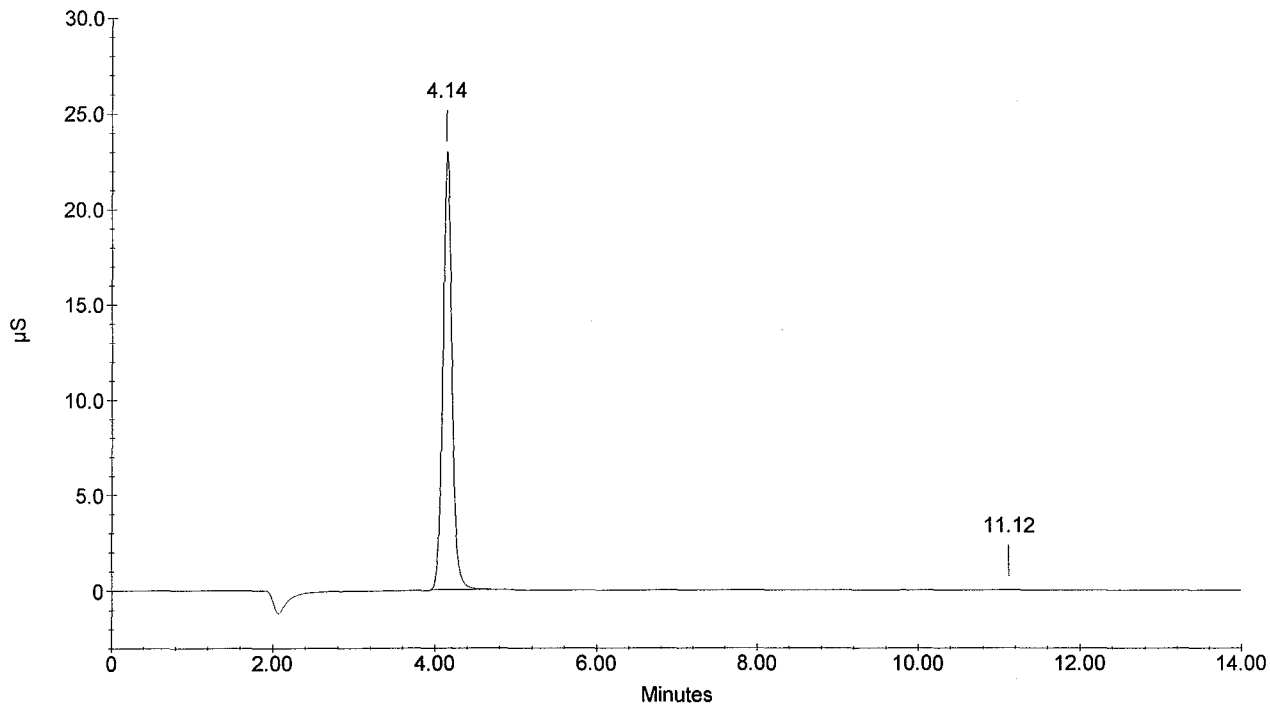
Sample Name : 238671
Dilution Factor : 2000.00
Injection Number : 11
Data File Name : c:\peaknet\data\031229\031229_011.DXD
Method File Name : c:\peaknet\method\anions031030.met
Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 2:42:17 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#015724 AG14-#1018096
System Operator : AMS

010141

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	4.14	CHLORIDE	20742.067	227742	1768433	1	-6.26
1	4.14	CHLORIDE	20742.067	227742	1768433	1	-6.26
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
2	11.12	SULFATE	25.297	62	683	1	-5.95
			---total(s)---				
0.00			41509.430		3537549		

238671



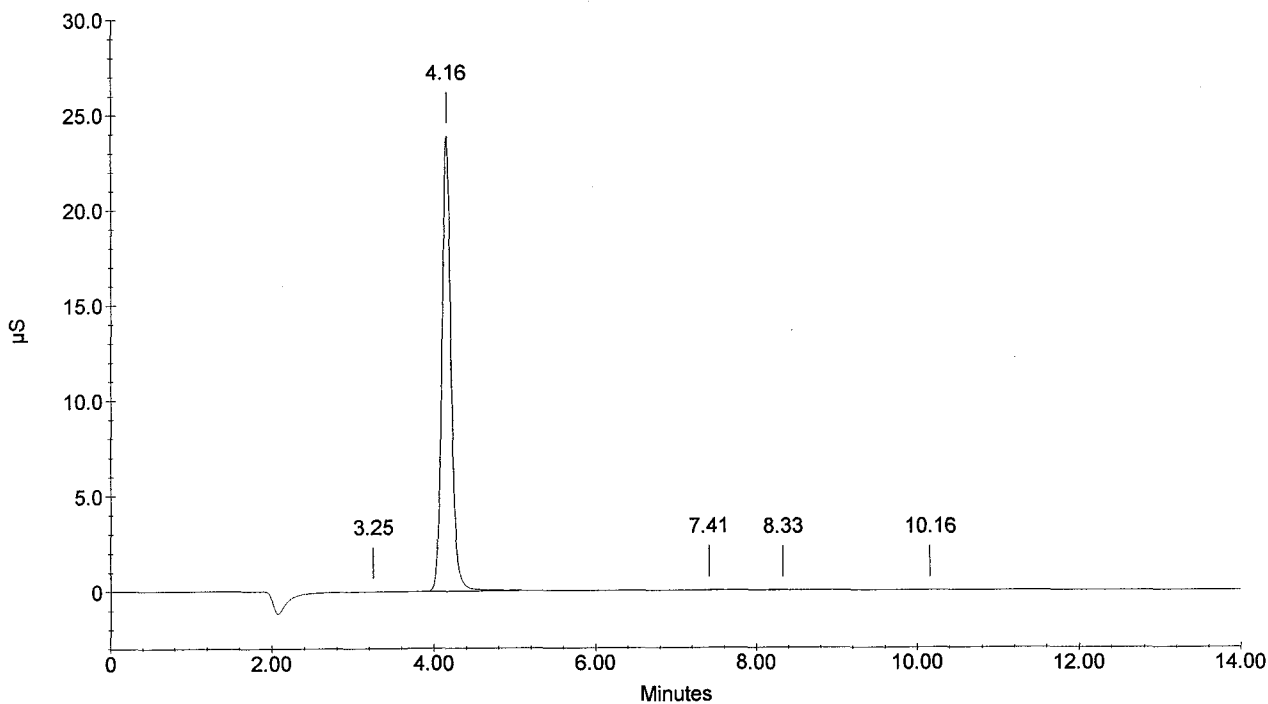
Sample Name : 238672
Dilution Factor : 2000.00
Injection Number : 12
Data File Name : c:\peaknet\data\031229\031229_012.DXD
Method File Name : c:\peaknet\method\anions031030.met
Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 2:58:53 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#015724 AG14-#1018096
System Operator : AMS

010142

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	3.25	FLUORIDE	102.380	37	220	1	2.52
2	4.16	CHLORIDE	21799.869	238312	1870079	1	-5.96
		NITRITE-N					
		BROMIDE					
3	7.41	NITRATE-N	70.891	143	2045	1	-1.59
5	10.16	PHOSPHATE-P	24.241	56	867	1	3.43
		SULFATE					
0.00			---total(s)---				
			21997.381		1873211		

238672



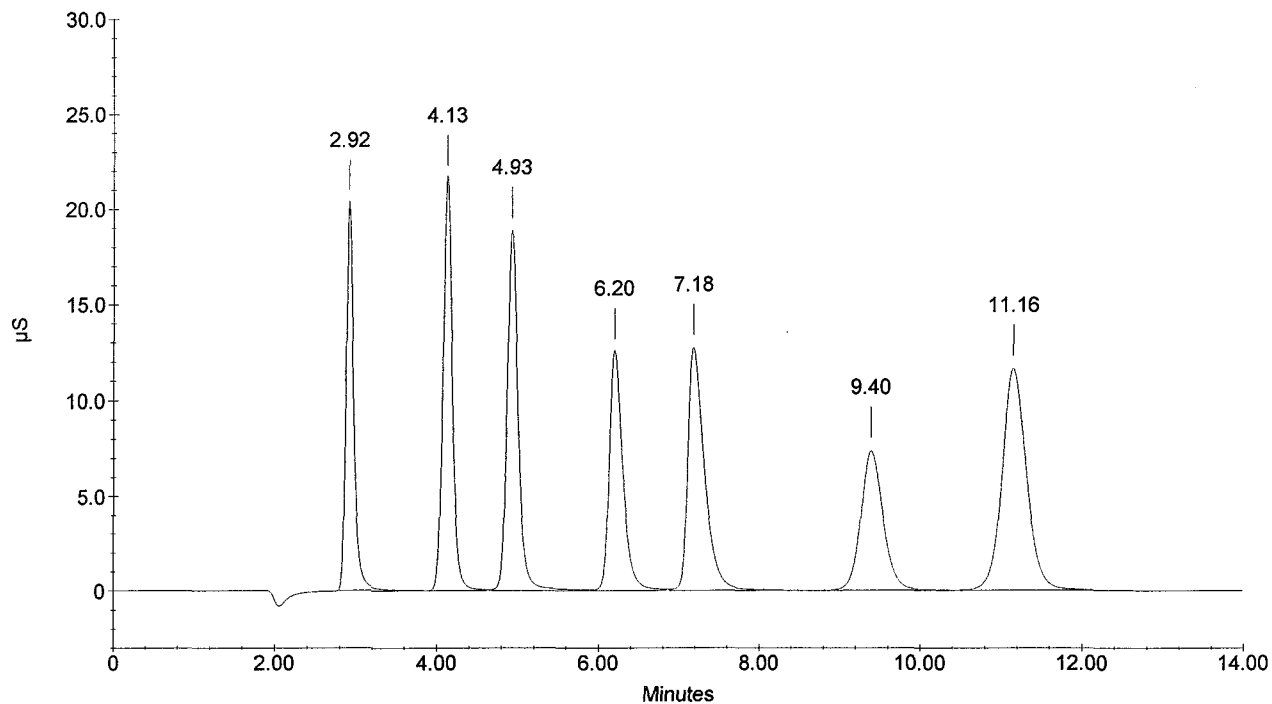
Sample Name : CCV
Dilution Factor : 20.00
Injection Number : 13
Data File Name : c:\peaknet\data\031229\031229_013.DXD
Method File Name : c:\peaknet\method\anions031030.met
Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 3:15:32 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#015724 AG14-#1018096
System Operator : AMS

010143

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	2.92	FLUORIDE	110.914	202541	1350970	2	-7.99
2	4.13	CHLORIDE	203.973	215503	1735518	2	-6.56
3	4.93	NITRITE-N BROMIDE	106.312	188007	1810455	2	-7.33
5	7.18	NITRATE-N	87.661	126755	1841253	2	-4.60
6	9.40	PHOSPHATE-P	187.185	73214	1420498	2	-4.31
7	11.16	SULFATE	376.429	116024	2453949	2	-5.61
---total(s)---							
0.00				1072.474	10612643		

CCV



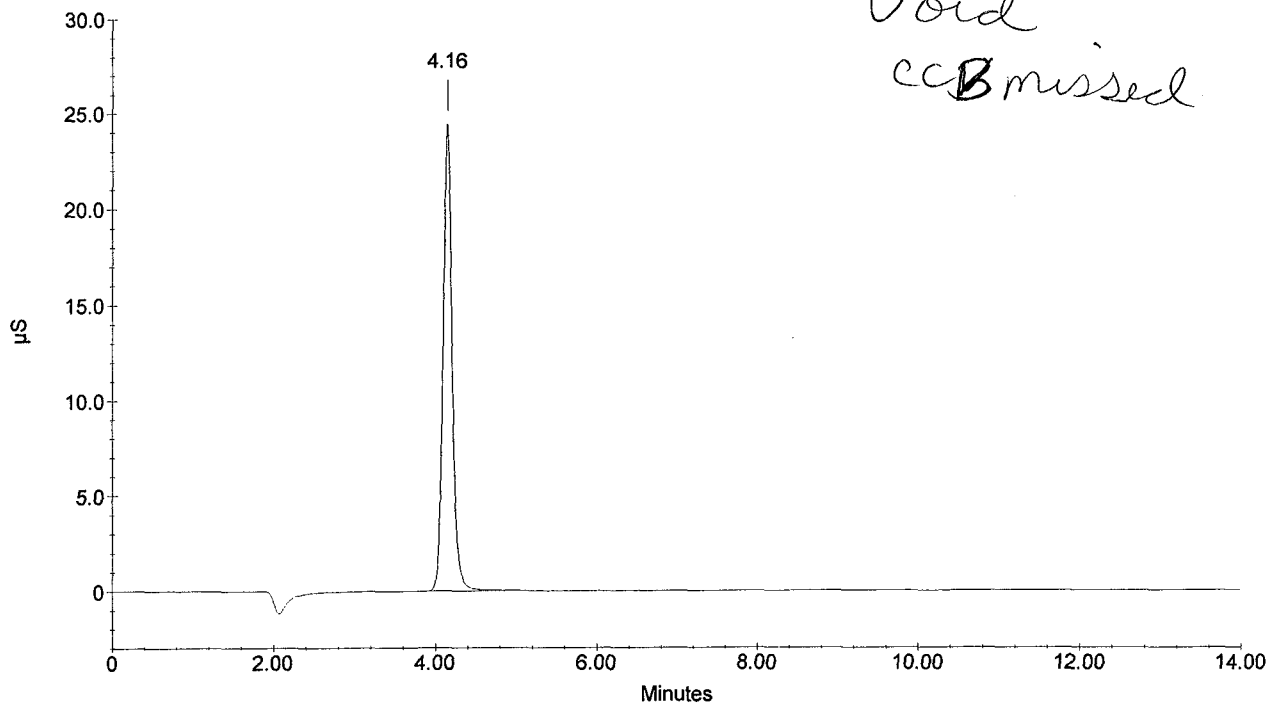
Sample Name : 238673
 Dilution Factor : 1.00
 Injection Number : 14
 Data File Name : ...031229_014.DXD
 Method File Name : ...ANIONS031030.met
 Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 3:32:08 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : AMS

010144

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	4.16	CHLORIDE	11.098	243957	1908449	1	-5.96
1	4.16	CHLORIDE	11.098	243957	1908449	1	-5.96
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
			---total(s)---				
0.00			22.197		3816899		

238673



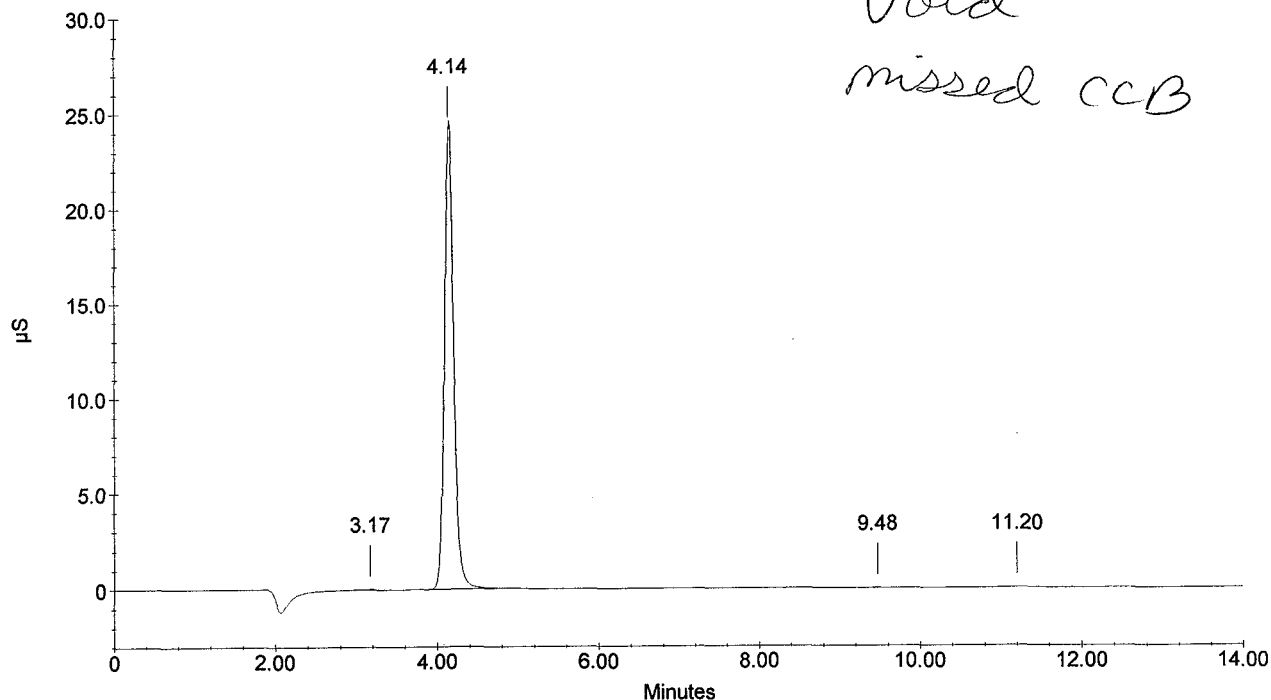
Sample Name : 238674
Dilution Factor : 2000.00
Injection Number : 15
Data File Name : ...\\031229_015.DXD
Method File Name : ...\\ANIONS031030.met
Schedule File Name : c:\\peaknet\\schedule\\29dec03.sch

Date Time Collected : 12/29/03 3:48:47 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#015724 AG14-#1018096
System Operator : AMS

010145

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	3.17	FLUORIDE	111.783	213	1287	1	0.00
2	4.14	CHLORIDE	22308.223	241044	1919278	1	-6.26
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
3	9.48	PHOSPHATE-P	27.975	38	1122	1	-3.50
4	11.20	SULFATE	41.567	107	1624	1	-5.27
0.00			---total(s)--- 22489.548		1923311		

238674



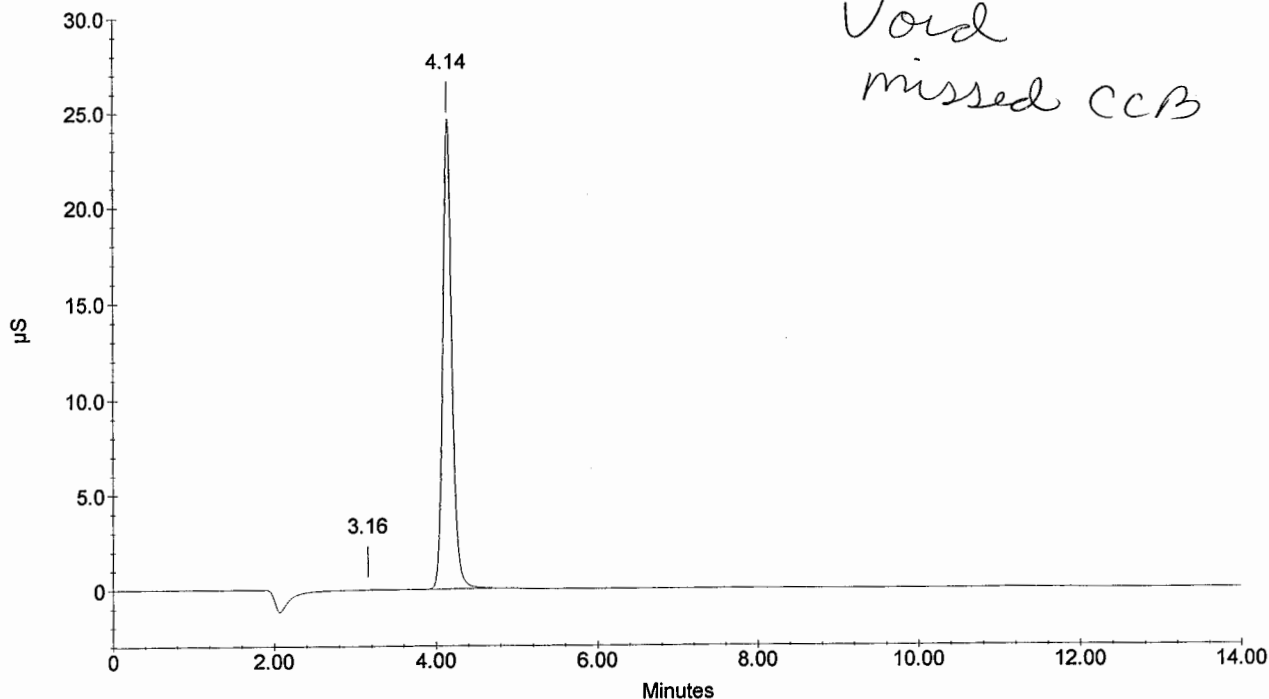
Sample Name : 238675
 Dilution Factor : 2000.00
 Injection Number : 16
 Data File Name : ...031229_016.DXD
 Method File Name : ...ANIONS031030.met
 Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 4:05:23 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : AMS

010146

Peak Information : All Components								
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta	
1	3.16	FLUORIDE	105.107	91	529	1	-0.42	
2	4.14	CHLORIDE	22239.499	242836	1912614	1	-6.26	
		NITRITE-N						
		BROMIDE						
		NITRATE-N						
		PHOSPHATE-P						
		SULFATE						
0.00			---total(s)---					
			22344.606		1913143			

238675



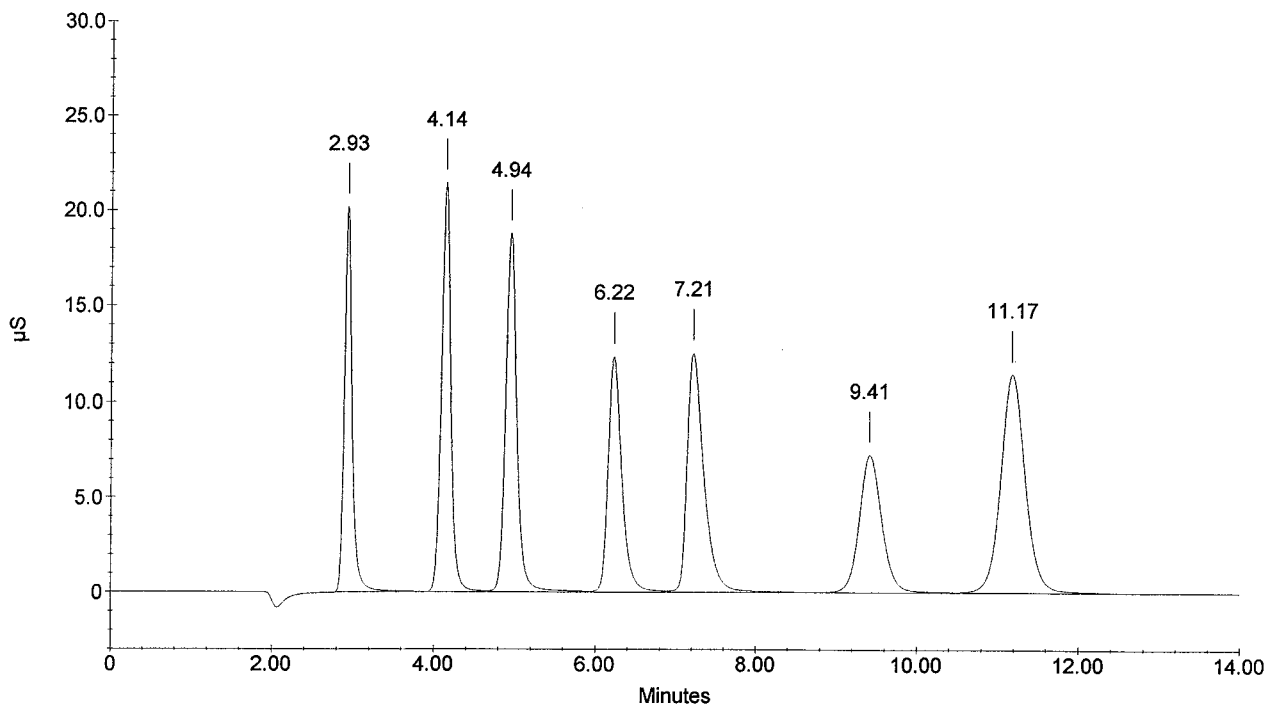
Sample Name : CCV
Dilution Factor : 20.00
Injection Number : 17
Data File Name : c:\peaknet\data\031229\031229_017.DXD
Method File Name : c:\peaknet\method\anions031030.met
Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 4:22:00 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#015724 AG14-#1018096
System Operator : AMS

010147

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	2.93	FLUORIDE	110.205	201638	1341616	2	-7.57
2	4.14	CHLORIDE	202.461	214348	1721123	2	-6.26
3	4.94	NITRITE-N BROMIDE	106.669	187829	1816962	2	-7.08
5	7.21	NITRATE-N	87.294	125231	1832939	2	-4.25
6	9.41	PHOSPHATE-P	186.763	72395	1416963	2	-4.18
7	11.17	SULFATE	373.327	114551	2432201	2	-5.50
---total(s)---							
0.00				1066.719	10561805		

CCV



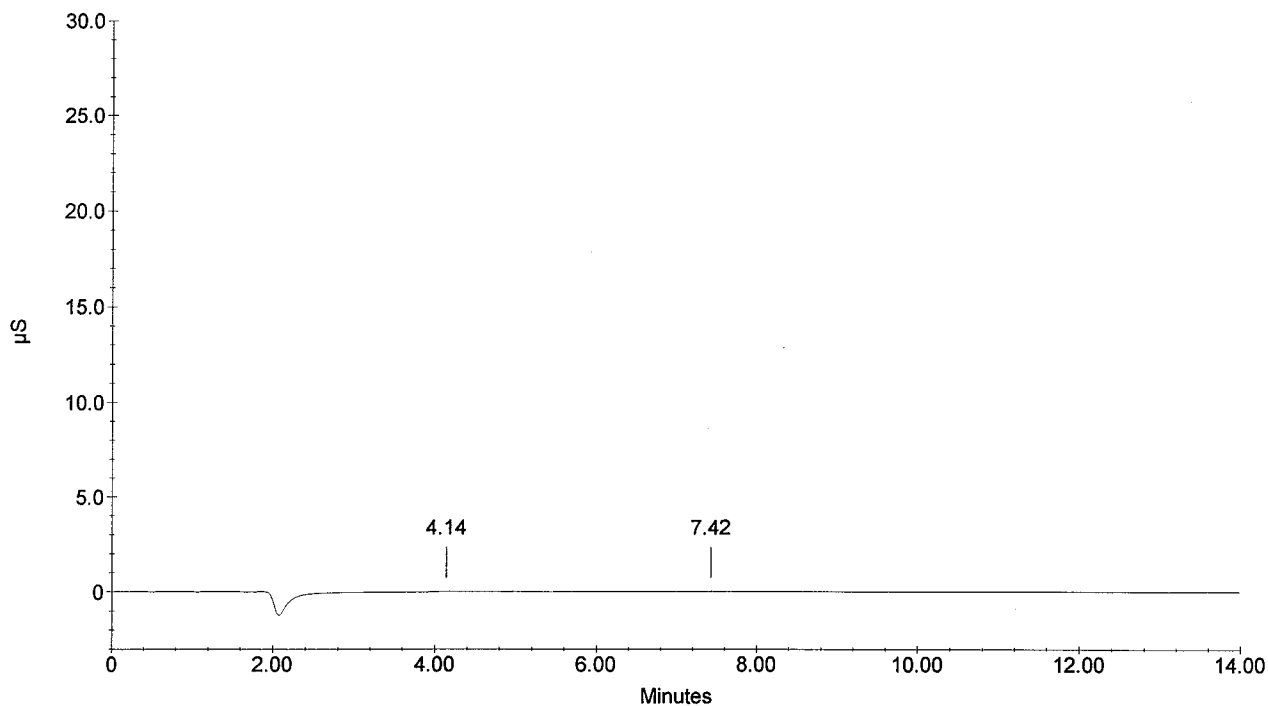
Sample Name : CCB
 Dilution Factor : 1.00
 Injection Number : 18
 Data File Name : c:\peaknet\data\031229\031229_018.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 4:38:36 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : AMS

010148

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	4.14	CHLORIDE	0.021	160	1294	1	-6.26
1	4.14	CHLORIDE	0.021	160	1294	1	-6.26
		NITRITE-N					
		BROMIDE					
2	7.42	NITRATE-N	0.033	115	1258	1	-1.42
		PHOSPHATE-P					
		SULFATE					
	0.00		---total(s)---				
			0.076		3846		

CCB



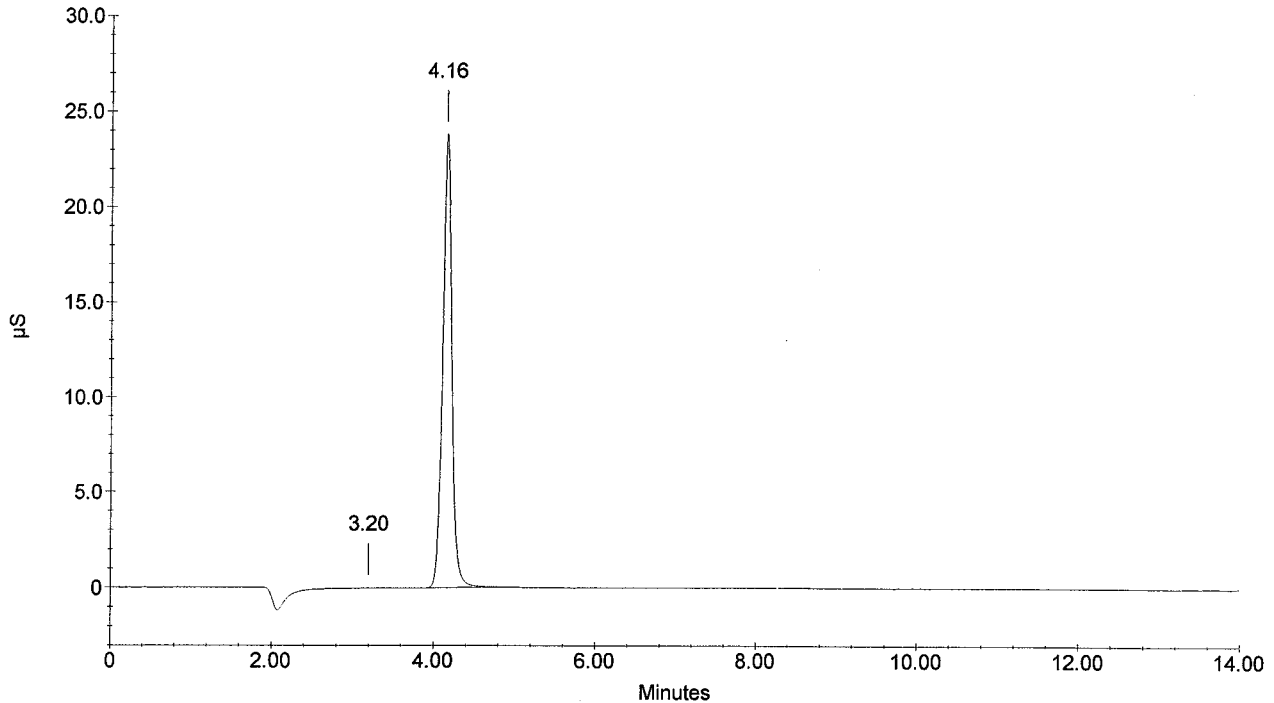
Sample Name : 238673
 Dilution Factor : 2000.00
 Injection Number : 19
 Data File Name : c:\peaknet\data\031229\031229_019.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 4:55:13 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : AMS

010149

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	3.20		0.000	25	60	1	
2	4.16	CHLORIDE NITRITE-N BROMIDE NITRATE-N PHOSPHATE-P SULFATE	✓ 21678.640	237768	1858380	1	-5.96
0.00			---total(s)--- 21678.640		1858440		

238673



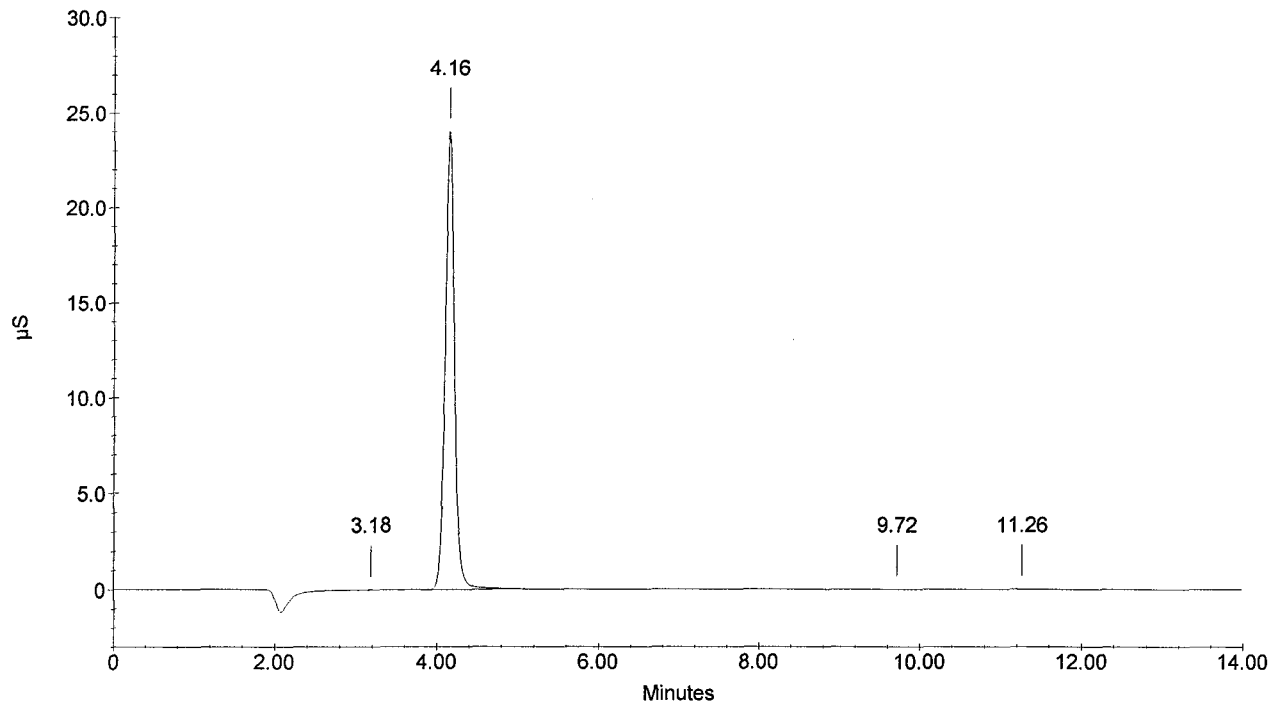
Sample Name : 237674
 Dilution Factor : 2000.00
 Injection Number : 20
 Data File Name : c:\peaknet\data\031229\031229_020.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 5:11:49 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : AMS

010150

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.18	FLUORIDE	103.798	75	381	1	0.42
2	4.16	CHLORIDE	22005.032	240130	1889908	1	-5.96
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
3	9.72	PHOSPHATE-P	22.133	52	723	1	-1.05
4	11.26	SULFATE	36.061	99	1305	1	-4.71
			---total(s)---				
0.00			22167.024		1892318		

237674



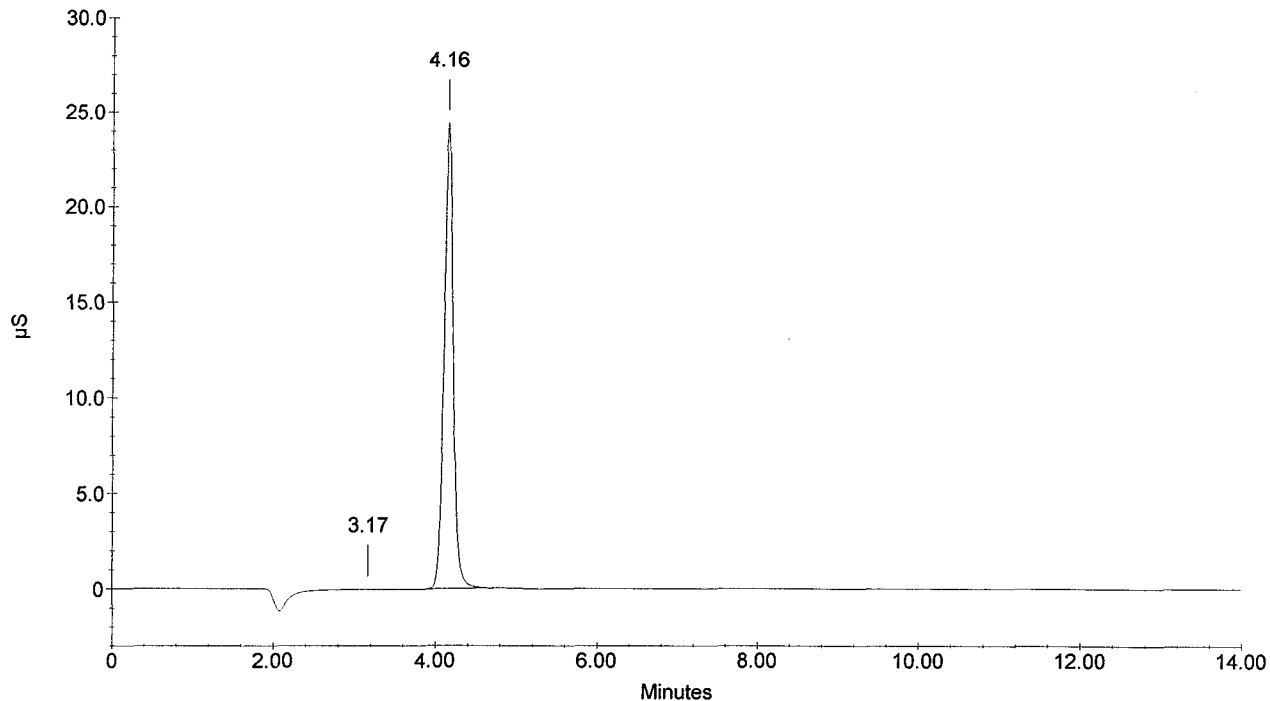
Sample Name : 238675
Dilution Factor : 2000.00
Injection Number : 21
Data File Name : c:\peaknet\data\031229\031229_021.DXD
Method File Name : c:\peaknet\method\anions031030.met
Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 5:28:26 PM
System Name : Dx-500
Detector Name : Conductivity Detector
Column Type : AS14-#015724 AG14-#1018096
System Operator : AMS

010151

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	3.17		0.000	15	132	1	
2	4.16	CHLORIDE	✓ 22130.692	243807	1902071	1	-5.96
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
	0.00		---total(s)---				
			22130.692		1902203		

238675



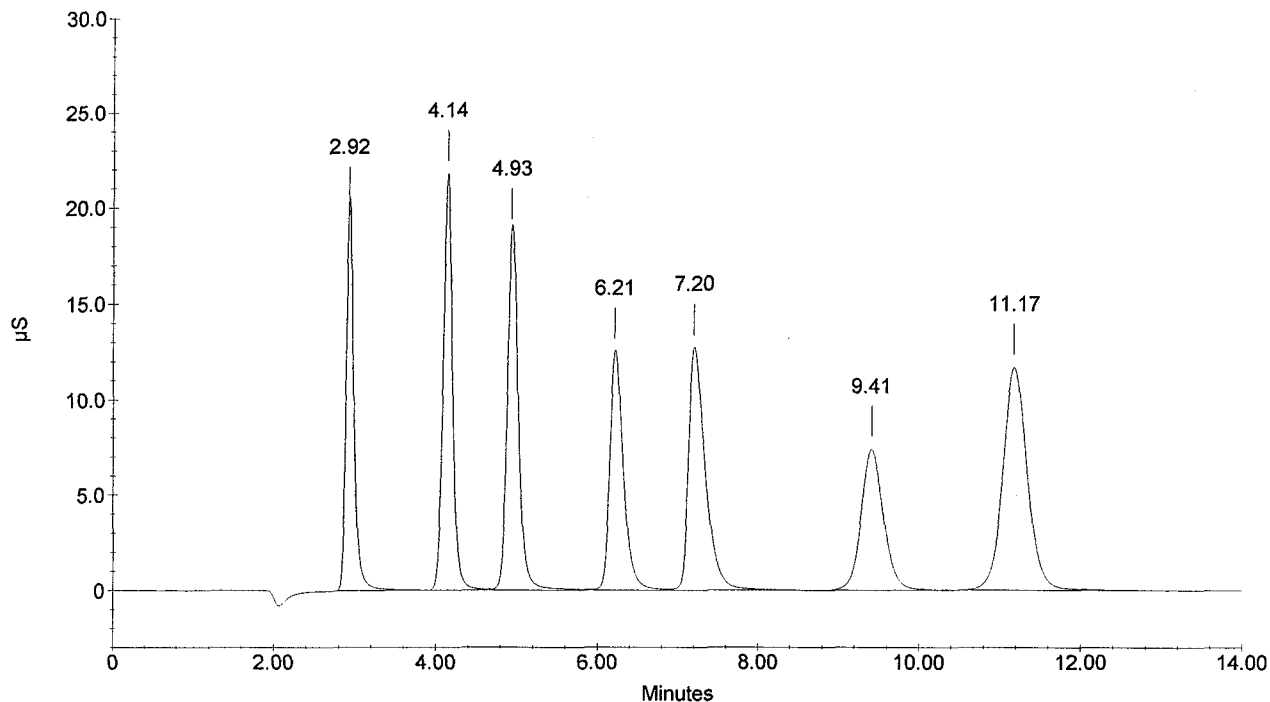
Sample Name : CCV
 Dilution Factor : 20.00
 Injection Number : 22
 Data File Name : c:\peaknet\data\031229\031229_022.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 5:45:02 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : AMS

010152

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	Bl. Code	%Delta
1	2.92	FLUORIDE	111.977	198379	1365025	1	-7.99
2	4.14	CHLORIDE	205.294	217847	1748116	2	-6.26
3	4.93	NITRITE-N BROMIDE	108.047	187196	1842102	2	-7.33
5	7.20	NITRATE-N	88.157	126964	1852517	2	-4.43
6	9.41	PHOSPHATE-P	188.260	73742	1429507	2	-4.18
7	11.17	SULFATE	378.556	116696	2468863	2	-5.50
---total(s)---							
0.00			1080.291		10706130		

CCV



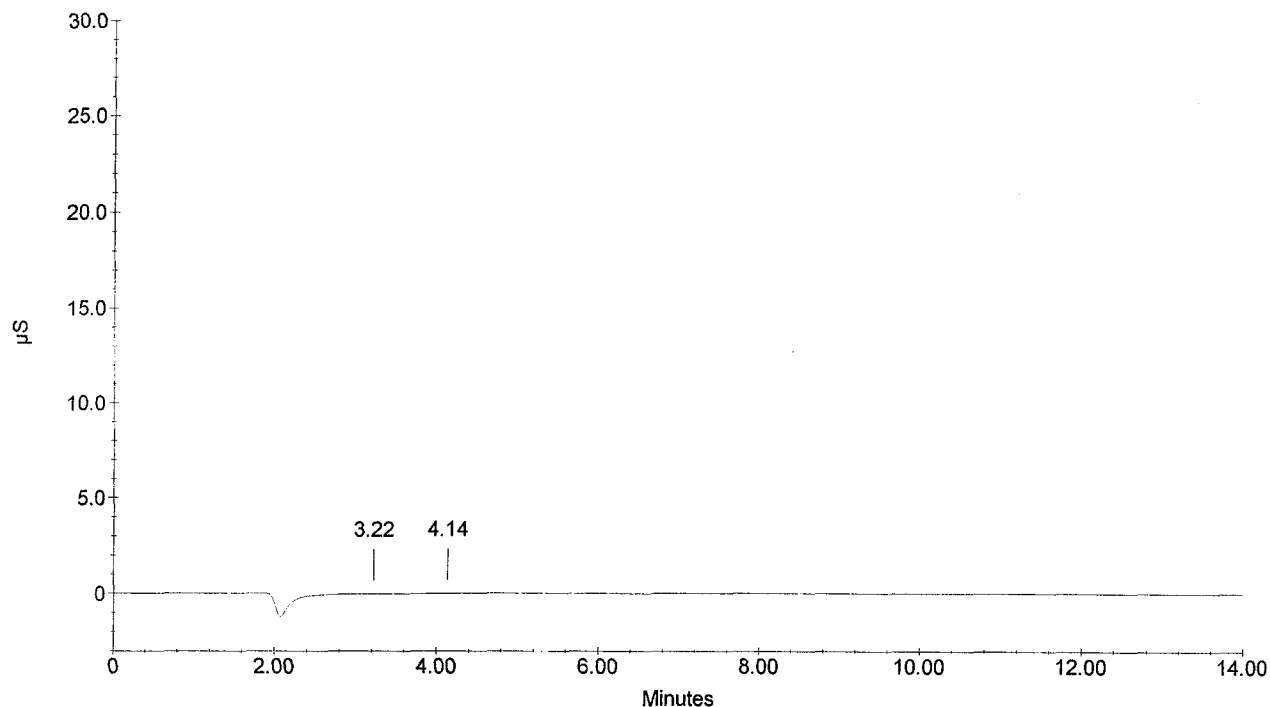
Sample Name : CCB
 Dilution Factor : 1.00
 Injection Number : 23
 Data File Name : c:\peaknet\data\031229\031229_023.DXD
 Method File Name : c:\peaknet\method\anions031030.met
 Schedule File Name : c:\peaknet\schedule\29dec03.sch

Date Time Collected : 12/29/03 6:01:40 PM
 System Name : Dx-500
 Detector Name : Conductivity Detector
 Column Type : AS14-#015724 AG14-#1018096
 System Operator : AMS

010153

Peak Information : All Components							
Pk. Num	Ret Time	Component Name	Concentration (ppm)	Height	Area	BI. Code	%Delta
1	3.22	FLUORIDE	0.051	5	262	1	1.68
2	4.14	CHLORIDE	0.028	153	2294	1	-6.26
		NITRITE-N					
		BROMIDE					
		NITRATE-N					
		PHOSPHATE-P					
		SULFATE					
			---total(s)---				
0.00			0.079		2556		

CCB



**SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 031205-4
SRR: 25287
SDG: 238656
CASE: CNWRA
VTSR: December 05, 2003
PROJECT#: 06002.01.071**

Certificates of Analysis

010154

**FISHER SCIENTIFIC
TRACEMETAL GRADE NITRIC ACID
CERTIFICATE OF ANALYSIS**

Catalog No. A509

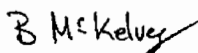
Lot No: 1103070

Release Date: July, 2003

Expiry Date: July, 2006

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

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



Dr. B. McKelvey
QA/QC Manager

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



Fisher Chemical

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INORGANIC LABS/RADCHEM LABS
 DATE RECEIVED: 11/25/03
 DATE EXPIRED: 11/25/2013
 DATE OPENED: 11/25/03
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010155

**FISHER SCIENTIFIC
TRACEMETAL GRADE NITRIC ACID
CERTIFICATE OF ANALYSIS**

Catalog No. A509

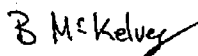
Lot No: 1103070

Release Date: July, 2003

Expiry Date: July, 2006

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

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010156

FISHER SCIENTIFIC
TRACEMETAL GRADE HYDROCHLORIC ACID

CERTIFICATE OF ANALYSIS

Catalog No. A508

Lot No: 4103030

Date: March, 2003

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

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

B. McKelvey

Dr. B. McKelvey
 QA/QC Manager

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



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 DATE RECEIVED: 11/25/03
 DATE EXPIRED: 11/25/03
 DATE OPENED: 11/25/03
 INORG: 4335-4340 PO: F53279

010157

FISHER SCIENTIFIC
TRACEMETAL GRADE HYDROCHLORIC ACID

CERTIFICATE OF ANALYSIS

Catalog No. A508

Lot No: 4103030

Date: March, 2003

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

Element concentrations are at the point of bottling.
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 QA/QC Manager

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 Pittsburgh, PA., 15275 Phone (412) 490-8300



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 DATE RECEIVED: 10/10/03
 DATE EXPIRED: 10/10/2013
 DATE OPENED: 10/13/03
 INORG: 4289-4294 PO: F52242

SPEXcertificate™

010158

Certificate of Reference Material

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

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

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

Refer to side 2 for details of measurement uncertainties.

Instrumental Analysis by ICP Spectrometer:

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

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

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

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

INORGANIC LABS/FACD/CHEM LABS
DATE RECEIVED: 12/31/03
DATE EXPIRED: 12/31/04
DATE OPENED: 11/5/03
INFORM: 4306
PO: P52061
DR

SPEXcertificate™

010159

Certificate of Reference Material

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

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

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

Refer to side 2 for details of measurement uncertainties.

Instrumental Analysis by ICP Spectrometer:

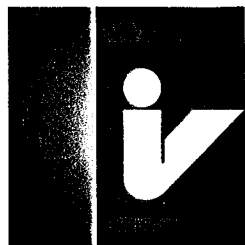
Element	Labeled (mg/L)	Measured (mg/L)	NIST SRM
Ca	5,000	4,984.92	3109a
K	5,000	4,990.26	3141a
Mg	5,000	4,991.82	3131a
Na	5,000	4,998.07	3152a

Spex Reference Multi: Lot #10-100AS, 12-113AS, 5-198VY, 6-28VY-REF

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

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

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 09/15/03
DATE EXPIRED: 09/15/04
DATE OPENED: 09/16/03
INORG: 4945 PO: E50028



inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

CUSTOM-GRADE SOLUTION

Catalog Number: CGSC1-1 and CGSC1-5

1000 µg/mL Scandium IN 5% HNO₃ (abs) 010160

Lot Number: **W-SC02055**

Starting Material: Sc₂O₃
Starting Material Purity: 99.99%
Starting Material Lot No: 632-5721

INORGANIC LABS/RADCHEM LABS

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

CERTIFIED CONCENTRATION: 1000 ± 5 µg/mL

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

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

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

($\bar{x}$) = mean

x_i = individual results

n = number of measurements

$\sum s_i$ = The summation of all significant estimated errors.

Classical Wet Assay: 1000 ± 5 µg/mL

Method: EDTA Titration vs NIST SRM 928 Lead Nitrate.

Instrument Analysis: 995 ± 5 µg/mL

Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3148a.

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

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

Custom-Grade solutions tested for trace metallic impurities by ICP-MS were analyzed in an ULPA-Filtered Clean Room.

An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

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

M - checked by ICP-MS

O - checked by ICP-OES

i - spectral interference

n - not checked for

s - solution standard element

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

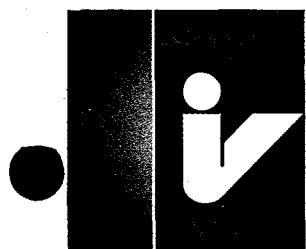
QA:KL Rev.031303JTS

Paul R. Laines

Quality Assurance Manager

Expires:

EXPIRES
12/2004



inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

CUSTOM-GRADE SOLUTION

Catalog Number: CGSC10-1 and CGSC10-5

10,000 µg/mL Scandium IN 5% HNO₃ (abs)

010161

Lot Number: **T-SC02053**

Starting Material: Sc₂O₃
Starting Material Purity: 99.999%
Starting Material Lot No: 632-5721

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 09/24/03
DATE EXPIRED: 10/01/2004
DATE OPENED: 09/24/03
INORG: 4262 PD: F50030

CERTIFIED CONCENTRATION: 10,047 ± 29 µg/mL

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

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

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

($\bar{x}$) = mean

x_i = individual results

n = number of measurements

$\sum s_i$ = The summation of all significant estimated errors.

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

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

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

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

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

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

M - checked by ICP-MS

O - checked by ICP-OES

i - spectral interference

n - not checked for

s - solution standard element

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

(over)

QA:KL Rev.021203DN

Paul R. Gaines

Quality Assurance Manager

Expires:

EXPIRES

01/2004

SPEXTM Certificate

010162

Certificate of Reference Material

Catalog Number: PLB9-2X/2Y/2T

Lot No. 9-143B

Description: 1000 mg/L Boron

Matrix: H₂O

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

Certified Value: 999.5 mg/L

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

Certified Value is Traceable to: NIST SRM 3107

The CRM is prepared gravimetrically using high purity (NH₄)₂(B₄O₇)-4H₂O Lot# 08001E. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1001 mg/L

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

Instrumentation Analysis By ICP spectrometer: 998 mg/L

Uncertified Properties:

Density: 1.000 @ 23.7 Degrees Celsius

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

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.06	Cu	<0.001	Pb	<0.001
As	<0.001	Fe	0.001	Re	<0.001
Ag	<0.002	Ga	<0.001	Rb	<0.001
Ba	<0.001	In	<0.001	Sr	<0.001
Be	<0.001	K	<0.01	Sb	<0.001
Bi	<0.001	Li	<0.001	Sn	<0.001
Cd	<0.001	Mn	<0.001	Ti	<0.001
Co	<0.001	Mo	<0.001	Tl	<0.001
Ca	0.003	Mg	<0.001	V	0.004
Cr	<0.003	Na	0.026	Zr	<0.001
		Ni	<0.001	Zn	<0.007

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

Date of Certification: JUN '03

Certifying Officer: N. Kocherakota

INORGANIC LABS/RADCHEM LABS
 DATE RECEIVED: 06/30/03
 DATE EXPIRED: 06/30/2004
 DATE OPENED: 06/23/03
 INORG: 4139
 PO: F52270

SPXTM Certificate

Certificate of Reference Material

010163

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 relevant 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. Kocherakota

INORGANIC LABS/RADCHEM LABS
 DATE RECEIVED: 05/12/03
 DATE EXPIRED: 05/15/2004
 DATE OPENED: 05/12/03
 INORG: 406.5 PO: F52181

SPEXcertificate™

Certificate of Reference Material

010164

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 relevant 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. Kocherakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 05/12/03
DATE EXPIRED: 05/12/04
DATE OPENED: 05/12/03
INDRG: 4066 PO: F52181

SPX CertificateTM

Certificate of Reference Material

010165

Catalog Number: PLP9-2X/2Y/2T

Lot No. 9-150P

Description: 1000 mg/L Phosphorus

Matrix: H2O

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

Certified Value: 1002.5 mg/L

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

Certified Value is Traceable to: NIST SRM 3139a

The CRM is prepared gravimetrically using high purity (NH₄)H₂(PO₄) Lot# W1002B. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis.

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1003 mg/L

Method: Precipitation using Magnesia Mixture. Filter, ignite, and weigh as Mg₂P₂O₇.

Instrumentation Analysis By ICP spectrometer: 1002 mg/L

Uncertified Properties:

Density: 0.9996 @ 24.0 Degrees Celsius

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

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

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

Date of Certification: OCT - - 2003

Certifying Officer: N. Kocherakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 10/31/03
DATE EXPIRED: 10/31/2004
DATE OPENED: 11/3/03
INORG: 4304 PO: F52261

SPXertificateTM

Certificate of Reference Material

010166

Catalog Number: PLSI9-2X/2Y/2T

Lot No. 10-07SI

Description: 1000 mg/L Silicon

Matrix: H₂O / 0.4% F-

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

Certified Value: 998.5 mg/L

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

Certified Value is Traceable to: NIST SRM #3150

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

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 997 mg/L

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

Instrumentation Analysis By ICP spectrometer: 1000 mg/L

Uncertified Properties:

Density: 1.010 @ 26.5 Degrees Celsius

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

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

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

Date of Certification: AUG '03

Certifying Officer: N. Kocherakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 09/05/03
DATE EXPIRED: 08/30/2004
DATE OPENED: 09/05/03
INORG: 4232
PU: 552225

SPEXTM Certificate

Certificate of Reference Material

010167

Catalog Number: PLTI9-2X/2Y/2T

Lot No. 10-38TI

Description: 1000 mg/L Titanium

Matrix: H₂O/ 0.24% F-

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

Certified Value: 1001 mg/L

Uncertainty Associated with Measurement: 3.0mg/L

Certified Value is Traceable to: NIST SRM #3162a

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

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1003 mg/L

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

Instrumentation Analysis By ICP spectrometer: 999 mg/L

Uncertified Properties:

Density: 1.001 @ 22.5 Degrees Celsius

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

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

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

Date of Certification: AUG '03

Certifying Officer: N. Kocherakota

INORGANIC LABS/RADCHEM LABS
 DATE RECEIVED: 09/05/03
 DATE EXPIRED: 08/30/2004
 DATE OPENED: 09/05/03
 INORG: 4224 PO: F52225

INORGANIC LABS/RADCHEM LABS
 DATE RECEIVED: 10/31/03
 DATE EXPIRED: 10/31/2004
 DATE OPENED: 11/3/03
 INORG: 4308 PO: F53061

SPEXTM Certificate

Certificate of Reference Material

010168

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 relevant to the certified properties listed below.

Certified Value: 1002.5 mg/L

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

Certified Value is Traceable to: NIST SRM 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: OCT -- 2003

Certifying Officer: N. Kocherakota

SPEX CertificateTM

Certificate of Reference Material

010169

Catalog Number: PLSN5-2X/2Y/2T

Lot No. 9-62SN

Description: 1000 mg/L Tin

Matrix: 20% HCL

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

Certified Value: 1000 mg/L

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

Certified Value is Traceable to: NIST SRM 3161a

The CRM is prepared gravimetrically using high purity Tin Metal Lot# 02891N. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis. Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 999 mg/L

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

Instrumentation Analysis By ICP spectrometer: 1001 mg/L

Uncertified Properties:

Density: 1.034 @ 24.8 Degrees Celsius

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

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

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

Date of Certification: JUN 03

Certifying Officer: N. Kocherakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 06/30/03
DATE EXPIRED: 06/30/04
DATE OPENED: 06/23/03
INORG: 441
PO: F52370

SPEXcertificateTM

Certificate of Reference Material

010170

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 relevant to the certified properties listed below.

Certified Value: 1001 mg/L

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

Certified Value is Traceable to: NIST SRM 3106

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

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1001 mg/L

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

Instrumentation Analysis By ICP spectrometer: 1001 mg/L

Uncertified Properties:

Density: 1.052 @ 23.1 Degrees Celsius

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

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

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

Date of Certification: JUN '03

Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 06/29/03
DATE EXPIRED: 06/30/04
DATE OPENED: 06/23/03
INORG: 4138 PO: F523370

SPEXcertificate™

Certificate of Reference Material

010171

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 relevant 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. Kocherakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 05/12/03
DATE EXPIRED: 05/12/04
DATE OPENED: 05/12/03
INORG: 4064 PO: F52181

SPEXTM Certificate

Certificate of Reference Material

010172

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 relevant 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. Kocherakota

INORGANIC LABS/RADCHEM LABS
 DATE RECEIVED: 05/12/03
 DATE EXP. 05/15/2004
 DATE OPENED: 05/12/03
 INORG: 4067 PO: F52181

SPEXTMertificate

Certificate of Reference Material

010173

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 relevant 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(C₄H₇O₂N₂)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. Kocherakota

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

SPEXTM Certificate

Certificate of Reference Material

010174

INORGANIC LABS/RADCHEM LABS
 DATE RECEIVED: 06/30/03
 DATE EXPIRED: 06/30/2004
 DATE OPENED: 06/30/03
 INORG: 440
 PO: F52370

Catalog Number: PLS9-2X/2Y/2T

Lot No. 8-74S

Description: 1000 mg/L Sulfur

Matrix: H₂O

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

Certified Value: 1003 mg/L

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

Certified Value is Traceable to: NIST SRM 3154

The CRM is prepared gravimetrically using high purity Ammonium Sulfate Lot# 05891M. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1003 mg/L

Method: Precipitation using barium chloride, filter, ignite and weigh as BaSO₄.

Instrumentation Analysis By ICP spectrometer: 1003 mg/L

Uncertified Properties:

Density: 1.007 @ 23.6 Degrees Celsius

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

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

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

Date of Certification: JUN '03

Certifying Officer: N. Kocherakota

SPEXTM Certificate

Certificate of Reference Material

010175

Catalog Number: PLTH2-2X/2Y

Lot No. 10-24TH

Description: 1000 mg/L Thorium

Matrix: 2% HNO₃

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

Certified Value: 999 mg/L

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

Certified Value is Traceable to: NIST SRM #3159

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

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1000 mg/L

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

Instrumentation Analysis By ICP spectrometer: 998 mg/L

Uncertified Properties:

Density: 1.010 @ 22.0 Degrees Celsius

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

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

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

Date of Certification: AUG '03 **Certifying Officer:** N. Kocherakota

INORGANIC LABS/RADIOCHEM LABS
 DATE RECEIVED: 09/05/03
 DATE EXPIRED: 08/30/2004
 DATE OPENED: 09/05/03
 INORG: 4233 PO: F52225

SPExertificateTM

Certificate of Reference Material

010176

Catalog Number: PLU2-2X/2Y

Lot No. 9-179U

Description: 1000 mg/L Uranium

Matrix: 2% HNO₃

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

Certified Value: 999.5 mg/L

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

Certified Value is Traceable to: NIST SRM 3164.

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

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 999 mg/L

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

Instrumentation Analysis By ICP spectrometer: 1000 mg/L

Uncertified Properties:

Density: 1.010 @ 23.6 Degrees Celsius

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

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

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

Date of Certification: JUN '03

Certifying Officer: N. Kocherakota

INORGANIC LABS/RADCHEM LABS
 DATE RECEIVED: 06/20/03
 DATE EXPIRED: 06/30/2004
 DATE OPENED: 06/23/03
 INORG: 4142
 PO: F523370

SPEx Certificate TM

Certificate of Reference Material

010177

Catalog Number: PLW9-2X/2Y

Lot No. 9-177W

Description: 1000 mg/L Tungsten

Matrix: H₂O

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

Certified Value: 1,000 mg/L

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

Certified Value is Traceable to: NIST SRM 3163

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

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1000 mg/L

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

Instrumentation Analysis By ICP spectrometer: 1000 mg/L

Uncertified Properties:

Density: 0.9979 @ 23.7 Degrees Celsius

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

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

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

Date of Certification: AUG '03

Certifying Officer: N. Kocherakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 08/11/03
DATE EXPIRED: 08/15/2004
DATE OPENED: 08/13/03
INORG: 4212 PO: E52018

*SPEX*ertificate™ Certificate of Reference Material

010178

Catalog Number: PLZR2-2X/2Y/2T

Lot No. 10-05ZR

Description: 1000 mg/L Zirconium

Matrix: 2% HNO₃

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

Certified Value: 997 mg/L

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

Certified Value is Traceable to: NIST SRM 3169

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

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 997 mg/L

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

Instrumentation Analysis By ICP spectrometer: 997 mg/L

Uncertified Properties:

Density: 1.010 @ 23.6 Degrees Celsius

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

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.03	Cu	0.002	Pb	0.002
As	<0.001	Fe	0.017	Rb	<0.001
Ag	<0.05	Ga	<0.001	Re	<0.001
B	<0.004	In	<0.001	Si	0.10
Ba	<0.001	K	0.10	Sr	<0.001
Be	<0.001	Li	0.002	Sb	<0.001
Bi	<0.001	Mg	0.003	Ti	<0.001
Ca	0.11	Mn	<0.001	Tl	<0.001
Cr	<0.009	Mo	<0.001	V	<0.001
Cd	0.004	Na	0.04	Zn	0.02
Co	<0.001	Ni	<0.001		

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

Date of Certification: AUG 03

Certifying Officer: N. Kocherakota

DATE RECEIVED: 08/11/03
DATE EXP. 08/15/2004
DATE OPENED: 08/13/03
INORG: 4213 PD: F52218

SPEXTM Certificate

Certificate of Reference Material

010179

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 relevant 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. Kocherakota

INORGANIC LABS/RADCHEM LABS
 DATE RECEIVED: 02/13/03
 DATE EXPIRED: 02/15/2004
 DATE OPENED: 02/13/03
 INORG: 3951 PO: F52060

SPEXcertificate™

Certificate of Reference Material

010180

Catalog Number: ICV-2A Lot No.: 24-84AS
Description: Initial Calibration Verification Standard II
Matrix: 5% Nitric Acid

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

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

Refer to side 2 for details of measurement uncertainties.

Instrumental Analysis by ICP Spectrometer:

Element	Labeled (mg/L)	Measured (mg/L)	NIST SRM	Element	Labeled (mg/L)	Measured (mg/L)	NIST SRM
Ca	2,000	2,005.40	3109a	Ni	500	500.58	3136
K	2,000	1,997.89	3141a	V	500	504.23	3165
Mg	2,000	1,992.26	3131a	Cr	200	203.21	3112a
Na	2,000	1,992.99	3152a	Cu	200	199.75	3114
Al	1,000	1,005.90	3101a	Ag	100	100.46	3151
Ba	1,000	1,001.51	3104a	Be	100	100.04	3105a
Fe	1,000	1,003.17	3126a	Mn	100	100.64	3132
Co	500	505.10	3113	Zn	100	100.52	3168a

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

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

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

INORGANIC LABS/RADIOCHEM LABS
DATE RECEIVED: 11/29/03
DATE EXPIRED: 11/30/04
DATE OPENED: 11/21/03
INORG: 4328 PO: F52278

SPEXTM Certificate

Certificate of Reference Material

010181

Catalog Number: PLSB7-2X/2Y/2T

Lot No. 10-43SB

Description: 1000 mg/L Antimony

Matrix: H₂O/0.6Tart.Acid/tr.HNO₃

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

Certified Value: 1004 mg/L

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

Certified Value is Traceable to: NIST SRM 3102a

The CRM is prepared gravimetrically using high purity Antimony Metal Lot# 04021A. The certified value listed is the average of values obtained by classical wet assay and ICP spectrometer analysis

Refer to side 2 for details of measurement uncertainties.

Classical Wet Assay: 1005 mg/L

Method: Evaporate to dryness. Fume with Nitric Acid. Ignite and weigh as Sb₂O₄.

Instrumental Analysis by ICP spectrometer: 1002 mg/L

Uncertified Properties:

Density: 1.046 @ 25.5 Degrees Celsius

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

Element	mg/L	Element	mg/L	Element	mg/L
Al	0.03	Cu	0.002	Pb	0.009
As	<0.001	Fe	0.03	Rb	<0.001
Ag	<0.001	Ga	<0.001	Re	<0.001
B	<0.004	In	<0.001	Sr	<0.001
Ba	<0.001	K	0.01	Si	<0.01
Be	<0.001	Li	<0.001	Ti	<0.003
Bi	0.002	Mg	0.005	Tl	<0.001
Ca	0.14	Mn	<0.001	V	<0.001
Cr	<0.002	Mo	<0.001	Zr	<0.001
Cd	<0.001	Na	0.005	Zn	0.02
Co	<0.001	Ni	<0.001		

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

Date of Certification: NOV -- 2003

Certifying Officer: N. Kocherakota

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

010182

SPEXertificate™

Certificate of Reference Material

Catalog Number: ICV-2C Lot No.: 24-85AS
 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:

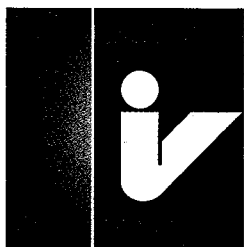
Element	Labeled (mg/L)	Measured (mg/L)	NIST SRM
As	500	497.85	3103a
Pb	500	495.41	3128
Se	500	501.98	3149
TL	500	501.89	3158
Cd	100	99.77	3108

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 -- 2000 Certifying Officer: N. Kocherakota

INORGANIC LABS/RADCHEM LABS
 DATE RECEIVED: 1/26/03
 DATE EXPIRED: 1/30/2004
 DATE OPENED: 1/21/03
 INORG: 4330 PO: F52018



certificate of analysis

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

2.0 DESCRIPTION OF CRM Custom-Grade 10000 µg/mL Aluminum in 5% (abs) HNO₃

Catalog Number: CGAL10-1 and CGAL10-5
Lot Number: W-AL04008
Starting Material: Al metal
Starting Material Purity (%): 99.998460
Starting Material Lot No 607116
Matrix: 5% (abs) HNO₃

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

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 10070 ± 31 µg/mL

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

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

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

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

($\bar{x}$) = mean

x_i = individual results

n = number of measurements

$\sum s_i$ = The summation of all significant estimated errors

(Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

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

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

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

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

4.1 Assay Method #1 10006 ± 55 µg/mL

ICP Assay NIST SRM 3101a Lot Number: 992003

Assay Method #2 10070 ± 31 µg/mL

EDTA NIST SRM 928 Lot Number: 880710

- 4.2 BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.
- 4.3 THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001. Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.
- 4.4 GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

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

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

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

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

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:

ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP

For the validation of analytical methods

For the preparation of "working reference samples"

For interference studies and the determination of correction coefficients

For detection limit and linearity studies

For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

010185

Storage & Handling - Keep tightly sealed when not in use. Store and use at $20 \pm 4^\circ\text{C}$. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 26.98154; +3, 6; $\text{Al}(\text{H}_2\text{O})_6^{3+}$

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

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

Al Containing Samples (Preparation and Solution) - Metal (Best dissolved in $\text{HCl} / \text{HNO}_3$); α - Al_2O_3 (Na_2CO_3 fusion in Pt°); γ - Al_2O_3 (Soluble in acids such as HCl); Ores (Carbonate fusion in Pt° followed by HCl dissolution); Organic Matrices (sulfuric/peroxide digestion or nitric / sulfuric / perchloric acid decomposition, or dry ash and dissolution in dilute HCl).

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

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at λ concs.)
ICP-OES 394.401 nm	0.05 / 0.006 $\mu\text{g}/\text{mL}$	1	atom	U, Ce
ICP-OES 396.152 nm	0.03 / 0.006 $\mu\text{g}/\text{mL}$	1	atom	Mo, Zr, Ce
ICP-OES 167.078 nm	0.1 / 0.009 $\mu\text{g}/\text{mL}$	1	ion	Fe
ICP-MS 27 amu	30 ppt	na	M'	$^{13}\text{C}^{14}\text{N}$, $^{13}\text{C}^{15}\text{N}$, $^1\text{H}^{12}\text{C}^{14}\text{N}$, $^1\text{H}^{13}\text{C}^{14}\text{N}$, $^{12}\text{C}^{16}\text{O}$, $^{13}\text{C}^{16}\text{O}$, $^{12}\text{C}^{18}\text{O}$, $^{13}\text{C}^{18}\text{O}$, $^{14}\text{N}^{16}\text{O}$, $^{15}\text{N}^{16}\text{O}$, $^{14}\text{N}^{18}\text{O}$, $^{15}\text{N}^{18}\text{O}$, ^{28}Si , ^{29}Si , ^{30}Si , ^{44}Ti , ^{46}Ti , ^{47}Ti , ^{48}Ti , ^{50}Ti , ^{52}Cr , ^{53}Cr , ^{54}Cr , ^{56}Fe , ^{57}Fe , ^{58}Fe , ^{60}Fe , ^{62}Ni , ^{64}Ni , ^{66}Ni , ^{68}Ni , ^{70}Ni , ^{72}Zn , ^{74}Zn , ^{76}Zn , ^{78}Zn , ^{80}Zn , ^{82}Zn , ^{84}Zn , ^{86}Zn , ^{88}Zn , ^{90}Zn , ^{92}Zn , ^{94}Zn , ^{96}Zn , ^{98}Zn , ^{100}Zn , ^{102}Zn , ^{104}Zn , ^{106}Zn , ^{108}Zn , ^{110}Zn , ^{112}Zn , ^{114}Zn , ^{116}Zn , ^{118}Zn , ^{120}Zn , ^{122}Zn , ^{124}Zn , ^{126}Zn , ^{128}Zn , ^{130}Zn , ^{132}Zn , ^{134}Zn , ^{136}Zn , ^{138}Zn , ^{140}Zn , ^{142}Zn , ^{144}Zn , ^{146}Zn , ^{148}Zn , ^{150}Zn , ^{152}Zn , ^{154}Zn , ^{156}Zn , ^{158}Zn , ^{160}Zn , ^{162}Zn , ^{164}Zn , ^{166}Zn , ^{168}Zn , ^{170}Zn , ^{172}Zn , ^{174}Zn , ^{176}Zn , ^{178}Zn , ^{180}Zn , ^{182}Zn , ^{184}Zn , ^{186}Zn , ^{188}Zn , ^{190}Zn , ^{192}Zn , ^{194}Zn , ^{196}Zn , ^{198}Zn , ^{200}Zn , ^{202}Zn , ^{204}Zn , ^{206}Zn , ^{208}Zn , ^{210}Zn , ^{212}Zn , ^{214}Zn , ^{216}Zn , ^{218}Zn , ^{220}Zn , ^{222}Zn , ^{224}Zn , ^{226}Zn , ^{228}Zn , ^{230}Zn , ^{232}Zn , ^{234}Zn , ^{236}Zn , ^{238}Zn , ^{240}Zn , ^{242}Zn , ^{244}Zn , ^{246}Zn , ^{248}Zn , ^{250}Zn , ^{252}Zn , ^{254}Zn , ^{256}Zn , ^{258}Zn , ^{260}Zn , ^{262}Zn , ^{264}Zn , ^{266}Zn , ^{268}Zn , ^{270}Zn , ^{272}Zn , ^{274}Zn , ^{276}Zn , ^{278}Zn , ^{280}Zn , ^{282}Zn , ^{284}Zn , ^{286}Zn , ^{288}Zn , ^{290}Zn , ^{292}Zn , ^{294}Zn , ^{296}Zn , ^{298}Zn , ^{300}Zn , ^{302}Zn , ^{304}Zn , ^{306}Zn , ^{308}Zn , ^{310}Zn , ^{312}Zn , ^{314}Zn , ^{316}Zn , ^{318}Zn , ^{320}Zn , ^{322}Zn , ^{324}Zn , ^{326}Zn , ^{328}Zn , ^{330}Zn , ^{332}Zn , ^{334}Zn , ^{336}Zn , ^{338}Zn , ^{340}Zn , ^{342}Zn , ^{344}Zn , ^{346}Zn , ^{348}Zn , ^{350}Zn , ^{352}Zn , ^{354}Zn , ^{356}Zn , ^{358}Zn , ^{360}Zn , ^{362}Zn , ^{364}Zn , ^{366}Zn , ^{368}Zn , ^{370}Zn , ^{372}Zn , ^{374}Zn , ^{376}Zn , ^{378}Zn , ^{380}Zn , ^{382}Zn , ^{384}Zn , ^{386}Zn , ^{388}Zn , ^{390}Zn , ^{392}Zn , ^{394}Zn , ^{396}Zn , ^{398}Zn , ^{400}Zn , ^{402}Zn , ^{404}Zn , ^{406}Zn , ^{408}Zn , ^{410}Zn , ^{412}Zn , ^{414}Zn , ^{416}Zn , ^{418}Zn , ^{420}Zn , ^{422}Zn , ^{424}Zn , ^{426}Zn , ^{428}Zn , ^{430}Zn , ^{432}Zn , ^{434}Zn , ^{436}Zn , ^{438}Zn , ^{440}Zn , ^{442}Zn , ^{444}Zn , ^{446}Zn , ^{448}Zn , ^{450}Zn , ^{452}Zn , ^{454}Zn , ^{456}Zn , ^{458}Zn , ^{460}Zn , ^{462}Zn , ^{464}Zn , ^{466}Zn , ^{468}Zn , ^{470}Zn , ^{472}Zn , ^{474}Zn , ^{476}Zn , ^{478}Zn , ^{480}Zn , ^{482}Zn , ^{484}Zn , ^{486}Zn , ^{488}Zn , ^{490}Zn , ^{492}Zn , ^{494}Zn , ^{496}Zn , ^{498}Zn , ^{500}Zn , ^{502}Zn , ^{504}Zn , ^{506}Zn , ^{508}Zn , ^{510}Zn , ^{512}Zn , ^{514}Zn , ^{516}Zn , ^{518}Zn , ^{520}Zn , ^{522}Zn , ^{524}Zn , ^{526}Zn , ^{528}Zn , ^{530}Zn , ^{532}Zn , ^{534}Zn , ^{536}Zn , ^{538}Zn , ^{540}Zn , ^{542}Zn , ^{544}Zn , ^{546}Zn , ^{548}Zn , ^{550}Zn , ^{552}Zn , ^{554}Zn , ^{556}Zn , ^{558}Zn , ^{560}Zn , ^{562}Zn , ^{564}Zn , ^{566}Zn , ^{568}Zn , ^{570}Zn , ^{572}Zn , ^{574}Zn , ^{576}Zn , ^{578}Zn , ^{580}Zn , ^{582}Zn , ^{584}Zn , ^{586}Zn , ^{588}Zn , ^{590}Zn , ^{592}Zn , ^{594}Zn , ^{596}Zn , ^{598}Zn , ^{600}Zn , ^{602}Zn , ^{604}Zn , ^{606}Zn , ^{608}Zn , ^{610}Zn , ^{612}Zn , ^{614}Zn , ^{616}Zn , ^{618}Zn , ^{620}Zn , ^{622}Zn , ^{624}Zn , ^{626}Zn , ^{628}Zn , ^{630}Zn , ^{632}Zn , ^{634}Zn , ^{636}Zn , ^{638}Zn , ^{640}Zn , ^{642}Zn , ^{644}Zn , ^{646}Zn , ^{648}Zn , ^{650}Zn , ^{652}Zn , ^{654}Zn , ^{656}Zn , ^{658}Zn , ^{660}Zn , ^{662}Zn , ^{664}Zn , ^{666}Zn , ^{668}Zn , ^{670}Zn , ^{672}Zn , ^{674}Zn , ^{676}Zn , ^{678}Zn , ^{680}Zn , ^{682}Zn , ^{684}Zn , ^{686}Zn , ^{688}Zn , ^{690}Zn , ^{692}Zn , ^{694}Zn , ^{696}Zn , ^{698}Zn , ^{700}Zn , ^{702}Zn , ^{704}Zn , ^{706}Zn , ^{708}Zn , ^{710}Zn , ^{712}Zn , ^{714}Zn , ^{716}Zn , ^{718}Zn , ^{720}Zn , ^{722}Zn , ^{724}Zn , ^{726}Zn , ^{728}Zn , ^{730}Zn , ^{732}Zn , ^{734}Zn , ^{736}Zn , ^{738}Zn , ^{740}Zn , ^{742}Zn , ^{744}Zn , ^{746}Zn , ^{748}Zn , ^{750}Zn , ^{752}Zn , ^{754}Zn , ^{756}Zn , ^{758}Zn , ^{760}Zn , ^{762}Zn , ^{764}Zn , ^{766}Zn , ^{768}Zn , ^{770}Zn , ^{772}Zn , ^{774}Zn , ^{776}Zn , ^{778}Zn , ^{780}Zn , ^{782}Zn , ^{784}Zn , ^{786}Zn , ^{788}Zn , ^{790}Zn , ^{792}Zn , ^{794}Zn , ^{796}Zn , ^{798}Zn , ^{800}Zn , ^{802}Zn , ^{804}Zn , ^{806}Zn , ^{808}Zn , ^{810}Zn , ^{812}Zn , ^{814}Zn , ^{816}Zn , ^{818}Zn , ^{820}Zn , ^{822}Zn , ^{824}Zn , ^{826}Zn , ^{828}Zn , ^{830}Zn , ^{832}Zn , ^{834}Zn , ^{836}Zn , ^{838}Zn , ^{840}Zn , ^{842}Zn , ^{844}Zn , ^{846}Zn , ^{848}Zn , ^{850}Zn , ^{852}Zn , ^{854}Zn , ^{856}Zn , ^{858}Zn , ^{860}Zn , ^{862}Zn , ^{864}Zn , ^{866}Zn , ^{868}Zn , ^{870}Zn , ^{872}Zn , ^{874}Zn , ^{876}Zn , ^{878}Zn , ^{880}Zn , ^{882}Zn , ^{884}Zn , ^{886}Zn , ^{888}Zn , ^{890}Zn , ^{892}Zn , ^{894}Zn , ^{896}Zn , ^{898}Zn , ^{900}Zn , ^{902}Zn , ^{904}Zn , ^{906}Zn , ^{908}Zn , ^{910}Zn , ^{912}Zn , ^{914}Zn , ^{916}Zn , ^{918}Zn , ^{920}Zn , ^{922}Zn , ^{924}Zn , ^{926}Zn , ^{928}Zn , ^{930}Zn , ^{932}Zn , ^{934}Zn , ^{936}Zn , ^{938}Zn , ^{940}Zn , ^{942}Zn , ^{944}Zn , ^{946}Zn , ^{948}Zn , ^{950}Zn , ^{952}Zn , ^{954}Zn , ^{956}Zn , ^{958}Zn , ^{960}Zn , ^{962}Zn , ^{964}Zn , ^{966}Zn , ^{968}Zn , ^{970}Zn , ^{972}Zn , ^{974}Zn , ^{976}Zn , ^{978}Zn , ^{980}Zn , ^{982}Zn , ^{984}Zn , ^{986}Zn , ^{988}Zn , ^{990}Zn , ^{992}Zn , ^{994}Zn , ^{996}Zn , ^{998}Zn , ^{1000}Zn , ^{1002}Zn , ^{1004}Zn , ^{1006}Zn , ^{1008}Zn , ^{1010}Zn , ^{1012}Zn , ^{1014}Zn , ^{1016}Zn , ^{1018}Zn , ^{1020}Zn , ^{1022}Zn , ^{1024}Zn , ^{1026}Zn , ^{1028}Zn , ^{1030}Zn , ^{1032}Zn , ^{1034}Zn , ^{1036}Zn , ^{1038}Zn , ^{1040}Zn , ^{1042}Zn , ^{1044}Zn , ^{1046}Zn , ^{1048}Zn , ^{1050}Zn , ^{1052}Zn , ^{1054}Zn , ^{1056}Zn , ^{1058}Zn , ^{1060}Zn , ^{1062}Zn , ^{1064}Zn , ^{1066}Zn , ^{1068}Zn , ^{1070}Zn , ^{1072}Zn , ^{1074}Zn , ^{1076}Zn , ^{1078}Zn , ^{1080}Zn , ^{1082}Zn , ^{1084}Zn , ^{1086}Zn , ^{1088}Zn , ^{1090}Zn , ^{1092}Zn , ^{1094}Zn , ^{1096}Zn , ^{1098}Zn , ^{1100}Zn , ^{1102}Zn , ^{1104}Zn , ^{1106}Zn , ^{1108}Zn , ^{1110}Zn , ^{1112}Zn , ^{1114}Zn , ^{1116}Zn , ^{1118}Zn , ^{1120}Zn , ^{1122}Zn , ^{1124}Zn , ^{1126}Zn , ^{1128}Zn , ^{1130}Zn , ^{1132}Zn , ^{1134}Zn , ^{1136}Zn , ^{1138}Zn , ^{1140}Zn , ^{1142}Zn , ^{1144}Zn , ^{1146}Zn , ^{1148}Zn , ^{1150}Zn , ^{1152}Zn , ^{1154}Zn , ^{1156}Zn , ^{1158}Zn , ^{1160}Zn , ^{1162}Zn , ^{1164}Zn , ^{1166}Zn , ^{1168}Zn , ^{1170}Zn , ^{1172}Zn , ^{1174}Zn , ^{1176}Zn , ^{1178}Zn , ^{1180}Zn , ^{1182}Zn , ^{1184}Zn , ^{1186}Zn , ^{1188}Zn , ^{1190}Zn , ^{1192}Zn , ^{1194}Zn , ^{1196}Zn , ^{1198}Zn , ^{1200}Zn , ^{1202}Zn , ^{1204}Zn , ^{1206}Zn , ^{1208}Zn , ^{1210}Zn , ^{1212}Zn , ^{1214}Zn , ^{1216}Zn , ^{1218}Zn , ^{1220}Zn , ^{1222}Zn , ^{1224}Zn , ^{1226}Zn , ^{1228}Zn , ^{1230}Zn , ^{1232}Zn , ^{1234}Zn , ^{1236}Zn , ^{1238}Zn , ^{1240}Zn , ^{1242}Zn , ^{1244}Zn , ^{1246}Zn , ^{1248}Zn , ^{1250}Zn , ^{1252}Zn , ^{1254}Zn , ^{1256}Zn , ^{1258}Zn , ^{1260}Zn , ^{1262}Zn , ^{1264}Zn , ^{1266}Zn , ^{1268}Zn , ^{1270}Zn , ^{1272}Zn , ^{1274}Zn , ^{1276}Zn , ^{1278}Zn , ^{1280}Zn , ^{1282}Zn , ^{1284}Zn , ^{1286}Zn , ^{1288}Zn , ^{1290}Zn , ^{1292}Zn , ^{1294}Zn , ^{1296}Zn , ^{1298}Zn , ^{1300}Zn , ^{1302}Zn , ^{1304}Zn , ^{1306}Zn , ^{1308}Zn , ^{1310}Zn , ^{1312}Zn , ^{1314}Zn , ^{1316}Zn , ^{1318}Zn , ^{1320}Zn , ^{1322}Zn , ^{1324}Zn , ^{1326}Zn , ^{1328}Zn , ^{1330}Zn , ^{1332}Zn , ^{1334}Zn , ^{1336}Zn , ^{1338}Zn , ^{1340}Zn , ^{1342}Zn , ^{1344}Zn , ^{1346}Zn , ^{1348}Zn , ^{1350}Zn , ^{1352}Zn , ^{1354}Zn , ^{1356}Zn , ^{1358}Zn , ^{1360}Zn , ^{1362}Zn , ^{1364}Zn , ^{1366}Zn , ^{1368}Zn , ^{1370}Zn , ^{1372}Zn , ^{1374}Zn , ^{1376}Zn , ^{1378}Zn , ^{1380}Zn , ^{1382}Zn , ^{1384}Zn , ^{1386}Zn , ^{1388}Zn , ^{1390}Zn , ^{1392}Zn , ^{1394}Zn , ^{1396}Zn , ^{1398}Zn , ^{1400}Zn , ^{1402}Zn , ^{1404}Zn , ^{1406}Zn , ^{1408}Zn , ^{1410}Zn , ^{1412}Zn , ^{1414}Zn , ^{1416}Zn , ^{1418}Zn , ^{1420}Zn , ^{1422}Zn , ^{1424}Zn , ^{1426}Zn , ^{1428}Zn , ^{1430}Zn , ^{1432}Zn , ^{1434}Zn , ^{1436}Zn , ^{1438}Zn , ^{1440}Zn , ^{1442}Zn , ^{1444}Zn , ^{1446}Zn , ^{1448}Zn , ^{1450}Zn , ^{1452}Zn , ^{1454}Zn , ^{1456}Zn , 1458

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010186



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

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

Certification Date: February 13, 2003

Expiration Date:

EXPIRES
1/2004

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: JoAnn Struthers, QA Administrative Assistant

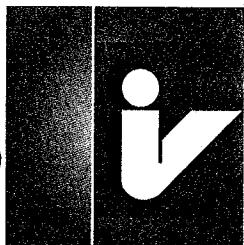
JoAnn Struthers

Certificate Approved By: Katalin Le, QC Supervisor

Katalin Le

Certifying Officer: Paul Gaines, Chemist, Senior Technical Director

Paul Gaines



inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

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

2.0 DESCRIPTION OF CRM Custom-Grade 10000 µg/mL Calcium in 1.4% (abs) HNO₃ **010187**

Catalog Number: CGCA10-1 AND CGCA10-5

Lot Number: T-CA03010

Starting Material: CaO

Starting Material Purity (%): 99.9981

Starting Material Lot No C27L01

Matrix: 1.4% (abs) HNO₃

INORGANIC LABS/RADCHEM LABS Pg. 1 of 2

DATE RECEIVED: 01/09/03

DATE EXPIRED: 02/01/2004

DATE OPENED: 01/10/03

INORG: 3900 PO: F52071

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 10,007 ± 22 µg/mL

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

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

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

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

($\bar{x}$) = mean

x_i = individual results

n = number of measurements

$\sum S$ = The summation of all significant estimated errors

(Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

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

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

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

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

4.1 Assay Method #1 10,034 ± 25 µg/mL

ICP Assay NIST SRM 3109a Lot Number: 000622

Assay Method #2 10,007 ± 22 µg/mL

EDTA NIST SRM 928 Lot Number: 880710

- 4.2 BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.
- 4.3 THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001. Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.
- 4.4 GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

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

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

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

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

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:

ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP

For the validation of analytical methods

For the preparation of "working reference samples"

For interference studies and the determination of correction coefficients

For detection limit and linearity studies

For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at $20 \pm 4^\circ\text{C}$. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 40.078; +2; 6; $\text{Ca}(\text{H}_2\text{O})_6^{2+}$

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

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

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

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

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

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

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

10.0 QUALITY STANDARD DOCUMENTATION

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

Recognized by:

Registrar Accreditation Board (ANSI-RAB)

Standards Council of Canada (SCC)

Dutch Council for Accreditation (RVA)

Entidad Mexicana de Acreditacion, a.c.(EMA)

Members of **IQ Net International Certification Network**:

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

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration"

- Chemical Testing - Accredited A2LA Certificate Number 883.01



10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers"

- Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:

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

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission

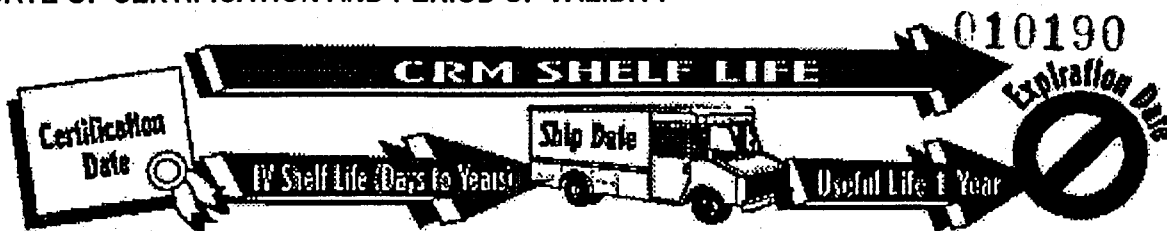
- Domestic Licensing of Production and Utilization Facilities

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

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

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2
DATE RECEIVED: 01/09/03
DATE EXPIRED: 02/01/2004
DATE OPENED: 01/10/03
INORG: 3900 PO: F52071

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY



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

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

Certification Date: August 26, 2002

Expiration Date: **EXPIRES**
12 2004

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Debbie Newman, QA Administrator

Certificate Approved By: Katalin Le, QC Supervisor

Certifying Officer: Paul Gaines, Chemist, Senior Technical Director

Debbie Newman
Katalin Le
Paul Gaines

certificate of analysis

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

010191

2.0 DESCRIPTION OF CRM Custom-Grade 10000 µg/mL Iron in 3.5% (abs) HNO₃

Catalog Number: CGFE10-1 and CGFE10-5
Lot Number: T-FE03028
Starting Material: Fe metal
Starting Material Purity (%): 99.9992
Starting Material Lot No: 23024
Matrix: 3.5% (abs) HNO₃

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

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 9920 ± 22 µg/mL

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

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

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

($\bar{x}$) = mean

x_i = individual results

n = number of measurements

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

$\sum S$ = The summation of all significant estimated errors.

(Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

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

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

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

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

4.1 Assay Method #1

9920 ± 22 µg/mL

ICP Assay NIST SRM 3126a Lot Number: 000606

Assay Method #2

9962 ± 41 µg/mL

EDTA NIST SRM 928 Lot Number: 880710

- 4.2 BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.
- 4.3 THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001. Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.
- 4.4 GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

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

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

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

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

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

010193

Storage & Handling - Keep tightly sealed when not in use. Store and use at $20 \pm 4^\circ\text{C}$. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 55.847; +3; 6; $\text{Fe}(\text{H}_2\text{O})_6^{3+}$

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

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

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

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

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

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

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

10.0 QUALITY STANDARD DOCUMENTATION

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

Recognized by:

Registrar Accreditation Board (ANSI-RAB)

Standards Council of Canada (SCC)

Dutch Council for Accreditation (RVA)

Entidad Mexicana de Acreditacion, a.c.(EMA)

Members of IQ Net International Certification Network:

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



10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration"

- Chemical Testing - Accredited A2LA Certificate Number 883.01



10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers"

- Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:

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

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission

- Domestic Licensing of Production and Utilization Facilities

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

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

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2

DATE RECEIVED: 2/28/03

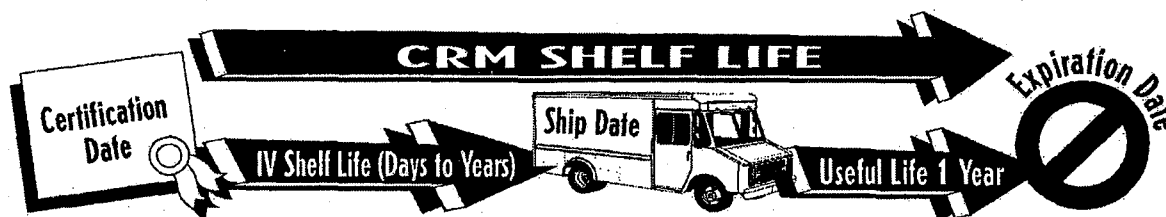
DATE EXPIRED: 3/01/2004

DATE OPENED: 2/28/03

INORG: 3963 PO: F52064

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010194



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

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

Certification Date: October 11, 2002

Expiration Date: **EXPIRES**
1st 2004

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Debbie Newman, QA Administrator

Debbie Newman

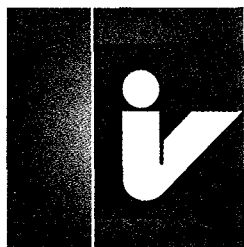
Certificate Approved By: Katalin Le, QC Supervisor

Katalin Le

Certifying Officer: Paul Gaines, Chemist, Senior Technical Director

Paul Gaines

ISO 9001:2000
APPENDIX B
MIL-STD-45662A



inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

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

- 2.0 DESCRIPTION OF CRM** Custom-Grade 10000 µg/mL Potassium in 1.4% (abs) HNO₃ **010195**

Catalog Number: CGK10-1, CGK10-2, and CGK10-5
Lot Number: **W-K02111**
Starting Material: KNO₃
Starting Material Purity (%): 99.997230
Starting Material Lot No: K18J19
Matrix: 1.4% (abs) HNO₃

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/5/03 10/2
DATE EXPIRED: 12/1/2004 DR
DATE OPENED: 11/5/03
INORG: 4330 PO: FS2258

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 9930 ± 9 µg/mL
Certified Density: 1.024 g/mL (measured at 22° C)

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

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

($\bar{x}$) = mean

x_i = individual results

n = number of measurements

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

$\sum s_i^2$ = The summation of all significant estimated errors.

(Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

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

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

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

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

- 4.1 Assay Method #1** **9926 ± 62 µg/mL**
ICP Assay NIST SRM 3141a Lot Number: 891312
Assay Method #2 **9930 ± 9 µg/mL**
Gravimetric NIST SRM Lot Number: See Sec. 4.2

- 4.2 BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.
- 4.3 THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001. Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.
- 4.4 GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

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

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

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

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

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

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

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 29.0983; +1; (6); K'(aq)
 (Coordination Number in parentheses is assumed, not certain.)

Chemical Compatibility - Soluble in HCl, HNO₃, H₂SO₄, and HF aqueous matrices. Avoid use of HClO₄ due to insolubility of the perchlorate. Stable with all metals and inorganic anions except ClO₄⁻.

Stability - 2-100 ppb levels stable for months in 1% HNO₃ / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO₃ / LDPE container.

K Containing Samples (Preparation and Solution) - Metal (Dissolves very rapidly in water); Ores (Sodium carbonate fusion in Pt⁺ followed by HCl dissolution-blank levels of K in sodium carbonate critical); Organic Matrices (Sulfuric/peroxide digestion)

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

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at all concs.)
ICP-OES 766.490 nm	0.4 / 0.001 µg/mL	1	atom	2 nd order radiation from R.E.s on some optical designs
ICP-OES 771.531 nm	1.0 / 0.03 µg/mL	1	atom	2 nd order radiation from R.E.s on some optical designs
ICP-OES 404.721 nm	1.1 / 0.05 µg/mL	1	atom	<u>U</u> , <u>Ce</u>
ICP-MS 39 amu	10 ppt	n/a	M ⁺	³³ ArH, ²⁴ Na ¹⁶ O, ⁷⁸ Se ¹²

- 8.0 **HAZARDOUS INFORMATION** - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.
- 9.0 **HOMOGENEITY** - This solution was mixed according to procedure IV-MPM-004 and is guaranteed to be homogeneous.
- 10.0 **QUALITY STANDARD DOCUMENTATION**

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

Recognized by:

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

Members of IQ Net International Certification Network:

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

10.2 **ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration"**

- Chemical Testing - Accredited A2LA Certificate Number 883.01

010197



10.3 **ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers"**

- Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:

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

10.4 **10CFR50 Appendix B - Nuclear Regulatory Commission**

- Domestic Licensing of Production and Utilization Facilities

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

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

11.0 **DATE OF CERTIFICATION AND PERIOD OF VALIDITY**



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

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

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 11/5/03 242
DATE EXPIRED: 12/1/04 DR
DATE OPENED: 11/5/03
INORG: 4326 PO: P52258

Certification Date: January 30, 2003

Expiration Date:

EXPIRES
12/2004

010198

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: JoAnn Struthers, QA Administrative Assistant

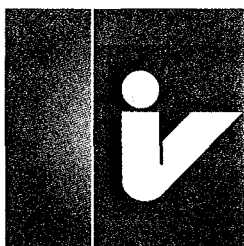
JoAnn Struthers

Certificate Approved By: Katalin Le, QC Supervisor

Katalin Le

Certifying Officer: Paul Gaines, Chemist, Senior Technical Director

Paul Gaines



inorganic ventures / iv labs

195 lehigh avenue, suite 4, lakewood, nj 08701 usa
phone: 800-669-6799 • 732-901-1900 • fax: 732-901-1903
e-mail: ivsales@ivstandards.com • website: www.ivstandards.com

certificate of analysis

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

2.0 DESCRIPTION OF CRM Custom-Grade 10000 µg/mL Magnesium in 1.4% (abs) HNO₃ **010199**

Catalog Number: CGMG10-1 and CGMG10-5
Lot Number: T-MG03006
Starting Material: Mg metal
Starting Material Purity (%): 99.9968
Starting Material Lot No: RML91191
Matrix: 1.4% (abs) HNO₃

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

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 9921 ± 20 µg/mL

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

The Certified Value is the instrument analysis value. The following equations are used in the calculation of the certified value and the uncertainty:

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

($\bar{x}$) = mean

x_i = individual results

n = number of measurements

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

$\sum s_i$ = The summation of all significant estimated errors.

(Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

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

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

4.1 Assay Method #1 9998 ± 20 µg/mL
EDTA NIST SRM 928 Lot Number: 880710

Assay Method #2 9921 ± 20 µg/mL
ICP Assay NIST SRM 3131a Lot Number: 991107

- 4.2 BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.
- 4.3 THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001. Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.
- 4.4 GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

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

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

<u>Q</u> Al 0.02454	<u>M</u> Dy < 0.02455	<u>Q</u> Li 0.00797	<u>M</u> Pr < 0.00123	<u>M</u> Te < 0.12275
<u>M</u> Sb 0.00306	<u>M</u> Er < 0.02046	<u>M</u> Lu < 0.00164	<u>M</u> Re < 0.00409	<u>M</u> Tb < 0.00123
<u>M</u> As < 0.04092	<u>M</u> Eu < 0.01228	<u>S</u> Mg	<u>M</u> Rh < 0.00409	<u>M</u> Tl < 0.00409
<u>M</u> Ba < 0.04092	<u>M</u> Gd < 0.00409	<u>M</u> Mn < 0.01637	<u>M</u> Rb < 0.00409	<u>M</u> Th < 0.00409
<u>Q</u> Be < 0.00017	<u>M</u> Ga < 0.00409	<u>Q</u> Hg < 0.00900	<u>M</u> Ru < 0.00818	<u>M</u> Tm < 0.00164
<u>M</u> Bi < 0.00164	<u>M</u> Ge < 0.02455	<u>M</u> Mo < 0.00818	<u>M</u> Sm < 0.00409	<u>M</u> Sn < 0.02046
<u>Q</u> B 0.00871	<u>M</u> Au < 0.01228	<u>M</u> Nd < 0.00818	<u>M</u> Sc < 0.04092	<u>Q</u> Ti 0.10206
<u>M</u> Cd < 0.01228	<u>M</u> Hf < 0.00818	<u>Q</u> Ni 0.01404	<u>M</u> Se < 0.03273	<u>M</u> W < 0.04092
<u>Q</u> Ca 0.01070	<u>M</u> Ho < 0.00205	<u>M</u> Nb < 0.00205	<u>Q</u> Si 0.03186	<u>M</u> U < 0.00818
<u>M</u> Ce < 0.02046	<u>M</u> In < 0.04092	<u>n</u> Os	<u>M</u> Ag < 0.00818	<u>M</u> V < 0.00818
<u>M</u> Cs < 0.00123	<u>M</u> Ir < 0.02046	<u>M</u> Pd < 0.02046	<u>Q</u> Na 0.01817	<u>M</u> Yb < 0.00409
<u>Q</u> Cr 0.02315	<u>Q</u> Fe 0.02467	<u>Q</u> P < 0.01600	<u>M</u> Sr < 0.00205	<u>M</u> Y < 0.16367
<u>M</u> Co < 0.01228	<u>M</u> La < 0.00205	<u>M</u> Pt < 0.00818	<u>n</u> S	<u>Q</u> Zn 0.01892
<u>Q</u> Cu 0.00672	<u>Q</u> Pb 0.03236	<u>Q</u> K < 0.05000	<u>M</u> Ta < 0.02864	<u>M</u> Zr < 0.02046

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

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:

ICP-MS, ICP-OES, FAAS, GFAA, XRF, and DCP

For the validation of analytical methods

For the preparation of "working reference samples"

For interference studies and the determination of correction coefficients

For detection limit and linearity studies

For additional intended uses, contact IV Technical Staff

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at $20 \pm 4^\circ\text{C}$. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 24.305; +2; 6; $\text{Mg}(\text{H}_2\text{O})_6^{2+}$

Chemical Compatibility - Soluble in HCl , HNO_3 , and H_2SO_4 ; avoid HF , H_3PO_4 , and neutral to basic media. Stable with most metals and inorganic anions forming insoluble silicates, carbonates, hydroxides, oxides, and tungstates in neutral and slightly acidic media.

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

Mg Containing Samples (Preparation and Solution) - Metal (Best dissolved in diluted HNO_3); Oxide (Readily soluble in above compatible aqueous acidic solutions); Ores (Carbonate fusion in Pt^0 followed by HCl dissolution); Organic Matrices (Sulfuric / peroxide digestion or nitric / sulfuric / perchloric acid decomposition, or dry ash and dissolution in dilute HCl).

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

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at = concs.)
ICP-OES 279.553 nm	0.0002 / 0.00003 $\mu\text{g/mL}$	1	ion	Th
ICP-OES 280.270 nm	0.0003 / 0.00005 $\mu\text{g/mL}$	1	ion	U, V
ICP-OES 285.213 nm	0.002 / 0.00003 $\mu\text{g/mL}$	1	atom	U, Hf, Cr, Zr
ICP-MS 24 amu	42 ppt	n/a	M'	$^7\text{Li}^+\text{O}$, $^{45}\text{Ti}^{12}$, $^{40}\text{Ca}^{12}$

010201

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

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

10.0 QUALITY STANDARD DOCUMENTATION

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

Recognized by:

Registrar Accreditation Board (ANSI-RAB)

Standards Council of Canada (SCC)

Dutch Council for Accreditation (RVA)

Entidad Mexicana de Acreditación, a.c.(EMA)

Members of **IQ Net International Certification Network**:

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

10.2 ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration"

- Chemical Testing - Accredited A2LA Certificate Number 883.01



10.3 ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers"

- Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:

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

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission

- Domestic Licensing of Production and Utilization Facilities

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

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

INORGANIC LABS/RADCHEM LABS Pg. 2 of 2

DATE RECEIVED: 07/31/03

DATE EXPIRED: 08/01/2004

DATE OPENED: 08/01/03

INORG: 4204 PO: F52391

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

010202



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

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

Certification Date: August 28, 2002

Expiration Date: **EXPIRES**
01 02 004

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Debbie Newman, QA Administrator

Debbie Newman
Katalin Le

Certificate Approved By: Katalin Le, QC Supervisor

Certifying Officer: Paul Gaines, Chemist, Senior Technical Director

Paul Gaines

ISO 9001:2000
APPENDIX B
MIL-STD-55062



inorganic ventures / iv labs

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certificate of analysis

1.0 Inorganic Ventures / IV Labs is an ISO Guide 34-2000 Certified Reference Material (CRM) Manufacturer:

Certificate #883-02. The certificate is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31-2000 (Reference Materials - Contents of certificates and label(s)), ISO Guide 34-2000 "Quality System Guidelines for the Production of Reference Materials," and ISO Guide 35-1989 "Certification of Reference Materials - General and Statistical Principles."

2.0 DESCRIPTION OF CRM Custom-Grade 10000 µg/mL Sodium in 1.4% (abs) HNO₃

010203

Catalog Number: CGNA10-1, CGNA10-2, and CGNA10-5
Lot Number: T-NA03006
Starting Material: Na₂CO₃
Starting Material Purity (%): 99.999936
Starting Material Lot No 42095
Matrix: 1.4% (abs) HNO₃

INORGANIC LABS/RADCHEM LABS Pg 1 of 2
DATE RECEIVED: 07/31/03
DATE EXPIRED: 08/01/2004
DATE OPENED: 08/01/03
INORG: 4205 PO: F52391

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 10,005 ± 7 µg/mL

Certified Density: 1.032 g/mL (measured at 22° C)

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

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

($\bar{x}$) = mean

x_i = individual results

n = number of measurements

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

$\sum s_i^2$ = The summation of all significant estimated errors

(Most common are the errors from instrumental measurement, weighing, dilution to volume, and the fixed error reported on the NIST SRM certificate of analysis.)

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

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

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

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

4.1 Assay Method #1 10,067 ± 75 µg/mL

ICP Assay NIST SRM 3152a Lot Number: 990907

Assay Method #2 10,005 ± 7 µg/mL

Gravimetric NIST SRM Lot Number: See Sec. 4.2

- 4.2 BALANCE CALIBRATION** - All balances are checked daily using in-house procedure number 6-IMM-001. The weights used for testing are annually compared to Gerhart Scale Corporation's master weights and are traceable to the National Institute of Standards and Technology (NIST). The NIST Traceability numbers are 692476 - Class 1 and 692476A - Class 2. The NIST test number is 822/260017-98. All analytical balances are calibrated every 4 months by Gerhart Scale Corp. of South Amboy. The balances are calibrated with a class 1 and/or class 2 analytical weight set. These weights are tested annually by a NIST / NVLAP accredited calibration lab. The NIST test number is 822/260017-98.
- 4.3 THERMOMETER CALIBRATION** - The thermometers used in the determination of the final densities are calibrated vs standard thermometer No. 903-2680 which was certified in accordance with the procedures outlined by ASTM E77-87 and NIST Monograph 150 using NIST Test Nos. and Std Nos.: 769543, 217368/769543, 217368/P14452, 176240/P14452, 176240. The in-house procedure No. is 2-QC-001. Thermometers which are not calibrated vs standard thermometer No. 903-2680 are traceable to NIST Identification Nos. 92564, 119016, 471047 and NIST test report Nos. 811/258522, 811/2557078, and 236090.
- 4.4 GLASSWARE CALIBRATION** - In-house procedure 3-QC-002 is used to calibrate all Class A Glassware used in the manufacture and quality control of Custom Grade Standards.

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

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

<u>O</u> Al < 0.00090	<u>M</u> Dy < 0.02499	<u>O</u> Li < 0.00003	<u>M</u> Pr < 0.00125	<u>M</u> Te < 0.12494
<u>M</u> Sb < 0.00208	<u>M</u> Er < 0.02082	<u>M</u> Lu < 0.00167	<u>M</u> Re < 0.00417	<u>M</u> Tb < 0.00125
<u>M</u> As < 0.04165	<u>M</u> Eu < 0.01249	<u>O</u> Mg 0.00015	<u>M</u> Rh < 0.00417	<u>M</u> Tl < 0.00417
<u>M</u> Ba < 0.04165	<u>M</u> Gd < 0.00417	<u>O</u> Mn < 0.00003	<u>M</u> Rb < 0.00417	<u>M</u> Th < 0.00417
<u>O</u> Be < 0.00020	<u>M</u> Ga < 0.00417	<u>O</u> Hg < 0.01500	<u>M</u> Ru < 0.00833	<u>M</u> Tm < 0.00167
<u>M</u> Bi < 0.00167	<u>O</u> Ge < 0.00150	<u>M</u> Mo < 0.00833	<u>M</u> Sm < 0.00417	<u>M</u> Sn < 0.02082
<u>O</u> B < 0.00060	<u>O</u> Au < 0.00300	<u>M</u> Nd < 0.00833	<u>O</u> Sc < 0.00002	<u>O</u> Ti < 0.00070
<u>M</u> Cd < 0.01249	<u>M</u> Hf < 0.00833	<u>O</u> Ni < 0.00230	<u>O</u> Se < 0.05000	<u>M</u> W < 0.04165
<u>O</u> Ca 0.00160	<u>M</u> Ho < 0.00208	<u>M</u> Nb < 0.00208	<u>O</u> Si < 0.00340	<u>M</u> U < 0.00833
<u>M</u> Ce < 0.02082	<u>M</u> In < 0.04165	<u>n</u> Os	<u>M</u> Ag < 0.00833	<u>O</u> V < 0.00090
<u>M</u> Cs 0.00104	<u>M</u> Ir < 0.02082	<u>M</u> Pd < 0.02082	<u>S</u> Na	<u>M</u> Yb < 0.00417
<u>M</u> Cr < 0.02082	<u>O</u> Fe < 0.00110	<u>O</u> P < 0.04000	<u>M</u> Sr < 0.00208	<u>M</u> Y < 0.16658
<u>M</u> Co < 0.01249	<u>M</u> La < 0.00208	<u>M</u> Pt < 0.00833	<u>O</u> S < 0.07200	<u>O</u> Zn 0.00130
<u>O</u> Cu < 0.00140	<u>M</u> Pb < 0.01249	<u>O</u> K 0.00873	<u>M</u> Ta < 0.02915	<u>M</u> Zr < 0.02082

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

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

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

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 22.98977; +1; (6); Na'(aq) largely ionic in nature (Coordination Number in parentheses is assumed, not certain.)

Chemical Compatibility - Soluble in HCl, HNO₃, H₂SO₄, and HF aqueous matrices. Stable with all metals and inorganic anions.

Stability - 2-100 ppb levels stable for months in 1% HNO₃ / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO₃ / LDPE container.

Na Containing Samples (Preparation and Solution) - Metal (Dissolves very rapidly in water). Ores (Lithium carbonate fusion in graphite crucible followed by HCl dissolution - blank levels of Na in lithium carbonate critical). Organic Matrices (Sulfuric / peroxide digestion or nitric/sulfuric/perchloric acid decomposition).

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

Technique	Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe at 480 nm)
ICP-OES	589.595 nm	0.07 / 0.00009 µg/mL	1	atom	2 nd order radiation from R.E.s on some optical designs
ICP-OES	588.995 nm	0.03 / 0.006 µg/mL	1	atom	2 nd order radiation from R.E.s on some optical designs
ICP-OES	330.237 nm	2.0 / 0.09 µg/mL	1	atom	<u>Pd</u> , <u>Zn</u>
ICP-MS	23 amu	310 ppt	n/a	M'	⁴⁵ Ti ¹² , ⁴⁴ Ca ¹²

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

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

10.0 **QUALITY STANDARD DOCUMENTATION**

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

Recognized by:

Registrar Accreditation Board (ANSI-RAB)

Standards Council of Canada (SCC)

Dutch Council for Accreditation (RVA)

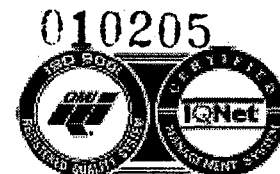
Entidad Mexicana de Acreditacion, a.c.(EMA)

Members of IQ Net International Certification Network:

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

10.2 **ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration"**

- Chemical Testing - Accredited A2LA Certificate Number 883.01



10.3 **ISO/IEC Guide 34 - 2000 "General Requirements for the Competence of Reference Material Producers"**

- Reference Materials Production - Accredited A2LA Certificate Number 883.02

A2LA Mutual Recognition Agreement Partners:

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

10.4 **10CFR50 Appendix B - Nuclear Regulatory Commission**

- Domestic Licensing of Production and Utilization Facilities

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

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

11.0 **DATE OF CERTIFICATION AND PERIOD OF VALIDITY**



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

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

Certification Date: January 24, 2003

Expiration Date:

EXPIRES

01 22 00 4

INORGANIC LABS/RADCHEM LABS 89 2042
DATE RECEIVED: 07/31/03
DATE EXPIRED: 08/01/2004
DATE OPENED: 08/01/03
INORG: 4205 PO: F52391

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

010206

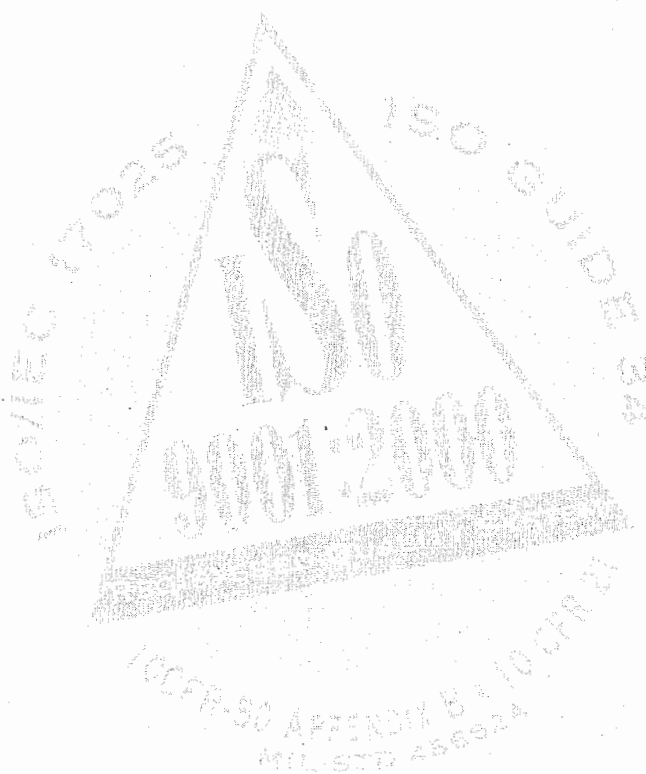
Certificate Prepared By: Debbie Newman, LIMS Administrator

Debbie Newman
Katalin Le

Certificate Approved By: Katalin Le, QC Supervisor

Certifying Officer: Paul Gaines, Chemist, Senior Technical Director

Paul Gaines





Certificate of Analysis

CUSTOM-GRADE SOLUTION

1000 µg/mL Lithium in 0.1% HNO₃ (abs)

010207

Catalog Number: CGLI1-1, CGLI1-2 and CGLI1-5

Lot Number: **W-LI02066**

Starting Material:
Starting Material Purity:
Starting Material Lot No:

Li₂CO₃
99.999%
1053

INORGANIC LABS/RADCHEM LABS

DATE RECEIVED: 06/20/03
DATE EXPIRED: 07/01/2004
DATE OPENED: 06/23/03
INORG: 4149 PO: F52370

CERTIFIED CONCENTRATION: 998 ± 2 µg/mL

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

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

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

($\bar{x}$) = mean

x_i = individual results

n = number of measurements

$\sum S_i$ = The summation of all significant estimated errors.

Classical Wet Assay: 998 ± 2 µg/mL

Method: Gravimetric as the Sulfate vs NIST weights #822/254143-94.

Instrument Analysis: 1000 ± 4 µg/mL

Method: Inductively Coupled Plasma Spectroscopy (ICP) vs NIST SRM 3129a.

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

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

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

<u>O</u> Al <0.010	<u>M</u> Dy <0.00060	<u>s</u> Li	<u>M</u> Pr <0.000030	<u>O</u> Te <0.0090
<u>M</u> Sb <0.000050	<u>M</u> Er <0.000050	<u>M</u> Lu <0.000040	<u>M</u> Re <0.00010	<u>M</u> Tb <0.000030
<u>O</u> As <0.044	<u>M</u> Eu <0.00030	<u>O</u> Mg <0.00010	<u>M</u> Rh <0.00010	<u>M</u> Tl <0.00010
<u>M</u> Ba <0.0010	<u>M</u> Gd <0.00010	<u>O</u> Mn <0.00020	<u>M</u> Rb <0.00010	<u>M</u> Th <0.00010
<u>O</u> Be <0.000050	<u>M</u> Ga <0.00010	<u>O</u> Hg <0.0070	<u>M</u> Ru <0.00020	<u>M</u> Tm <0.000040
<u>M</u> Bi <0.000040	<u>M</u> Ge <0.00060	<u>M</u> Mo <0.00020	<u>M</u> Sm <0.00010	<u>M</u> Sn <0.00050
<u>O</u> B <0.0060	<u>O</u> Au <0.010	<u>M</u> Nd <0.00020	<u>M</u> Sc <0.0010	<u>O</u> Ti <0.00030
<u>O</u> Cd <0.0018	<u>M</u> Hf <0.00020	<u>O</u> Ni <0.0040	<u>O</u> Se <0.020	<u>M</u> W <0.0010
<u>O</u> Ca 0.051	<u>M</u> Ho <0.000050	<u>M</u> Nb <0.000050	<u>O</u> Si 0.023	<u>M</u> U <0.00020
<u>M</u> Ce <0.00050	<u>O</u> In <0.030	<u>n</u> Os	<u>O</u> Ag <0.0040	<u>O</u> V <0.0010
<u>M</u> Cs 0.0018	<u>M</u> Ir <0.00050	<u>M</u> Pd <0.00050	<u>O</u> Na <0.10	<u>M</u> Yb <0.00010
<u>O</u> Cr <0.0020	<u>O</u> Fe <0.0020	<u>O</u> P <0.030	<u>O</u> Sr <0.0010	<u>M</u> Y <0.0040
<u>M</u> Co <0.00030	<u>M</u> La <0.000050	<u>M</u> Pt <0.00020	<u>O</u> S <0.050	<u>O</u> Zn <0.030
<u>M</u> Cu <0.00060	<u>M</u> Pb <0.00030	<u>O</u> K 0.0070	<u>M</u> Ta <0.00070	<u>M</u> Zr <0.00050

M - checked by ICP-MS

O - checked by ICP-OES

i - spectral interference

n - not checked for

s - solution standard element

ANALYZED DENSITY OF SOLUTION (measured at 22°C): 1.004 g/mL

(over)

QA:KL Rev.022403DN

Paul R. James

Inorganic Ventures, Inc.

195 Lehigh Avenue • Suite 4 • Lakewood, NJ 08701

Orders: 800-669-6799 • FAX (732) 901-1903

Technical Support: 800-569-6799

Quality Assurance Manager

EXPIRES

01/22/04

TITLE

Nitrite-N 100ppm

PROJECT NO. —

43

BOOK NO. 104

Work continued from Page

SWRI^c

43-01-104 Nitrite-N 100mg/L

010208

0.0492g Sodium nitrite (Fisher Lot# 944033)
diluted to 100ml w/ DI H₂O.

Balance # 34.

10

15

20

25

30

35

Am2
10/27/03

www.scientificbindery88yrs.com

SIGNATURE

R. Sprus

DISCLOSED TO AND UNDERSTOOD BY

Am2

DATE

10/27/03

WITNESS

Work continued to Page

DATE

8/13/03

DATE

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

ANALYTICAL CONTROL LABORATORY ANALYSIS

010209

Name & Grade:

SODIUM NITRITE, A.C.S.

Catalog Number: S347

Lot Number: 944033

P.O./ Other Customer ID:

Date of Testing/Mfg: 07/14/94

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-WHITE CRYSTS W/YEL TINT
ASSAY	%	99.5000
CALCIUM IN %	%	0.0030
CHLORIDE	%	0.0020
FLUORIDE (F)	PPM	0.400
HEAVY METALS	%	0.0003
IDENTIFICATION		PASS
INSOLUBLE MATTER	%	0.0020
IRON	%	0.00030
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: 07/18/94 (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..944033.B1.

Location: FL

Certificate of Analysis

THE RIGHT CHEMICALS
THE RIGHT CHEMISTRY[®]

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

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

010210

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 ₄ OH 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:

Alfa Aesar
A Johnson Matthey Company



30 Bond Street • Ward Hill, MA 01835-8099 USA • Telephone: (978) 521-6300 • Fax: (978) 521-6350
Toll-free Catalog Sales: (800) 343-0660 • Technical Services: (800) 343-7276 • Specialty/Bulk Sales: (888) 343-8025
www.alfa.com • email: info@alfa.com



1001 West 34th St., Ste. 100
Milwaukee, WI 53219
Tel. 800-855-9700 • (414) 351-2700
Fax 800-855-9591 • (414) 351-2700
e-mail: aldinfo@aldrich.com

Certificate of Analysis

SOUTHWEST RESEARCH INST
DAIRY FARMER
6220 CULEBRA RD
SAN ANTONIO TX 78238

PC NBR: 130686E

010211

PRODUCT NUMBER: 236527-500G

LOT NUMBER: 15308E1

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

Sigma-Aldrich, Inc. warrants that its products conform to the information contained in this and other Sigma-Aldrich publications. Purchaser must determine the suitability of the product(s) for their particular use. Additional terms and conditions may apply. Please see reverse side of the invoice or packing slip.

Aldrich brand products are sold exclusively through Sigma-Aldrich, Inc.

SPEXertificate™

010212

Certificate of Reference Material

Catalog Number: ICMIX2-100 Lot No.: 24-79AS
Description: IC Instrument Check Standard 2
Matrix: H₂O

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. Kocherakota

INORGANIC LABS/RAPIDCHEM LABS
DATE RECEIVED: 3/12/03
DATE EXPIRED: 3/15/2004
DATE OPENED: 3/12/03
INORG: 3989
PO: F50153
DR

SPEXcertificate™

010213

Certificate of Reference Material

Catalog Number: AS-F9-2X/2Y **Lot No.:** 23-109AS
Description: 1000 mg/L of Fluoride
Matrix: H₂O

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 $\pm$ 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

UNIVERSITY LABS/RESEARCH LABS
DATE RECEIVED: 01/03/2003
DATE EXPIRED: 01/03/2004
DATE OPENED: 01/03/2003
INSTR: 3895 PO: F50071

INORGANIC LABS/KAACHEN LABS
DATE RECEIVED: 12/15/03
DATE EXPIRED: 12/15/03
DATE OPENED: 12/15/03
INORG: 3500 PO: F3267

SPEX Certificate TM

Certificate of Reference Material

010214

Catalog Number: AS-CL9-2X/2Y

Lot No. 23-38AS

Description: 1000 mg/L Chloride

Matrix: H₂O

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: 997.5 mg/L

Traceable to: NIST SRM 3182

The CRM is prepared gravimetrically using high purity Sodium Chloride Lot# 004723. 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: Precipitate using AgNO₃, filter, dry and weigh as AgCl.

Instrumentation Analysis By Ion Chromatography: 995 mg/L

Uncertified Properties:

Trace Ionic Impurities in the Actual Solution via IC Analysis:

Element	mg/L	Element	mg/L
Br	<0.1	NO ₃	<0.1
F	<0.05	PO ₄	<0.05
NO ₂	<0.2	SO ₄	<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: Dec -- 02 **Certifying Officer:** N. Kocherakota

SPEXcertificate™

Certificate of Reference Material

010215

Catalog Number: AS-NO₂9-2X/2Y Lot No.: 23-23AS
Description: 1000 mg/L of Nitrite
Matrix: H₂O

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 (NO₂⁻): 1000.5 mg/L ± 3 mg/L
Traceable to: SPEX CRM 0601NO₂

The CRM is prepared gravimetrically using high purity Sodium Nitrite (NaNO₂) 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 KMnO₄. KMnO₄ standardized with As₂O₃ 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: MAY - - '03 Certifying Officer: N. Kocherakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 05/28/03
DATE EXPIRED: 05/30/04
DATE OPENED: 05/28/03
INORG: 4107 PO: FS2354

SPEXertificate™

010216

Certificate of Reference Material

Catalog Number: AS-BR9-2X/2Y Lot No.: 23-52AS
Description: 1000 mg/L of Bromide
Matrix: H₂O

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⁻): 999 mg/L $\pm$ 3 mg/L
Traceable to: SPEX CRM 19-45AS

The CRM is prepared gravimetrically using high purity Sodium Bromide (NaBr) Lot#017400
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: 1,002 mg/L

Method: Gravimetric analysis by precipitation using Silver Nitrate, filtering, drying and weighing as AgBr.

Instrumental Analysis by Ion Chromatography: 996 mg/L

Trace Anion Impurities in the Actual Solution via IC Analysis:

Element	mg/L
F ⁻	<0.02
BrO ₃ ⁻	<0.02
NO ₂ ⁻	<0.05
NO ₃ ⁻	<0.05
PO ₄ ⁻³	<0.20
Cl ⁻	<1.50
SO ₄ ⁻²	<0.05

Balances are calibrated regularly with weight sets traceable to NIST#s 32856, 32867 and others.
This CRM is guaranteed stable and accurate to $\pm$ 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: MAY - - '03 Certifying Officer: N. Kocherakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 05/28/03
DATE EXPIRED: 05/30/2004
DATE OPENED: 05/28/03
INORG: 4106 PD: F50354

SPEXcertificate™

Certificate of Reference Material

010217

Catalog Number: AS-NO₃N9-2X/2Y Lot No.: 23-82AS
Description: 1000 mg/L of Nitrate-N
Matrix: H₂O

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 (NO₃⁻-N): 1002.5 mg/L ± 3 mg/L
Traceable to: NIST SRM 3185

The CRM is prepared gravimetrically using high purity Sodium Nitrate (NaNO₃) 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 (C₂₀H₁₇N₄.NO₃).

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

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 2/24/03
DATE EXPIRED: 2/15/04
DATE OPENED: 2/24/03
INORG: 3860 PO: F53061

SPC Xertificate™

Certificate of Reference Material

010218

Catalog Number: AS-PO₄9-2X/2Y Lot No.: 24-63AS
Description: 1000 mg/L of Phosphate
Matrix: H₂O

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 (PO₄³⁻): 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 (KH₂PO₄) 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 Mg₂P₂O₇.

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

11000-11110 LABS/RADIUM LABS
DATE RECEIVED: 12/17/02
DATE EXPIRED: 12/15/03
DATE OPENED: 12/17/02
THORGE: 3680
PO: F5244
DR

SPEXertificateTM

Certificate of Reference Material

010219

Catalog Number: AS-SO49-2X/2Y
Description: 1000 mg/L Sulfate
Matrix: H₂O

Lot No. 7-149VY

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: 997 mg/L

Uncertainty Associated with Measurement: +/- 3.0 mg/

Certified Value is Traceable to: NIST SRM 3181

The CRM is prepared gravimetrically using high purity Potassium Sulfate Lot# X34146. 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: 998 mg/L

Method: Precipitated using Barium Chloride, filtered, ignited and weighed as BaSO₄

Instrumentation Analysis By Ion Chromatography: 996 mg/L

Uncertified Properties:

Trace Ionic Impurities in the Actual Solution via IC Analysis:

Element	mg/L	Element	mg/L
Br	<0.01	NO ₃	<0.01
Cl	<0.01	PO ₄	<0.10
F	<0.005		
NO ₂	<0.01		

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

Date of Certification: MAY -- '03

Certifying Officer: N. Kocherlakota

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 05/28/03
DATE EXPIRED: 05/30/2004
DATE OPENED: 05/28/03
INORG: 4108 PO: F52054

SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 031205-4
SRR: 25287
SDG: 238656
CASE: CNWRA
VTSR: December 05, 2003
PROJECT#: 06002.01.071

Pipette Calibrations

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

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

John J. Smith
26-Nov-2003

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	1.0088	1.0069	1.0055	1.01	100.71
TMA1	1000	1.0043	1.0018	1.0023	1.00	100.28
TMA2	1000	1.0064	1.005	1.0048	1.01	100.54
TMA3	1000	OUT	OF	SERVICE		
TMA6	1000	1.0048	1.0062	1.0041	1.01	100.50
TMB1	900	0.9014	0.9018	0.9005	0.90	100.14
TMC1	800	0.7999	0.8004	0.8014	0.80	100.07
TMDD1	750	0.7543	0.7532	0.7538	0.75	100.50
TMD1	700	0.6974	0.6946	0.6936	0.70	99.31
TMD2	700	0.7059	0.7054	0.7058	0.71	100.81
TME1	600	0.5979	0.5961	0.5948	0.60	99.38
TMF2	500	0.5	0.4965	0.4969	0.50	99.56
TMF5	500	0.5039	0.5035	0.5022	0.50	100.64
ICF1	500	0.4974	0.4971	0.4954	0.50	99.33
L30-500	500	0.5038	0.5015	0.501	0.50	100.42
TMG3	400	0.3941	0.3949	0.3953	0.39	98.69
TMH1	300	OUT	OF	SERVICE		
TMH2	300	0.2974	0.2971	0.2959	0.30	98.93
TMJ1	250	0.2484	0.248	0.2481	0.25	99.27
TMJ2	250	0.2487	0.2484	0.2485	0.25	99.41
TMJ3	250	0.2501	0.2495	0.2491	0.25	99.83
TMK2	200	0.2007	0.2007	0.2006	0.20	100.33
TML1	150	0.1487	0.1488	0.1486	0.15	99.13
TMM1	120	0.1206	0.1206	0.1202	0.12	100.39
TMN3	100	0.1001	0.1	0.1	0.10	100.03
ICN1	100	0.1005	0.1005	0.1009	0.10	100.63
TMQ1	80	0.08	0.0797	0.0799	0.08	99.83
TMR1	70	OUT	OF	SERVICE		
TMS1	60	OUT	OF	SERVICE		
LAB-30A	50	0.0495	0.0497	0.0516	0.05	100.53
TMU1	40	0.0398	0.0398	0.0403	0.04	99.92
TMU2	40	0.0397	0.0396	0.0395	0.04	99.00
TMV1	30	0.0297	0.0296	0.0297	0.03	98.89
L30-20	20	0.0203	0.0203	0.0202	0.02	101.33
TMW1	25	0.0253	0.0249	0.025	0.03	100.27
TMY1	15	OUT	OF	SERVICE		

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

Balance #: 16

Thermometer #: G-011

diH2O Temperature (°C): 21

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)
Lab30	1000	1.0038	1.0069	1.0055
TMA1	1000	1.0043	1.0018	1.0023
TMA2	1000	1.0069	1.0050	1.0048
TMA3	1000	Out of Service w 11/4/03		
TMA6	1000	1.0048	1.0062	1.0041
TMB1	900	0.9014	0.9018	0.9005
TMC1	800	0.7999	0.8004	0.8014
TMDD1	750	0.7543	0.7532	0.7538
TMD1	700	0.6974	0.6946	0.6936
TMD2	700	0.7059	0.7054	0.7058
TME1	600	0.5979	0.5961	0.5948
TMF2	500	0.5000	0.4965	0.4969
TMF5	500	0.5039	0.5035	0.5022
ICF1	500	0.4974	0.4971	0.4984
L30-500	500	0.5038	0.5015	0.5010
TMG3	400	0.3941	0.3949	0.3953
TMH1	300	Out of Service 11/04/03 w		
TMH2	300	0.2974	0.2971	0.2959
TMJ1	250	0.2484	0.2480	0.2481
TMJ2	250	0.2487	0.2484	0.2485
TMJ3	250	0.2501	0.2495	0.2491
TMK2	200	0.2007	0.2007	0.2006
TML1	150	0.1487	0.1488	0.1486
TMM1	120	0.1206	0.1206	0.1202
TMN3	100	0.1001	0.1000	0.1000
ICN1	100	0.1005	0.1005	0.1009
TMQ1	80	0.0800	0.0797	0.0799
TMR1	70	Out of Service w 11/4/03		
TMS1	60			
LAB-30A	50	0.0495	0.0497	0.0516
TMU1	40	0.0398	0.0398	0.0403
TMU2	40	0.0397	0.0396	0.0395
TMV1	30	0.0297	0.0296	0.0297
L30-20	20	0.0203	0.0203	0.0202
TMW1	25	0.0253	0.0249	0.0250
TMY1	15	Out of Service w 11/4/03		

Analyst: [Signature]

Date: 26 Nov-2003

Reviewed by: [Signature]

Date: 12/19/03

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

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

010222

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
ADJ200-A	20				0.000	0.00
	100				0.000	0.00
	200				0.000	0.00
ADJ200-C	20				0.000	0.00
	100				0.000	0.00
	200				0.000	0.00
ADJ200-D	20				0.000	0.00
	100				0.000	0.00
	200				0.000	0.00
ADJ200-G	20	0.0204	0.0202	0.0204	0.020	101.67
	100	0.0980	0.0980	0.0982	0.098	98.07
	200	0.1968	0.1963	0.1964	0.197	98.25
ADJ200-H	20	0.0197	0.0202	0.0201	0.020	100.00
	100	0.0993	0.0992	0.0994	0.099	99.30
	200	0.1995	0.1990	0.1986	0.199	99.52
ADJ200-J	20	0.0199	0.0199	0.0198	0.020	99.33
	100	0.0998	0.0995	0.0994	0.100	99.57
	200	0.2003	0.2002	0.2002	0.200	100.12
ADJ200	20				0.000	0.00
	100				0.000	0.00
	200				0.000	0.00
ADJ200	20				0.000	0.00
	100				0.000	0.00
	200				0.000	0.00
ADJ200	20				0.000	0.00
	100				0.000	0.00
	200				0.000	0.00

FRM-247a (Rev 3/Oct 03)

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010223Balance #: 16Thermometer #: G011diH₂O Temperature (°C) 22

Eppendorf #	True Value (μL)	1 st Reading (g)	2 nd Reading (g)	3 rd Reading (g)
ADJ200-A	20			
	100			
	200			
ADJ200-C	20			
	100			
	200			
ADJ200-D	20			
	100			
	200			
ADJ200-G	20	0.0204	0.0202	0.0204
	100	0.0980	0.0980	0.0982
	200	0.1968	0.1963	0.1964
ADJ200-H	20	0.0197	0.0202	0.0201
	100	0.0993	0.0992	0.0994
	200	0.1995	0.1990	0.1986
ADJ200-J	20	0.0199	0.0199	0.0198
	100	0.0998	0.0995	0.0994
	200	0.2003	0.2002	0.2002
ADJ200	20			
	100			
	200			
ADJ200	20			
	100			
	200			

Analyst: Richard H. H. H.Reviewed by: Valerie H. H.Date: 12/5/03Date: 12/19/03

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

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

010224

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

Eppendorf #	True Value (μL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	20	0.0203	0.0204	0.0203	0.020	101.67
ADJ200-A	100	0.0992	0.0993	0.0994	0.099	99.30
	200	0.1997	0.1994	0.1991	0.199	99.70
	20	0.0202	0.0201	0.0201	0.020	100.67
ADJ200-C	100	0.0998	0.0996	0.0991	0.100	99.50
	200	0.1989	0.1993	0.1992	0.199	99.57
	20	0.0204	0.0203	0.0202	0.020	101.50
ADJ200-D	100	0.0993	0.0998	0.0996	0.100	99.57
	200	0.1988	0.1996	0.1998	0.199	99.70
	20					
ADJ200-G	100					
	200					
	20					
ADJ200-H	100					
	200					
	20					
ADJ200-J	100					
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					

FRM-247a (Rev 3/Oct 03)

FRM-244 (Rev 2/Sept 02)

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010225

Balance #: 34

Thermometer #: G-011

diH₂O Temperature (°C) 21

Eppendorf #	True Value (μL)	1 st Reading (g)	2 nd Reading (g)	3 rd Reading (g)
20 μL – 200 μL	20	.0203	.0204	.0203
	ADJ200-A	100	.0992	.0993
		200	.1997	.1994
	20	.0202	.0201	.0201
	ADJ200-C	100	.0998	.0996
		200	.1989	.1993
	20	.0204	.0203	.0202
	ADJ200-D	100	.0993	.0998
		200	.1988	.1996
	20			
	ADJ200-G	100		
		200		
	20			
	ADJ200-H	100		
		200		
	20			
	ADJ200-J	100		
		200		
	20			
	ADJ200	100		
		200		
	20			
	ADJ200	100		
		200		

Analyst: John Wells
 Reviewed by: Michael Allen

Date: 12-5-03
 Date: 12/19/03

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

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

010226

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

Eppendorf #	True Value (μL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	100				0.000	0.00
ADJ1000-C	500				0.000	0.00
	1000				0.000	0.00
	100				0.000	0.00
ADJ1000-D	500				0.000	0.00
	1000				0.000	0.00
	100				0.000	0.00
ADJ1000-E	500				0.000	0.00
	1000				0.000	0.00
	100				0.000	0.00
ADJ1000-F	500				0.000	0.00
	1000				0.000	0.00
	100	0.1010	0.1013	0.1009	0.101	101.07
ADJ1000-G	500	0.4967	0.4959	0.4963	0.496	99.26
	1000	0.9972	0.9940	0.9927	0.995	99.46
	100	0.0999	0.1001	0.1001	0.100	100.03
ADJ1000-H	500	0.4943	0.4945	0.4948	0.495	98.91
	1000	0.9897	0.9904	0.9899	0.990	99.00
	100	0.1013	0.1002	0.1015	0.101	101.00
ADJ1000-J	500	0.4967	0.4965	0.4960	0.496	99.28
	1000	0.9938	0.9972	0.9954	0.995	99.55
	100				0.000	0.00
ADJ1000	500				0.000	0.00
	1000				0.000	0.00
	100				0.000	0.00
ADJ1000	500				0.000	0.00
	1000				0.000	0.00

FRM-247b (Rev 2/Oct 03)

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 10227Balance #: 16Thermometer #: G011diH2O Temperature (° C) 22

Eppendorf #	True Value (μL)	1 st Reading (g)	2 nd Reading (g)	3 rd Reading (g)
ADJ1000-C	100			
	500			
	1000			
ADJ1000-D	100			
	500			
	1000			
ADJ1000-E	100			
	500			
	1000			
ADJ1000-F	100			
	500			
	1000			
ADJ1000-G	100	0.1010	0.1013	0.1009
	500	0.4967	0.4959	0.4963
	1000	0.9972	0.9940	0.9927
ADJ1000-H	100	0.0999	0.1001	0.1001
	500	0.4943	0.4945	0.4948
	1000	0.9897	0.9904	0.9899
ADJ1000-J	100	0.1013	0.1002	0.1015
	500	0.4967	0.4965	0.4960
	1000	0.9938	0.9972	0.9954
ADJ1000	100			
	500			
	1000			
ADJ1000	100			
	500			
	1000			

Analyst: Richard H. H. H.Reviewed by: Walter H. H. H.Date: 12/5/03Date: 12/19/03

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

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

010228

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

Eppendorf #	True Value (μL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	100	0.1018	0.0996	0.1004	0.101	100.60
ADJ1000-C	500	0.4964	0.4972	0.4969	0.497	99.37
	1000	0.9949	0.9938	0.9952	0.995	99.46
	100	0.0999	0.0977	0.0989	0.099	98.83
ADJ1000-D	500	0.4936	0.4948	0.4944	0.494	98.85
	1000	0.9998	0.9950	0.9963	0.997	99.70
	100	0.1001	0.1008	0.1014	0.101	100.77
ADJ1000-E	500	0.4999	0.4998	0.4996	0.500	99.95
	1000	1.0065	0.9967	1.0010	1.001	100.14
	100	0.1011	0.1009	0.1003	0.101	100.77
ADJ1000-F	500	0.4956	0.4987	0.4991	0.498	99.56
	1000	0.9988	0.9985	0.9990	0.999	99.88
	100					
ADJ1000-G	500					
	1000					
	100					
ADJ1000-H	500					
	1000					
	100					
ADJ1000-J	500					
	1000					
	100					
ADJ1000	500					
	1000					
	100					
ADJ1000	500					
	1000					

FRM-247b (Rev 2/Oct 03)

Book/page: 04 088

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010229

Balance #: 34

Thermometer #: G011

diH2O Temperature (°C) 21

Eppendorf #	True Value (µL)	1 st Reading (g)	2 nd Reading (g)	3 rd Reading (g)
	100	.1018	.0996	.1004
ADJ1000-C	500	.4964	.4972	.4969
	1000	.9949	.9938	.9952
	100	.0999	.0977	.0989
ADJ1000-D	500	.4936	.4948	.4944
	1000	.9998	.9950	.9963
	100	.1001	.1008	.1014
ADJ1000-E	500	.4999	.4998	.4996
	1000	1.0065	.9967	1.0010
	100	.1011	.1009	.1003
ADJ1000-F	500	.4956	.4987	.4991
	1000	.9988	.9985	.9990
	100			
ADJ1000-G	500			
	1000			
	100			
ADJ1000-H	500			
	1000			
	100			
ADJ1000-J	500			
	1000			
	100			
ADJ1000	500			
	1000			
	100			
ADJ1000	500			
	1000			

Analyst: John Wills

Date: 12-5-03

Reviewed by: W. Wagner

Date: 12/19/03

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

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

010230

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

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
ADJ5000-C	500				0.000	0.00
	2500				0.000	0.00
	5000				0.000	0.00
ADJ5000-G	500				0.000	0.00
	2500				0.000	0.00
	5000				0.000	0.00
ADJ5000-H	500				0.000	0.00
	2500				0.000	0.00
	5000				0.000	0.00
ADJ5000-I	500				0.000	0.00
	2500				0.000	0.00
	5000				0.000	0.00
ADJ5000-J	500	0.4970	0.4903	0.4937	0.494	98.73
	2500	2.4916	2.4852	2.4833	2.487	99.47
	5000	5.0190	4.9900	5.0007	5.003	100.06
ADJ5000-K	500	0.5056	0.5045	0.5053	0.505	101.03
	2500	2.4970	2.4962	2.4958	2.496	99.85
	5000	5.0170	5.0169	5.0160	5.017	100.33
ADJ5000-L	500	0.4910	0.4967	0.4943	0.494	98.80
	2500	2.4878	2.4905	2.4859	2.488	99.52
	5000	4.9905	4.9772	4.9803	4.983	99.65
ADJ5000	500				0.000	0.00
	2500				0.000	0.00
	5000				0.000	0.00
ADJ5000	500				0.000	0.00
	2500				0.000	0.00
	5000				0.000	0.00
ADJ5000	500				0.000	0.00
	2500				0.000	0.00
	5000				0.000	0.00
ADJ5000	500				0.000	0.00
	2500				0.000	0.00
	5000				0.000	0.00

FRM-247c (Rev 2/Mar 03)

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 10231Balance #: 16Thermometer #: G011diH₂O Temperature (°C) 22

Eppendorf #	True Value (μL)	1 st Reading (g)	2 nd Reading (g)	3 rd Reading (g)
ADJ5000-C	500			
	2500			
	5000			
ADJ5000-G	500			
	2500			
	5000			
ADJ5000-H	500			
	2500			
	5000			
ADJ5000-I	500			
	2500			
	5000			
ADJ5000-J	500	0.4970	0.4903	0.4937
	2500	2.4916	2.4852	2.4833
	5000	5.0190	4.9900	5.0007
ADJ5000-K	500	0.5056	0.5045	0.5053
	2500	2.4970	2.4962	2.4958
	5000	5.0170	5.0169	5.0160
ADJ5000-L	500	0.4910	0.4967	0.4943
	2500	2.4878	2.4905	2.4859
	5000	4.9905	4.9772	4.9803
ADJ5000	500			
	2500			
	5000			
ADJ5000	500			
	2500			
	5000			
ADJ5000	500			
	2500			
	5000			
ADJ5000	500			
	2500			
	5000			

Analyst: Richard SmithReviewed by: Nate JonesDate: 12/5/03Date: 12/19/03

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

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

010232

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	0.4984	0.4953	0.4942	0.496	99.19
ADJ5000-C	2500	2.5323	2.5320	2.5228	2.529	101.16
	5000	5.0383	5.0329	5.0222	5.031	100.62
	500					
ADJ5000-G	2500	OUT	OFE	SERVICE		
	5000					
	500					
ADJ5000-H	2500	OUT	OFE	SERVICE		
	5000					
	500	0.5093	0.5082	0.5078	0.508	101.69
ADJ5000-I	2500	2.4925	2.4956	2.4967	2.495	99.80
	5000	5.0167	4.9903	5.0080	5.005	100.10
	500					
ADJ5000-J	2500					
	5000					
	500					
ADJ5000-K	2500					
	5000					
	500					
ADJ5000-L	2500					
	5000					
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					

FRM-247c (Rev 2/Mar 03)

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010233Balance #: 34Thermometer #: G011diH₂O Temperature (°C) 21

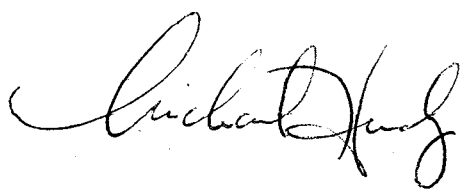
Eppendorf #	True Value (μL)	1 st Reading (g)	2 nd Reading (g)	3 rd Reading (g)
	500	.4984	.4953	.4942
ADJ5000-C	2500	2.5323	2.5320	2.5228
	5000	5.0383	5.0329	5.0222
	500			
ADJ5000-G	2500	out	OF	service
	5000			
	500			
ADJ5000-H	2500	out	OF	service
	5000			
	500	.5093	.5082	.5078
ADJ5000-I	2500	3.4925	3.4956	2.4967
	5000	5.0167	4.9903	5.0080
	500			
ADJ5000-J	2500			
	5000			
	500			
ADJ5000-K	2500			
	5000			
	500			
ADJ5000-L	2500			
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			

* Out of service 12-4-03, set screw is jamming (hang) to where you cannot set it past 4.58 mL. Jee

Analyst: John WilksDate: 12-5-03Reviewed by: Nate AllenDate: 12/19/03

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

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



12/22/03

010234

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
ADJ200-A	20				0.000	0.00
	100				0.000	0.00
	200				0.000	0.00
ADJ200-C	20				0.000	0.00
	100				0.000	0.00
	200				0.000	0.00
ADJ200-D	20				0.000	0.00
	100				0.000	0.00
	200				0.000	0.00
ADJ200-G	20	0.0202	0.0204	0.0203	0.020	101.50
	100	0.0990	0.0999	0.0988	0.099	99.23
	200	0.1980	0.1974	0.1986	0.198	99.00
ADJ200-H	20	0.0199	0.0206	0.0203	0.020	101.33
	100	0.0996	0.0991	0.0999	0.100	99.53
	200	0.1993	0.1999	0.1984	0.199	99.60
ADJ200-J	20	0.0200	0.0202	0.0199	0.020	100.17
	100	0.0985	0.0991	0.0990	0.099	98.87
	200	0.2012	0.1998	0.2009	0.201	100.32
ADJ200	20				0.000	0.00
	100				0.000	0.00
	200				0.000	0.00
ADJ200	20				0.000	0.00
	100				0.000	0.00
	200				0.000	0.00
ADJ200	20				0.000	0.00
	100				0.000	0.00
	200				0.000	0.00

FRM-247a (Rev 3/Oct 03)

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 10235

Balance #: 34

Thermometer #: G011

diH₂O Temperature (° C) 21

Eppendorf #	True Value (μL)	1 st Reading (g)	2 nd Reading (g)	3 rd Reading (g)
20 μL – 200 μL	20			
	ADJ200-A	100		
		200		
	20			
	ADJ200-C	100		
		200		
	20			
	ADJ200-D	100		
		200		
	20	0.0202	0.0204	0.0203
	ADJ200-G*	100	0.0990	0.0999
		200	0.1980	0.1974
	20	0.0199	0.0206	0.0203
	ADJ200-H	100	0.0996	0.0991
		200	0.1993	0.1999
	20	0.0200	0.0202	0.0199
	ADJ200-J	100	0.0985	0.0991
		200	0.2012	0.1998
	20			
	ADJ200	100		
		200		
	20			
	ADJ200	100		
		200		

* required adjustment

Analyst: Richard H. H.

Reviewed by: Aspr...

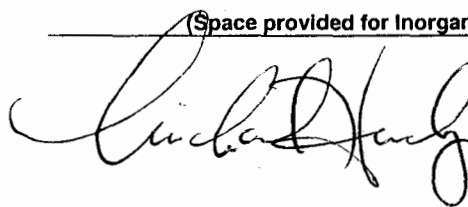
Date: 12/22/03

Date: 12/26/03

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

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

010236

 12/22/03**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
ADJ1000-C	100				0.000	0.00
	500				0.000	0.00
	1000				0.000	0.00
ADJ1000-D	100				0.000	0.00
	500				0.000	0.00
	1000				0.000	0.00
ADJ1000-E	100				0.000	0.00
	500				0.000	0.00
	1000				0.000	0.00
ADJ1000-F	100				0.000	0.00
	500				0.000	0.00
	1000				0.000	0.00
ADJ1000-G	100	0.1023	0.1016	0.1019	0.102	101.93
	500	0.4959	0.4936	0.4947	0.495	98.95
	1000	1.0011	1.0037	1.0024	1.002	100.24
ADJ1000-H	100	0.1008	0.0997	0.1010	0.101	100.50
	500	0.4981	0.4936	0.4954	0.496	99.14
	1000	0.9999	1.0007	1.0004	1.000	100.03
ADJ1000-J	100	0.1014	0.1018	0.1015	0.102	101.57
	500	0.4952	0.4936	0.4973	0.495	99.07
	1000	0.9889	0.9881	0.9870	0.988	98.80
ADJ1000	100				0.000	0.00
	500				0.000	0.00
	1000				0.000	0.00
ADJ1000	100				0.000	0.00
	500				0.000	0.00
	1000				0.000	0.00

FRM-247b (Rev 2/Oct 03)

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

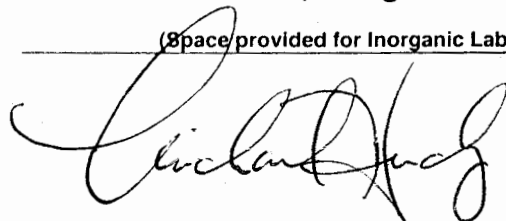
Balance #: 34Thermometer #: G011diH2O Temperature (° C) 21.0237

Eppendorf #	True Value (µL)	1 st Reading (g)	2 nd Reading (g)	3 rd Reading (g)
ADJ1000-C	100	ca/ 12/22/03		
	500			
	1000			
ADJ1000-D	100			
	500			
	1000			
ADJ1000-E	100			
	500			
	1000			
ADJ1000-F	100			
	500			
	1000			
ADJ1000-G	100	0.1023	0.1016	0.1019
	500	0.4959	0.4936	0.4947
	1000	1.0011	1.0037	1.0024
ADJ1000-H	100	0.1008	0.0997	0.1010
	500	0.4981	0.4936	0.4954
	1000	0.9999	1.0007	1.0004
ADJ1000-J	100	0.1014	0.1018	0.1015
	500	0.4952	0.4936	0.4973
	1000	0.9889	0.9881	0.9870
ADJ1000	100	ca/ 12/22/03		
	500			
	1000			
ADJ1000	100			
	500			
	1000			

Analyst: [Signature]Date: 12/22/03Reviewed by: [Signature]Date: 12/26/03

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

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



12/22/03

010238

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

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	500				0.000	0.00
ADJ5000-C	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000-G	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000-H	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000-I	2500				0.000	0.00
	5000				0.000	0.00
	500	0.4953	0.4977	0.4961	0.496	99.27
ADJ5000-J	2500	2.4897	2.4831	2.4874	2.487	99.47
	5000	5.0083	5.0036	5.0093	5.007	100.14
	500	0.5090	0.5087	0.5076	0.508	101.69
ADJ5000-K	2500	2.5182	2.5033	2.5216	2.514	100.57
	5000	5.0336	5.0153	5.0235	5.024	100.48
	500	0.4974	0.4951	0.4963	0.496	99.25
ADJ5000-L	2500	2.4971	2.4982	2.4959	2.497	99.88
	5000	5.0251	5.0147	5.0159	5.019	100.37
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00

FRM-247c (Rev 2/Mar 03)

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010239Balance #: 34Thermometer #: G011diH2O Temperature (°C) 21

Eppendorf #	True Value (μL)	1 st Reading (g)	2 nd Reading (g)	3 rd Reading (g)
ADJ5000-C	500			
	2500			
	5000			
ADJ5000-G	500			
	2500			
	5000			
ADJ5000-H	500			
	2500			
	5000			
ADJ5000-I	500			
	2500			
	5000			
ADJ5000-J	500	0.4953	0.4977	0.4961
	2500	2.4897	2.4831	2.4874
	5000	5.0083	5.0036	5.0093
ADJ5000-K	500	0.5090	0.5087	0.5076
	2500	2.5182	2.5033	2.5216
	5000	5.0336	5.0153	5.0235
ADJ5000-L	500	0.4974	0.4951	0.4963
	2500	2.4971	2.4982	2.4959
	5000	5.0251	5.0147	5.0159
ADJ5000	500			
	2500			
	5000			
ADJ5000	500			
	2500			
	5000			
ADJ5000	500			
	2500			
	5000			
ADJ5000	500			
	2500			
	5000			

Analyst: L. D. H. H. H.Reviewed by: R. S. H. H. H.Date: 12/22/03Date: 12/26/03

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

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

Richard J. Fandy 12/30/03

010240

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

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	20				0.000	0.00
ADJ200-A	100				0.000	0.00
	200				0.000	0.00
	20				0.000	0.00
ADJ200-C	100				0.000	0.00
	200				0.000	0.00
	20				0.000	0.00
ADJ200-D	100				0.000	0.00
	200				0.000	0.00
	20	0.0199	0.0202	0.0201	0.020	100.33
ADJ200-G	100	0.0996	0.0998	0.1000	0.100	99.80
	200	0.1992	0.1989	0.1997	0.199	99.63
	20	0.0203	0.0204	0.0201	0.020	101.33
ADJ200-H	100	0.0993	0.0997	0.0989	0.099	99.30
	200	0.1998	0.1983	0.1985	0.199	99.43
	20	0.0201	0.0202	0.0201	0.020	100.67
ADJ200-J	100	0.0998	0.1001	0.0997	0.100	99.87
	200	0.2007	0.2005	0.2010	0.201	100.37
	20				0.000	0.00
ADJ200	100				0.000	0.00
	200				0.000	0.00
	20				0.000	0.00
ADJ200	100				0.000	0.00
	200				0.000	0.00
	20				0.000	0.00
ADJ200	100				0.000	0.00
	200				0.000	0.00

FRM-247a (Rev 3/Oct 03)

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 34

Thermometer #: G011

diH2O Temperature (° C) 21.0241

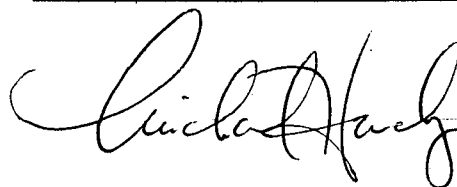
Eppendorf #	True Value (µL)	1 st Reading (g)	2 nd Reading (g)	3 rd Reading (g)
20 µL – 200 µL	✓ 20			
	ADJ200-A	100		
		200		
		20		
	ADJ200-C	100		
		200		
		20		
	ADJ200-D	100		
		200		
		20		
	ADJ200-G	100		
		200		
		20		
	ADJ200-H	100		
		200		
		20		
	ADJ200-J	100		
		200		
		20		
	ADJ200	100		
		200		
		20		
	ADJ200	100		
		200		

Analyst: Richard Hudg
 Reviewed by: Amr

Date: 12/30/03
 Date: 12/31/03

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

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


 12/30/03

010242

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

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	100				0.000	0.00
ADJ1000-C	500				0.000	0.00
	1000				0.000	0.00
	100				0.000	0.00
ADJ1000-D	500				0.000	0.00
	1000				0.000	0.00
	100				0.000	0.00
ADJ1000-E	500				0.000	0.00
	1000				0.000	0.00
	100				0.000	0.00
ADJ1000-F	500				0.000	0.00
	1000				0.000	0.00
	100	0.1008	0.1004	0.1003	0.101	100.50
ADJ1000-G	500	0.4978	0.4992	0.4981	0.498	99.67
	1000	0.9962	0.9989	0.9983	0.998	99.78
	100	0.1014	0.1017	0.1010	0.101	101.37
ADJ1000-H	500	0.4967	0.4951	0.4972	0.496	99.27
	1000	0.9942	0.9961	0.9960	0.995	99.54
	100	0.1013	0.1005	0.1021	0.101	101.30
ADJ1000-J	500	0.4993	0.4996	0.4989	0.499	99.85
	1000	0.9990	0.9989	1.0010	1.000	99.96
	100				0.000	0.00
ADJ1000	500				0.000	0.00
	1000				0.000	0.00
	100				0.000	0.00
ADJ1000	500				0.000	0.00
	1000				0.000	0.00

FRM-247b (Rev 2/Oct 03)

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 34

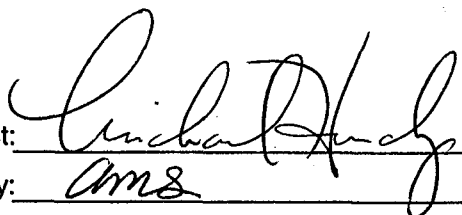
Thermometer #: G111

diH₂O Temperature (°C) 21

Eppendorf #	True Value (μL)	1 st Reading (g)	2 nd Reading (g)	3 rd Reading (g)
100 μL – 1000 μL	100			
	ADJ1000-C	500		
	1000			
	100			
	ADJ1000-D	500		
	1000			
	100			
	ADJ1000-E	500		
	1000			
	100			
	ADJ1000-F	500		
	1000			
	100	0.1008	0.1004	0.1003
	ADJ1000-G*	500	0.4978	0.4981
	1000	0.9962	0.9989	0.9983
	100	0.1014	0.1017	0.1010
	ADJ1000-H*	500	0.4961	0.4972
	1000	0.9942	0.9961	0.9960
	100	0.1013	0.1005	0.1021
	ADJ1000-J	500	0.4993	0.4996
	1000	0.9990	0.9989	1.0010
	100			
	ADJ1000	500		
	1000			
	100			
	ADJ1000	500		
	1000			

* required adjustment

Analyst:



Date:

12/31/03

Reviewed by:

ams

Date:

12/31/03

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

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

Richard H. H. 12/30/03

010244

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

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	500				0.000	0.00
ADJ5000-C	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000-G	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000-H	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000-I	2500				0.000	0.00
	5000				0.000	0.00
	500	0.5009	0.5006	0.5015	0.501	100.20
ADJ5000-J	2500	2.5050	2.5037	2.5044	2.504	100.17
	5000	5.0151	5.0167	5.0136	5.015	100.30
	500	0.5010	0.5027	0.5018	0.502	100.37
ADJ5000-K	2500	2.5062	2.5120	2.5111	2.510	100.39
	5000	5.0215	5.0300	5.0229	5.025	100.50
	500	0.4958	0.4967	0.4944	0.496	99.13
ADJ5000-L	2500	2.4937	2.4850	2.4892	2.489	99.57
	5000	4.9988	5.0002	4.9979	4.999	99.98
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00

FRM-247c (Rev 2/Mar 03)

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 34Thermometer #: G011diH₂O Temperature (°C) 010245

Eppendorf #	True Value (μL)	1 st Reading (g)	2 nd Reading (g)	3 rd Reading (g)
ADJ5000-C	500			
	2500			
	5000			
ADJ5000-G	500			
	2500			
	5000			
ADJ5000-H	500			
	2500			
	5000			
ADJ5000-I	500			
	2500			
	5000			
ADJ5000-J *	500	0.5009	0.5006	0.5015
	2500	2.5050	2.5037	2.5044
	5000	5.0151	5.0167	5.0136
ADJ5000-K	500	0.5010	0.5027	0.5018
	2500	2.5062	2.5120	2.5111
	5000	5.0215	5.0300	5.0229
ADJ5000-L	500	0.4958	0.4967	0.4944
	2500	2.4937	2.4850	2.4892
	5000	4.9988	5.0002	4.9979
ADJ5000	500			
	2500			
	5000			
ADJ5000	500			
	2500			
	5000			
ADJ5000	500			
	2500			
	5000			

* required adjustment

Analyst: [Signature]Date: 12/30/03Reviewed by: [Signature]Date: 12/31/03

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

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

010246

Am2 10/24/03

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				0.000	0.00
ADJ200-A	100				0.000	0.00
	200				0.000	0.00
	20				0.000	0.00
ADJ200-C	100				0.000	0.00
	200				0.000	0.00
	20				0.000	0.00
ADJ200-D	100				0.000	0.00
	200				0.000	0.00
	20	0.0200	0.0198	0.0198	0.020	99.33
ADJ200-G	100	0.0980	0.0981	0.0980	0.098	98.03
	200	0.1962	0.1963	0.1959	0.196	98.07
	20	0.0203	0.0201	0.0201	0.020	100.83
ADJ200-H	100	0.0983	0.0982	0.0980	0.098	98.17
	200	0.1972	0.1968	0.1967	0.197	98.45
	20	0.0198	0.0199	0.0200	0.020	99.50
ADJ200-J	100	0.0984	0.0984	0.0984	0.098	98.40
	200	0.1986	0.1985	0.1984	0.199	99.25
	20				0.000	0.00
ADJ200	100				0.000	0.00
	200				0.000	0.00
	20				0.000	0.00
ADJ200	100				0.000	0.00
	200				0.000	0.00
	20				0.000	0.00
ADJ200	100				0.000	0.00
	200				0.000	0.00

FRM-247a (Rev 3/Oct 03)

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 34

Thermometer #: G011

diH2O Temperature (° C) 21

010247

20 μ L – 200 μ L	Eppendorf #	True Value (μ L)	1 st Reading (g)	2 nd Reading (g)	3 rd Reading (g)
		20			
	ADJ200-A	100			
		200			
		20			
	ADJ200-C	100			
		200			
		20			
	ADJ200-D	100			
		200			
		20	0.0200	0.0198	0.0198
	ADJ200-G	100	0.0980	0.0981	0.0980
		200	0.1962	0.1963	0.1959
		20	0.0203	0.0201	0.0201
	ADJ200-H	100	0.0983	0.0982	0.0980
		200	0.1972	0.1968	0.1967
		20	0.0198	0.0199	0.0200
	ADJ200-J	100	0.0984	0.0984	0.0984
		200	0.1986	0.1985	0.1984
		20			
	ADJ200	100			
		200			
		20			
	ADJ200	100			
		200			

Analyst: [Signature]

Reviewed by: [Signature]

Date: 10/24/03

Date: 11/18/03

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

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

JMS 10/24/03

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				0.000	0.00
ADJ1000-C	500				0.000	0.00
	1000				0.000	0.00
	100				0.000	0.00
ADJ1000-D	500				0.000	0.00
	1000				0.000	0.00
	100				0.000	0.00
ADJ1000-E	500				0.000	0.00
	1000				0.000	0.00
	100				0.000	0.00
ADJ1000-F	500				0.000	0.00
	1000				0.000	0.00
	100	0.1018	0.1013	0.1020	0.102	101.70
ADJ1000-G	500	0.4912	0.4930	0.4943	0.493	98.57
	1000	0.9808	0.9894	0.9863	0.986	98.55
	100	0.1012	0.0999	0.1000	0.100	100.37
ADJ1000-H	500	0.4936	0.4923	0.4916	0.493	98.50
	1000	0.9801	0.9810	0.9824	0.981	98.12
	100	0.1010	0.1008	0.1009	0.101	100.90
ADJ1000-J	500	0.4961	0.4951	0.4949	0.495	99.07
	1000	0.9980	0.9955	0.9928	0.995	99.54
	100				0.000	0.00
ADJ1000	500				0.000	0.00
	1000				0.000	0.00
	100				0.000	0.00
ADJ1000	500				0.000	0.00
	1000				0.000	0.00

FRM-247b (Rev 2/Oct 03)

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 34

Thermometer #: G011

diH2O Temperature (°C) 21.0249

Eppendorf #	True Value (μL)	1 st Reading (g)	2 nd Reading (g)	3 rd Reading (g)
100 μL – 1000 μL	100			
	ADJ1000-C	500		
		1000		
		100		
	ADJ1000-D	500		
		1000		
		100		
	ADJ1000-E	500		
		1000		
		100		
	ADJ1000-F	500		
		1000		
	100	0.1018	0.1013	0.1020
	ADJ1000-G	500	0.4912	0.4930
		1000	0.9808	0.9894
		100	0.1012	0.0999
	ADJ1000-H	500	0.4936	0.4923
		1000	0.9801	0.9810
		100	0.1010	0.1008
	ADJ1000-J	500	0.4961	0.4951
		1000	0.9980	0.9955
		100		
	ADJ1000	500		
		1000		
		100		
	ADJ1000	500		
		1000		

Analyst: AMS

Reviewed by: Michael Henry

Date: 10/24/03

Date: 11/18/03

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

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

MCS 10/24/03
010250

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

Eppendorf #	True Value (µL)	1st Reading (g)	2nd Reading (g)	3rd Reading (g)	Avg Wt (g)	% of True Value
	500				0.000	0.00
ADJ5000-C	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000-G	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000-H	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000-I	2500				0.000	0.00
	5000				0.000	0.00
	500	0.4940	0.4956	0.4959	0.495	99.03
ADJ5000-J	2500	2.4860	2.4823	2.4829	2.484	99.35
	5000	4.9711	4.9533	4.9641	4.963	99.26
	500	0.5086	0.5091	0.5062	0.508	101.59
ADJ5000-K	2500	2.4983	2.5007	2.4946	2.498	99.91
	5000	5.0851	5.0357	5.0136	5.045	100.90
	500	0.5041	0.5036	0.5030	0.504	100.71
ADJ5000-L	2500	2.4946	2.4902	2.4842	2.490	99.59
	5000	4.9820	4.9910	4.9660	4.980	99.59
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00
	500				0.000	0.00
ADJ5000	2500				0.000	0.00
	5000				0.000	0.00

FRM-247c (Rev 2/Mar 03)

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 34

Thermometer #: 6011

diH2O Temperature (°C) 21

Eppendorf #	True Value (μL)	1 st Reading (g)	2 nd Reading (g)	3 rd Reading (g)
500 μL – 5000 μL	500			
	ADJ5000-C	2500		
		5000		
	500			
	ADJ5000-G	2500		
		5000		
	500			
	ADJ5000-H	2500		
		5000		
	500			
	ADJ5000-I	2500		
		5000		
	500	0.4940	0.4956	0.4959
	ADJ5000-J	2500	2.4860	2.4823
		5000	4.9711	4.9533
	500	0.5086	0.5091	0.5062
	ADJ5000-K	2500	2.4983	2.5007
		5000	5.0251	5.0357
	500	0.5041	0.5036	0.5030
	ADJ5000-L	2500	2.4946	2.4902
		5000	4.9820	4.9910
	500			
	ADJ5000	2500		
		5000		
	500			
	ADJ5000	2500		
		5000		
	500			
	ADJ5000	2500		
		5000		

Analyst: *Ames*

Date: 10/24/03

Reviewed by: *Michael*

Date: 11/18/03

010252

Book/page:

04 002

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log

Balance #: 34Thermometer #: G-011diH₂O Temperature (°C) 21

Eppendorf #	True Value (μL)	1 st Reading (g)	2 nd Reading (g)	3 rd Reading (g)
20 μL – 200 μL	20	.0201	.0202	.0201
	ADJ200-A	.0989	.0991	.0988
	200	.1982	.1995	.1987
20 μL – 200 μL	20	.0200	.0203	.0204
	ADJ200-C	.0986	.0992	.0990
	200	.1990	.1997	.1991
20 μL – 200 μL	20	.0204	.0204	.0201
	ADJ200-D	.0990	.0993	.0989
	200	.1988	.1991	.1992
20 μL – 200 μL	20	.0200	.0199	.0200
	ADJ200-G	.0980	.0986	.0991
	200	.1989	.1988	.1989
20 μL – 200 μL	20	.0202	.0202	.0203
	ADJ200-H	.0998	.0997	.0993
	200	.2015	.2012	.2002
20 μL – 200 μL	20	.0203	.0200	.0203
	ADJ200-J	.0990	.0995	.0996
	200	.2010	.2002	.1998
20 μL – 200 μL	20			
	ADJ200			
	200			
20 μL – 200 μL	20			
	ADJ200			
	200			

Analyst:

John WillsDate: 10-2-03

Reviewed by:

Laura WrightDate: 10/2/03

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

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

010253

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	0.0202	0.0201	0.020	100.67
ADJ200-A	100	0.0989	0.0991	0.0988	0.099	98.93
	200	0.1982	0.1995	0.1987	0.199	99.40
	20	0.0200	0.0203	0.0204	0.020	101.17
ADJ200-C	100	0.0986	0.0992	0.0990	0.099	98.93
	200	0.1990	0.1997	0.1991	0.199	99.63
	20	0.0204	0.0204	0.0201	0.020	101.50
ADJ200-D	100	0.0990	0.0993	0.0989	0.099	99.06
	200	0.1988	0.1991	0.1992	0.199	99.52
	20	0.0200	0.0199	0.0200	0.020	99.83
ADJ200-G	100	0.0980	0.0986	0.0991	0.099	98.57
	200	0.1989	0.1988	0.1989	0.199	99.43
	20	0.0202	0.0202	0.0203	0.020	101.17
ADJ200-H	100	0.0998	0.0997	0.0993	0.100	99.60
	200	0.2015	0.2012	0.2002	0.201	100.48
	20	0.0203	0.0200	0.0203	0.020	101.00
ADJ200-J	100	0.0990	0.0995	0.0996	0.099	99.37
	200	0.2010	0.2002	0.1998	0.200	100.17
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					
	20					
ADJ200	100					
	200					

FRM-247a (Rev 3/Oct 03)

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 10254Balance #: 34Thermometer #: G011diH2O Temperature (°C) 21

Eppendorf #	True Value (µL)	1 st Reading (g)	2 nd Reading (g)	3 rd Reading (g)
	100	.1006	.0995	.0997
ADJ1000-C	500	.4934	.4938	.4927
	1000	.9933	.9958	.9923
	100	.1010	.1009	.1011
ADJ1000-D	500	.4932	.4946	.4941
	1000	.9931	.9973	.9934
	100	.0991	.0993	.0984
ADJ1000-E	500	.4986	.4921	.4976
	1000	.9958	.9955	.9969
	100	.1002	.1017	.0999
ADJ1000-F	500	.4957	.4977	.4964
	1000	.9952	.9987	.9972
	100	.0998	.0997	.0981
ADJ1000-G	500	.4927	.4996	.4929
	1000	1.0049	.9948	.9956
	100	.1006	.0998	.1001
ADJ1000-H	500	.4954	.4945	.4920
	1000	.9914	.9927	.9933
	100	.1018	.1001	.1016
ADJ1000-J	500	.4964	.4967	.4974
	1000	1.0018	.9961	.9952
	100			
ADJ1000	500			
	1000			
	100			
ADJ1000	500			
	1000			

Analyst: John W. [Signature]Date: 10-2-03Reviewed by: Deanna WrightDate: 10/2/03

SwRI - Div. 01, Inorganic Labs' Adjustable Volume Pipette Verification Log 010255

(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	0.1006	0.0995	0.0997	0.100	99.93
ADJ1000-C	500	0.4934	0.4938	0.4927	0.493	98.66
	1000	0.9933	0.9958	0.9923	0.994	99.38
	100	0.1010	0.1009	0.1011	0.101	101.00
ADJ1000-D	500	0.4932	0.4946	0.4941	0.494	98.79
	1000	0.9931	0.9973	0.9934	0.995	99.46
	100	0.0991	0.0993	0.0984	0.099	98.93
ADJ1000-E	500	0.4986	0.4921	0.4976	0.496	99.22
	1000	0.9958	0.9955	0.9969	0.996	99.61
	100	0.1002	0.1017	0.0999	0.101	100.60
ADJ1000-F	500	0.4957	0.4977	0.4964	0.497	99.32
	1000	0.9952	0.9987	0.9972	0.997	99.70
	100	0.0998	0.0997	0.0981	0.099	99.20
ADJ1000-G	500	0.4927	0.4996	0.4929	0.495	99.01
	1000	1.0049	0.9948	0.9956	0.998	99.84
	100	0.1006	0.0998	0.1001	0.100	100.17
ADJ1000-H	500	0.4954	0.4945	0.4920	0.494	98.79
	1000	0.9914	0.9927	0.9933	0.992	99.25
	100	0.1018	0.1001	0.1016	0.102	101.60
ADJ1000-J	500	0.4964	0.4967	0.4974	0.497	99.37
	1000	1.0018	0.9961	0.9952	0.998	99.77
	100					
ADJ1000	500					
	1000					
	100					
ADJ1000	500					
	1000					

FRM-247b (Rev 2/Oct 03)

SwRI Div. 01 – Inorganic Laboratory Adjustable Pipette Verification Log 010256Balance #: 34Thermometer #: G011diH2O Temperature (°C) 21

Eppendorf #	True Value (µL)	1 st Reading (g)	2 nd Reading (g)	3 rd Reading (g)
	500	.5022	.5084	.5093
ADJ5000-C	2500	2.5084	2.4944	2.5060
	5000	5.0171	5.0053	5.0024
	500	.5062	.5078	.5032
ADJ5000-G	2500	2.5049	2.5087	2.5025
	5000	5.0270	5.0220	5.0173
	500	.5017	.5082	.5052
ADJ5000-H	2500	2.4989	2.4980	2.4942
	5000	5.0258	5.0043	5.0103
	500	.4988	.4985	.4973
ADJ5000-I	2500	2.4954	2.4944	2.4949
	5000	5.0137	4.9989	5.0016
	500	.5007	.5011	.4985
ADJ5000-J	2500	2.4989	2.4991	2.4962
	5000	5.0447	5.0181	5.0080
	500	.5080	.5061	.5076
ADJ5000-K	2500	2.4992	2.4971	2.5022
	5000	5.0286	5.0071	5.0046
	500	.5064	.4970	.5040
ADJ5000-L	2500	2.4966	2.4994	2.4944
	5000	5.0075	4.9936	4.9940
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			
	500			
ADJ5000	2500			
	5000			

Analyst: John WillsDate: 10-2-03Reviewed by: Laura WrightDate: 10/2/03

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

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

010257

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	0.5022	0.5084	0.5093	0.507	101.33
ADJ5000-C	2500	2.5084	2.4944	2.5060	2.503	100.12
	5000	5.0171	5.0053	5.0024	5.008	100.17
	500	0.5062	0.5078	0.5032	0.506	101.15
ADJ5000-G	2500	2.5049	2.5087	2.5025	2.505	100.21
	5000	5.0270	5.0220	5.0173	5.022	100.44
	500	0.5017	0.5082	0.5052	0.505	101.01
ADJ5000-H	2500	2.4989	2.4980	2.4942	2.497	99.88
	5000	5.0258	5.0043	5.0103	5.013	100.27
	500	0.4988	0.4985	0.4973	0.498	99.64
ADJ5000-I	2500	2.4954	2.4944	2.4949	2.495	99.80
	5000	5.0137	4.9989	5.0016	5.005	100.00
	500	0.5007	0.5011	0.4985	0.500	100.02
ADJ5000-J	2500	2.4989	2.4991	2.4962	2.498	99.92
	5000	5.0447	5.0181	5.0080	5.024	100.47
	500	0.5080	0.5061	0.5076	0.507	101.45
ADJ5000-K	2500	2.4992	2.4971	2.5022	2.500	99.98
	5000	5.0286	5.0071	5.0046	5.013	100.27
	500	0.5064	0.4970	0.5040	0.502	100.49
ADJ5000-L	2500	2.4966	2.4994	2.4944	2.497	99.87
	5000	5.0075	4.9936	4.9940	4.998	99.97
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					
	500					
ADJ5000	2500					
	5000					

FRM-247c (Rev 2/Mar 03)

**SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT**

CLIENT: Division 20

TASK ORDER: 031205-4

SRR: 25287

SDG: 238656

CASE: CNWRA

VTSR: December 05, 2003

PROJECT#: 06002.01.071

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	
12-9-03	2.0000	2.0000	JW	SN: J5052675
12-10-03	2.0000	2.0001	JW	--
12-11-03	2.0000	1.9999	JW	--
12-12-03	2.0000	2.0000	JW	--
12/15/03	2.0000	2.0001	ma	"
12-16-03	2.0000	1.9999	JW	"
12-17-03	2.0000	1.9999	JW	"
12-18-03	2.0000	2.0000	JW	"
12-19-03	2.0000	2.0000	JW	"
12-22-03	2.0000	1.9999	JW	"

If balance is out of limits, clean the balance and re-calibrate using Class "S" weights.

If balance is still out of limits, place a "DO NOT USE" sign on it and call (x5896) for service.

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FRM-112 (Rev 1/Dec 99)

010258

Southwest Research Institute
Division 01
BALANCE VERIFICATION LOG

BALANCE #	LAB #:	SERIAL #:	TOLERANCE:	COMMENTS:
19	27	0068597	±0.05	
Date	Std Wt (g)	Recorded Wt (g)	Operator	
11-25-03	10.00	10.00	Jew	SN: 550624-5 11-25-03 SN: 5503 //
11-26-03	10.00	10.00	Jew	//
12-1-03	10.00	10.00	Jew	//
12-2-03	10.00	10.00	Jew	//
12-3-03	10.00	10.00	Jew	//
12-4-03	10.00	10.00	Jew	//
12-5-03	10.00	10.00	Jew	//
12-8-03	10.00	10.00	Jew	//
12-9-03	10.00	10.00	Jew	//
12-10-03	10.00	10.00	Jew	//

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)

010259

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	
11-25-03	2.0000	2.0000	JW	SN: 550526-15
11-26-03	2.0000	1.9999	JW	"
12-1-03	2.0000	2.0000	JW	"
12-2-03	2.0000	2.0000	JW	"
12-3-03	2.0000	1.9999	JW	"
12-4-03	2.0000	2.0000	JW	"
12-5-03	2.0000	2.0000	JW	"
12-8-03	2.0000	1.9999	JW	"
12-9-03	2.0000	1.9999	JW	"
12-10-03	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.

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FRM-112 (Rev 1/Dec 99)

010260

010261

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

FRM-112 (Rev 1/Dec 99)

✓AMS
12/31/03

010262

Southwest Research Institute
Division 01
BALANCE VERIFICATION LOG

BALANCE #	LAB #:	SERIAL #:	TOLERANCE:	COMMENTS:
16	28	P37987	± 0.0005	
Date	Std Wt (g)	Recorded Wt (g)	Operator	
10-28-03	2.0000	1.9999	Jew	S.N: 99-J50526-15
10/29/03	2.0000	2.0000	W	"
10-30-03	2.0000	2.0000	Jew	"
10/31/03	2.0000	2.0000	W	"
11-3-03	2.0000	2.0000	Jew	"
11-4-03	2.0000	2.0060	Jew	"
11-5-03	2.0000	2.0060	Jew	"
11-6-03	2.0000	2.0000	Jew	"
11-7-03	2.0000	2.0000	Jew	"
11-10-03	2.0000	2.0000	Jew	"

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)

✓ *ams*
11/17/03

Southwest Research Institute
Division 01
BALANCE VERIFICATION LOG

010263

BALANCE #	LAB #:	SERIAL #:	TOLERANCE:	COMMENTS:
34	28	1116031935	±0.0005	
Date	Std Wt (g)	Recorded Wt (g)	Operator	
10/2/03	2.0000	2.0000	W	sn:99-J50526-15
10-3-03	2.0000	2.0000	Jew	"
10/6/03	2.0000	2.0000	W	"
10-7-03	2.0000	1.9999	Jew	"
10/8/03	2.0000	2.0000	W	"
10-9-03	2.0000	2.0000	Jew	"
10-10-03	2.0000	2.0001	Jew	"
10-13-03	2.0000	2.0000	Jew	"
10-14-03	2.0000	2.0000	Jew	"
10-15-03	2.0000	2.0000	Jew	"

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.

✓ Jms
10/27/03

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FRM-112 (Rev 1/Dec 99)

010264

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	
8-12-03	2.0000	2.0004	Jew	SN=5537
8/13/03	2.0000	2.0003	W	"
8/14/03	2.0000	2.0003	W	"
8/15/03	2.0000	2.0004	W	"
8-18-03	2.0000	2.0003	Jew	"
8/19/03	2.0000	2.0002	W	"
8/20/03	2.0000	2.0003	W	"
8/21/03	2.0000	2.0002	W	"
8/21/03	2.0000	2.0000	W	99-J50526-15
8-22-03	2.0000	2.0000	Jew	"

If balance is out of limits, clean the balance and re-calibrate using Class "S" weights.

If balance is still out of limits, place a "DO NOT USE" sign on it and call (x5896) for service.

Page # 5

FRM-112 (Rev 1/Dec 99)

✓ Oms
10/27/03

**SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 031205-4
SRR: 25287
SDG: 238656
CASE: CNWRA
VTSR: December 05, 2003
PROJECT#: 06002.01.071**

DI Water Verification

D.I. WATER SYSTEM NOTEBOOK

METALS LAB

SOUTHWEST RESEARCH INSTITUTE

01 029

010265

DATE	INITIALS	READING (M OHMS)	SET PT./ QC LT. Green=OK	CALL FOR Service LT. Green=OK	USAGE (GALS)	COMMENTS
11/10/03	DR	18.0	✓	✓	51562.1	7:20 pm
11/11/03	DR	18.0	✓	✓	51569.3	8:15 pm
11/11/03	DR	18.0	✓	✓	51574.4	2:09, Filter changed to US Filter
11/12/03	DR	18.0	✓	✓	51578.9	6:13 pm
11/13/03	DR	18.0	✓	✓	51583.8	7:31 pm
11/14/03	DR	18.0	✓	✓	51585.5	6:40 pm
11/17/03			checked	mm8 11/17/03		
11/12/03	DR	18.0	✓	✓	51593.0	5:57 pm
11/21/03	mm8	18.0	✓	✓	51610.0	11:50 am
11/24/03	DR	18.0	✓	✓	51621.3	7 pm
11/25/03	DR	18.0	✓	✓	51624.9	6:50 pm
11/26/03	DR	18.0	✓	✓	51628.0	1 pm
12/1/03	DR	18.0	✓	✓	51634.9	6:30 pm
12/2/03	DR	18.0	✓	✓	51640.5	5:50 pm
12/3/03	DR	18.0	✓	✓	51642.7	5:10 pm
12/4/03	DR	18.0	✓	✓	51651.4	5:49 pm
12/5/03	DR	18.0	✓	✓	51659.3	5:01 pm
12/8/03	DR					7 out of 10 on 12/6/03
12/9/03	DR	18.0	✓	✓	51663.2	6 pm
12/10/03	DR	18.0	✓	✓	51665.7	6:30 pm
12/11/03	DR	18.0	✓	✓	51670.9	6:50 pm
12/12/03	DR	18.0	✓	✓	51673.7	3:25 pm
12/15/03	DR	18.0	✓	✓	51676.0	6:00 pm
12/16/03	DR	18.0	✓	✓	51683.4	5:48 pm
12/17/03	DR	18.0	✓	✓	51684.8	5:34 pm
12/18/03	DR	18.0	✓	✓	51688.8	4:48 pm
			VOS	12/22/03		
12/19/03	DR	18.0	✓	✓	51691.0	7:20 pm
12/22/03	DR	18.0	✓	✓	51699.1	5:50 pm
12/23/03	DR	18.0	✓	✓	51701.4	5:48 pm
12/26/03	DR	18.0	✓	✓	51702.7	4:30 pm
12/29/03	DR	18.0	✓	✓	51704.9	5:31 pm
12/30/03	DR	18.0	✓	✓	51708.0	5:42 pm
				mm8 12/31/03		

✓ mm8
12/31/03

D.I. WATER SYSTEM NOTEBOOK

01 029

METALS LAB

SOUTHWEST RESEARCH INSTITUTE

010266

DATE	INITIALS	READING (M OHMS)	SET PT./ QC LT. Green=OK	CALL FOR Service LT. Green=OK	USAGE (GALS)	COMMENTS
11/10/03	DR	18.0	✓	✓	51562.1	7:20 pm
11/10/03	DR	18.0	✓	✓	51569.3	8:15 pm
11/11/03	DR	18.0	✓	✓	51574.4	2:09, Filter changed by US Filter
11/12/03	DR	18.0	✓	✓	51578.9	6:13 pm
11/13/03	DR	18.0	✓	✓	51583.8	9:31 pm
11/14/03	DR	18.0	✓	✓	51585.5	6:40 pm
11/17/03			checked	am 8 11/17/03		→
11/17/03	DR	18.0	✓	✓	51593.0	5:17 pm
11/21/03	am 8	18.0	✓	✓	51610.0	11:50 am
11/24/03	DR	18.0	✓	✓	51621.3	7 pm
11/25/03	DR	18.0	✓	✓	51624.9	6:50 pm
11/26/03	DR	18.0	✓	✓	51628.0	1 pm
11/27/03	DR	18.0	✓	✓	51634.9	6:30 pm
11/28/03	DR	18.0	✓	✓	51640.5	5:50 pm
11/29/03	DR	18.0	✓	✓	51642.7	5:10 pm
11/30/03	DR	18.0	✓	✓	51651.4	5:49 pm
12/1/03	DR	18.0	✓	✓	51659.3	5:01 pm
12/8/03	DR					7 out of 10 12/12/03
12/9/03	DR	18.0	✓	✓	51663.2	6 pm
12/10/03	DR	18.0	✓	✓	51665.7	6:30 pm
12/11/03	DR	18.0	✓	✓	51670.9	6:50 pm
12/12/03	DR	18.0	✓	✓	51673.7	3:25 pm
12/15/03	DR	18.0	✓	✓	51676.0	6:00 pm
12/16/03	DR	18.0	✓	✓	51683.4	5:48 pm
12/17/03	DR	18.0	✓	✓	51684.8	5:34 pm
12/18/03	DR	18.0	✓	✓	51688.8	4:48 pm
VDS 12/22/03						
12/19/03	DR	18.0	✓	✓	51691.0	7:20 pm
12/22/03	DR	18.0	✓	✓	51699.1	5:56 pm
12/23/03	DR	18.0	✓	✓	51701.4	5:48 pm
12/26/03	DR	18.0	✓	✓	51702.7	4:30 pm
12/29/03	DR	18.0	✓	✓	51704.9	5:31 pm
12/30/03	DR	18.0	✓	✓	51708.0	5:42 pm
am 8 12/31/03						

✓ am 8
12/31/03

D.I. WATER SYSTEM NOTEBOOK

METALS LAB

SOUTHWEST RESEARCH INSTITUTE

01 028

010267

DATE	INITIALS	READING (M OHMS)	SET PT./ QC LT. Green=OK	CALL FOR Service LT. Green=OK	USAGE (GALS)	COMMENTS
9/23/03	DR	18.0	✓	✓	51391.3	5:47pm
9/24/03	DR	18.0	✓	✓	51398.6	5:26pm
9/25/03	area under construction, unable to read					DR 9/25/03
9/26/03	DR	18.0	✓	✓	51419.0	6:43pm
9/29/03	DR	18.0	✓	✓	51416.8	8:40pm
9/30/03	DR	18.0	✓	✓	51420.3	7:45pm
10/1/03	DR	18.0	✓	✓	51424.2	7:30pm
10/2/03	DR	18.0	✓	✓	51431.3	6:20pm
10/3/03	DR	18.0	✓	✓	51434.5	5:32pm
10/6/03	DR	18.0	✓	✓	51445.0	5:41pm
10/7/03	DR	18.0	✓	✓	51448.9	7:20pm
10/8/03	DR	18.0	✓	✓	51454.0	6:38pm
10/9/03	DR	18.0	✓	✓	51468.8	8pm
10/10/03	DR	18.0	✓	✓	51464.0	6:07pm
← VDJ 10/13/03 →						
10/13/03	DR	18.0	✓	✓	51474.8	6:53pm
10/14/03	DR	18.0	✓	✓	51476.1	7:13pm
10/15/03	DR	18.0	✓	✓	51478.3	7:20pm
10/16/03	DR	18.0	✓	✓	51482.3	6:40pm
10/19/03	DR	18.0	✓	✓	51486.5	8:11pm
10/20/03	DR	18.0	✓	✓	51489.2	8:21pm
10/21/03	DR	18.0	✓	✓	51495.4	7:15pm
10/22/03	DR	18.0	✓	✓	51502.2	8:00pm
10/23/03	DR	18.0	✓	✓	51509.0	9:16pm
10/24/03	DR	18.0	✓	✓	51514.5	8:15pm
10/27/03	WD — Reviewed					
10/27/03	DR	18.0	✓	✓	51529.5	9:00pm
10/28/03	DR	18.0	✓	✓	51523.6	6:00pm
10/29/03	DR	18.0	✓	✓	51526.4	7:35pm
10/30/03	DR	18.0	✓	✓	51531.2	8:40pm
10/31/03	DR	18.0	✓	✓	51533.7	5:45pm
11/1/03	DR	18.0	✓	✓	51539.4	7:25pm
11/4/03	DR	18.0	✓	✓	51548.9	7:01pm
11/5/03	DR	18.0	✓	✓	51553.2	8:29pm
11/6/03	DR	18.0	✓	✓	51556.9	7:16pm

✓ *Am8*
11/17/03

01 028

010268						
DATE	INITIALS	READING (M OHMS)	SET PT./ QC LT. Green=OK	CALL FOR Service LT. Green=OK	USAGE (GALS)	COMMENTS
9/23/03	DR	18.0	✓	✓	51391.3	5:47pm
9/24/03	DR	18.0	✓	✓	51398.6	5:26pm
9/25/03	area under construction, unable to read				DR 9/25/03	
9/26/03	DR	18.0	✓	✓	51419.0	6:43pm
9/29/03	DR	18.0	✓	✓	51416.8	8:46pm
9/30/03	DR	18.0	✓	✓	51420.3	7:48pm
10/1/03	DR	18.0	✓	✓	51424.2	9:36pm
10/2/03	DR	18.0	✓	✓	51431.3	6:20pm
10/3/03	DR	18.0	✓	✓	51434.5	5:32pm
10/6/03	DR	18.0	✓	✓	51445.0	5:46pm
10/7/03	DR	18.0	✓	✓	51448.9	2:22pm
10/8/03	DR	18.0	✓	✓	51454.0	6:38pm
10/9/03	DR	18.0	✓	✓	51468.8	8pm
10/10/03	DR	18.0	✓	✓	51464.0	6:07pm
←		VDS		10/13/03	→	
10/13/03	DR	18.0	✓	✓	51474.8	6:53pm
10/14/03	DR	18.0	✓	✓	51476.1	7:13pm
10/15/03	DR	18.0	✓	✓	51478.3	7:00pm
10/20/03	DR	18.0	✓	✓	51482.3	6:40pm
10/21/03	DR	18.0	✓	✓	51486.5	8:11pm
10/22/03	DR	18.0	✓	✓	51489.2	8:21pm
10/23/03	DR	18.0	✓	✓	51495.4	7:15pm
10/24/03	DR	18.0	✓	✓	51502.2	8:00pm
10/25/03	DR	18.0	✓	✓	51509.0	9:16pm
10/26/03	DR	18.0	✓	✓	51514.5	8:15pm
10/27/03	WD — Reviewed					

D.I. WATER SYSTEM NOTEBOOK

METALS LAB

SOUTHWEST RESEARCH INSTITUTE

01 027

010269

DATE	INITIALS	READING (M OHMS)	SET PT./ QC LT. Green=OK	CALL FOR Service LT. Green=OK	USAGE (GALS)	COMMENTS
8/7/03	DR	18.0	✓	✓	5085.0	7:25 pm
8/8/03	DR	18.0	✓	✓	5085.0	7:52 5:40 pm. 8/8/03
8/11/03	DR	18.0	✓	✓	5090.4	6:36 pm
8/12/03	DR	18.0	✓	✓	5092.1	5:01 pm
8/13/03	DR	18.0	✓	✓	5094.6	8 pm
8/14/03						
8/14/03	DR	18.0	✓	✓	5096.3	9:58 pm
8/15/03	DR	18.0	✓	✓	5097.9	2:48 pm
8/18/03	DR	18.0	✓	✓	5101.1	10:27 pm
8/19/03	DR	18.0	✓	✓	5101.1	10:41 pm
8/20/03	DR	18.0	✓	✓	5103.4	7:40 pm
8/21/03	DR	18.0	✓	✓	5105.1	8 pm
8/22/03	DR	18.0	✓	✓	5106.4	7:30 pm
8/25/03	DR	18.0	✓	✓	5108.1	6:41 pm
8/26/03	DR	18.0	✓	✓	5110.5	8:12 pm
8/26/03	DR 8/26/03					
8/27/03	DR	18.0	✓	✓	5111.3	6:00 pm
8/28/03	DR	18.0	✓	✓	5113.9	6:21 pm
8/29/03	DR	18.0	✓	✓	5114.3	6:42 pm
9/1/03	DR	18.0	✓	yellow	5118.3	6:20 pm
9/2/03						
9/3/03	DR	18.0	✓	yellow	5119.2	9 pm
9/4/03	DR	18.0	✓	yellow	5121.4	8:21 pm
9/5/03	DR	18.0	✓	yellow	5122.9	6:07 pm. U.S. Filter called
9/8/03	DR	18.0	✓	✓	5123.4	7:47 pm. Tankhouse
9/9/03	DR	18.0	✓	✓	5124.6	7:26 pm
9/10/03	DR	18.0	✓	✓	5126.2	6:46 pm
9/11/03	DR	18.0	✓	✓	5129.2	7:23 pm
9/12/03	DR	18.0	✓	✓	5131.5	9:20 pm
9/15/03	DR	18.0	✓	✓	5133.2	6:03 pm
9/16/03	DR	18.0	✓	✓	5134.3	6:38 pm
9/17/03	DR	18.0	✓	✓	5134.7	6:00 pm
9/18/03	DR	18.0	✓	✓	5135.2	5:05 pm
9/19/03	DR	18.0	✓	✓	5136.0	5:44 pm
9/22/03	DR	18.0	✓	✓	5138.5	5:40 pm

**SOUTHWEST RESEARCH INSTITUTE
NUCLEAR PROJECT
CLIENT: Division 20
TASK ORDER: 031205-4
SRR: 25287
SDG: 238656
CASE: CNWRA
VTSR: December 05, 2003
PROJECT#: 06002.01.071**

**SURVEILLANCE REPORTS
From Division 30**



Institute Quality Assurance Surveillance Report

010270

Project Number: 20-06002

Report Number: 2004-SR-0001

Page 1 of 1

Surveillance Scope: Monitor the Tests for Trace Metal Analysis by ICP and IC in Division 01. The client is NRC High Level Waste Program. This is a QA Nuclear surveillance.

Reference Documents: Task Order 031205-4, TAP 01-0406-038 Inductively Coupled Plasma/Atomic Emission Spectrometric Method for Trace Elemental Analysis, TAP 01-0406-042, IC for the Measurement of Inorganic Ions, and QPP Rev. 4.

Starting Date: 2003-12-05

Ending Date: 2003-12-31

Institute QA Representative: Charles S. Butcher

Person(s) Conducting Test/Exam/Procedure: J. Wilks, D. Harris, A. Straun

Satisfactory Findings: A work request was provided to Division 01 for work performed. The work order was logged in by Receiving and labeled with PO number, QA Nuclear requirements, project number, tests required, and test revisions. The samples were labeled with PO number, QA label, ID number, and work order number. The analyst's training records were on file as required. Copies of the work orders, methods, and PQP were available. The instruments were calibrated with NIST traceable standards and the samples run. Data run was recorded, signed, and reviewed by project personnel prior to transmittal to the client.

Unsatisfactory Findings: N/A

Nonconformance Report Number: N/A

CAR/SCAR Number: N/A

Attachments: None

Recommendations/Actions: N/A

Equipment Calibration: Equipment was calibrated before running samples. All standards were NIST traceable.

Approved: "/s/ R. Weber"
Institute Quality Assurance

Date: 1/5/04

Distribution: Original – IQS Records
c: C. S. Butcher (30)
PM – B. Werling (20)
J. Boyd (01)
R. Brient (20)