



# PARAGON ANALYTICS,

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225 Commerce Drive Fort Collins, CO 80524 (800) 443-1511 (970) 490-1511 FAX (970) 490-1522

September 6, 2000

Mr. Michael Dale  
NMED/DOE Oversight Bureau  
134 State Road 4, Suite A  
White Rock, NM 87544



RE: Paragon Workorder: 00-06-226  
Client Project Name: None Submitted  
Client Project Number: HRMB 6.26.00

Dear Mr Dale:

Six water samples were received from NMED/DOE Oversight Bureau on June 28, 2000.  
The samples were scheduled for the following analyses:

Metals	pages 1-28	Gross Alpha/Beta	pages 1-6
Inorganics	pages 1-41	Gamma Spectroscopy	pages 1-21
Strontium-90	pages 1-9	Total Organic Carbon	pages 1-9
Isotopic Uranium	pages 1-16	Isotopic Americium & Isotopic Curium	pages 1-15
Isotopic Plutonium	pages 1-15		

The results for these analyses are contained in the following reports.

Please note that dioxin/furan and TKN samples have been withheld pending review of rad chem results. Initial screen data showed the possibility of radioactivity above the level at which we could sub contract to a lab without a rad license. This review will now take place, and I will contact you about the possibility of further analyses.

Thank you for your confidence in Paragon Analytics, Inc. Should you have any questions, please call.

Sincerely,

Paragon Analytics, Inc.  
Lance Steere  
Senior Project Manager

LRS/mj  
Enclosure: Report



7507

1A-00

2

# Paragon Analytics, Incorporated

## Sample Number(s) Cross-Reference Table

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**Paragon OrderNum:** 0006226

**Client Name:** NMED DOE Oversight Bureau

**Client Project Name:**

**Client Project Number:** HRMB 6.26.00 ✓

**Client PO Number:**

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Client Sample	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
DP SPRING	0006226-1		WATER	6/26/00	10:20
DP SPRING	0006226-2		WATER	6/26/00	10:20
LAO-2	0006226-3		WATER	6/26/00	10:46
LAO-2	0006226-4		WATER	6/26/00	10:46
LAO-3A	0006226-5		WATER	6/26/00	13:23
LAO-3A	0006226-6		WATER	6/26/00	13:23





# Paragon Analytics, Inc.

225 Commerce Drive Fort Collins, CO 80524  
800-443-1511 or (970) 490-1511 (970) 490-1522 Fax

Accession Number (LAB ID)

Chain-of-Custody Date 6/27/00 Page 2 of 2

Project Name / No.: 6.26.00 HRMB Turnaround Time: Standard or Rush (Due \_\_\_\_\_) (circle one) Dispose or Return to Client (circle one) Sampler \_\_\_\_\_

Report To: John Young  
Phone: (505) 827-1558 x1036  
Fax: (505) 827-1544  
Company: NMEO - HRMB  
Address: 2044A Galates Street  
Santa Fe, N.M.  
87505

Sample ID	Date	Time	Lab ID	Matrix*	No. of Containers	VOCs	Oil & Grease	BTEX (only)	Non-halogenated Organics	SVOCs	OC Pesticides	PCBs	OP Pesticides	Herbicides	TCLP Organics	TCLP Metals**	Total Metals**	Dissolved Metals**	Reactive CN / S	Hexavalent Chromium	Inorganic Anions**	TOX	Gross Alpha/Beta	Actinides**	Total Uranium	Tritium (#42)	Total Radium	Gamma Isotopes**	Strontium**	pH/TDS (Line # 85)	Diss. Digestion (Line # 39)	Dioxine/Furane (Line # 14)	TSS (Line # 86)	3H Long Count (Line # 118)	
DP Spring	6/26/00	1020	1/2	H <sub>2</sub> O	15	X	X	X	X	X	R.O.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
LDO-2	6/26/00	1046	3/4	H <sub>2</sub> O	17	X	X	X	X	X	R.O.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
LDO-3A	6/26/00	1323	5/6	H <sub>2</sub> O	17	X	X	X	X	X	R.O.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Comments:  
(Example: Indicate if TICs are requested for GC/MS VOCs or SVOCs)  
  
Rad Analysis:  
was low-level  
analysis

Relinquished By: (1)  
Signature Roxane Ortiz  
Printed Name ROXANE ORTIZ  
Date 6/27/00 Time 1225  
Company NMEO HRMB

Relinquished By: (2)  
Signature \_\_\_\_\_  
Printed Name \_\_\_\_\_  
Date \_\_\_\_\_ Time \_\_\_\_\_  
Company \_\_\_\_\_

Relinquished By: (3)  
Signature \_\_\_\_\_  
Printed Name \_\_\_\_\_  
Date \_\_\_\_\_ Time \_\_\_\_\_  
Company \_\_\_\_\_

Received By: (1)  
Signature \_\_\_\_\_  
Printed Name FEDER  
Date \_\_\_\_\_ Time \_\_\_\_\_  
Company \_\_\_\_\_

Received By: (2)  
Signature Mark Stella  
Printed Name MARK STELLA  
Date 6-28-00 Time 09:15  
Company PAE

Received By: (3)  
Signature \_\_\_\_\_  
Printed Name \_\_\_\_\_  
Date \_\_\_\_\_ Time \_\_\_\_\_  
Company \_\_\_\_\_

\* (W) Water; (LQ) Non-aqueous liquid; (Soil) Soil; (NS) Non-soil Solid. \*\* Indicate specific analytes in "comments". Distribution: white / yellow (Paragon); pink retained by originator.

CONDITION OF SAMPLE UPON RECEIPT FORM

CLIENT: NMED PROJECT MANAGER: CS

WORKORDER NO: 0030226 INITIALS: M DATE: 6-28-00

1. Does this project require any special handling in addition to standard Paragon procedures? <b>IS PRE-SCREENING REQUIRED? (radiochemistry, DOE, etc.)</b>		Yes <u>Yes</u>	<u>No</u> No
2. Are custody seals provided on the cooler? If so, how many <u>1</u>	N/A	<u>Yes</u>	No
3. Are the custody seals on sample containers intact?	N/A	<u>Yes</u>	No
4. Is there a Chain-of-Custody (COC) or other representative documents, letters, or shipping memos?		<u>Yes</u>	No
5. Is the COC complete? Relinquished: Yes <u>✓</u> No <u>   </u> Analyses Requested: Yes <u>✓</u> No <u>   </u>	N/A	<u>Yes</u>	No
6. Is the COC in agreement with the samples received? No. of Samples: Yes <u>✓</u> No <u>   </u> Sample ID's: Yes <u>✓</u> No <u>   </u> Matrix: Yes <u>✓</u> No <u>   </u> No. of Containers: Yes <u>✓</u> No <u>   </u>	N/A	<u>Yes</u>	No
7. Were COC (if applicable) and sample labels legible?		<u>Yes</u>	No
8. Were airbills present and/or removable?		<u>Yes</u>	No
9. Are all aqueous samples requiring chemical preservation preserved correctly (excluding volatile organics)? Are all aqueous <b>non-preserved</b> samples at the correct pH?	N/A	<u>Yes</u> <u>Yes</u>	No No
10. Is there enough sample for requested analyses? If so, were samples placed in the proper containers?		<u>Yes</u>	No
11. Are all samples within holding times for the requested analyses?		<u>Yes</u>	No
12. Were all sample containers received intact? (not broken or leaking, etc.)		<u>Yes</u>	No
13. Are samples requiring no headspace (volatiles, reactive cyanide/sulfide), headspace free? <b>Size of bubble</b> <u>   </u> < green pea; <u>   </u> > green pea (List sample IDs and affected containers on Page 2)	N/A	<u>Yes</u>	No
14. Is Paragon to dispose of samples?		<u>Yes</u>	No
15. Were the sample(s) shipped on ice?	N/A	<u>Yes</u>	No
16. Were cooler temperatures measured at 2 - 6 °C ?	N/A	<u>Yes</u>	No
17. Were all samples cooled that should have been cooled?		<u>Yes</u>	No

Cooler #'s 1 2 3 \_\_\_\_\_  
 Temperature 4°C 6°C 3°C \_\_\_\_\_ °C

Project Manager Signature / Date: [Signature]

**A NO RESPONSE TO ANY QUESTION (EXCEPT # 1 and #14 REQUIRES THE COMPLETION OF PAGE 2 OF THIS FORM**

# FedEx

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**0200**

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Date 6/27/03

Sender's Name Michael Dale Phone 505 672-0443

Company New Mexico Environment SCS

Address 1371 State Road 41 Ste A Dept./Floor/Suite/Room

City White Rock State NM ZIP 87141

**2 Your Internal Billing Reference**

**3 To**

Recipient's Name Lana Stern Phone

Company Paragon Analytics

Address 223 Commercial Drive Dept./Floor/Suite/Room

To/HOLD: If FedEx location, print FedEx address here.

City Ft. Collins State CO ZIP 80521



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\* Call for Confirmation. \* Declared value limit \$500.

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No  Yes As per attached Shipper's Declaration  Yes Shipper's Declaration not required  Dry Ice Dry Ice, 9 UN 1845 \_\_\_\_\_ kg

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Total Packages	Total Weight	Total Declared Value*	Total Charges
<u>2</u>	<u>40</u>	\$ <u>00</u>	
<small>*Our liability is limited to \$100 unless you declare a higher value. See back for details.</small>			<input type="checkbox"/> Credit Card Auth.

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By signing you authorize us to deliver this shipment without obtaining a signature and agree to indemnify and hold us harmless from any resulting claims.

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**360**

# Paragon Analytics, Inc.



## METALS CASE NARRATIVE

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### NMED DOE Oversight Bureau

HRMB 6.26.00

**Order Number - 0006226**

1. This report consists of 3 water samples for both total recoverable and dissolved metals.
2. The samples were received cool and intact on 06/28/00.
3. The total recoverable samples had been preserved for the requested analyses. The dissolved samples had been filtered and preserved prior to receipt.
4. The samples were prepared for analysis based on SW-846, 3<sup>rd</sup> Edition procedures.

For analysis by Trace and conventional ICPs, the samples were digested following method 3005A and PAI SOP 806 Rev. 5.

For analysis by Cold Vapor AA (CVAA), the samples were digested following method 7470A and PAI SOP 812 Rev. 6.

5. The samples were analyzed following SW-846, 3<sup>rd</sup> Edition procedures.

Analysis by Trace ICP followed method 6010B and PAI SOP 807 Rev. 4.

The relationship between intensity and concentration for each element is established using at least four standards, one of which is a blank solution. The equation which relates intensity to concentration is:

$$I = A_0 + (A_1 * c^n) + (A_2 * c^{2n})$$

where: I = intensity  
c = concentration  
A<sub>0</sub> = offset coefficient  
A<sub>1</sub> = gain coefficient  
A<sub>2</sub> = curvature coefficient  
n = exponent coefficient

During sample analysis concentrations are computed by the software and the results are printed in mg/L. The instrument software does not provide a printout which gives both intensity and concentration. The validity of the calibration equation is tested by analyzing the following solutions: a blank, a



low level check solution with concentrations near the reporting limit, an Initial Calibration Verification (ICV) standard from a 2<sup>nd</sup> source standard solution with concentrations near the middle of the analytical range, a Continuing Calibration Verification (CCV) standard with concentrations at two times those in the ICV, and a readback of the highest calibration standard.

These solutions provide verification that the calibration equations are functioning properly throughout the analytical range of the instrument. During sample analysis dilutions are made for analytes found at concentrations above the highest calibration standard. No results are taken from extrapolations beyond the highest standard.

Analysis by conventional ICP followed method 6010B and PAI SOP 805 Rev. 1.

Calibration of the conventional ICP is performed as described above for the Trace ICP.

Analysis by CVAA followed method 7470A and PAI SOP 812 Rev. 6.

The relationship between intensity and concentration is determined daily, prior to sample analysis. At least five standards and a blank solution are analyzed to establish the calibration curve. The instrument software performs a linear regression to fit the calibration data to a curve of the form:

$$\text{conc.} = B * I + C$$

where: conc. = concentration  
B = slope coefficient  
I = intensity  
C = intercept coefficient

A printout summarizing the calibration data supplies the calibration curve and correlation coefficient. During sample analysis both intensity and concentration values are printed. Dilutions are made for concentrations above the highest calibration standard. No results are taken from extrapolations above the highest standard.

6. All standards and solutions are NIST traceable and were used within their recommended shelf life.
7. The samples were prepared and analyzed within the established hold times.

All in house quality control procedures were followed, as described below.

8. General quality control procedures.
  - A preparation (method) blank and laboratory control sample were digested and analyzed with the samples in each digestion batch. There were not more than 20 samples in each digestion batch.
  - The preparation (method) blank results associated with each batch were below the reporting limits for the requested analytes. This indicates that no contaminants were introduced to the samples during the digestion procedure.



- The laboratory control sample associated with each batch was within the acceptance limits. This indicates complete digestion according to the method.
  - All initial and continuing calibration blanks associated with each batch were below the reporting limits for the requested analytes. This indicates a valid calibration and stable instrument conditions.
  - All initial and continuing calibration verifications associated with each batch were within the acceptance criteria for the requested analytes. This indicates a valid calibration and stable instrument conditions.
  - The interference check samples, and high standard readbacks associated with Method 6010B analyses were within acceptance criteria.
9. PAI sample ID 0006275-2 was designated as the QC sample for the ICP analyses. PAI sample ID 0006269-2 was designated as the QC sample for the mercury analysis.
- A matrix spike and matrix spike duplicate were digested and analyzed with each batch. All acceptance criteria for accuracy were met with the following exceptions.

<u>Analyte</u>	<u>Sample ID</u>
Silicon	0006275-2MS & MSD

The native sample results are flagged for matrix spike failure and an analytical post spike was performed. Results of the spike were acceptable indicating that the matrix was not significantly affecting quantitation of this analyte.

- A sample duplicate and spike duplicate were digested and analyzed with each batch. All acceptance criteria for precision were met.
  - A serial dilution was analyzed with each ICP batch. All acceptance criteria were met.
10. Sample dilutions were not required for the requested analyses.



The data contained in the following report have been reviewed and approved by the personnel listed below:

Darryl Patrick

Darryl Patrick  
Senior Inorganic Chemist

7/19/00

Date

SW

Reviewer's Initials

7/19/00

Date

### CERTIFICATION

Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

# Paragon Analytics, Incorporated

## Sample Number(s) Cross-Reference Table

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**Paragon OrderNum:** 0006226

**Client Name:** NMED DOE Oversight Bureau

**Client Project Name:**

**Client Project Number:** HRMB 6.26.00

**Client PO Number:**

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Client Sample	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
DP SPRING	0006226-1		WATER	6/26/00	10:20
DP SPRING	0006226-2		WATER	6/26/00	10:20
LAO-2	0006226-3		WATER	6/26/00	10:46
LAO-2	0006226-4		WATER	6/26/00	10:46
LAO-3A	0006226-5		WATER	6/26/00	13:23
LAO-3A	0006226-6		WATER	6/26/00	13:23

### **Inorganic Data Reporting Qualifiers**

The following qualifiers are used by the laboratory when reporting results of inorganic analyses.

- Result qualifier -- If the analyte was analyzed for but not detected a "U" is entered.
- QC qualifier -- Specified entries and their meanings are as follows:
  - E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
  - M - Duplicate injection precision was not met.
  - N - Spiked sample recovery not within control limits. A post spike is analyzed for all 6010B analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than 4 times the spike added concentration.
  - \* - Duplicate analysis (relative percent difference) not within control limits.

# Total Recoverable ICP Metals

Method SW6010

Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: DP SPRING

Lab ID: 0006226-1

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 26-Jun-00

Date Extracted: 07-Jul-00

Date Analyzed: 11-Jul-00

Prep Batch: IP000707-2

QCBatchID: IP000707-2-4

Run ID: IT000711-1A1

Cleanup: NONE

Basis: As Received

Sample Aliquot: 50 G

Final Volume: 50 ML

Result Units: MG/L

File Name: TS00711

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
7429-90-5	ALUMINUM	1	0.24	0.2		
7440-36-0	ANTIMONY	1	0.02	0.02	U	
7440-38-2	ARSENIC	1	0.01	0.01	U	
7440-39-3	BARIUM	1	0.1	0.1	U	
7440-41-7	BERYLLIUM	1	0.005	0.005	U	
7440-43-9	CADMIUM	1	0.005	0.005	U	
7440-70-2	CALCIUM	1	17	1		
7440-47-3	CHROMIUM	1	0.01	0.01	U	
7440-48-4	COBALT	1	0.01	0.01	U	
7440-50-8	COPPER	1	0.01	0.01	U	
7439-89-6	IRON	1	0.18	0.1		
7439-92-1	LEAD	1	0.003	0.003	U	
7439-95-4	MAGNESIUM	1	1.8	1		
7439-96-5	MANGANESE	1	0.01	0.01	U	
7440-02-0	NICKEL	1	0.02	0.02	U	
7440-09-7	POTASSIUM	1	9.5	1		
7782-49-2	SELENIUM	1	0.005	0.005	U	
7440-22-4	SILVER	1	0.01	0.01	U	
7440-28-0	THALLIUM	1	0.01	0.01	U	
7440-62-2	VANADIUM	1	0.01	0.01	U	
7440-66-6	ZINC	1	0.02	0.02	U	

Data Package ID: IT0006226-1

# Dissolved ICP Metals

Method SW6010

Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: DP SPRING

Lab ID: 0006226-2

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 26-Jun-00

Date Extracted: 07-Jul-00

Date Analyzed: 11-Jul-00

Prep Batch: IP000707-2

QCBatchID: IP000707-2-4

Run ID: IT000711-1A1

Cleanup: NONE

Basis: As Received

Sample Aliquot: 50 G

Final Volume: 50 ML

Result Units: MG/L

File Name: TS00711

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
7429-90-5	ALUMINUM	1	0.2	0.2	U	
7440-36-0	ANTIMONY	1	0.02	0.02	U	
7440-38-2	ARSENIC	1	0.01	0.01	U	
7440-39-3	BARIUM	1	0.1	0.1	U	
7440-41-7	BERYLLIUM	1	0.005	0.005	U	
7440-43-9	CADMIUM	1	0.005	0.005	U	
7440-70-2	CALCIUM	1	18	1		
7440-47-3	CHROMIUM	1	0.01	0.01	U	
7440-48-4	COBALT	1	0.01	0.01	U	
7440-50-8	COPPER	1	0.01	0.01	U	
7439-89-6	IRON	1	0.19	0.1		
7439-92-1	LEAD	1	0.003	0.003	U	
7439-95-4	MAGNESIUM	1	1.8	1		
7439-96-5	MANGANESE	1	0.01	0.01	U	
7440-02-0	NICKEL	1	0.02	0.02	U	
7440-09-7	POTASSIUM	1	9.5	1		
7782-49-2	SELENIUM	1	0.005	0.005	U	
7440-22-4	SILVER	1	0.01	0.01	U	
7440-28-0	THALLIUM	1	0.01	0.01	U	
7440-62-2	VANADIUM	1	0.01	0.01	U	
7440-66-6	ZINC	1	0.02	0.02	U	

Data Package ID: IT0006226-1

# Total Recoverable ICP Metals

Method SW6010

Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: LAO-2  
Lab ID: 0006226-3

Sample Matrix: WATER  
% Moisture: N/A  
Date Collected: 26-Jun-00  
Date Extracted: 07-Jul-00  
Date Analyzed: 11-Jul-00

Prep Batch: IP000707-2  
QCBatchID: IP000707-2-4  
Run ID: IT000711-1A1  
Cleanup: NONE  
Basis: As Received

Sample Aliquot: 50 G  
Final Volume: 50 ML  
Result Units: MG/L

File Name: TS00711

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
7429-90-5	ALUMINUM	1	0.34	0.2		
7440-36-0	ANTIMONY	1	0.02	0.02	U	
7440-38-2	ARSENIC	1	0.01	0.01	U	
7440-39-3	BARIUM	1	0.1	0.1	U	
7440-41-7	BERYLLIUM	1	0.005	0.005	U	
7440-43-9	CADMIUM	1	0.005	0.005	U	
7440-70-2	CALCIUM	1	16	1		
7440-47-3	CHROMIUM	1	0.01	0.01	U	
7440-48-4	COBALT	1	0.01	0.01	U	
7440-50-8	COPPER	1	0.01	0.01	U	
7439-89-6	IRON	1	0.29	0.1		
7439-92-1	LEAD	1	0.003	0.003	U	
7439-95-4	MAGNESIUM	1	4.3	1		
7439-96-5	MANGANESE	1	0.01	0.01	U	
7440-02-0	NICKEL	1	0.02	0.02	U	
7440-09-7	POTASSIUM	1	5	1		
7782-49-2	SELENIUM	1	0.005	0.005	U	
7440-22-4	SILVER	1	0.01	0.01	U	
7440-28-0	THALLIUM	1	0.01	0.01	U	
7440-62-2	VANADIUM	1	0.01	0.01	U	
7440-66-6	ZINC	1	0.02	0.02	U	

Data Package ID: IT0006226-1

# Dissolved ICP Metals

Method SW6010

Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: LAO-2  
Lab ID: 0006226-4

Sample Matrix: WATER  
% Moisture: N/A  
Date Collected: 26-Jun-00  
Date Extracted: 07-Jul-00  
Date Analyzed: 11-Jul-00

Prep Batch: IP000707-2  
QCBatchID: IP000707-2-4  
Run ID: IT000711-1A1  
Cleanup: NONE  
Basis: As Received

Sample Aliquot: 50 G  
Final Volume: 50 ML  
Result Units: MG/L  
File Name: TS00711

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
7429-90-5	ALUMINUM	1	0.28	0.2		
7440-36-0	ANTIMONY	1	0.02	0.02	U	
7440-38-2	ARSENIC	1	0.01	0.01	U	
7440-39-3	BARIUM	1	0.1	0.1	U	
7440-41-7	BERYLLIUM	1	0.005	0.005	U	
7440-43-9	CADMIUM	1	0.005	0.005	U	
7440-70-2	CALCIUM	1	16	1		
7440-47-3	CHROMIUM	1	0.01	0.01	U	
7440-48-4	COBALT	1	0.01	0.01	U	
7440-50-8	COPPER	1	0.01	0.01	U	
7439-89-6	IRON	1	0.26	0.1		
7439-92-1	LEAD	1	0.003	0.003	U	
7439-95-4	MAGNESIUM	1	4.3	1		
7439-96-5	MANGANESE	1	0.01	0.01	U	
7440-02-0	NICKEL	1	0.02	0.02	U	
7440-09-7	POTASSIUM	1	4.9	1		
7782-49-2	SELENIUM	1	0.005	0.005	U	
7440-22-4	SILVER	1	0.01	0.01	U	
7440-28-0	THALLIUM	1	0.01	0.01	U	
7440-62-2	VANADIUM	1	0.01	0.01	U	
7440-66-6	ZINC	1	0.02	0.02	U	

Data Package ID: IT0006226-1

# Total Recoverable ICP Metals

Method SW6010

Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: LAO-3A  
Lab ID: 0006226-5

Sample Matrix: WATER  
% Moisture: N/A  
Date Collected: 26-Jun-00  
Date Extracted: 07-Jul-00  
Date Analyzed: 11-Jul-00

Prep Batch: IP000707-2  
QCBatchID: IP000707-2-4  
Run ID: IT000711-1A1  
Cleanup: NONE  
Basis: As Received

Sample Aliquot: 50 G  
Final Volume: 50 ML  
Result Units: MG/L

File Name: TS00711

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
7429-90-5	ALUMINUM	1	0.33	0.2		
7440-36-0	ANTIMONY	1	0.02	0.02	U	
7440-38-2	ARSENIC	1	0.01	0.01	U	
7440-39-3	BARIUM	1	0.1	0.1	U	
7440-41-7	BERYLLIUM	1	0.005	0.005	U	
7440-43-9	CADMIUM	1	0.005	0.005	U	
7440-70-2	CALCIUM	1	15	1		
7440-47-3	CHROMIUM	1	0.01	0.01	U	
7440-48-4	COBALT	1	0.01	0.01	U	
7440-50-8	COPPER	1	0.01	0.01	U	
7439-89-6	IRON	1	0.28	0.1		
7439-92-1	LEAD	1	0.003	0.003	U	
7439-95-4	MAGNESIUM	1	3.5	1		
7439-96-5	MANGANESE	1	0.01	0.01	U	
7440-02-0	NICKEL	1	0.02	0.02	U	
7440-09-7	POTASSIUM	1	5.4	1		
7782-49-2	SELENIUM	1	0.005	0.005	U	
7440-22-4	SILVER	1	0.01	0.01	U	
7440-28-0	THALLIUM	1	0.01	0.01	U	
7440-62-2	VANADIUM	1	0.01	0.01	U	
7440-66-6	ZINC	1	0.02	0.02	U	

Data Package ID: IT0006226-1

# Dissolved ICP Metals

Method SW6010

Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: LAO-3A  
Lab ID: 0006226-6

Sample Matrix: WATER  
% Moisture: N/A  
Date Collected: 26-Jun-00  
Date Extracted: 07-Jul-00  
Date Analyzed: 11-Jul-00

Prep Batch: IP000707-2  
QCBatchID: IP000707-2-4  
Run ID: IT000711-1A1  
Cleanup: NONE  
Basis: As Received

Sample Aliquot: 50 G  
Final Volume: 50 ML  
Result Units: MG/L

File Name: TS00711

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
7429-90-5	ALUMINUM	1	0.2	0.2	U	
7440-36-0	ANTIMONY	1	0.02	0.02	U	
7440-38-2	ARSENIC	1	0.01	0.01	U	
7440-39-3	BARIUM	1	0.1	0.1	U	
7440-41-7	BERYLLIUM	1	0.005	0.005	U	
7440-43-9	CADMIUM	1	0.005	0.005	U	
7440-70-2	CALCIUM	1	15	1		
7440-47-3	CHROMIUM	1	0.01	0.01	U	
7440-48-4	COBALT	1	0.01	0.01	U	
7440-50-8	COPPER	1	0.01	0.01	U	
7439-89-6	IRON	1	0.21	0.1		
7439-92-1	LEAD	1	0.003	0.003	U	
7439-95-4	MAGNESIUM	1	3.5	1		
7439-96-5	MANGANESE	1	0.01	0.01	U	
7440-02-0	NICKEL	1	0.02	0.02	U	
7440-09-7	POTASSIUM	1	5.4	1		
7782-49-2	SELENIUM	1	0.005	0.005	U	
7440-22-4	SILVER	1	0.01	0.01	U	
7440-28-0	THALLIUM	1	0.01	0.01	U	
7440-62-2	VANADIUM	1	0.01	0.01	U	
7440-66-6	ZINC	1	0.02	0.02	U	

Data Package ID: IT0006226-1

# ICP Metals

Method SW6010

Method Blank

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: IP000707-2MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 07/07/2000

Date Analyzed: 07/11/2000

Prep Batch: IP000707-2

QC Batch ID: IP000707-2-4

Run ID: IT000711-1A1

Cleanup: NONE

Basis: N/A

Sample Aliquot: 50 G

Final Volume: 50 ML

Result Units: MG/L

File Name: TS00711

CASNO	Target Analyte	DF	Result	Reporting Limit	Result Qualifier	EPA Qualifier
7429-90-5	ALUMINUM	1	0.2	0.2	U	
7440-36-0	ANTIMONY	1	0.02	0.02	U	
7440-38-2	ARSENIC	1	0.01	0.01	U	
7440-39-3	BARIUM	1	0.1	0.1	U	
7440-41-7	BERYLLIUM	1	0.005	0.005	U	
7440-43-9	CADMIUM	1	0.005	0.005	U	
7440-70-2	CALCIUM	1	1	1	U	
7440-47-3	CHROMIUM	1	0.01	0.01	U	
7440-48-4	COBALT	1	0.01	0.01	U	
7440-50-8	COPPER	1	0.01	0.01	U	
7439-89-6	IRON	1	0.1	0.1	U	
7439-92-1	LEAD	1	0.003	0.003	U	
7439-95-4	MAGNESIUM	1	1	1	U	
7439-96-5	MANGANESE	1	0.01	0.01	U	
7440-02-0	NICKEL	1	0.02	0.02	U	
7440-09-7	POTASSIUM	1	1	1	U	
7782-49-2	SELENIUM	1	0.005	0.005	U	
7440-22-4	SILVER	1	0.01	0.01	U	
7440-28-0	THALLIUM	1	0.01	0.01	U	
7440-62-2	VANADIUM	1	0.01	0.01	U	
7440-66-6	ZINC	1	0.02	0.02	U	

Data Package ID: IT0006226-1

Date Printed: Monday, July 17, 2000

Paragon Analytics Inc.

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# ICP Metals

## Method SW6010

### Matrix Spike And Matrix Spike Duplicate

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: SHARED QC  
LabID: 0006275-2MS

Sample Matrix: WATER  
% Moisture: N/A  
Date Collected: 19-Jun-00  
Date Extracted: 07-Jul-00  
Date Analyzed: 11-Jul-00

Prep Batch: IP000707-2  
QCBatchID: IP000707-2-4  
Run ID: IT000711-1A1  
Cleanup: NONE  
Basis: As Received

Sample Aliquot: 50 G  
Final Volume: 50 ML  
Result Units: MG/L

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7429-90-5	ALUMINIUM	1.9		4.26		0.2	2	117	80 - 120%
7440-36-0	ANTIMONY	0.02	U	0.523		0.02	0.5	105	80 - 120%
7440-38-2	ARSENIC	0.01	U	2.25		0.01	2	112	80 - 120%
7440-39-3	BARIUM	0.1	U	2.01		0.1	2	100	80 - 120%
7440-41-7	BERYLLIUM	0.005	U	0.0493		0.005	0.05	99	80 - 120%
7440-43-9	CADMIUM	0.005	U	0.0476		0.005	0.05	95	80 - 120%
7440-70-2	CALCIUM	6		46.9		1	40	102	80 - 120%
7440-47-3	CHROMIUM	0.022		0.211		0.01	0.2	94	80 - 120%
7440-48-4	COBALT	0.01	U	0.503		0.01	0.5	101	80 - 120%
7440-50-8	COPPER	0.011		0.257		0.01	0.25	98	80 - 120%
7439-89-6	IRON	2.3		3.45		0.1	1	116	80 - 120%
7439-92-1	LEAD	0.0086		0.491		0.003	0.5	97	80 - 120%
7439-95-4	MAGNESIUM	2.6		42.1		1	40	99	80 - 120%
7439-96-5	MANGANESE	0.084		0.561		0.01	0.5	95	80 - 120%
7440-02-0	NICKEL	0.02	U	0.481		0.02	0.5	96	80 - 120%
7440-09-7	POTASSIUM	1.3		39.3		1	40	95	80 - 120%
7782-49-2	SELENIUM	0.005	U	2.09		0.005	2	105	80 - 120%
7440-22-4	SILVER	0.01	U	0.0523		0.01	0.05	105	80 - 120%
7440-28-0	THALLIUM	0.01	U	2.01		0.01	2	101	80 - 120%
7440-62-2	VANADIUM	0.01	U	0.492		0.01	0.5	98	80 - 120%
7440-66-6	ZINC	0.02	U	0.494		0.02	0.5	99	80 - 120%

Data Package ID: IT0006226-1

# ICP Metals

## Method SW6010

### Matrix Spike And Matrix Spike Duplicate

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: SHARED QC

LabID: 0006275-2MS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 19-Jun-00

Date Extracted: 07-Jul-00

Date Analyzed: 11-Jul-00

Prep Batch: IP000707-2

QCBatchID: IP000707-2-4

Run ID: IT000711-1A1

Cleanup: NONE

Basis: As Received

Sample Aliquot: 50 G

Final Volume: 50 ML

Result Units: MG/L

MSD Lab ID: 0006275-2MSD

CASNO	Target Analyte	Spike Added	MSD Result	MSD Qual	Reporting Limit	MSD % Rec.	RPD	RPD Limits
7429-90-5	ALUMINUM	2	4.17		0.2	113	2	20
7440-36-0	ANTIMONY	0.5	0.524		0.02	105	0	20
7440-38-2	ARSENIC	2	2.23		0.01	112	1	20
7440-39-3	BARIUM	2	2		0.1	100	0	20
7440-41-7	BERYLLIUM	0.05	0.0493		0.005	99	0	20
7440-43-9	CADMIUM	0.05	0.0478		0.005	96	1	20
7440-70-2	CALCIUM	40	46.9		1	102	0	20
7440-47-3	CHROMIUM	0.2	0.212		0.01	95	1	20
7440-48-4	COBALT	0.5	0.503		0.01	101	0	20
7440-50-8	COPPER	0.25	0.256		0.01	98	0	20
7439-89-6	IRON	1	3.32		0.1	104	4	20
7439-92-1	LEAD	0.5	0.497		0.003	98	1	20
7439-95-4	MAGNESIUM	40	42.1		1	99	0	20
7439-96-5	MANGANESE	0.5	0.561		0.01	95	0	20
7440-02-0	NICKEL	0.5	0.48		0.02	96	0	20
7440-09-7	POTASSIUM	40	39.1		1	95	0	20
7782-49-2	SELENIUM	2	2.14		0.005	107	2	20
7440-22-4	SILVER	0.05	0.0525		0.01	105	0	20
7440-28-0	THALLIUM	2	2.02		0.01	101	1	20
7440-62-2	VANADIUM	0.5	0.493		0.01	99	0	20
7440-66-6	ZINC	0.5	0.495		0.02	99	0	20

Data Package ID: IT0006226-1

# Total Recoverable ICP Metals

Method SW6010

Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: DP SPRING  
Lab ID: 0006226-1

Sample Matrix: WATER  
% Moisture: N/A  
Date Collected: 26-Jun-00  
Date Extracted: 07-Jul-00  
Date Analyzed: 12-Jul-00

Prep Batch: IP000707-2  
QCBatchID: IP000707-2-4  
Run ID: IP000712-1A1  
Cleanup: NONE  
Basis: As Received

Sample Aliquot: 50 G  
Final Volume: 50 ML  
Result Units: MG/L  
File Name: IS00712

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
7440-42-8	BORON	1	0.1	0.1	U	
7439-93-2	LITHIUM	1	0.01	0.01		
7440-21-3	SILICON	1	8.6	0.05		
7440-23-5	SODIUM	1	26	1		

Data Package ID: IP0006226-1

# Dissolved ICP Metals

Method SW6010

Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: DP SPRING

Lab ID: 0006226-2

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 26-Jun-00

Date Extracted: 07-Jul-00

Date Analyzed: 12-Jul-00

Prep Batch: IP000707-2

QCBatchID: IP000707-2-4

Run ID: IP000712-1A1

Cleanup: NONE

Basis: As Received

Sample Aliquot: 50 G

Final Volume: 50 ML

Result Units: MG/L

File Name: IS00712

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
7440-42-8	BORON	1	0.1	0.1	U	
7439-93-2	LITHIUM	1	0.011	0.01		
7440-21-3	SILICON	1	8.4	0.05		
7440-23-5	SODIUM	1	26	1		

Data Package ID: IP0006226-1

# Total Recoverable ICP Metals

Method SW6010

Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: LAO-2  
Lab ID: 0006226-3

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 26-Jun-00

Date Extracted: 07-Jul-00

Date Analyzed: 12-Jul-00

Prep Batch: IP000707-2

QCBatchID: IP000707-2-4

Run ID: IP000712-1A1

Cleanup: NONE

Basis: As Received

Sample Aliquot: 50 G

Final Volume: 50 ML

Result Units: MG/L

File Name: IS00712

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
7440-42-8	BORON	1	0.1	0.1	U	
7439-93-2	LITHIUM	1	0.053	0.01		
7440-21-3	SILICON	1	26	0.05		
7440-23-5	SODIUM	1	29	1		

Data Package ID: IP0006226-1

# Dissolved ICP Metals

Method SW6010

Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: LAO-2  
Lab ID: 0006226-4

Sample Matrix: WATER  
% Moisture: N/A  
Date Collected: 26-Jun-00  
Date Extracted: 07-Jul-00  
Date Analyzed: 12-Jul-00

Prep Batch: IP000707-2  
QCBatchID: IP000707-2-4  
Run ID: IP000712-1A1  
Cleanup: NONE  
Basis: As Received

Sample Aliquot: 50 G  
Final Volume: 50 ML  
Result Units: MG/L

File Name: IS00712

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
7440-42-8	BORON	1	0.1	0.1	U	
7439-93-2	LITHIUM	1	0.052	0.01		
7440-21-3	SILICON	1	26	0.05		
7440-23-5	SODIUM	1	30	1		

Data Package ID: IP0006226-1

# Total Recoverable ICP Metals

Method SW6010

Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: LAO-3A  
Lab ID: 0006226-5

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 26-Jun-00

Date Extracted: 07-Jul-00

Date Analyzed: 12-Jul-00

Prep Batch: IP000707-2

QC Batch ID: IP000707-2-4

Run ID: IP000712-1A1

Cleanup: NONE

Basis: As Received

Sample Aliquot: 50 G

Final Volume: 50 ML

Result Units: MG/L

File Name: IS00712

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
7440-42-8	BORON	1	0.1	0.1	U	
7439-93-2	LITHIUM	1	0.039	0.01		
7440-21-3	SILICON	1	26	0.05		
7440-23-5	SODIUM	1	30	1		

Data Package ID: IP0006226-1

# Dissolved ICP Metals

Method SW6010

Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID:	LAO-3A
Lab ID:	0006226-6

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 26-Jun-00

Date Extracted: 07-Jul-00

Date Analyzed: 12-Jul-00

Prep Batch: IP000707-2

QCBatchID: IP000707-2-4

Run ID: IP000712-1A1

Cleanup: NONE

Basis: As Received

Sample Aliquot: 50 G

Final Volume: 50 ML

Result Units: MG/L

File Name: IS00712

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
7440-42-8	BORON	1	0.1	0.1	U	
7439-93-2	LITHIUM	1	0.039	0.01		
7440-21-3	SILICON	1	26	0.05		
7440-23-5	SODIUM	1	30	1		

Data Package ID: IP0006226-1

# ICP Metals

Method SW6010

Method Blank

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: IP000707-2MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 07/07/2000

Date Analyzed: 07/12/2000

Prep Batch: IP000707-2

QC Batch ID: IP000707-2-4

Run ID: IP000712-1A1

Cleanup: NONE

Basis: N/A

Sample Aliquot: 50 G

Final Volume: 50 ML

Result Units: MG/L

File Name: IS00712

CASNO	Target Analyte	DF	Result	Reporting Limit	Result Qualifier	EPA Qualifier
7440-42-8	BORON	1	0.1	0.1	U	
7439-93-2	LITHIUM	1	0.01	0.01	U	
7440-21-3	SILICON	1	0.05	0.05	U	
7440-23-5	SODIUM	1	1	1	U	

Data Package ID: IP0006226-1

# ICP Metals

## Method SW6010

### Matrix Spike And Matrix Spike Duplicate

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: SHARED QC

LabID: 0006275-2MS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 19-Jun-00

Date Extracted: 07-Jul-00

Date Analyzed: 12-Jul-00

Prep Batch: IP000707-2

QCBatchID: IP000707-2-4

Run ID: IP000712-1A1

Cleanup: NONE

Basis: As Received

Sample Aliquot: 50 G

Final Volume: 50 ML

Result Units: MG/L

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7440-42-8	BORON	0.1	U	0.944		0.1	1	94	80 - 120%
7439-93-2	LITHIUM	0.01	U	0.494		0.01	0.5	99	80 - 120%
7440-21-3	SILICON	3.9		7.14	N	0.05	2	160	80 - 120%
7440-23-5	SODIUM	17		56.3		1	40	100	80 - 120%

MSD Lab ID: 0006275-2MSD

CASNO	Target Analyte	Spike Added	MSD Result	MSD Qual	Reporting Limit	MSD % Rec.	RPD	RPD Limits
7440-42-8	BORON	1	0.94		0.1	94	0	20
7439-93-2	LITHIUM	0.5	0.495		0.01	99	0	20
7440-21-3	SILICON	2	6.99	N	0.05	153	2	20
7440-23-5	SODIUM	40	56.2		1	99	0	20

Data Package ID: IP0006226-1

**ICP Metals**  
**Method SW6010**  
**Analytical Spike Sample Recovery**

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: SHARED QC  
LabID: 0006275-2A

Run ID: IP000712-1A1  
Date Analyzed: 12-Jul-00  
Result Units: MG/L

Target Analyte	Sample Result	Samp Qual	PS Result	PS Qual	Spike Added	PS % Rec.	Control Limits
SILICON	3.93482		12.01156		8	101	75 - 125%

Data Package ID: IP0006226-1

Date Printed: Monday, July 17, 2000

Paragon Analytics Inc.

LIMS Version: 1.885

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# Total Recoverable MERCURY

Method SW7470

## Sample Results

Lab Name: Paragon Analytics, Inc.

Client Name: NMED DOE Oversight Bureau

Client Project ID: HRMB 6.26.00

Work Order Number: 0006226

Reporting Basis: As Received

Final Volume: 20 G

Matrix: WATER

Result Units: MG/L

---

Client Sample ID	Lab ID	Date Collected	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Reporting Limit	Flag	Sample Aliquot
DP SPRING	0006226-1	6/26/2000	7/14/2000	07/14/2000	N/A	1	0.0002	0.0002	U	20 G
LAO-2	0006226-3	6/26/2000	7/14/2000	07/14/2000	N/A	1	0.0002	0.0002	U	20 G
LAO-3A	0006226-5	6/26/2000	7/14/2000	07/14/2000	N/A	1	0.0002	0.0002	U	20 G

### Comments:

- 
1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: *HG0006226-1*

# Dissolved MERCURY

Method SW7470

## Sample Results

Lab Name: Paragon Analytics, Inc.

Client Name: NMED DOE Oversight Bureau

Client Project ID: HRMB 6.26.00

Work Order Number: 0006226

Reporting Basis: As Received

Final Volume: 20 G

Matrix: WATER

Result Units: MG/L

Client Sample ID	Lab ID	Date Collected	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Reporting Limit	Flag	Sample Aliquot
DP SPRING	0006226-2	6/26/2000	7/14/2000	07/14/2000	N/A	1	0.0002	0.0002	U	20 G
LAO-2	0006226-4	6/26/2000	7/14/2000	07/14/2000	N/A	1	0.0002	0.0002	U	20 G
LAO-3A	0006226-6	6/26/2000	7/14/2000	07/14/2000	N/A	1	0.0002	0.0002	U	20 G

### Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: *HG0006226-1*

**Mercury**  
**Method SW7470**  
**Method Blank**

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: HG000714-1MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 07/14/2000

Date Analyzed: 07/14/2000

Prep Batch: HG000714-1

QCBatchID: HG000714-1-3

Run ID: HG000714-2A1

Cleanup: NONE

Basis: N/A

Sample Aliquot: 20 G

Final Volume: 20 G

Result Units: MG/L

File Name: 0714WATR

CASNO	Target Analyte	DF	Result	Reporting Limit	Result Qualifier	EPA Qualifier
7439-97-6	MERCURY	1	0.0002	0.0002	U	

Data Package ID: HG0006226-1

# Mercury

## Method SW7470

### Matrix Spike And Matrix Spike Duplicate

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: SHARED QC  
LabID: 0006269-2MS

Sample Matrix: WATER  
% Moisture: N/A  
Date Collected: 27-Jun-00  
Date Extracted: 14-Jul-00  
Date Analyzed: 14-Jul-00

Prep Batch: HG000714-1  
QCBatchID: HG000714-1-3  
Run ID: HG000714-2A1  
Cleanup: NONE  
Basis: As Received

Sample Aliquot: 20 G  
Final Volume: 20 G  
Result Units: MG/L

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7439-97-6	MERCURY	0.0002	U	0.00218		0.0002	0.002	109	80 - 120%

MSD Lab ID: 0006269-2MSD

CASNO	Target Analyte	Spike Added	MSD Result	MSD Qual	Reporting Limit	MSD % Rec.	RPD	RPD Limits
7439-97-6	MERCURY	0.002	0.00221		0.0002	111	1	20

Data Package ID: HG0006226-1

# Paragon Analytics, Inc.



## INORGANICS CASE NARRATIVE

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### NMED DOE Oversight Bureau

HRMB 6.26.00

**Order Number - 0006226**

1. This report consists of data for three water samples.
2. The samples were received cool and intact on 06/28/00.
3. The samples had been correctly preserved for the requested analyses.
4. The samples were prepared for analysis based on SW-846, 3<sup>rd</sup> Edition procedures and Methods for the Chemical Analysis of Waters and Wastes (MCAWW), May 1994 procedures.
5. The samples were analyzed following SW-846 and MCAWW procedures for the following methods:

<u>Analyte</u>	<u>Method</u>	<u>SOP #</u>
Bicarbonate	310.1	1106 Rev 1
Carbonate	310.1	1106 Rev 1
Total Cyanide	9010	1110 Rev 1
Ammonia as N	350.3	1116 Rev 0
Nitrate/Nitrite as N	353.3	1108 Rev 0
Chloride	300.0	1113 Rev 0
Bromide	300.0	1113 Rev 0
Fluoride	300.0	1113 Rev 0
Sulfate	300.0	1113 Rev 0
Total Phosphorus	365.2	1119 Rev 0
TDS	160.1	1101 Rev 1
TSS	160.2	1100 Rev 1

6. All standards and solutions were used within their recommended shelf life.
7. The samples were prepared and analyzed within the established hold times for all analyses.



All in house quality control procedures were followed, as described below.

8. General quality control procedures.

- A preparation (method) blank and laboratory control sample (LCS) were prepared and analyzed with the samples in each preparation batch. There were not more than 20 samples in each preparation batch.
- The method blank associated with each batch was below the reporting limits for the requested analytes. This indicates that no contaminants were introduced to the samples during preparation and analysis.
- The LCS was within the acceptance limits for all analyses.
- All initial and continuing calibration blanks (ICB/CCB) associated with each batch were below the reporting limits for the requested analytes.
- All initial and continuing calibration verifications (ICV/CCV) associated with each batch were within the acceptance criteria for the requested analytes. This indicates a valid calibration and stable instrument conditions.

9. Matrix specific quality control procedures.

PAI sample ID 0006162-1 was designated as the quality control sample for the bicarbonate and carbonate batch. PAI sample ID 0006269-2 was designated as the quality control sample for the total cyanide batch. PAI sample ID 0006269-1 was designated as the quality control sample for the the total phosphorus batch. PAI sample ID 0006226-1 was designated as the quality control sample for the ammonia and IC batches. PAI sample ID 0006226-5 was designated as the quality control sample for the TDS and TSS batches. PAI sample ID 0007074-1 was designated as the quality control sample for the nitrate/nitrite batch.

- A matrix spike (MS) and matrix spike duplicate (MSD) were prepared and analyzed with the total cyanide, ammonia, nitrate/nitrite, total phosphorus and IC batches. All guidance criteria for precision and accuracy were met with the following exceptions.

<u>Analyte</u>	<u>Sample ID</u>
Chloride	0006226-1 MS & MSD

The chloride concentration in the native sample was above the analytical range of this analyte on the ion chromatograph; therefore accurate quantitation of MS/MSD recoveries for chloride was not possible as the spike added was small relative to the unspiked sample concentrations. The MS/MSD results were within acceptance limits for all other associated analyses. The Laboratory Control Sample indicates that the procedure was in control.

- A sample duplicate was prepared and analyzed with the bicarbonate, carbonate, TSS and TDS batches. All guidance criteria for precision were met.



10. It was necessary to dilute PAI samples 0006226-1, -3, and -5 for the nitrate/nitrite analysis in order to protect the cadmium reduction column and to bring the instrument response to within the analytical range of these analytes on the spectrophotometer. It was necessary to dilute PAI samples 0006226-1 and 3 in order to bring the chloride concentration into the analytical range of this analyte on the ion chromatograph.

The data contained in the following report have been reviewed and approved by the personnel listed below:

Tony Briney  
Tony Briney  
Inorganic Chemist

8/3/00  
Date

DP  
Reviewer's Initials

8/3/00  
Date

CERTIFICATION

Paragon Analyticals, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

# Paragon Analytics, Incorporated

## Sample Number(s) Cross-Reference Table

---

**Paragon OrderNum:** 0006226

**Client Name:** NMED DOE Oversight Bureau

**Client Project Name:**

**Client Project Number:** HRMB 6.26.00

**Client PO Number:**

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Client Sample	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
DP SPRING	0006226-1		WATER	6/26/00	10:20
DP SPRING	0006226-2		WATER	6/26/00	10:20
LAO-2	0006226-3		WATER	6/26/00	10:46
LAO-2	0006226-4		WATER	6/26/00	10:46
LAO-3A	0006226-5		WATER	6/26/00	13:23
LAO-3A	0006226-6		WATER	6/26/00	13:23

# Paragon Analytics, Incorporated

## Sample Number(s) Cross-Reference Table

---

**Paragon OrderNum:** 0006272

**Client Name:** NMED DOE Oversight Bureau

**Client Project Name:**

**Client Project Number:** HRMB 6.29.00

**Client PO Number:**

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Client Sample	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
PA-6.7	0006272-1		WATER	6/29/00	8:30
PA-6.7	0006272-2		WATER	6/29/00	8:30
PA at TM	0006272-3		WATER	6/29/00	9:30
PA at TM	0006272-4		WATER	6/29/00	9:30
PA-10.6	0006272-5		WATER	6/29/00	11:10
PA-10.6	0006272-6		WATER	6/29/00	11:10

## **Inorganic Data Reporting Qualifiers**

The following qualifiers are used by the laboratory when reporting results of inorganic analyses.

- Concentration qualifier -- If the analyte was analyzed for but not detected a "U" is entered.
- QC qualifier -- Specified entries and their meanings are as follows:
  - N - Spiked sample recovery not within control limits.
  - \* - Duplicate analysis (relative percent difference) not within control limits.
- B - The method blank for the analysis contained the analyte of interest above the reporting limit.

# Alkalinity as Calcium Carbonate

Method EPA310.1

Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: DP SPRING

Lab ID: 0006226-1

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 26-Jun-00

Date Extracted: 30-Jun-00

Date Analyzed: 30-Jun-00

Prep Batch: AK000630-1

QCBatchID: AK000630-1-2

Run ID: AK000630-1A

Cleanup: NONE

Basis: As Received

Sample Aliquot: 100 ML

Final Volume: 100 ML

Result Units: MG/L

File Name:

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
10-13-9	BICARBONATE AS CaCO <sub>3</sub>	1	73	5		
3812-32-6	CARBONATE AS CaCO <sub>3</sub>	1	5	5	U	

Data Package ID: AK0006226-1

Date Printed: Wednesday, July 05, 2000

Paragon Analytics Inc.

LIMS Version: 1.880

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# Alkalinity as Calcium Carbonate

Method EPA310.1

Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: LAO-2  
Lab ID: 0006226-3

Sample Matrix: WATER  
% Moisture: N/A  
Date Collected: 26-Jun-00  
Date Extracted: 30-Jun-00  
Date Analyzed: 30-Jun-00

Prep Batch: AK000630-1  
QCBatchID: AK000630-1-2  
Run ID: AK000630-1A  
Cleanup: NONE  
Basis: As Received

Sample Aliquot: 100 ML  
Final Volume: 100 ML  
Result Units: MG/L  
File Name:

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
10-13-9	BICARBONATE AS CaCO3	1	77	5		
3812-32-6	CARBONATE AS CaCO3	1	5	5	U	

Data Package ID: AK0006226-1

# Alkalinity as Calcium Carbonate

Method EPA310.1

Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: LAO-3A  
Lab ID: 0006226-5

Sample Matrix: WATER  
% Moisture: N/A  
Date Collected: 26-Jun-00  
Date Extracted: 30-Jun-00  
Date Analyzed: 30-Jun-00

Prep Batch: AK000630-1  
QCBatchID: AK000630-1-2  
Run ID: AK000630-1A  
Cleanup: NONE  
Basis: As Received

Sample Aliquot: 100 ML  
Final Volume: 100 ML  
Result Units: MG/L  
File Name:

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
10-13-9	BICARBONATE AS CaCO3	1	84	5		
3812-32-6	CARBONATE AS CaCO3	1	5	5	U	

Data Package ID: AK0006226-1

# Alkalinity as Calcium Carbonate

Method EPA310.1

Method Blank

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: AK000630-1MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 06/30/2000

Date Analyzed: 06/30/2000

Prep Batch: AK000630-1

QCBatchID: AK000630-1-2

Run ID: AK000630-1A

Cleanup: NONE

Basis: N/A

Sample Aliquot: 100 ML

Final Volume: 100 ML

Result Units: MG/L

File Name:

CASNO	Target Analyte	DF	Result	Reporting Limit	Result Qualifier	EPA Qualifier
10-13-9	BICARBONATE AS CaCO <sub>3</sub>	1	5	5	U	
3812-32-6	CARBONATE AS CaCO <sub>3</sub>	1	5	5	U	

Data Package ID: AK0006226-1

# Alkalinity as Calcium Carbonate

Method EPA310.1

Blank Spike

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: AK000630-1LCS

Sample Matrix: WATER

Prep Batch: AK000630-1

Sample Aliquot: 100 ML

% Moisture: N/A

QCBatchID: AK000630-1-2

Final Volume: 100 ML

Date Collected: N/A

Run ID: AK000630-1A

Result Units: mg/L

Date Extracted: 06/30/2000

Cleanup: NONE

Date Analyzed: 06/30/2000

Basis: N/A

CASNO	Target Analyte	Spike Added	LCS Result	Reporting Limit	Result Qualifier	LCS % Rec.	Control Limits
10-13-9	BICARBONATE AS CaCO <sub>3</sub>	100	99	5		99	85 - 115%
3812-32-6	CARBONATE AS CaCO <sub>3</sub>	100	99	5		99	85 - 115%

Data Package ID: AK0006226-1

# Alkalinity as Calcium Carbonate

Method EPA310.1

## Duplicate Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: SHARED QC	Sample Matrix: WATER	Prep Batch: AK000630-1	Sample Aliquot: 100 ML
Lab ID: 0006162-1	% Moisture: N/A	QCBatchID: AK000630-1-2	Final Volume: 100 ML
	Date Collected: 06/21/2000	Run ID: AK000630-1A	Result Units: mg/L
	Date Extracted: 06/30/2000	Cleanup: NONE	
	Date Analyzed: 06/30/2000	Basis: As Received	

CASNO	Target Analyte	Sample Result	Samp Qual	Duplicate Result	Dup Qual	Reporting Limit	Dilution Factor	RPD	RPD Limit
10-13-9	BICARBONATE AS CACO	74		72.6		5	1	2	15
3812-32-6	CARBONATE AS CACO3	5	U	5	U	5	1		15

Data Package ID: AK0006226-1

Date Printed: Wednesday, July 05, 2000

Paragon Analytics Inc.

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LIMS Version: 1.880

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**AMMONIA**  
**Method EPA350.3**  
**Sample Results**

Lab Name: Paragon Analytics, Inc.  
Client Name: NMED DOE Oversight Bureau  
Client Project ID: HRMB 6.26.00  
Work Order Number: 0006226  
Reporting Basis: As Received

Final Volume: 10 ML  
Matrix: WATER  
Result Units: mg/L

Client Sample ID	Lab ID	Date Collected	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Reporting Limit	Flag	Sample Aliquot
DP SPRING	0006226-1	6/26/2000	7/7/2000	07/07/2000	N/A	1	1.2	0.5		10 ML
LAO-2	0006226-3	6/26/2000	7/7/2000	07/07/2000	N/A	1	0.5	0.5	U	10 ML
LAO-3A	0006226-5	6/26/2000	7/7/2000	07/07/2000	N/A	1	0.5	0.5	U	10 ML

**Comments:**

- 1. ND or U = Not Detected at or above the client requested detection limit.

**Data Package ID: NH0006226-1**

# Ammonia as N

## Method EPA350.3

### Method Blank

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: NH000707-1MB

Sample Matrix: WATER  
% Moisture: N/A

Prep Batch: NH000707-1  
QCBatchID: NH000707-1-1  
Run ID: NH000707-1A  
Cleanup: NONE  
Basis: N/A

Sample Aliquot: 10 ML  
Final Volume: 10 ML  
Result Units: mg/L

Lab ID	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Reporting Limit	Flag
NH000707-1MB	7/7/2000	07/07/2000	N/A	1	0.5	0.5	U

#### Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: NH0006226-1

# Ammonia as N

Method EPA350.3

## Blank Spike

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: NH000707-1LCS

Sample Matrix: WATER

Prep Batch: NH000707-1

Sample Aliquot: 10 ML

% Moisture: N/A

QCBatchID: NH000707-1-1

Final Volume: 10 ML

Date Collected: N/A

Run ID: NH000707-1A

Result Units: mg/L

Date Extracted: 07/07/2000

Cleanup: NONE

Date Analyzed: 07/07/2000

Basis: N/A

CASNO	Target Analyte	Spike Added	BS Result	Reporting Limit	Result Qualifier	BS % Rec.	Control Limits
7664-41-7	AMMONIA	10	10.2	0.5		102	85 - 115

Data Package ID: NH0006226-1

Date Printed: Monday, July 10, 2000

Paragon Analytics Inc.

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LIMS Version: 1.884

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# Ammonia as N

Method EPA350.3

## Matrix Spike And Matrix Spike Duplicate

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: DP SPRING  
LabID: 0006226-1MS

Sample Matrix: WATER  
% Moisture: N/A  
Date Collected: 26-Jun-00  
Date Extracted: 07-Jul-00  
Date Analyzed: 07-Jul-00

Prep Batch: NH000707-1  
QCBatchID: NH000707-1-1  
Run ID: NH000707-1A  
Cleanup: NONE  
Basis: As Received

Sample Aliquot: 10 ML  
Final Volume: 10 ML  
Result Units: mg/L

Spike Added	Sample Result	Samp Qual	Reporting Limit	MS Result	MS % Rec.	MS Qualifier	Control Limits
10	1.2		0.5	10.2	90		75 - 125%

MSD Lab ID: 0006226-1MSD

Spike Added	MSD Result	MSD Qual	Reporting Limit	MSD % Rec.	RPD	RPD Limits
10	10.1		0.5	89	1	15

Data Package ID: NH0006226-1

# CYANIDE, TOTAL

Method SW9010

## Sample Results

Lab Name: Paragon Analytics, Inc.  
Client Name: NMED DOE Oversight Bureau  
Client Project ID: HRMB 6.26.00  
Work Order Number: 0006226  
Reporting Basis: As Received

Final Volume: 50 ML  
Matrix: WATER  
Result Units: mg/L

Client Sample ID	Lab ID	Date Collected	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Reporting Limit	Flag	Sample Aliquot
DP SPRING	0006226-1	6/26/2000	7/7/2000	07/08/2000	N/A	1	0.01	0.01	U	50 ML
LAO-2	0006226-3	6/26/2000	7/7/2000	07/08/2000	N/A	1	0.01	0.01	U	50 ML
LAO-3A	0006226-5	6/26/2000	7/7/2000	07/08/2000	N/A	1	0.01	0.01	U	50 ML

### Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: CN0006226-1

**Total Cyanide**  
**Method SW9010**  
**Method Blank**

Lab Name: Paragon Analytics, Inc.  
Work Order Number: 0006226  
Client Name: NMED DOE Oversight Bureau  
ClientProject ID: HRMB 6.26.00

Lab ID: CN000707-1MB

Sample Matrix: WATER  
% Moisture: N/A

Prep Batch: CN000707-1  
QCBatchID: CN000707-1-3  
Run ID: CN000708-1A  
Cleanup: NONE  
Basis: N/A

Sample Aliquot: 50 ML  
Final Volume: 50 ML  
Result Units: mg/L

Lab ID	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Reporting Limit	Flag
CN000707-1MB	7/7/2000	07/08/2000	N/A	1	0.01	0.01	U

**Comments:**

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: CN0006226-1

# Total Cyanide

Method SW9010

Blank Spike

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: CN000707-1LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 07/07/2000

Date Analyzed: 07/08/2000

Prep Batch: CN000707-1

QCBatchID: CN000707-1-3

Run ID: CN000708-1A

Cleanup: NONE

Basis: N/A

Sample Aliquot: 50 ML

Final Volume: 50 ML

Result Units: mg/L

CASNO	Target Analyte	Spike Added	BS Result	Reporting Limit	Result Qualifier	BS % Rec.	Control Limits
57-12-5	CYANIDE, TOTAL	0.4	0.396	0.01		99	85 - 115

Data Package ID: CN0006226-1

Date Printed: Monday, July 10, 2000

Paragon Analytics Inc.

LIMS Version: 1.884

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# Total Cyanide

Method SW9010

## Matrix Spike And Matrix Spike Duplicate

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: SHARED QC

LabID: 0006269-2MS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 27-Jun-00

Date Extracted: 07-Jul-00

Date Analyzed: 08-Jul-00

Prep Batch: CN000707-1

QCBatchID: CN000707-1-3

Run ID: CN000708-1A

Cleanup: NONE

Basis: As Received

Sample Aliquot: 50 ML

Final Volume: 50 ML

Result Units: mg/L

Spike Added	Sample Result	Samp Qual	Reporting Limit	MS Result	MS % Rec.	MS Qualifier	Control Limits
0.1	0.01	U	0.01	0.106	106		63 - 126%

MSD Lab ID: 0006269-2MSD

Spike Added	MSD Result	MSD Qual	Reporting Limit	MSD % Rec.	RPD	RPD Limits
0.1	0.118		0.01	118	10	30

Data Package ID: CN0006226-1

# NITRATE/NITRITE

## Method EPA353.3

### Sample Results

Lab Name: Paragon Analytics, Inc.  
Client Name: NMED DOE Oversight Bureau  
Client Project ID: HRMB 6.26.00  
Work Order Number: 0006226  
Reporting Basis: As Received

Final Volume: 3 ML  
Matrix: WATER  
Result Units: MG/L

Client Sample ID	Lab ID	Date Collected	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Reporting Limit	Flag	Sample Aliquot
DP SPRING	0006226-1	6/26/2000	7/20/2000	07/22/2000	N/A	2	1.4	0.1		3 ML
LAO-2	0006226-3	6/26/2000	7/20/2000	07/22/2000	N/A	2	1.3	0.1		3 ML
LAO-3A	0006226-5	6/26/2000	7/20/2000	07/22/2000	N/A	2	1.1	0.1		3 ML

#### Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: NN0006226-1

# Nitrate/Nitrite as N

Method EPA353.3

Method Blank

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: NN000720-1MB

Sample Matrix: WATER  
% Moisture: N/A

Prep Batch: NN000720-1  
QCBatchID: NN000720-1-1  
Run ID: NN000722-1A  
Cleanup: NONE  
Basis: N/A

Sample Aliquot: 3 ML  
Final Volume: 3 ML  
Result Units: MG/L

Lab ID	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Reporting Limit	Flag
NN000720-1MB	7/20/2000	07/22/2000	N/A	1	0.05	0.05	U

## Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: NN0006226-1

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# Nitrate/Nitrite as N

Method EPA353.3

Blank Spike

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: NN000720-1LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 07/20/2000

Date Analyzed: 07/22/2000

Prep Batch: NN000720-1

QCBatchID: NN000720-1-1

Run ID: NN000722-1A

Cleanup: NONE

Basis: N/A

Sample Aliquot: 3 ML

Final Volume: 3 ML

Result Units: MG/L

CASNO	Target Analyte	Spike Added	BS Result	Reporting Limit	Result Qualifier	BS % Rec.	Control Limits
1-005	NITRATE/NITRITE	0.5	0.503	0.05		101	90 - 110

Data Package ID: NN0006226-1

# Nitrate/Nitrite as N

Method EPA353.3

## Matrix Spike And Matrix Spike Duplicate

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: SHARED QC

LabID: 0007074-1MS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 07-Jul-00

Date Extracted: 20-Jul-00

Date Analyzed: 22-Jul-00

Prep Batch: NN000720-1

QCBatchID: NN000720-1-1

Run ID: NN000722-1A

Cleanup: NONE

Basis: As Received

Sample Aliquot: 3 ML

Final Volume: 3 ML

Result Units: MG/L

Spike Added	Sample Result	Samp Qual	Reporting Limit	MS Result	MS % Rec.	MS Qualifier	Control Limits
5	5.7		0.5	10	86		75 - 125%

MSD Lab ID: 0007074-1MSD

Spike Added	MSD Result	MSD Qual	Reporting Limit	MSD % Rec.	RPD	RPD Limits
5	10.4		0.5	94	4	20

Data Package ID: NN0006226-1

# TOTAL PHOSPHORUS

## Method EPA365.2

### Sample Results

Lab Name: Paragon Analytics, Inc.

Client Name: NMED DOE Oversight Bureau

Client Project ID: HRMB 6.26.00

Work Order Number: 0006226

Reporting Basis: As Received

Final Volume: 50 ML

Matrix: WATER

Result Units: MG/L

Client Sample ID	Lab ID	Date Collected	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Reporting Limit	Flag	Sample Aliquot
DP SPRING	0006226-1	6/26/2000	7/12/2000	07/12/2000	N/A	1	0.14	0.05		50 ML
LAO-2	0006226-3	6/26/2000	7/12/2000	07/12/2000	N/A	1	0.24	0.05		50 ML
LAO-3A	0006226-5	6/26/2000	7/12/2000	07/12/2000	N/A	1	0.25	0.05		50 ML

#### Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: PO0006226-1

# Total Phosphorus as P

Method EPA365.2

Method Blank

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: PO000712-1MB

Sample Matrix: WATER  
% Moisture: N/A

Prep Batch: PO000712-1  
QCBatchID: PO000712-1-1  
Run ID: PO000712-1A  
Cleanup: NONE  
Basis: N/A

Sample Aliquot: 50 ML  
Final Volume: 50 ML  
Result Units: MG/L

Lab ID	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Reporting Limit	Flag
PO000712-1MB	7/12/2000	07/12/2000	N/A	1	0.05	0.05	U

## Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: PO0006226-1

# Total Phosphorus as P

Method EPA365.2

Blank Spike

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: PO000712-1LCS

Sample Matrix: WATER

Prep Batch: PO000712-1

Sample Aliquot: 50 ML

% Moisture: N/A

QCBatchID: PO000712-1-1

Final Volume: 50 ML

Date Collected: N/A

Run ID: PO000712-1A

Result Units: MG/L

Date Extracted: 07/12/2000

Cleanup: NONE

Date Analyzed: 07/12/2000

Basis: N/A

CASNO	Target Analyte	Spike Added	LCS Result	Reporting Limit	Result Qualifier	LCS % Rec.	Control Limits
7723-14-0	TOTAL PHOSPHORUS	0.5	0.521	0.05		104	80 - 120%

Data Package ID: PO0006226-1

# Total Phosphorus as P

## Method EPA365.2

### Matrix Spike And Matrix Spike Duplicate

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: SHARED QC	Sample Matrix: WATER	Prep Batch: PO000712-1	Sample Aliquot: 50 ML
LabID: 0006269-1MS	% Moisture: N/A	QCBatchID: PO000712-1-1	Final Volume: 50 ML
	Date Collected: 27-Jun-00	Run ID: PO000712-1A	Result Units: MG/L
	Date Extracted: 12-Jul-00	Cleanup: NONE	
	Date Analyzed: 12-Jul-00	Basis: As Received	

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7723-14-0	TOTAL PHOSPHORUS	0.13		0.665		0.05	0.5	106	80 - 120%

MSD Lab ID: 0006269-1MSD

CASNO	Target Analyte	Spike Added	MSD Result	MSD Qual	Reporting Limit	MSD % Rec.	RPD	RPD Limits
7723-14-0	TOTAL PHOSPHORUS	0.5	0.649		0.05	103		20

Data Package ID: PO0006226-1

# TOTAL DISSOLVED SOLIDS

Method EPA160.1

## Sample Results

Lab Name: Paragon Analytics, Inc.

Client Name: NMED DOE Oversight Bureau

Client Project ID: HRMB 6.26.00

Work Order Number: 0006226

Reporting Basis: As Received

Final Volume: 100 ML

Matrix: WATER

Result Units: mg/L

Client Sample ID	Lab ID	Date Collected	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Reporting Limit	Flag	Sample Aliquot
DP SPRING	0006226-1	6/26/2000	6/29/2000	06/30/2000	N/A	1	170	20		100 ML
LAO-2	0006226-3	6/26/2000	6/29/2000	06/30/2000	N/A	1	240	20		100 ML
LAO-3A	0006226-5	6/26/2000	6/29/2000	06/30/2000	N/A	1	220	20		100 ML

### Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: TD0006226-1

00028

# Total Dissolved Solids

Method EPA160.1

Method Blank

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: TD000629-1MB

Sample Matrix: WATER  
% Moisture: N/A

Prep Batch: TD000629-1  
QCBatchID: TD000629-1-2  
Run ID: TD000630-1A  
Cleanup: NONE  
Basis: N/A

Sample Aliquot: 100 ML  
Final Volume: 100 ML  
Result Units: mg/L

Lab ID	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Reporting Limit	Flag
TD000629-1MB	6/29/2000	06/30/2000	N/A	1	20	20	U

## Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: TD0006226-1

# Total Dissolved Solids

Method EPA160.1

Blank Spike

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: TD000629-1LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 06/29/2000

Date Analyzed: 06/30/2000

Prep Batch: TD000629-1

QCBatchID: TD000629-1-2

Run ID: TD000630-1A

Cleanup: NONE

Basis: N/A

Sample Aliquot: 100 ML

Final Volume: 100 ML

Result Units: mg/L

CASNO	Target Analyte	Spike Added	BS Result	Reporting Limit	Result Qualifier	BS % Rec.	Control Limits
10-33-3	TOTAL DISSOLVED SOLIDS	400	403	20		101	85 - 115

Data Package ID: TD0006226-1

Date Printed: Wednesday, July 05, 2000

Paragon Analytics Inc.

LIMS Version: 1.880

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00030

# Total Dissolved Solids

Method EPA160.1

## Duplicate Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Reporting Basis: As Received

Sample Aliquot: 100 ML

Final Volume: 100ML

Matrix: WATER

Result Units mg/L

Client Sample ID	Lab ID	Date Prepared	Date Analyzed	Dilution Factor	Duplicate Result	Dup Qual	Sample Result	Samp Qual	Reporting Limit	RPD	RPD Limit
LAO-3A	0006226-5	06/29/2000	06/30/2000	1	218		220		20	0	15

### Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: TD0006226-1

00031

# TOTAL SUSPENDED SOLIDS

Method EPA160.2

## Sample Results

Lab Name: Paragon Analytics, Inc.

Client Name: NMED DOE Oversight Bureau

Client Project ID: HRMB 6.26.00

Work Order Number: 0006226

Reporting Basis: As Received

Final Volume: 100 ML

Matrix: WATER

Result Units: mg/L

---

Client Sample ID	Lab ID	Date Collected	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Reporting Limit	Flag	Sample Aliquot
DP SPRING	0006226-1	6/26/2000	6/29/2000	06/30/2000	N/A	1	20	20	U	100 ML
LAO-2	0006226-3	6/26/2000	6/29/2000	06/30/2000	N/A	1	20	20	U	100 ML
LAO-3A	0006226-5	6/26/2000	6/29/2000	06/30/2000	N/A	1	20	20	U	100 ML

### Comments:

- 
1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: TS0006226-1

# Total Suspended Solids

Method EPA160.2

Method Blank

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: TS000629-1MB

Sample Matrix: WATER  
% Moisture: N/A

Prep Batch: TS000629-1  
QCBatchID: TS000629-1-1  
Run ID: TS000630-1  
Cleanup: NONE  
Basis: N/A

Sample Aliquot: 100 ML  
Final Volume: 100 ML  
Result Units: mg/L

Lab ID	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Reporting Limit	Flag
TS000629-1MB	6/29/2000	06/30/2000	N/A	1	20	20	U

## Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: TS0006226-1

# Total Suspended Solids

Method EPA160.2

Blank Spike

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: TS000629-1LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 06/29/2000

Date Analyzed: 06/30/2000

Prep Batch: TS000629-1

QCBatchID: TS000629-1-1

Run ID: TS000630-1

Cleanup: NONE

Basis: N/A

Sample Aliquot: 100 ML

Final Volume: 100 ML

Result Units: mg/L

CASNO	Target Analyte	Spike Added	BS Result	Reporting Limit	Result Qualifier	BS % Rec.	Control Limits
10-32-2	TOTAL SUSPENDED SOLIDS	1350	1310	20		97	85 - 115

Data Package ID: TS0006226-1

# Total Suspended Solids

Method EPA160.2

## Duplicate Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Reporting Basis: As Received

Sample Aliquot: 100 ML

Final Volume: 100ML

Matrix: WATER

Result Units mg/L

Client Sample ID	Lab ID	Date Prepared	Date Analyzed	Dilution Factor	Duplicate Result	Dup Qual	Sample Result	Samp Qual	Reporting Limit	RPD	RPD Limit
LAO-3A	0006226-5	06/29/2000	06/30/2000	1	20	U	20	U	20		15

### Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: TS0006226-1

# Ion Chromatography

Method EPA300.0

Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: DP SPRING  
Lab ID: 0006226-1

Sample Matrix: WATER  
% Moisture: N/A  
Date Collected: 26-Jun-00  
Date Extracted: 06-Jul-00  
Date Analyzed: 06-Jul-00

Prep Batch: IC000706-1  
QCBatchID: IC000706-1-2  
Run ID: IC000706-1A  
Cleanup: NONE  
Basis: As Received

Sample Aliquot: 5 ML  
Final Volume: 5 ML  
Result Units: MG/L  
File Name: uly06\_058.

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
16984-48-8	FLUORIDE	1	0.89	0.1		
16887-00-6	CHLORIDE	10	30	2		
24959-67-9	BROMIDE	1	0.2	0.2	U	
14808-79-8	SULFATE	1	6.8	1		

Data Package ID: IC0006226-1

# Ion Chromatography

Method EPA300.0

Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: LAO-2  
Lab ID: 0006226-3

Sample Matrix: WATER  
% Moisture: N/A  
Date Collected: 26-Jun-00  
Date Extracted: 06-Jul-00  
Date Analyzed: 06-Jul-00

Prep Batch: IC000706-1  
QCBatchID: IC000706-1-2  
Run ID: IC000706-1A  
Cleanup: NONE  
Basis: As Received

Sample Aliquot: 5 ML  
Final Volume: 5 ML  
Result Units: MG/L  
File Name: uly06\_059.

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
16984-48-8	FLUORIDE	1	0.59	0.1		
16887-00-6	CHLORIDE	10	24	2		
24959-67-9	BROMIDE	1	0.74	0.2		
14808-79-8	SULFATE	1	12	1		

Data Package ID: IC0006226-1

# Ion Chromatography

Method EPA300.0

Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: LAO-3A

Lab ID: 0006226-5

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 26-Jun-00

Date Extracted: 06-Jul-00

Date Analyzed: 06-Jul-00

Prep Batch: IC000706-1

QCBatchID: IC000706-1-2

Run ID: IC000706-1A

Cleanup: NONE

Basis: As Received

Sample Aliquot: 5 ML

Final Volume: 5 ML

Result Units: MG/L

File Name: uly06\_037.

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
16984-48-8	FLUORIDE	1	0.77	0.1		
16887-00-6	CHLORIDE	1	19	0.2		
24959-67-9	BROMIDE	1	1.2	0.2		
14808-79-8	SULFATE	1	14	1		

Data Package ID: IC0006226-1

# Ion Chromatography

Method EPA300.0

Method Blank

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: IC000706-2MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 07/06/2000

Date Analyzed: 07/06/2000

Prep Batch: IC000706-1

QCBatchID: IC000706-1-2

Run ID: IC000706-1A

Cleanup: NONE

Basis: N/A

Sample Aliquot: 5 ML

Final Volume: 5 ML

Result Units: MG/L

File Name: uly06\_029.

CASNO	Target Analyte	DF	Result	Reporting Limit	Result Qualifier	EPA Qualifier
16984-48-8	FLUORIDE	1	0.1	0.1	U	
16887-00-6	CHLORIDE	1	0.2	0.2	U	
24959-67-9	BROMIDE	1	0.2	0.2	U	
14808-79-8	SULFATE	1	1	1	U	

Data Package ID: IC0006226-1

# Ion Chromatography

Method EPA300.0

Blank Spike

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: IC000706-2LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 07/06/2000

Date Analyzed: 07/06/2000

Prep Batch: IC000706-1

QCBatchID: IC000706-1-2

Run ID: IC000706-1A

Cleanup: NONE

Basis: N/A

Sample Aliquot: 5 ML

Final Volume: 5 ML

Result Units: MG/L

CASNO	Target Analyte	Spike Added	LCS Result	Reporting Limit	Result Qualifier	LCS % Rec.	Control Limits
16984-48-8	FLUORIDE	5	4.93	0.1		99	90 - 110%
16887-00-6	CHLORIDE	10	9.91	0.2		99	90 - 110%
24959-67-9	BROMIDE	10	9.63	0.2		96	90 - 110%
14808-79-8	SULFATE	50	49.5	1		99	90 - 110%

Data Package ID: IC0006226-1

# Ion Chromatography

Method EPA300.0

## Matrix Spike And Matrix Spike Duplicate

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: DP SPRING

LabID: 0006226-1MS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 26-Jun-00

Date Extracted: 06-Jul-00

Date Analyzed: 06-Jul-00

Prep Batch: IC000706-1

QCBatchID: IC000706-1-2

Run ID: IC000706-1A

Cleanup: NONE

Basis: As Received

Sample Aliquot: 5 ML

Final Volume: 5 ML

Result Units: MG/L

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
16984-48-8	FLUORIDE	0.89		2.81		0.1	2	96	80 - 120%
24959-67-9	BROMIDE	0.2	U	4.96		0.2	5	99	85 - 115%
14808-79-8	SULFATE	6.8		26		1	20	96	85 - 115%

MSD Lab ID: 0006226-1MSD

CASNO	Target Analyte	Spike Added	MSD Result	MSD Qual	Reporting Limit	MSD % Rec.	RPD	RPD Limits
16984-48-8	FLUORIDE	2	2.86		0.1	99	2	20
24959-67-9	BROMIDE	5	4.99		0.2	100	1	15
14808-79-8	SULFATE	20	26.2		1	97	1	15

Data Package ID: IC0006226-1



# Paragon Analytics, Inc.

## Radiochemistry Case Narrative

### Strontium-90

---

#### **NMED DOE Oversight Bureau**

HRMB 6.26.00

PAI WO 0006226

1. This report consists of six water samples received by Paragon on 06/28/00.
2. These samples were prepared according to Paragon Analytics, Inc. procedure PAI SOP707R4.
3. These samples were analyzed for the presence of Strontium-90 according to Paragon Analytics, Inc. procedure PAI SOP724R6. The analyses were completed on 08/09/00.
4. Total radiostrontium is reported as Strontium-90. The presence of other radioisotopes of strontium may cause positive bias in the measured strontium concentration.
5. The analysis results for these samples are reported in units of pCi/L. The samples were filtered prior to analysis.
6. Sample volume was insufficient to allow preparation of a duplicate. A Laboratory Control Sample Duplicate (LCSD) was prepared in lieu of a prep batch duplicate.
7. The chemical yield for Laboratory Control Sample Duplicate 0006226-S3 exceeded the PAI default upper control limit of 110%. The PAI requirement of a batch duplicate is met in batch 06226SRW.XL1 and LCSD 0006226-S3 is not reported. Please refer to NCR 2776.
8. ICP-AES measurement of strontium concentrations prior to chemical separation for Method Blank 0006226-B1 and Laboratory Control Sample 0006226-S1 showed concentrations less than the amount known to have been added to the sample in the form of strontium carrier. To avoid a low bias in the final analytical results the known concentration of the carrier was used in chemical yield calculations in lieu of the pre-separation measurement.
9. No further problems were encountered during the preparation and analysis of these samples. All remaining quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Julie Ellingson

Julie Ellingson  
Radiochemistry Instrument Technician

8/15/00

Date

Renee Gulevz  
Radiochemistry Final Data Review

8/17/00  
Date

**Sr-90 ANALYSIS RESULTS SUMMARY**

Method ASTM D5811-95

Lab Name: Paragon Analytics, Inc.

Date Collected: 07/31/2000

Client Name: Shared QC

Date Analyzed : 08/09/2000

Client Project ID: Blank

Sample Matrix : Water

Lab Sample ID Series: 00-06-226

Count Duration: 1000 Min.

Analyzed by: JE

Client Sample ID	Lab Sample ID	Sr-90 (pCi/l)
Blank	00-06-226-B1	-0.01 ± 0.06
Blank	Decision Level	0.06

Reported Uncertainties are the Estimated Total Propagated Uncertainties (2σ). See PAI SOP743 for details of TPU determinations.

Reported activities are the calculated net activities, not truncated or censored by an *a priori* detection limit estimate. Sample results should be compared to the decision level calculated from the appropriate blank.

These samples were prepared using PAI SOP707 and analyzed using PAI SOP724.

Remarks:

Blank is shared for workorders 0006226, 0006265, 0007164, 0007192, 0007193, and 0007083.

00002  
00003

JF

**Sr-90 ANALYSIS MDA SUMMARY**

Method ASTM D5811-95

Lab Name: Paragon Analytics, Inc.

Date Collected: 07/31/2000

Client Name: Shared QC

Date Analyzed : 08/09/2000

Client Project ID: Blank

Sample Matrix : Water

Lab Sample ID Series: 00-06-226

Count Duration: 1000 Min.

Analyzed by: JE

Client Sample ID	Lab Sample ID	Sr-90 MDA (pCi/l)
Blank	00-06-226-B1	0.09

Remarks:

Blank is shared for workorders 0006226, 0006265, 0007164, 0007192  
0007193, and 0007083.

~~00003~~  
00004

JE

**Sr-90 LCS RESULTS**  
Method ASTM D5811-95

Lab Name: Paragon Analytics, Inc.

Date Collected: 07/31/2000

Client Name: Shared QC

Date Analyzed : 08/04/2000

Client Project ID : LCS

Sample Matrix : Water

Lab Workorder Number : 00-06-226

Count Duration: 60 Min.

Lab Sample ID	Sr-90 Known Value	Sr-90 Rep't Value	Sr-90 Recovery	Flag
00-06-226-S1	12.3 ± 3.08	10.6 ± 2.06	85.7%	Pass

Reported Uncertainties are the Estimated Total Propagated Uncertainties ( $2\sigma$ ). See PAI SOP 743FC for details of TPU determinations.

Control Limits = Known ± 25% for Sr-90.

Acceptance Range for LCS samples is the known value ± the control limits stated above. The reported value, without the uncertainty, should be compared to that range.

Remarks:

LCS is shared for workorders 0006226, 0006265, 0007164, 0007192, 0007193, and 0007083.

00005

JE

**Sr-90 LCS RESULTS**  
Method ASTM D5811-95

Lab Name: Paragon Analytics, Inc.

Date Collected: 07/31/2000

Client Name: Shared QC

Date Analyzed : 08/04/2000

Client Project ID : LCSD

Sample Matrix : Water

Lab Workorder Number : 00-06-226

Count Duration: 60 Min.

Lab Sample ID	Sr-90 Known Value	Sr-90 Rep't Value	Sr-90 Recovery	Flag
00-06-226-S2	12.3 ± 3.08	9.65 ± 1.89	78.3%	Pass

Reported Uncertainties are the Estimated Total Propagated Uncertainties (2σ). See PAI SOP 743FC for details of TPU determinations.

Control Limits = Known ± 25% for Sr-90.

Acceptance Range for LCS samples is the known value ± the control limits stated above. The reported value, without the uncertainty, should be compared to that range.

Remarks:

Sample 00-06-226-S2 is a LCS duplicate.  
LCSD is shared for workorders 0006226, 0006265, 0007164, 0007192, 0007193, and 0007083.

**Sr-90 ANALYSIS RESULTS SUMMARY**

Method ASTM D5811-95

Lab Name: Paragon Analytics, Inc.

Date Collected: 06/26/2000

Client Name: NMED DOE Oversight Bureau

Date Analyzed : 08/07/2000

Client Project ID: HRMB 6.26.00

Sample Matrix : Water

Lab Sample ID Series: 00-06-226

Count Duration: 120 Min.

Analyzed by: JE

Client Sample ID	Lab Sample ID	Sr-90 (pCi/l)
DP SPRING	00-06-226-01	57 ± 10
DP SPRING	00-06-226-02	57 ± 10
LAO-2	00-06-226-03	7.0 ± 1.4
LAO-2	00-06-226-04	8.1 ± 1.5
LAO-3A	00-06-226-05	24.5 ± 4.5
LAO-3A	00-06-226-06	26.7 ± 4.9

Reported Uncertainties are the Estimated Total Propagated Uncertainties ( $2\sigma$ ). See PAI SOP743 for details of TPU determinations.

Reported activities are the calculated net activities, not truncated or censored by an *a priori* detection limit estimate. Sample results should be compared to the decision level calculated from the appropriate blank.

These samples were prepared using PAI SOP707 and analyzed using PAI SOP724.

**Sr-90 ANALYSIS MDA SUMMARY**

Method ASTM D5811-95

Lab Name: Paragon Analytics, Inc.

Date Collected: 06/26/2000

Client Name: NMED DOE Oversight Bureau

Date Analyzed : 08/07/2000

Client Project ID: HRMB 6.26.00

Sample Matrix : Water

Lab Sample ID Series: 00-06-226

Count Duration: 120 Min.

Analyzed by: JE

Client Sample ID	Lab Sample ID	Sr-90 MDA (pCi/l)
DP SPRING	00-06-226-01	0.41
DP SPRING	00-06-226-02	0.43
LAO-2	00-06-226-03	0.42
LAO-2	00-06-226-04	0.42
LAO-3A	00-06-226-05	0.40
LAO-3A	00-06-226-06	0.44

00008 JE

CONTROLLED  
PARAGON ANALYTICS, INC.

NON-CONFORMANCE REPORT

Initiated by: N. Carver  
Date Initiated 8/3/00

Method/QA Procedure SR-90 SOP 707 Rev 4  
Workorders Affected 06226 SRW.XL1  
Clients LAU SMO/ES4-18/NMED

SECTION I

TYPE OF EVENT:

- 1. Spike/Surrogate Criteria Not Met
- 2. Calibration Criteria Not Met (Type of Equipment)
- 3. Lab Contamination
- 4. Method Requirements Not Met
- 5. Purchased Materials Do Not Meet Quality Specs
- 6. Equipment Failure
- 7. Deviation from QAP, SOP, Method
- 8. Other (Specify)

SPECIFY

Samples 00-06-226-53 and 00-06-265-02 had chemical recoveries above the upper control limit, 123.2% and 124.2% respectively. The upper control limit is 110%.

Client Contacted? ( Y / N ): Name: \_\_\_\_\_

Date: \_\_\_\_\_

Time: \_\_\_\_\_

SECTION II

CORRECTIVE ACTION TAKEN:

- 1. Submit for Re-Extraction (Re-work)
- 2. Recalibrate (Re-work)
- 3. Re-analyze (Re-work)
- 4. Return to Vendor/Reject
- 5. Service call/return for repair
- 6. Retrain
- 7. Document in Narrative
- 8. Other, describe \_\_\_\_\_

Approved by: [Signature] (for CRS)

SECTION III

REQUEST FOR REWORK IN SAMPLE PREP OR DIGESTION

Initial date prepared, Page # \_\_\_\_\_

Date for Rework, Page # \_\_\_\_\_

Submitted by \_\_\_\_\_

Received by \_\_\_\_\_

Outcome of Re-analysis ✓ \_\_\_\_\_

8/9

Approved by: \_\_\_\_\_

DISPOSITION

Use as is

Reject

Repair

Do not report 5-3; note in narrative. DJS 8/9/00

SIGNATURES

Approved By [Signature] for CRS Date 8/10/00 (Project Mgr)

Verification of Disposition [Signature] Date 8/9/00 (Dept Supv)

QA Dept Approval \_\_\_\_\_ Date \_\_\_\_\_ (QA Mgr)

COPIES: \_\_\_ Project Manager \_\_\_ Operations Manager \_\_\_ Department Supervisor FORM 313FC4.fm (11-20-98)



# Paragon Analytics, Inc.

## Radiochemistry Case Narrative

### Isotopic Uranium

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#### **NMED DOE Oversight Bureau**

HRMB 6.26.00

PAI WO 0006226

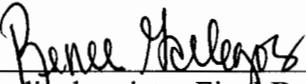
1. This report consists of 6 water samples received by Paragon on 06/28/2000.
2. These samples were prepared according to Paragon Analytics, Inc. procedures PAI SOP776R3, PAI SOP778R4, and PAI SOP780R2.
3. All samples were analyzed for the presence of isotopic uranium according to Paragon Analytics, Inc. procedure PAI SOP714R5. The analyses were completed on 08/18/2000.
4. The analysis results for these samples are reported in units of pCi/L. The samples were not filtered prior to analysis.
5. Due to insufficient sample volume, a duplicate laboratory control sample (LCS) was prepared in lieu of a prep batch duplicate.
6. The spike recovery of 0.05% for the duplicate laboratory control sample(LCS) (PAI ID AS03598LCS1-D1) is below the standard control limit of 82% (see NCR #2800 in this report). The primary LCS (PAI ID AS03598LCS1) results meet recovery criteria. The sample results are submitted with the results of the primary LCS only.
7. Sample LAO-2 (PAI ID 0006226-3) was initially prepared on 08/02/2000 in batch AS03598. The sample was lost during the micro-precipitation step prior to analysis (see NCR #2782 in this report). Due to limited available volume, this sample was reprepared with a 250mL aliquot on 08/11/2000 in batch AS03619. The results for AS03619 for this sample are submitted in this report.
8. Inspection of the spectra for samples DP SPRING, LAO-2, LAO-2, LAO-3A, LAO-3A (PAI ID 0006226-1, -3, -4, -5, and -6), AS03598BLK1, and AS03598LCS1 indicates the presence of Pu-242 tracer peak. The U-234 region of interest (ROI) for each of these samples was set to exclude the Pu-242 peak. However, due to possible tailing of the Pu-242 the U-234 results may be biased slightly high. The results are submitted without further qualification.

9. U-234, for batch AS03598, and U-234 and U-238, for batch AS03619, activity is reported in the associated method blank above the minimum detectable concentration value. The measured blank activity is below the standard MDC (0.2 pCi/L) in all cases. Results should be compared to the method blank activity to determine the validity of the measurement.
10. No further anomalous situations were encountered during the preparation or analysis of these samples. All remaining quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

  
\_\_\_\_\_  
Kurt Garrett  
Radiochemistry Instrumentation

9/5/00  
Date

  
\_\_\_\_\_  
Renee Holroyd  
Radiochemistry Final Data Review

9/5/00  
Date

CONTROLLED  
PARAGON ANALYTICS, INC.

NON-CONFORMANCE REPORT

initiated by: K. Garrett  
Date Initiated 8/21/00

Method/QA Procedure ISO-U  
Workorders Affected 0006226  
Clients NMED

SECTION I

TYPE OF EVENT:

- 1. Spike/Surrogate Criteria Not Met
- 2. Calibration Criteria Not Met (Type of Equipment)
- 3. Lab Contamination
- 4. Method Requirements Not Met
- 5. Purchased Materials Do Not Meet Quality Specs
- 6. Equipment Failure
- 7. Deviation from QAP, SOP, Method
- 8. Other (Specify)

SPECIFY Spike  
LCS dup recovery of 0.05%  
below requested standard  
82% control limit

Client Contacted? ( Y / N ): Name:

Date:

Time:

SECTION II

CORRECTIVE ACTION TAKEN:

- 1. Submit for Re-Extraction (Re-work)
- 2. Recalibrate (Re-work)
- 3. Re-analyze (Re-work)
- 4. Return to Vendor/Reject
- 5. Service call/return for repair
- 6. Retrain
- 7. Document in Narrative
- 8. Other, describe

Approved by: Do not report this ac

SECTION III

REQUEST FOR REWORK IN SAMPLE PREP OR DIGESTION

Initial date prepared, Page # \_\_\_\_\_  
Date for Rework, Page # \_\_\_\_\_  
Submitted by \_\_\_\_\_  
Received by \_\_\_\_\_  
Outcome of Re-analysis \_\_\_\_\_

Approved by: \_\_\_\_\_

DISPOSITION

Use as is

Reject

Repair

SIGNATURES

Approved By [Signature] Date 8/21/00 (Project Mgr)

Verification of Disposition [Signature] Date 8/31/00 (Dept Supv)

QA Dept Approval \_\_\_\_\_ Date \_\_\_\_\_ (QA Mgr)

COPIES: \_\_\_ Project Manager \_\_\_ Operations Manager \_\_\_ Department Supervisor FORM 313FC4.frm (11-20-98)

**CONTROLLED**  
**PARAGON ANALYTICS, INC.**

**NON-CONFORMANCE REPORT**

initiated by: BW Method/QA Procedure u  
 Date Initiated 8-11-00 Workorders Affected 0006226  
 Clients N Med

**SECTION I**

TYPE OF EVENT:

SPECIFY

- 1. Spike/Surrogate Criteria Not Met
- 2. Calibration Criteria Not Met (Type of Equipment)
- 3. Lab Contamination
- 4. Method Requirements Not Met
- 5. Purchased Materials Do Not Meet Quality Specs
- 6. Equipment Failure
- 7. Deviation from QAP, SOP, Method
- 8. Other (Specify)

Sample was lost during microprecip - 0006226-3

Client Contacted? ( Y / N ): Name:

Date:

Time:

**SECTION II**

CORRECTIVE ACTION TAKEN:

- 1. Submit for Re-Extraction (Re-work)
- 2. Recalibrate (Re-work)
- 3. Re-analyze (Re-work)
- 4. Return to Vendor/Reject
- 5. Service call/return for repair
- 6. Retrain
- 7. Document in Narrative
- 8. Other, describe \_\_\_\_\_

Approved by: [Signature]

**SECTION III**

REQUEST FOR REWORK IN SAMPLE PREP OR DIGESTION

Initial date prepared, Page # Batch ASD3598 8/2/00  
 Date for Rework, Page # ASD3619 8/11/00  
 Submitted by BW 8/17/00  
 Received by ESC 8/17/00  
 Outcome of Re-analysis \_\_\_\_\_

Approved by: \_\_\_\_\_

DISPOSITION

Use as is  Reject  Repair

Sample 0006226-3 was initially prepped in analytical batch ASD3598 - sample lost at microprecip. The sample was re-extracted in batch ASD3619 at a reduced aliquot due to limited sample volume. The results of the second analysis are reported.

SIGNATURES RG - 9-1-00

Approved By \_\_\_\_\_ Date \_\_\_\_\_ (Project Mgr)

Verification of Disposition [Signature] Date 9-1-00 (Dept Supv)

QA Dept Approval \_\_\_\_\_ Date \_\_\_\_\_ (QA Mgr)

# Isotopic Uranium By Alpha Spectroscopy

Method PAI 714R5

## Method Blank Results

Page: 1 of 2

Reported on: Friday, September 01, 2000  
10:20:05

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:  
Lab ID: AS03598BLK1

Sample Matrix: Water

Date Prepared: 02-Aug-00

Prep SOP: PAI 780R2

Prep Batch: AS03598

Date Collected: 02-Aug-00

Date Analyzed: 11-Aug-00

Analytical SOP: PAI 714R5

Final Aliquot: 2.000

Aliquot Units: L

Report Basis: As Received

Count Time (min.): 1000

Target Nuclide	Result +/- 2s TPU	MDC	Reporting Units	Lab Qualifier
U-234	0.027 +/- 0.012	0.011	pCi/L	B3
U-235	0.0069 +/- 0.0075	0.012	pCi/L	U
U-238	0.0059 +/- 0.0067	0.011	pCi/L	U

## Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
U-232	2.22	1.69	pCi/L	76%	30-110%

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y2 - Chemical Yield outside default limits.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

B - Analyte concentration greater than MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: UW0006226-1

# Isotopic Uranium By Alpha Spectroscopy

Method PAI 714R5

## Method Blank Results

Page: 2 of 2

Reported on: Friday, September 01, 2000  
10:20:06

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:  
Lab ID: AS03619BLK1

Sample Matrix: Water  
Date Prepared: 11-Aug-00  
Prep SOP: PAI 778R4  
Prep Batch: AS03619

Date Collected: 11-Aug-00  
Date Analyzed: 18-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 2.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	Result +/- 2s TPU	MDC	Reporting Units	Lab Qualifier
U-234	0.028 +/- 0.013	0.015	pCi/L	B3
U-235	0.0166 +/- 0.0093	0.0096	pCi/L	B3
U-238	0.0114 +/- 0.0094	0.014	pCi/L	U

## Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
U-232	2.22	1.57	pCi/L	71%	30-110%

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.  
LT - Result is less than Requested MDC, greater than sample specific MDC.  
Y2 - Chemical Yield outside default limits.  
B3 - Analyte concentration greater than MDC but less than Requested MDC.  
B - Analyte concentration greater than MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: UW0006226-1

# Isotopic Uranium By Alpha Spectroscopy

## Method PAI 714R5

### LCS Results

Page: 1 of 3

Reported on: Friday, September 01, 2000  
10:20:05

Client Name: NMED DOE Oversight Bureau

Laboratory Name: Paragon Analytics, Inc.

Client Project Name:

PAI Work Order: 0006226

Client Project Number: HRMB 6.26.00

Field ID:

Lab ID: AS03598LCS1

Sample Matrix: Water

Date Prepared: 02-Aug-00

Prep SOP: PAI 780R2

Prep Batch: AS03598

Date Collected: 02-Aug-00

Date Analyzed: 16-Aug-00

Analytical SOP: PAI 714R5

Final Aliquot: 2.000

Aliquot Units: L

Report Basis: As Received

Count Time (min.): 300

Target Nuclide	LCS Results +/- 2s TPU	MDC	Spike Added	Reporting Units	LCS Recovery	Control Limits	Lab Qualifier
U-234	2.47 +/- 0.40	0.036	2.25	pCi/L	109%	82-122%	P
U-235	0.240 +/- 0.068	0.020	N/A	pCi/L	N/A	N/A	
U-238	2.56 +/- 0.41	0.024	2.25	pCi/L	114%	82-122%	P

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
U-232	2.22	1.46	pCi/L	66%	30-110%

#### Comments:

Data Package ID: UW0006226-1

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y2 - Chemical Yield outside default limits.

\* - Duplicate DER not within control limits.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

# Isotopic Uranium By Alpha Spectroscopy

Method PAI 714R5

## LCS Results

Page: 2 of 3

Reported on: Friday, September 01, 2000  
10:20:06

Client Name: NMED DOE Oversight Bureau

Laboratory Name: Paragon Analytics, Inc.

Client Project Name:

PAI Work Order: 0006226

Client Project Number: HRMB 6.26.00

Field ID:  
Lab ID: AS03619LCS1

Sample Matrix: Water  
Date Prepared: 11-Aug-00  
Prep SOP: PAI 778R4  
Prep Batch: AS03619

Date Collected: 11-Aug-00  
Date Analyzed: 18-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 2.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	LCS Results +/- 2s TPU	MDC	Spike Added	Reporting Units	LCS Recovery	Control Limits	Lab Qualifier
U-234	2.25 +/- 0.29	0.014	2.25	pCi/L	100%	82-122%	P
U-235	0.161 +/- 0.031	0.0084	N/A	pCi/L	N/A	N/A	LT
U-238	2.39 +/- 0.31	0.0066	2.25	pCi/L	106%	82-122%	P

## Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
U-232	2.22	1.68	pCi/L	76%	30-110%

### Comments:

Data Package ID: UW0006226-1

#### Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- LT - Result is less than Requested MDC, greater than sample specific MDC.
- Y2 - Chemical Yield outside default limits.
- \* - Duplicate DER not within control limits.

#### Abbreviations:

- TPU - Total Propagated Uncertainty (see PAI SOP 743)
- MDC - Minimum Detectable Concentration (see PAI SOP 709)

# Isotopic Uranium By Alpha Spectroscopy

Method PAI 714R5

## LCS Results

Page: 3 of 3

Reported on: Friday, September 01, 2000  
10:20:06

Client Name: NMED DOE Oversight Bureau

Laboratory Name: Paragon Analytics, Inc.

Client Project Name:

PAI Work Order: 0006226

Client Project Number: HRMB 6.26.00

Field ID:  
Lab ID: AS03619LCS1-D1

Sample Matrix: Water  
Date Prepared: 11-Aug-00  
Prep SOP: PAI 778R4  
Prep Batch: AS03619

Date Collected: 11-Aug-00  
Date Analyzed: 18-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 2.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	LCS Results +/- 2s TPU	MDC	Spike Added	Reporting Units	LCS Recovery	Control Limits	Lab Qualifier
U-234	2.12 +/- 0.28	0.011	2.25	pCi/L	94%	82-122%	P
U-235	0.178 +/- 0.035	0.013	N/A	pCi/L	N/A	N/A	LT
U-238	2.12 +/- 0.28	0.014	2.25	pCi/L	94%	82-122%	P

## Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
U-232	2.22	1.57	pCi/L	71%	30-110%

### Comments:

Data Package ID: *UW0006226-1*

#### Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- LT - Result is less than Requested MDC, greater than sample specific MDC.
- Y2 - Chemical Yield outside default limits.
- \* - Duplicate DER not within control limits.

#### Abbreviations:

- TPU - Total Propagated Uncertainty (see PAI SOP 743)
- MDC - Minimum Detectable Concentration (see PAI SOP 709)

# Isotopic Uranium By Alpha Spectroscopy

Method PAI 714R5

## Duplicate Sample Results (DER)

Page: 1 of 1

Reported on: Friday, September 01, 2000  
10:20:06

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:	Prep Date	Analysis Date	Prep Batch	Final Aliquot
Lab ID: AS03619LCS1	8/11/2000	8/18/2000	AS03619	2.000
DUP ID: AS03619LCS1-D1	8/11/2000	8/18/2000	AS03619	2.000

Sample Matrix: Water  
Date Collected: 11-Aug-00  
Analytical SOP: PAI 714R5  
Prep SOP: PAI 778R4  
Aliquot Units: L  
Report Basis: Total

Analyte	Sample Result +/- 2s TPU	Duplicate Result +/- 2s TPU	Units	DER	Warning Limit	Lab Qualifiers
U-234	2.25 +/- 0.29	2.12 +/- 0.28	pCi/L	0.31	< 1.42	
U-235	0.161 +/- 0.031	0.178 +/- 0.035	pCi/L	0.36	< 1.42	
U-238	2.39 +/- 0.31	2.12 +/- 0.28	pCi/L	0.65	< 1.42	

## Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
U-232	2.22	1.57	pCi/L	71%	30-110%

### Comments:

#### Qualifiers/Flags:

W - DER is greater than Warning Limit of 1.42  
H - DER is Higher than Control Limit of 2.13

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
DER - Duplicate Error Ratio

Data Package ID: UW0006226-1

Paragon Analytics Inc.

00010

# Isotopic Uranium By Alpha Spectroscopy

## Method PAI 714R5

### Sample Results

Page: 1 of 6

Reported on: Friday, September 01, 2000  
10:20:04

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: DP SPRING

Lab ID: 0006226-1

Sample Matrix: Water

Date Prepared: 02-Aug-00

Prep SOP: PAI 780R2

Prep Batch: AS03598

Date Collected: 26-Jun-00

Date Analyzed: 11-Aug-00

Analytical SOP: PAI 714R5

Final Aliquot: 2.000

Aliquot Units: L

Report Basis: As Received

Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-234	0.331 +/- 0.056	0.012	pCi/L	
U-235	0.034 +/- 0.014	0.012	pCi/L	LT
U-238	0.049 +/- 0.017	0.013	pCi/L	LT

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
U-232	2.22	1.56	pCi/L	70%	30-110%

### Comments:

**Qualifiers/Flags:**

U - Result is less than the sample specific MDC.

Y2 - Chemical Yield outside default limits.

\* - Duplicate DER not within control limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

**Abbreviations:**

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: UW0006226-1

Paragon Analytics Inc.

00011

# Isotopic Uranium By Alpha Spectroscopy

## Method PAI 714R5

### Sample Results

Page: 2 of 6

Reported on: Friday, September 01, 2000  
10:20:06

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: DP SPRING

Lab ID: 0006226-2

Sample Matrix: Water

Date Prepared: 11-Aug-00

Prep SOP: PAI 778R4

Prep Batch: AS03619

Date Collected: 26-Jun-00

Date Analyzed: 18-Aug-00

Analytical SOP: PAI 714R5

Final Aliquot: 2.000

Aliquot Units: L

Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-234	0.255 +/- 0.045	0.017	pCi/L	
U-235	0.025 +/- 0.012	0.012	pCi/L	LT
U-238	0.045 +/- 0.015	0.0074	pCi/L	LT

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
U-232	2.22	1.65	pCi/L	74%	30-110%

### Comments:

**Qualifiers/Flags:**

U - Result is less than the sample specific MDC.

Y2 - Chemical Yield outside default limits.

\* - Duplicate DER not within control limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

**Abbreviations:**

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: UW0006226-1

Paragon Analytics Inc.

00012

# Isotopic Uranium By Alpha Spectroscopy

## Method PAI 714R5

### Sample Results

Page: 3 of 6

Reported on: Friday, September 01, 2000  
10:20:06

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: LAO-2  
Lab ID: 0006226-3

Sample Matrix: Water  
Date Prepared: 11-Aug-00  
Prep SOP: PAI 778R4  
Prep Batch: AS03619

Date Collected: 26-Jun-00  
Date Analyzed: 18-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 0.2500  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-234	0.26 +/- 0.10	0.090	pCi/L	
U-235	0.100 +/- 0.067	0.077	pCi/L	LT
U-238	0.125 +/- 0.069	0.061	pCi/L	LT

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
U-232	17.8	12.8	pCi/L	72%	30-110%

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y2 - Chemical Yield outside default limits.

\* - Duplicate DER not within control limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: UW0006226-1

Paragon Analytics Inc.

00013

# Isotopic Uranium By Alpha Spectroscopy

## Method PAI 714R5

### Sample Results

Page: 4 of 6

Reported on: Friday, September 01, 2000  
10:20:04

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: LAO-2

Lab ID: 0006226-4

Sample Matrix: Water

Date Prepared: 02-Aug-00

Prep SOP: PAI 780R2

Prep Batch: AS03598

Date Collected: 26-Jun-00

Date Analyzed: 11-Aug-00

Analytical SOP: PAI 714R5

Final Aliquot: 1.925

Aliquot Units: L

Report Basis: As Received

Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-234	0.110 +/- 0.025	0.012	pCi/L	LT
U-235	0.0101 +/- 0.0080	0.011	pCi/L	U
U-238	0.046 +/- 0.015	0.0074	pCi/L	LT

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
U-232	2.31	1.78	pCi/L	77%	30-110%

#### Comments:

##### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y2 - Chemical Yield outside default limits.

\* - Duplicate DER not within control limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

##### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: UW0006226-1

Paragon Analytics Inc.

00014

# Isotopic Uranium By Alpha Spectroscopy

## Method PAI 714R5

### Sample Results

Page: 5 of 6

Reported on: Friday, September 01, 2000  
10:20:04

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: LAO-3A  
Lab ID: 0006226-5

Sample Matrix: Water  
Date Prepared: 02-Aug-00  
Prep SOP: PAI 780R2  
Prep Batch: AS03598

Date Collected: 26-Jun-00  
Date Analyzed: 11-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 1.610  
Aliquot Units: L  
Report Basis: As Received  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-234	0.152 +/- 0.036	0.018	pCi/L	LT
U-235	0.032 +/- 0.017	0.019	pCi/L	LT
U-238	0.113 +/- 0.030	0.016	pCi/L	LT

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
U-232	2.76	1.70	pCi/L	62%	30-110%

#### Comments:

##### Qualifiers/Flags:

U - Result is less than the sample specific MDC.  
Y2 - Chemical Yield outside default limits.  
\* - Duplicate DER not within control limits.  
LT - Result is less than Requested MDC, greater than sample specific MDC.

##### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: UW0006226-1

Paragon Analytics Inc.

00015

# Isotopic Uranium By Alpha Spectroscopy

## Method PAI 714R5

### Sample Results

Page: 6 of 6

Reported on: Friday, September 01, 2000  
10:20:05

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: LAO-3A  
Lab ID: 0006226-6

Sample Matrix: Water  
Date Prepared: 02-Aug-00  
Prep SOP: PAI 780R2  
Prep Batch: AS03598

Date Collected: 26-Jun-00  
Date Analyzed: 11-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 1.570  
Aliquot Units: L  
Report Basis: As Received  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
U-234	0.105 +/- 0.028	0.018	pCi/L	LT
U-235	0.033 +/- 0.015	0.015	pCi/L	LT
U-238	0.083 +/- 0.024	0.013	pCi/L	LT

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
U-232	2.83	1.82	pCi/L	64%	30-110%

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.  
Y2 - Chemical Yield outside default limits.  
\* - Duplicate DER not within control limits.  
LT - Result is less than Requested MDC, greater than sample specific MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: UW0006226-1

Paragon Analytics Inc.

00016



# Paragon Analytics, Inc.

## Radiochemistry Case Narrative

### Isotopic Plutonium

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#### NMED DOE Oversight Bureau

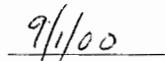
HRMB 6.26.00

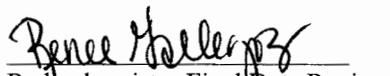
PAI WO 0006226

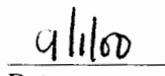
1. This report consists of 6 water samples received by Paragon on 06/28/2000.
2. These samples were prepared according to Paragon Analytics, Inc. procedures PAI SOP776R3, PAI SOP778R4, and PAI SOP780R2.
3. All samples were analyzed for the presence of isotopic plutonium according to Paragon Analytics, Inc. procedure PAI SOP714R5. The analyses were completed on 08/19/2000.
4. The analysis results for these samples are reported in units of pCi/L. The samples were not filtered prior to analysis.
5. Due to insufficient sample volume, a duplicate laboratory control sample (LCS) was prepared in lieu of a prep batch duplicate.
6. Inspection of the spectra for samples DP SPRING and LAO-3A (PAI ID 0006226-1 and -6) indicates the presence of unknown peaks in the Pu-238 region of interest (ROI), possibly Th-228. The reported Pu-238 results are below the standard MDC (0.1 pCi/L). The results are submitted without further qualification.
7. No further anomalous situations were encountered during the preparation or analysis of these samples. All quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

  
Kurt Garrett  
Radiochemistry Instrumentation

  
Date

  
Renee Holler  
Radiochemistry Final Data Review

  
Date

# Isotopic Plutonium By Alpha Spectroscopy

Method PAI 714R5

## Method Blank Results

Page: 1 of 2

Reported on: Friday, September 01, 2000  
10:20:05

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:  
Lab ID: AS03598BLK1

Sample Matrix: Water  
Date Prepared: 02-Aug-00  
Prep SOP: PAI 780R2  
Prep Batch: AS03598

Date Collected: 02-Aug-00  
Date Analyzed: 19-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 2.000  
Aliquot Units: L  
Report Basis: As Received  
Count Time (min.): 1000

Target Nuclide	Result +/- 2s TPU	MDC	Reporting Units	Lab Qualifier
Pu-238	-0.0009 +/- 0.0042	0.010	pCi/L	U
Pu-239	0.0038 +/- 0.0046	0.0070	pCi/L	U

## Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Pu-242	2.25	1.64	pCi/L	73%	30-110%

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.  
LT - Result is less than Requested MDC, greater than sample specific MDC.  
Y2 - Chemical Yield outside default limits.  
B3 - Analyte concentration greater than MDC but less than Requested MDC.  
B - Analyte concentration greater than MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: PUW0006226-1

# Isotopic Plutonium By Alpha Spectroscopy

Method PAI 714R5

## Method Blank Results

Page: 2 of 2

Reported on: Friday, September 01, 2000  
10:20:06

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:  
Lab ID: AS03619BLK1

Sample Matrix: Water  
Date Prepared: 11-Aug-00  
Prep SOP: PAI 778R4  
Prep Batch: AS03619

Date Collected: 11-Aug-00  
Date Analyzed: 19-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 2.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	Result +/- 2s TPU	MDC	Reporting Units	Lab Qualifier
Pu-238	0.0009 +/- 0.0055	0.011	pCi/L	U
Pu-239	0.0019 +/- 0.0026	0.0025	pCi/L	U

## Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Pu-242	2.25	1.75	pCi/L	78%	30-110%

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.  
LT - Result is less than Requested MDC, greater than sample specific MDC.  
Y2 - Chemical Yield outside default limits.  
B3 - Analyte concentration greater than MDC but less than Requested MDC.  
B - Analyte concentration greater than MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: PUW0006226-1

# Isotopic Plutonium By Alpha Spectroscopy

Method PAI 714R5

## LCS Results

Page: 1 of 4

Reported on: Friday, September 01, 2000  
10:20:05

Client Name: NMED DOE Oversight Bureau

Laboratory Name: Paragon Analytics, Inc.

Client Project Name:

PAI Work Order: 0006226

Client Project Number: HRMB 6.26.00

Field ID:  
Lab ID: AS03598LCS1

Sample Matrix: Water  
Date Prepared: 02-Aug-00  
Prep SOP: PAI 780R2  
Prep Batch: AS03598

Date Collected: 02-Aug-00  
Date Analyzed: 19-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 2.000  
Aliquot Units: L  
Report Basis: As Received  
Count Time (min.): 1000

Target Nuclide	LCS Results +/- 2s TPU	MDC	Spike Added	Reporting Units	LCS Recovery	Control Limits	Lab Qualifier
Pu-238	0.0035 +/- 0.0049	0.0081	N/A	pCi/L	N/A	N/A	U
Pu-239	2.17 +/- 0.28	0.0024	2.25	pCi/L	96%	82-118%	P

## Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Pu-242	2.25	1.83	pCi/L	81%	30-110%

### Comments:

Data Package ID: PUW0006226-1

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.  
LT - Result is less than Requested MDC, greater than sample specific MDC.  
Y2 - Chemical Yield outside default limits.  
\* - Duplicate DER not within control limits.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

# Isotopic Plutonium By Alpha Spectroscopy

## Method PAI 714R5

### LCS Results

Page: 2 of 4

Reported on: Friday, September 01, 2000  
10:20:05

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:

Lab ID: AS03598LCS1-D1

Sample Matrix: Water

Date Prepared: 02-Aug-00

Prep SOP: PAI 780R2

Prep Batch: AS03598

Date Collected: 02-Aug-00

Date Analyzed: 19-Aug-00

Analytical SOP: PAI 714R5

Final Aliquot: 2.000

Aliquot Units: L

Report Basis: As Received

Count Time (min.): 1000

Target Nuclide	LCS Results +/- 2s TPU	MDC	Spike Added	Reporting Units	LCS Recovery	Control Limits	Lab Qualifier
Pu-238	0.0018 +/- 0.0065	0.012	N/A	pCi/L	N/A	N/A	U
Pu-239	2.28 +/- 0.29	0.0065	2.25	pCi/L	101%	82-118%	P

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Pu-242	2.25	1.74	pCi/L	77%	30-110%

#### Comments:

Data Package ID: *PUW0006226-1*

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y2 - Chemical Yield outside default limits.

\* - Duplicate DER not within control limits.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

# Isotopic Plutonium By Alpha Spectroscopy

## Method PAI 714R5

### LCS Results

Page: 3 of 4

Reported on: Friday, September 01, 2000  
10:20:06

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:  
Lab ID: AS03619LCS1

Sample Matrix: Water  
Date Prepared: 11-Aug-00  
Prep SOP: PAI 778R4  
Prep Batch: AS03619

Date Collected: 11-Aug-00  
Date Analyzed: 19-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 2.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	LCS Results +/- 2s TPU	MDC	Spike Added	Reporting Units	LCS Recovery	Control Limits	Lab Qualifier
Pu-238	0.0027 +/- 0.0031	0.0025	N/A	pCi/L	N/A	N/A	LT
Pu-239	2.27 +/- 0.29	0.0025	2.25	pCi/L	101%	82-118%	P

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Pu-242	2.25	1.73	pCi/L	77%	30-110%

#### Comments:

Data Package ID: *PUW0006226-1*

#### Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- LT - Result is less than Requested MDC, greater than sample specific MDC.
- Y2 - Chemical Yield outside default limits.
- \* - Duplicate DER not within control limits.

#### Abbreviations:

- TPU - Total Propagated Uncertainty (see PAI SOP 743)
- MDC - Minimum Detectable Concentration (see PAI SOP 709)

# Isotopic Plutonium By Alpha Spectroscopy

Method PAI 714R5

## LCS Results

Page: 4 of 4

Reported on: Friday, September 01, 2000  
10:20:06

Client Name: NMED DOE Oversight Bureau

Laboratory Name: Paragon Analytics, Inc.

Client Project Name:

PAI Work Order: 0006226

Client Project Number: HRMB 6.26.00

Field ID:

Lab ID: AS03619LCS1-D1

Sample Matrix: Water

Date Prepared: 11-Aug-00

Prep SOP: PAI 778R4

Prep Batch: AS03619

Date Collected: 11-Aug-00

Date Analyzed: 19-Aug-00

Analytical SOP: PAI 714R5

Final Aliquot: 2.000

Aliquot Units: L

Report Basis: Total

Count Time (min.): 1000

Target Nuclide	LCS Results +/- 2s TPU	MDC	Spike Added	Reporting Units	LCS Recovery	Control Limits	Lab Qualifier
Pu-238	0.0066 +/- 0.0056	0.0070	N/A	pCi/L	N/A	N/A	U
Pu-239	2.17 +/- 0.28	0.0026	2.25	pCi/L	96%	82-118%	P

## Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Pu-242	2.25	1.65	pCi/L	73%	30-110%

### Comments:

Data Package ID: PUW0006226-1

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y2 - Chemical Yield outside default limits.

\* - Duplicate DER not within control limits.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

# Isotopic Plutonium By Alpha Spectroscopy

Method PAI 714R5

## Duplicate Sample Results (DER)

Page: 1 of 2

Reported on: Friday, September 01, 2000  
10:20:05

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:	Prep Date	Analysis Date	Prep Batch	Final Aliquot
Lab ID: AS03598LCS1	8/2/2000	8/19/2000	AS03598	2.000
DUP ID: AS03598LCS1-D1	8/2/2000	8/19/2000	AS03598	2.000

Sample Matrix: Water  
Date Collected: 02-Aug-00  
Analytical SOP: PAI 714R5  
Prep SOP: PAI 780R2  
Aliquot Units: L  
Report Basis: As Received

Analyte	Sample Result +/- 2s TPU	Duplicate Result +/- 2s TPU	Units	DER	Warning Limit	Lab Qualifiers
Pu-238	0.0035 +/- 0.0049	0.0018 +/- 0.0065	pCi/L	0.21	< 1.42	
Pu-239	2.17 +/- 0.28	2.28 +/- 0.29	pCi/L	0.27	< 1.42	

## Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Pu-242	2.25	1.74	pCi/L	77%	30-110%

### Comments:

#### Qualifiers/Flags:

W - DER is greater than Warning Limit of 1.42  
H - DER is Higher than Control Limit of 2.13

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
DER - Duplicate Error Ratio

Data Package ID: PUW0006226-1

# Isotopic Plutonium By Alpha Spectroscopy

Method PAI 714R5

## Duplicate Sample Results (DER)

Page: 2 of 2

Reported on: Friday, September 01, 2000  
10:20:06

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:	Prep Date	Analysis Date	Prep Batch	Final Aliquot
Lab ID: AS03619LCS1	8/11/2000	8/19/2000	AS03619	2.000
DUP ID: AS03619LCS1-D1	8/11/2000	8/19/2000	AS03619	2.000

Sample Matrix: Water  
Date Collected: 11-Aug-00  
Analytical SOP: PAI 714R5  
Prep SOP: PAI 778R4  
Aliquot Units: L  
Report Basis: Total

Analyte	Sample Result +/- 2s TPU	Duplicate Result +/- 2s TPU	Units	DER	Warning Limit	Lab Qualifiers
Pu-238	0.0027 +/- 0.0031	0.0066 +/- 0.0056	pCi/L	0.6	< 1.42	
Pu-239	2.27 +/- 0.29	2.17 +/- 0.28	pCi/L	0.24	< 1.42	

## Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Pu-242	2.25	1.65	pCi/L	73%	30-110%

### Comments:

#### Qualifiers/Flags:

W - DER is greater than Warning Limit of 1.42  
H - DER is Higher than Control Limit of 2.13

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
DER - Duplicate Error Ratio

Data Package ID: PUW0006226-1

# Isotopic Plutonium By Alpha Spectroscopy

## Method PAI 714R5

### Sample Results

Page: 1 of 6

Reported on: Friday, September 01, 2000  
10:20:04

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: DP SPRING

Lab ID: 0006226-1

Sample Matrix: Water

Date Prepared: 02-Aug-00

Prep SOP: PAI 780R2

Prep Batch: AS03598

Date Collected: 26-Jun-00

Date Analyzed: 19-Aug-00

Analytical SOP: PAI 714R5

Final Aliquot: 2.000

Aliquot Units: L

Report Basis: As Received

Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Pu-238	0.0196 +/- 0.0096	0.0076	pCi/L	LT
Pu-239	0.022 +/- 0.010	0.0095	pCi/L	LT

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Pu-242	2.25	1.55	pCi/L	69%	30-110%

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y2 - Chemical Yield outside default limits.

\* - Duplicate DER not within control limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: PUW0006226-1

Paragon Analytics Inc.

00010

# Isotopic Plutonium By Alpha Spectroscopy

## Method PAI 714R5

### Sample Results

Page: 2 of 6

Reported on: Friday, September 01, 2000  
10:20:06

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: DP SPRING

Lab ID: 0006226-2

Sample Matrix: Water

Date Prepared: 11-Aug-00

Prep SOP: PAI 778R4

Prep Batch: AS03619

Date Collected: 26-Jun-00

Date Analyzed: 19-Aug-00

Analytical SOP: PAI 714R5

Final Aliquot: 2.000

Aliquot Units: L

Report Basis: Total

Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Pu-238	-0.0010 +/- 0.0043	0.010	pCi/L	U
Pu-239	0.0078 +/- 0.0077	0.012	pCi/L	U

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Pu-242	2.25	1.61	pCi/L	72%	30-110%

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y2 - Chemical Yield outside default limits.

\* - Duplicate DER not within control limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: PUW0006226-1

Paragon Analytics Inc.

00011

# Isotopic Plutonium By Alpha Spectroscopy

## Method PAI 714R5

### Sample Results

Page: 3 of 6

Reported on: Friday, September 01, 2000  
10:20:04

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: LAO-2  
Lab ID: 0006226-3

Sample Matrix: Water  
Date Prepared: 02-Aug-00  
Prep SOP: PAI 780R2  
Prep Batch: AS03598

Date Collected: 26-Jun-00  
Date Analyzed: 19-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 1.960  
Aliquot Units: L  
Report Basis: As Received  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Pu-238	0.0074 +/- 0.0081	0.013	pCi/L	U
Pu-239	0.032 +/- 0.013	0.0098	pCi/L	LT

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Pu-242	2.30	1.63	pCi/L	71%	30-110%

### Comments:

**Qualifiers/Flags:**

U - Result is less than the sample specific MDC.

Y2 - Chemical Yield outside default limits.

\* - Duplicate DER not within control limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

**Abbreviations:**

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: PUW0006226-1

Paragon Analytics Inc.

00012

# Isotopic Plutonium By Alpha Spectroscopy

## Method PAI 714R5

### Sample Results

Page: 4 of 6

Reported on: Friday, September 01, 2000  
10:20:04

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: LAO-2

Lab ID: 0006226-4

Sample Matrix: Water

Date Prepared: 02-Aug-00

Prep SOP: PAI 780R2

Prep Batch: AS03598

Date Collected: 26-Jun-00

Date Analyzed: 19-Aug-00

Analytical SOP: PAI 714R5

Final Aliquot: 1.925

Aliquot Units: L

Report Basis: As Received

Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Pu-238	0.0069 +/- 0.0071	0.011	pCi/L	U
Pu-239	0.0129 +/- 0.0072	0.0027	pCi/L	LT

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Pu-242	2.34	1.69	pCi/L	72%	30-110%

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y2 - Chemical Yield outside default limits.

\* - Duplicate DER not within control limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: PUW0006226-1

Paragon Analytics Inc.

00013

# Isotopic Plutonium By Alpha Spectroscopy

## Method PAI 714R5

### Sample Results

Page: 5 of 6

Reported on: Friday, September 01, 2000  
10:20:04

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: LAO-3A  
Lab ID: 0006226-5

Sample Matrix: Water  
Date Prepared: 02-Aug-00  
Prep SOP: PAI 780R2  
Prep Batch: AS03598

Date Collected: 26-Jun-00  
Date Analyzed: 19-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 1.610  
Aliquot Units: L  
Report Basis: As Received  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Pu-238	0.0073 +/- 0.0059	0.0033	pCi/L	LT
Pu-239	0.021 +/- 0.011	0.0089	pCi/L	LT

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Pu-242	2.80	2.06	pCi/L	74%	30-110%

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.  
Y2 - Chemical Yield outside default limits.  
\* - Duplicate DER not within control limits.  
LT - Result is less than Requested MDC, greater than sample specific MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: PUW0006226-1

Paragon Analytics Inc.

00014

# Isotopic Plutonium By Alpha Spectroscopy

## Method PAI 714R5

### Sample Results

Page: 6 of 6

Reported on: Friday, September 01, 2000  
10:20:05

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: LAO-3A  
Lab ID: 0006226-6

Sample Matrix: Water  
Date Prepared: 02-Aug-00  
Prep SOP: PAI 780R2  
Prep Batch: AS03598

Date Collected: 26-Jun-00  
Date Analyzed: 19-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 1.570  
Aliquot Units: L  
Report Basis: As Received  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Pu-238	0.0097 +/- 0.0076	0.0089	pCi/L	LT
Pu-239	0.018 +/- 0.010	0.0089	pCi/L	LT

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Pu-242	2.87	2.00	pCi/L	70%	30-110%

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.  
Y2 - Chemical Yield outside default limits.  
\* - Duplicate DER not within control limits.  
LT - Result is less than Requested MDC, greater than sample specific MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: PUW0006226-1

Paragon Analytics Inc.

00015



# Paragon Analyticals, Inc.

## Radiochemistry Case Narrative

### Gross Alpha/Beta

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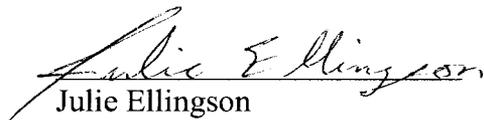
#### NMED DOE Oversight Bureau

HRMB 6.26.00

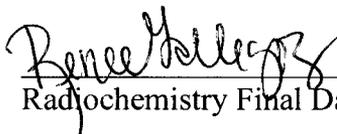
PAI WO 0006226

1. This report consists of six water samples received by Paragon on 06/28/00.
2. These samples were prepared according to Paragon Analyticals, Inc. procedure PAI SOP702R13.
3. The samples were analyzed for gross alpha and beta activity by gas flow proportional counting according to Paragon Analyticals, Inc. procedure PAI SOP724R6. The analyses were completed on 07/31/00. Gross alpha results are referenced to  $^{241}\text{Am}$ . Gross beta results are referenced to  $^{90}\text{Sr/Y}$ .
4. The analysis results for these samples are reported in units of pCi/L. The samples were not filtered prior to analysis.
5. Following an extended count the requested MDC of 1.5 pCi/L for gross beta for sample DP SPRING (PAI ID 0006226-02) was not achieved. Gross beta activity for the sample exceeded the achieved MDC.
6. No further anomalous situations were noted during the preparation and analysis of these samples. All remaining quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analyticals, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

  
Julie Ellingson  
Radiochemistry Instrument Technician

8/17/00  
Date

  
Renee Kelley  
Radiochemistry Final Data Review

8/17/00  
Date

ALPHA/BETA ANALYSIS RESULTS SUMMARY

Method 900.0/9310 (Modified)

Lab Name: Paragon Analytics, Inc.

Date Collected: 07/24/2000

Client Name: Shared QC

Date Analyzed : 07/28/2000

Client Project ID: Blank

Sample Matrix : Water

Lab Sample ID Series: 00-06-226

Count Duration: 1000 Min.

Analyzed By : JE

Client Sample ID	Lab Sample ID	Gross Alpha (pCi/liter)	Gross Beta (pCi/liter)
Blank	06-226-B1	0.49 ± 0.39	0.30 ± 0.56
Decision Level	06-226-B1	0.30	0.45

Reported Uncertainties are the Estimated Total Propagated Uncertainties (2σ). See PAI SOP743 for TPU determinations.

Reported Activities are the calculated net activities, not truncated or censored by an a priori detection limit estimate. Sample results should be compared to the decision level calculated from the appropriate blank.

These samples were prepared using PAI SOP702 and analyzed using PAI SOP724.

Remarks:

Blank is shared for workorders 0006226, 0007066, 0007083, 0007085, 0007095, and 0007096.

ALPHA/BETA ANALYSIS MDA SUMMARY

Method 900.0/9310 (Modified)

Lab Name: Paragon Analytics, Inc.

Date Collected: 07/24/2000

Client Name: Shared QC

Date Analyzed : 07/28/2000

Client Project ID: Blank

Sample Matrix : Water

Lab Sample ID Series: 00-06-226

Count Duration: 1000 Min.

Analyzed By : JE

Client Sample ID	Lab Sample ID	Gross Alpha MDA (pCi/liter)	Gross Beta MDA (pCi/liter)
Blank	06-226-B1	0.63	0.93

Reported Uncertainties are the Estimated Total Propagated Uncertainties ( $2\sigma$ ).  
See PAI SOP743 for TPU determinations.

These samples were prepared using PAI SOP702  
and analyzed using PAI SOP724.

Remarks:

Blank is shared for workorders 0006226, 0007066, 0007083,  
0007085, 0007095, and 0007096.

GROSS ALPHA/BETA BLANK SPIKE RESULTS

Method 900.0/9310 (Modified)

Lab Name: Paragon Analytics, Inc.

Date Collected: 07/24/2000

Client Name: Shared QC

Date Analyzed : 07/26/2000

Client Project ID : LCS

Sample Matrix : Water

Lab Workorder Number : 00-06-226

Units : pCi/l

Alpha Recovery Data

Lab Sample ID	Alpha Spike Added	Alpha Reported	Percent Recovery	Flag
00-06-226-S1	249.8	234.6	93.9	Pass

Beta Recovery Data

Lab Sample ID	Beta Spike Added	Beta Reported	Percent Recovery	Flag
00-06-226-S1	246.3	277.2	112.5	Pass

PAI sets control limits for gross alpha/beta measurements based on EPA/EMSL Laboratory Intercomparison Control Limits.

Acceptance Range for Percent Recovery of blank spike samples is known  $\pm$  30%.

Remarks:

LCS is shared for workorders 0006226, 0007066, 0007083, 0007085, 0007095, and 0007096.

# ALPHA/BETA ANALYSIS RESULTS SUMMARY

Method 900.0/9310 (Modified)

Lab Name: Paragon Analytics, Inc.

Date Collected: 06/26/2000

Client Name: NMED DOE Oversight Bureau

Date Analyzed : 07/27/2000

Client Project ID: HRMB 6.26.00

Sample Matrix : Water

Lab Sample ID Series: 00-06-226

Count Duration: 600 Min.

Analyzed By : JE

Client Sample ID	Lab Sample ID	Gross Alpha (pCi/liter)	Gross Beta (pCi/liter)
DP SPRING	06-226-01	0.65 ± 0.56	130 ± 18
DP SPRING	06-226-02	1.02 ± 0.61	130 ± 18
LAO-2	06-226-03	0.46 ± 0.65	22.0 ± 3.2
LAO-2	06-226-04	0.73 ± 0.58	22.0 ± 3.2
LAO-3A	06-226-05	0.56 ± 0.58	59.0 ± 8.2
LAO-3A	06-226-06	-0.11 ± 0.65	55.3 ± 7.7

Reported Uncertainties are the Estimated Total Propagated Uncertainties ( $2\sigma$ ). See PAI SOP743 for TPU determinations.

Reported Activities are the calculated net activities, not truncated or censored by an *a priori* detection limit estimate. Sample results should be compared to the decision level calculated from the appropriate blank.

These samples were prepared using PAI SOP702 and analyzed using PAI SOP724.

00005

JE

ALPHA/BETA ANALYSIS MDA SUMMARY

Method 900.0/9310 (Modified)

Lab Name: Paragon Analytics, Inc.

Date Collected: 06/26/2000

Client Name: NMED DOE Oversight Bureau

Date Analyzed : 07/27/2000

Client Project ID: HRMB 6.26.00

Sample Matrix : Water

Lab Sample ID Series: 00-06-226

Count Duration: 600 Min.

Analyzed By : JE

Client Sample ID	Lab Sample ID	Gross Alpha MDA (pCi/liter)	Gross Beta MDA (pCi/liter)
DP SPRING	06-226-01	0.91	1.2
DP SPRING	06-226-02	0.93	1.6
LAO-2	06-226-03	1.1	1.3
LAO-2	06-226-04	0.93	1.3
LAO-3A	06-226-05	0.95	1.3
LAO-3A	06-226-06	1.2	1.4

Reported Uncertainties are the Estimated Total Propagated Uncertainties (2σ). See PAI SOP743 for TPU determinations.

These samples were prepared using PAI SOP702 and analyzed using PAI SOP724.



# Paragon Analytics, Inc.

## Radiochemistry Case Narrative Gamma Spectroscopy

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### NMED DOE Oversight Bureau

HRMB 6.26.00

Paragon Work Order 0006226

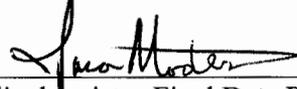
1. This report consists of analysis results for 6 water samples received by Paragon on 06/28/00. The analysis results for these samples are reported in units of pCi/L. The samples were not filtered prior to analysis.
2. These samples were prepared according to Paragon Analytics, Inc. procedure PAI SOP739R3.
3. The samples were analyzed for the presence of gamma emitting radionuclides according to Paragon Analytics, Inc. procedure PAI SOP713R5. The analyses were completed on 07/28/00.
4. Sample volumes were insufficient to allow preparation of a duplicate. A duplicate analysis of sample DP SPRING (PAI ID 0006226-1) was performed in lieu of a preparation duplicate.
5. Duplicate analysis results elevated above the DER warning limit of 1.42 (2sigma) have been flagged as "W" for Warn. Nuclide DER values exceeding 2.14 (3sigma) have been flagged "H" denoting 'outside limits, high'. For gamma spectroscopic analysis SOP 715 R10 states that 75% of the nuclides must be within the 2 sigma control limit to meet DER or RPD requirements. Elevated DER may be attributable to sample non-homogeneity.
6. Activity concentrations above the  $2\sigma$  TPU and / or the sample specific MDC are reported in some instances where minimum nuclide identification criteria are not met. Such tentative identifications result when the software attempts to calculate 'forced-fit' activity concentrations for analytes where the 'diagnostic' or key peak for a nuclide is not present above the critical level count rate or where applicable nuclide fraction limits are not satisfied. Nuclides with reported activities greater than the MDC or the associated TPU which did not meet minimum identification criteria have been flagged with a "TI" qualifier.
7. Due to software limitations some samples may report activity concentrations of zero with very large associated Total Propagated Uncertainties. This is a result of the reporting software attempting to store uncertainty values as a fraction of the sample activity. In cases of zero activity nuclides the software attempts to divide the counting uncertainty by zero. In these cases the Total Propagated Uncertainty is incorrectly reported. The associated Minimum Detectable Concentration, however, is calculated properly. The final analytical results receive a "U" flag and should be interpreted as a "non-detect" below the reported MDC.

8. No problems were encountered with either the client samples or the associated quality control samples. All quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

  
\_\_\_\_\_  
Radiochemistry Instrument Technician

8/17/00  
Date

  
\_\_\_\_\_  
Radiochemistry Final Data Review

8/18/00  
Date

# Gamma Spectroscopy Results

Method PAI 713R5

## Method Blank Results

Page: 1 of 2

Reported on: Thursday, August 17, 2000  
13:46:36

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:  
Lab ID: GS00358BLK1

Sample Matrix: Water

Date Collected: 21-Jul-00

Final Aliquot: 1.000

Date Prepared: 21-Jul-00

Date Analyzed: 26-Jul-00

Aliquot Units: L

Prep SOP: PAI 739R3

Analytical SOP: PAI 713R5

Report Basis: Total

Prep Batch: GS00358

Count Time (min.): 1000

Target Nuclide	Result +/- 2s TPU	MDC	Reporting Units	Lab Qualifier
Ac-228	0 +/- 10	10	pCi/L	U
Ag-110m	-0.2 +/- 1.3	2.2	pCi/L	U
Al-26	0 +/- 0	1.00	pCi/L	SQ
Am-241	2.5 +/- 6.0	10	pCi/L	U
Be-7	7 +/- 12	18	pCi/L	U
Bi-212	-10 +/- 280	20	pCi/L	U
Bi-214	1.0 +/- 6.9	8.4	pCi/L	U
Ce-139	-0.1 +/- 1.2	2.0	pCi/L	U
Ce-144	-0.5 +/- 8.6	14	pCi/L	U
Co-56	0.0 +/- 1.4	2.3	pCi/L	U
Co-57	0.4 +/- 1.1	1.9	pCi/L	U
Co-58	0.0 +/- 1.4	2.2	pCi/L	U
Co-60	-0.2 +/- 1.4	2.4	pCi/L	U
Cr-51	1 +/- 13	19	pCi/L	U
Cs-134	0.2 +/- 1.4	2.3	pCi/L	U
Cs-137	-0.3 +/- 1.4	2.5	pCi/L	U
Eu-152	1.9 +/- 4.6	7.8	pCi/L	U
Eu-154	2.1 +/- 7.4	13	pCi/L	U
Eu-155	1.1 +/- 4.9	8.3	pCi/L	U
Fe-59	-1.1 +/- 2.9	4.6	pCi/L	U
I-131	0.9 +/- 3.0	3.2	pCi/L	U
K-40	68 +/- 66	47	pCi/L	TI
Mn-54	0.1 +/- 1.3	2.2	pCi/L	U
Na-22	-0.6 +/- 1.5	2.5	pCi/L	U
Nb-94	0.9 +/- 1.5	2.6	pCi/L	U
Nb-95	2.3 +/- 5.2	2.6	pCi/L	U
Pa-234m	0 +/- 18000	400	pCi/L	U
Pb-212	0.6 +/- 2.1	3.8	pCi/L	U
Pb-214	-3.2 +/- 8.1	8.8	pCi/L	U

Data Package ID: GSW0006226-1

# Gamma Spectroscopy Results

Method PAI 713R5

## Method Blank Results

Page: 2 of 2

Reported on: Thursday, August 17, 2000  
13:46:36

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:  
Lab ID: GS00358BLK1

Sample Matrix: Water  
Date Prepared: 21-Jul-00  
Prep SOP: PAI 739R3  
Prep Batch: GS00358

Date Collected: 21-Jul-00  
Date Analyzed: 26-Jul-00  
Analytical SOP: PAI 713R5

Final Aliquot: 1.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	Result +/- 2s TPU	MDC	Reporting Units	Lab Qualifier
Ru-106	-5 +/- 14	23	pCi/L	U
Sb-124	-0.2 +/- 1.5	2.4	pCi/L	U
Sb-125	-0.7 +/- 3.3	5.6	pCi/L	U
Sc-46	0.0 +/- 1.4	2.3	pCi/L	U
Sr-85	0.2 +/- 1.2	2.0	pCi/L	U
Th-227	1.1 +/- 8.1	14	pCi/L	U
Th-234	31 +/- 44	46	pCi/L	U
Tl-208	-0.6 +/- 4.3	3.3	pCi/L	U
U-235	5 +/- 10	13	pCi/L	U
Zn-65	5.8 +/- 3.1	4.9	pCi/L	TI

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.  
LT - Result is less than Requested MDC, greater than sample specific MDC.  
Y2 - Chemical Yield outside default limits.  
B3 - Analyte concentration greater than MDC but less than Requested MDC.  
B - Analyte concentration greater than MDC.

SQ - Spectral interference prevents accurate quantitation.

SI - Identification is tentative due to spectral interference.

TI - Nuclide identification is tentative.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: GSW0006226-1

# Gamma Spectroscopy Results

Method PAI 713R5

## LCS Results

Page: 1 of 1

Reported on: Thursday, August 17, 2000  
13:46:36

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:  
Lab ID: GS00358LCS1

Sample Matrix: Water  
Date Prepared: 21-Jul-00  
Prep SOP: PAI 739R3  
Prep Batch: GS00358

Date Collected: 21-Jul-00  
Date Analyzed: 28-Jul-00  
Analytical SOP: PAI 713R5

Final Aliquot: 1.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 30

Target Nuclide	LCS Results +/- 2s TPU	MDC	Spike Added	Reporting Units	LCS Recovery	Control Limits	Lab Qualifier
Am-241	62200 +/- 7900	990	62400	pCi/L	100%	85-115%	P
Cd-109	173000 +/- 22000	3700	162000	pCi/L	107%	85-115%	P
Co-57	1110 +/- 180	95	1190	pCi/L	93%	85-115%	P
Co-60	28100 +/- 3500	89	28400	pCi/L	99%	85-115%	P
Cs-137	26500 +/- 3300	130	24900	pCi/L	106%	85-115%	P

### Comments:

Data Package ID: GSW0006226-1

#### Qualifiers/Flags:

- U - Result is less than the sample specific MDC or less than the associated TPU.
- LT - Result is less than Requested MDC, greater than sample specific MDC.
- Y2 - Chemical Yield outside default limits.
- \* - Duplicate DER not within control limits.

#### Abbreviations:

- TPU - Total Propagated Uncertainty (see PAI SOP 743)
- MDC - Minimum Detectable Concentration (see PAI SOP 709)

# Gamma Spectroscopy Results

Method PAI 713R5

## Duplicate Sample Results (DER)

Page: 1 of 2

Reported on: Thursday, August 17, 2000  
13:46:33

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:	DP SPRING	Prep Date	Analysis Date	Prep Batch	Final Aliquot
Lab ID:	0006226-01	7/21/2000	7/27/2000	GS00358	1.000
DUP ID:	0006226-1-D1	7/21/2000	7/28/2000	GS00358	1.000

Sample Matrix: Water  
Date Collected: 26-Jun-00  
Analytical SOP: PAI 713R5  
Prep SOP: PAI 739R3  
Aliquot Units: L  
Report Basis: Total

Analyte	Sample Result +/- 2s TPU	Duplicate Result +/- 2s TPU	Units	DER	Warning Limit	Lab Qualifiers
Ac-228	-13 +/- 31	-9 +/- 18	pCi/L	0.11	< 1.42	
Ag-110m	0.7 +/- 2.7	-0.3 +/- 2.6	pCi/L	0.27	< 1.42	
Al-26	-0.3 +/- 3.1	0 +/- 0	pCi/L	0.11	< 1.42	
Am-241	-12 +/- 13	-5 +/- 15	pCi/L	0.37	< 1.42	
Be-7	5 +/- 43	7 +/- 41	pCi/L	0.03	< 1.42	
Bi-212	3 +/- 21	-2 +/- 37	pCi/L	0.14	< 1.42	
Bi-214	-4 +/- 14	-12 +/- 13	pCi/L	0.42	< 1.42	
Ce-139	0.0 +/- 2.6	0.6 +/- 2.5	pCi/L	0.15	< 1.42	
Ce-144	-3 +/- 17	0 +/- 16	pCi/L	0.14	< 1.42	
Co-56	0.3 +/- 4.6	0.7 +/- 4.1	pCi/L	0.07	< 1.42	
Co-57	-0.5 +/- 2.3	0.0 +/- 2.0	pCi/L	0.18	< 1.42	
Co-58	0.3 +/- 4.5	0.1 +/- 3.9	pCi/L	0.03	< 1.42	
Co-60	-0.3 +/- 2.9	0.8 +/- 2.3	pCi/L	0.29	< 1.42	
Cr-51	7 +/- 83	1 +/- 90	pCi/L	0.04	< 1.42	
Cs-134	-0.4 +/- 2.4	0.2 +/- 2.5	pCi/L	0.18	< 1.42	
Cs-137	0.9 +/- 2.6	0.6 +/- 2.3	pCi/L	0.1	< 1.42	
Eu-152	-1.9 +/- 8.1	0.0 +/- 7.2	pCi/L	0.18	< 1.42	
Eu-154	0 +/- 15	1 +/- 14	pCi/L	0.04	< 1.42	
Eu-155	-1.1 +/- 8.5	-2.2 +/- 7.8	pCi/L	0.09	< 1.42	
Fe-59	3 +/- 13	1 +/- 12	pCi/L	0.09	< 1.42	
I-131	-30 +/- 510	0 +/- 600	pCi/L	0.04	< 1.42	
K-40	46 +/- 54	130 +/- 110	pCi/L	0.68	< 1.42	
Mn-54	-0.6 +/- 3.0	-0.6 +/- 2.7	pCi/L	0.01	< 1.42	
Na-22	-1.6 +/- 3.0	0.3 +/- 2.4	pCi/L	0.49	< 1.42	
Nb-94	0.2 +/- 2.5	-0.1 +/- 2.5	pCi/L	0.07	< 1.42	
Nb-95	-0.4 +/- 4.4	1.0 +/- 4.4	pCi/L	0.24	< 1.42	
Pa-234m	60 +/- 430	70 +/- 400	pCi/L	0.01	< 1.42	
Pb-212	5.2 +/- 6.7	-1.1 +/- 4.2	pCi/L	0.8	< 1.42	

Data Package ID: GSW0006226-1

# Gamma Spectroscopy Results

Method PAI 713R5

## Duplicate Sample Results (DER)

Page: 2 of 2

Reported on: Thursday, August 17, 2000  
13:46:33

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:	DP SPRING	Prep Date	Analysis Date	Prep Batch	Final Aliquot
Lab ID:	0006226-01	7/21/2000	7/27/2000	GS00358	1.000
DUP ID:	0006226-1-D1	7/21/2000	7/28/2000	GS00358	1.000

Sample Matrix: Water  
Date Collected: 26-Jun-00  
Analytical SOP: PAI 713R5  
Prep SOP: PAI 739R3  
Aliquot Units: L  
Report Basis: Total

Analyte	Sample Result +/- 2s TPU	Duplicate Result +/- 2s TPU	Units	DER	Warning Limit	Lab Qualifiers
Pb-214	1.0 +/- 8.3	1.0 +/- 10.0	pCi/L	0	< 1.42	
Ru-106	4 +/- 26	0 +/- 22	pCi/L	0.14	< 1.42	
Sb-124	0.0 +/- 4.4	0.6 +/- 4.9	pCi/L	0.1	< 1.42	
Sb-125	0.6 +/- 6.4	-0.5 +/- 6.3	pCi/L	0.12	< 1.42	
Sc-46	-0.2 +/- 4.1	-2.0 +/- 4.1	pCi/L	0.32	< 1.42	
Sr-85	5.7 +/- 5.7	10.1 +/- 6.0	pCi/L	0.53	< 1.42	
Th-227	-1 +/- 14	-13 +/- 50	pCi/L	0.24	< 1.42	
Th-234	230 +/- 120	380 +/- 130	pCi/L	0.84	< 1.42	
Tl-208	5.2 +/- 3.8	1.2 +/- 4.0	pCi/L	0.73	< 1.42	
U-235	-50 +/- 530	-5 +/- 14	pCi/L	0.09	< 1.42	
Zn-65	0.0 +/- 6.6	1.9 +/- 5.8	pCi/L	0.22	< 1.42	

### Comments:

#### Qualifiers/Flags:

W - DER is greater than Warning Limit of 1.42  
H - DER is Higher than Control Limit of 2.13

SQ - Spectral interference prevents accurate quantitation.  
SI - Identification is tentative due to spectral interference.  
TI - Nuclide identification is tentative.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
DER - Duplicate Error Ratio

Data Package ID: GSW0006226-1

# Gamma Spectroscopy Results

## Method PAI 713R5

### Sample Results

Page: 1 of 12

Reported on: Thursday, August 17, 2000

13:46:32

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: DP SPRING

Lab ID: 0006226-1

Sample Matrix: Water

Date Prepared: 21-Jul-00

Prep SOP: PAI 739R3

Prep Batch: GS00358

Date Collected: 26-Jun-00

Date Analyzed: 27-Jul-00

Analytical SOP: PAI 713R5

Final Aliquot: 1.000

Aliquot Units: L

Report Basis: Total

Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Ac-228	-13 +/- 31	18	pCi/L	U
Ag-110m	0.7 +/- 2.7	4.2	pCi/L	U
Al-26	-0.3 +/- 3.1	5.4	pCi/L	U
Am-241	-12 +/- 13	22	pCi/L	U
Be-7	5 +/- 43	49	pCi/L	U
Bi-212	3 +/- 21	35	pCi/L	U
Bi-214	-4 +/- 14	13	pCi/L	U
Ce-139	0.0 +/- 2.6	3.8	pCi/L	U
Ce-144	-3 +/- 17	27	pCi/L	U
Co-56	0.3 +/- 4.6	6.0	pCi/L	U
Co-57	-0.5 +/- 2.3	3.5	pCi/L	U
Co-58	0.3 +/- 4.5	5.7	pCi/L	U
Co-60	-0.3 +/- 2.9	5.0	pCi/L	U
Cr-51	7 +/- 83	65	pCi/L	U
Cs-134	-0.4 +/- 2.4	4.0	pCi/L	U
Cs-137	0.9 +/- 2.6	4.3	pCi/L	U
Eu-152	-1.9 +/- 8.1	14	pCi/L	U
Eu-154	0 +/- 15	25	pCi/L	U
Eu-155	-1.1 +/- 8.5	14	pCi/L	U
Fe-59	3 +/- 13	13	pCi/L	U
I-131	-30 +/- 510	58	pCi/L	U
K-40	46 +/- 54	76	pCi/L	U
Mn-54	-0.6 +/- 3.0	4.8	pCi/L	U
Na-22	-1.6 +/- 3.0	5.0	pCi/L	U
Nb-94	0.2 +/- 2.5	4.3	pCi/L	U
Nb-95	-0.4 +/- 4.4	5.4	pCi/L	U
Pa-234m	60 +/- 430	750	pCi/L	U
Pb-212	5.2 +/- 6.7	8.3	pCi/L	U
Pb-214	1.0 +/- 8.3	10	pCi/L	U
Ru-106	4 +/- 26	41	pCi/L	U
Sb-124	0.0 +/- 4.4	5.3	pCi/L	U

Data Package ID: GSW0006226-1

# Gamma Spectroscopy Results

Method PAI 713R5

## Sample Results

Page: 2 of 12

Reported on: Thursday, August 17, 2000  
13:46:32

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: DP SPRING

Lab ID: 0006226-1

Sample Matrix: Water

Date Prepared: 21-Jul-00

Prep SOP: PAI 739R3

Prep Batch: GS00358

Date Collected: 26-Jun-00

Date Analyzed: 27-Jul-00

Analytical SOP: PAI 713R5

Final Aliquot: 1.000

Aliquot Units: L

Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Sb-125	0.6 +/- 6.4	11	pCi/L	U
Sc-46	-0.2 +/- 4.1	5.4	pCi/L	U
Sr-85	5.7 +/- 5.7	6.7	pCi/L	U
Th-227	-1 +/- 14	24	pCi/L	U
Th-234	230 +/- 120	75	pCi/L	TI
Tl-208	5.2 +/- 3.8	4.8	pCi/L	
U-235	-50 +/- 530	28	pCi/L	U
Zn-65	0.0 +/- 6.6	11	pCi/L	U

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y2 - Chemical Yield outside default limits.

\* - Duplicate DER not within control limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

SQ - Spectral interference prevents accurate quantitation.

SI - Identification is tentative due to spectral interference.

TI - Nuclide identification is tentative.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: GSW0006226-1

Paragon Analytics Inc.

00009

# Gamma Spectroscopy Results

## Method PAI 713R5

### Sample Results

Page: 3 of 12

Reported on: Thursday, August 17, 2000  
13:46:33

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: DP SPRING

Lab ID: 0006226-2

Sample Matrix: Water

Date Prepared: 21-Jul-00

Prep SOP: PAI 739R3

Prep Batch: GS00358

Date Collected: 26-Jun-00

Date Analyzed: 27-Jul-00

Analytical SOP: PAI 713R5

Final Aliquot: 1.000

Aliquot Units: L

Report Basis: Total

Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Ac-228	5.1 +/- 9.2	15	pCi/L	U
Ag-110m	1.1 +/- 2.9	4.5	pCi/L	U
Al-26	-0.3 +/- 2.7	4.8	pCi/L	U
Am-241	-5 +/- 16	28	pCi/L	U
Be-7	6 +/- 46	52	pCi/L	U
Bi-212	0 +/- 23	39	pCi/L	U
Bi-214	11 +/- 13	11	pCi/L	U
Ce-139	-0.1 +/- 2.8	4.1	pCi/L	U
Ce-144	-4 +/- 19	29	pCi/L	U
Co-56	0.8 +/- 4.6	6.0	pCi/L	U
Co-57	0.0 +/- 2.4	3.7	pCi/L	U
Co-58	-1.3 +/- 4.5	5.6	pCi/L	U
Co-60	0.4 +/- 2.6	4.6	pCi/L	U
Cr-51	10 +/- 94	73	pCi/L	U
Cs-134	0.9 +/- 2.6	4.4	pCi/L	U
Cs-137	0.3 +/- 2.8	4.9	pCi/L	U
Eu-152	0.7 +/- 8.4	14	pCi/L	U
Eu-154	6 +/- 15	26	pCi/L	U
Eu-155	3.7 +/- 9.0	15	pCi/L	U
Fe-59	4 +/- 13	14	pCi/L	U
I-131	10 +/- 560	65	pCi/L	U
K-40	39 +/- 65	79	pCi/L	U
Mn-54	0.3 +/- 2.9	4.7	pCi/L	U
Na-22	0.7 +/- 2.7	4.6	pCi/L	U
Nb-94	-0.2 +/- 2.6	4.5	pCi/L	U
Nb-95	0.0 +/- 4.6	5.7	pCi/L	U
Pa-234m	80 +/- 440	780	pCi/L	U
Pb-212	2 +/- 12	11	pCi/L	U
Pb-214	-22 +/- 90	11	pCi/L	U
Ru-106	-9 +/- 29	46	pCi/L	U
Sb-124	-1.4 +/- 5.2	6.1	pCi/L	U

Data Package ID: GSW0006226-1

Paragon Analytics Inc.

00010

# Gamma Spectroscopy Results

## Method PAI 713R5

### Sample Results

Page: 4 of 12

Reported on: Thursday, August 17, 2000  
13:46:33

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: DP SPRING

Lab ID: 0006226-2

Sample Matrix: Water

Date Prepared: 21-Jul-00

Prep SOP: PAI 739R3

Prep Batch: GS00358

Date Collected: 26-Jun-00

Date Analyzed: 27-Jul-00

Analytical SOP: PAI 713R5

Final Aliquot: 1.000

Aliquot Units: L

Report Basis: Total

Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Sb-125	1.8 +/- 7.2	12	pCi/L	U
Sc-46	1.1 +/- 3.8	5.1	pCi/L	U
Sr-85	0.6 +/- 4.2	5.2	pCi/L	U
Th-227	4 +/- 16	28	pCi/L	U
Th-234	120 +/- 74	76	pCi/L	TI
Tl-208	0.0 +/- 2.8	4.9	pCi/L	U
U-235	-30 +/- 760	29	pCi/L	U
Zn-65	2.8 +/- 6.8	11	pCi/L	U

#### Comments:

##### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y2 - Chemical Yield outside default limits.

\* - Duplicate DER not within control limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

SQ - Spectral interference prevents accurate quantitation.

SI - Identification is tentative due to spectral interference.

TI - Nuclide identification is tentative.

##### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: GSW0006226-1

Paragon Analytics Inc.

00011

# Gamma Spectroscopy Results

## Method PAI 713R5

### Sample Results

Page: 5 of 12

Reported on: Thursday, August 17, 2000  
13:46:34

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Client Project Number: HRMB 6.26.00

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0006226

Field ID: LAO-2  
Lab ID: 0006226-3

Sample Matrix: Water  
Date Prepared: 21-Jul-00  
Prep SOP: PAI 739R3  
Prep Batch: GS00358

Date Collected: 26-Jun-00  
Date Analyzed: 27-Jul-00  
Analytical SOP: PAI 713R5

Final Aliquot: 1.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Ac-228	6.4 +/- 9.2	9.8	pCi/L	U
Ag-110m	0.0 +/- 1.6	2.5	pCi/L	U
Al-26	0.0 +/- 1.3	2.3	pCi/L	U
Am-241	1.4 +/- 6.5	11	pCi/L	U
Be-7	-4 +/- 25	28	pCi/L	U
Bi-212	0 +/- 1100	21	pCi/L	U
Bi-214	7.7 +/- 5.0	9.1	pCi/L	U
Ce-139	-0.2 +/- 1.7	2.5	pCi/L	U
Ce-144	-3 +/- 12	18	pCi/L	U
Co-56	0.5 +/- 2.5	3.2	pCi/L	U
Co-57	-0.1 +/- 1.5	2.3	pCi/L	U
Co-58	0.6 +/- 2.3	2.8	pCi/L	U
Co-60	-0.1 +/- 1.4	2.4	pCi/L	U
Cr-51	-2 +/- 50	39	pCi/L	U
Cs-134	-0.1 +/- 1.4	2.3	pCi/L	U
Cs-137	-0.3 +/- 1.5	2.6	pCi/L	U
Eu-152	-0.1 +/- 5.3	8.9	pCi/L	U
Eu-154	2.8 +/- 6.6	11	pCi/L	U
Eu-155	-1.6 +/- 5.6	9.3	pCi/L	U
Fe-59	4.2 +/- 5.7	5.9	pCi/L	U
I-131	10 +/- 280	32	pCi/L	U
K-40	68 +/- 53	45	pCi/L	
Mn-54	0.4 +/- 1.6	2.5	pCi/L	U
Na-22	0.2 +/- 1.5	2.6	pCi/L	U
Nb-94	0.7 +/- 1.4	2.3	pCi/L	U
Nb-95	8.1 +/- 5.2	3.4	pCi/L	TI
Pa-234m	-60 +/- 300	370	pCi/L	U
Pb-212	1.8 +/- 2.3	4.1	pCi/L	U
Pb-214	-6.4 +/- 7.3	8.7	pCi/L	U
Ru-106	1 +/- 14	23	pCi/L	U
Sb-124	1.3 +/- 2.7	3.2	pCi/L	U

Data Package ID: GSW0006226-1

# Gamma Spectroscopy Results

## Method PAI 713R5

### Sample Results

Page: 6 of 12

Reported on: Thursday, August 17, 2000  
13:46:34

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: LAO-2  
Lab ID: 0006226-3

Sample Matrix: Water  
Date Prepared: 21-Jul-00  
Prep SOP: PAI 739R3  
Prep Batch: GS00358

Date Collected: 26-Jun-00  
Date Analyzed: 27-Jul-00  
Analytical SOP: PAI 713R5

Final Aliquot: 1.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Sb-125	2.0 +/- 3.5	5.8	pCi/L	U
Sc-46	0.6 +/- 2.2	2.9	pCi/L	U
Sr-85	0.0 +/- 2.1	2.5	pCi/L	U
Th-227	3.6 +/- 8.7	15	pCi/L	U
Th-234	-3 +/- 21	38	pCi/L	U
Tl-208	-0.2 +/- 3.5	3.1	pCi/L	U
U-235	0.0 +/- 7.9	14	pCi/L	U
Zn-65	0.5 +/- 3.3	5.1	pCi/L	U

#### Comments:

##### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.  
Y2 - Chemical Yield outside default limits.  
\* - Duplicate DER not within control limits.  
LT - Result is less than Requested MDC, greater than sample specific MDC.  
SQ - Spectral interference prevents accurate quantitation.  
SI - Identification is tentative due to spectral interference.  
TI - Nuclide identification is tentative.

##### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: GSW0006226-1

Paragon Analytics Inc.

00013

# Gamma Spectroscopy Results

## Method PAI 713R5

### Sample Results

Page: 7 of 12

Reported on: Thursday, August 17, 2000  
13:46:34

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: LAO-2  
Lab ID: 0006226-4

Sample Matrix: Water  
Date Prepared: 21-Jul-00  
Prep SOP: PAI 739R3  
Prep Batch: GS00358

Date Collected: 26-Jun-00  
Date Analyzed: 27-Jul-00  
Analytical SOP: PAI 713R5

Final Aliquot: 1.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Ac-228	-13 +/- 28	16	pCi/L	U
Ag-110m	-0.4 +/- 2.5	3.9	pCi/L	U
Al-26	-0.5 +/- 2.8	4.8	pCi/L	U
Am-241	1 +/- 13	23	pCi/L	U
Be-7	4 +/- 39	45	pCi/L	U
Bi-212	1 +/- 19	32	pCi/L	U
Bi-214	-2 +/- 12	13	pCi/L	U
Ce-139	0.0 +/- 2.6	3.8	pCi/L	U
Ce-144	0 +/- 15	23	pCi/L	U
Co-56	-1.2 +/- 4.3	5.6	pCi/L	U
Co-57	1.2 +/- 1.9	3.0	pCi/L	U
Co-58	-1.7 +/- 4.3	5.4	pCi/L	U
Co-60	-0.8 +/- 2.7	4.6	pCi/L	U
Cr-51	-13 +/- 88	68	pCi/L	U
Cs-134	-0.1 +/- 2.4	4.0	pCi/L	U
Cs-137	0.4 +/- 2.3	4.0	pCi/L	U
Eu-152	2.8 +/- 7.0	12	pCi/L	U
Eu-154	2 +/- 14	24	pCi/L	U
Eu-155	-0.5 +/- 7.8	13	pCi/L	U
Fe-59	-2 +/- 12	13	pCi/L	U
I-131	10 +/- 470	55	pCi/L	U
K-40	6 +/- 40	68	pCi/L	U
Mn-54	0.6 +/- 2.7	4.4	pCi/L	U
Na-22	-1.0 +/- 2.8	4.8	pCi/L	U
Nb-94	0.5 +/- 2.4	4.1	pCi/L	U
Nb-95	-0.4 +/- 4.2	5.2	pCi/L	U
Pa-234m	540 +/- 410	560	pCi/L	U
Pb-212	-20 +/- 120	7.9	pCi/L	U
Pb-214	-8 +/- 13	10	pCi/L	U
Ru-106	-9 +/- 24	39	pCi/L	U
Sb-124	0.2 +/- 4.6	5.5	pCi/L	U

Data Package ID: GSW0006226-1

# Gamma Spectroscopy Results

## Method PAI 713R5

### Sample Results

Page: 8 of 12

Reported on: Thursday, August 17, 2000  
13:46:34

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Client Project Number: HRMB 6.26.00

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0006226

Field ID: LAO-2  
Lab ID: 0006226-4

Sample Matrix: Water  
Date Prepared: 21-Jul-00  
Prep SOP: PAI 739R3  
Prep Batch: GS00358

Date Collected: 26-Jun-00  
Date Analyzed: 27-Jul-00  
Analytical SOP: PAI 713R5

Final Aliquot: 1.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Sb-125	-2.0 +/- 6.7	11	pCi/L	U
Sc-46	-0.9 +/- 3.8	5.0	pCi/L	U
Sr-85	12.3 +/- 5.9	6.5	pCi/L	SI
Th-227	-11 +/- 66	26	pCi/L	U
Th-234	510 +/- 170	81	pCi/L	TI
Ti-208	0.0 +/- 4.2	5.1	pCi/L	U
U-235	4 +/- 13	23	pCi/L	U
Zn-65	1.7 +/- 5.6	8.8	pCi/L	U

#### Comments:

##### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.  
Y2 - Chemical Yield outside default limits.  
\* - Duplicate DER not within control limits.  
LT - Result is less than Requested MDC, greater than sample specific MDC.  
SQ - Spectral interference prevents accurate quantitation.  
SI - Identification is tentative due to spectral interference.  
TI - Nuclide identification is tentative.

##### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: GSW0006226-1

Paragon Analytics Inc.

00015

# Gamma Spectroscopy Results

## Method PAI 713R5

### Sample Results

Page: 9 of 12

Reported on: Thursday, August 17, 2000  
13:46:35

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Client Project Number: HRMB 6.26.00

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0006226

Field ID: LAO-3A  
Lab ID: 0006226-5

Sample Matrix: Water  
Date Prepared: 21-Jul-00  
Prep SOP: PAI 739R3  
Prep Batch: GS00358

Date Collected: 26-Jun-00  
Date Analyzed: 28-Jul-00  
Analytical SOP: PAI 713R5

Final Aliquot: 1.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Ac-228	-14 +/- 29	19	pCi/L	U
Ag-110m	0.3 +/- 2.6	4.1	pCi/L	U
Al-26	0 +/- 0	6.0	pCi/L	SQ
Am-241	-1 +/- 14	24	pCi/L	U
Be-7	6 +/- 44	50	pCi/L	U
Bi-212	16 +/- 21	33	pCi/L	U
Bi-214	-3 +/- 13	12	pCi/L	U
Ce-139	0.4 +/- 2.6	3.7	pCi/L	U
Ce-144	-2 +/- 17	27	pCi/L	U
Co-56	0.3 +/- 4.5	5.8	pCi/L	U
Co-57	-0.1 +/- 2.2	3.5	pCi/L	U
Co-58	-0.4 +/- 4.6	5.8	pCi/L	U
Co-60	0.8 +/- 2.8	4.8	pCi/L	U
Cr-51	5 +/- 87	66	pCi/L	U
Cs-134	-0.2 +/- 2.5	4.2	pCi/L	U
Cs-137	1.0 +/- 2.4	4.1	pCi/L	U
Eu-152	1.2 +/- 8.0	13	pCi/L	U
Eu-154	-1 +/- 15	25	pCi/L	U
Eu-155	3.2 +/- 8.4	14	pCi/L	U
Fe-59	0 +/- 14	14	pCi/L	U
I-131	0 +/- 570	60	pCi/L	U
K-40	94 +/- 86	87	pCi/L	
Mn-54	1.1 +/- 3.1	4.9	pCi/L	U
Na-22	1.2 +/- 2.7	4.6	pCi/L	U
Nb-94	-0.1 +/- 2.5	4.4	pCi/L	U
Nb-95	0.8 +/- 4.4	5.4	pCi/L	U
Pa-234m	130 +/- 450	790	pCi/L	U
Pb-212	12 +/- 12	8.7	pCi/L	
Pb-214	5 +/- 11	12	pCi/L	U
Ru-106	-9 +/- 26	42	pCi/L	U
Sb-124	0.3 +/- 4.9	5.8	pCi/L	U

Data Package ID: GSW0006226-1

# Gamma Spectroscopy Results

## Method PAI 713R5

### Sample Results

Page: 10 of 12

Reported on: Thursday, August 17, 2000  
13:46:35

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: LAO-3A  
Lab ID: 0006226-5

Sample Matrix: Water  
Date Prepared: 21-Jul-00  
Prep SOP: PAI 739R3  
Prep Batch: GS00358

Date Collected: 26-Jun-00  
Date Analyzed: 28-Jul-00  
Analytical SOP: PAI 713R5

Final Aliquot: 1.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Sb-125	2.0 +/- 6.6	11	pCi/L	U
Sc-46	-1.5 +/- 4.2	5.5	pCi/L	U
Sr-85	-0.1 +/- 3.8	4.6	pCi/L	U
Th-227	0 +/- 0	34	pCi/L	SQ
Th-234	138 +/- 79	81	pCi/L	TI
Tl-208	7.0 +/- 4.9	5.3	pCi/L	
U-235	-50 +/- 680	28	pCi/L	U
Zn-65	-2.3 +/- 6.7	10	pCi/L	U

#### Comments:

##### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.  
Y2 - Chemical Yield outside default limits.  
\* - Duplicate DER not within control limits.  
LT - Result is less than Requested MDC, greater than sample specific MDC.  
SQ - Spectral interference prevents accurate quantitation.  
SI - Identification is tentative due to spectral interference.  
TI - Nuclide identification is tentative.

##### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: GSW0006226-1

# Gamma Spectroscopy Results

## Method PAI 713R5

### Sample Results

Page: 11 of 12

Reported on: Thursday, August 17, 2000  
13:46:36

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Client Project Number: HRMB 6.26.00

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0006226

Field ID: LAO-3A  
Lab ID: 0006226-6

Sample Matrix: Water  
Date Prepared: 21-Jul-00  
Prep SOP: PAI 739R3  
Prep Batch: GS00358

Date Collected: 26-Jun-00  
Date Analyzed: 29-Jul-00  
Analytical SOP: PAI 713R5

Final Aliquot: 1.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Ac-228	-22 +/- 45	19	pCi/L	U
Ag-110m	1.4 +/- 2.7	4.1	pCi/L	U
Al-26	0 +/- 0	5.5	pCi/L	SQ
Am-241	-53 +/- 16	24	pCi/L	U
Be-7	0 +/- 44	49	pCi/L	U
Bi-212	-1 +/- 21	35	pCi/L	U
Bi-214	-25 +/- 85	12	pCi/L	U
Ce-139	0.1 +/- 2.6	3.8	pCi/L	U
Ce-144	7 +/- 17	26	pCi/L	U
Co-56	-0.6 +/- 5.0	6.3	pCi/L	U
Co-57	0.4 +/- 2.2	3.5	pCi/L	U
Co-58	-0.4 +/- 4.7	5.9	pCi/L	U
Co-60	-0.2 +/- 2.9	5.1	pCi/L	U
Cr-51	1 +/- 91	68	pCi/L	U
Cs-134	1.3 +/- 2.7	4.5	pCi/L	U
Cs-137	-1.1 +/- 2.6	4.5	pCi/L	U
Eu-152	2.7 +/- 7.9	13	pCi/L	U
Eu-154	-3 +/- 15	25	pCi/L	U
Eu-155	3.2 +/- 8.4	14	pCi/L	U
Fe-59	5 +/- 13	14	pCi/L	U
I-131	0 +/- 670	67	pCi/L	U
K-40	92 +/- 72	82	pCi/L	
Mn-54	0.9 +/- 2.9	4.7	pCi/L	U
Na-22	0.5 +/- 3.1	5.3	pCi/L	U
Nb-94	0.7 +/- 2.4	4.1	pCi/L	U
Nb-95	-0.9 +/- 4.8	5.8	pCi/L	U
Pa-234m	90 +/- 410	730	pCi/L	U
Pb-212	7 +/- 10	9.6	pCi/L	U
Pb-214	-2 +/- 11	11	pCi/L	U
Ru-106	-1 +/- 26	41	pCi/L	U
Sb-124	2.0 +/- 5.1	5.9	pCi/L	U

Data Package ID: GSW0006226-1

# Gamma Spectroscopy Results

## Method PAI 713R5

### Sample Results

Page: 12 of 12

Reported on: Thursday, August 17, 2000  
13:46:35

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Client Project Number: HRMB 6.26.00

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0006226

Field ID: LAO-3A  
Lab ID: 0006226-6

Sample Matrix: Water  
Date Prepared: 21-Jul-00  
Prep SOP: PAI 739R3  
Prep Batch: GS00358

Date Collected: 26-Jun-00  
Date Analyzed: 29-Jul-00  
Analytical SOP: PAI 713R5

Final Aliquot: 1.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Sb-125	-1.5 +/- 6.8	11	pCi/L	U
Sc-46	1.7 +/- 3.9	5.0	pCi/L	U
Sr-85	4.4 +/- 5.8	6.7	pCi/L	U
Th-227	0 +/- 14	24	pCi/L	U
Th-234	123 +/- 96	74	pCi/L	TI
Tl-208	6.3 +/- 3.7	4.6	pCi/L	
U-235	14 +/- 25	29	pCi/L	U
Zn-65	5.3 +/- 6.2	9.4	pCi/L	U

#### Comments:

##### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.  
Y2 - Chemical Yield outside default limits.  
\* - Duplicate DER not within control limits.  
LT - Result is less than Requested MDC, greater than sample specific MDC.  
SQ - Spectral interference prevents accurate quantitation.  
SI - Identification is tentative due to spectral interference.  
TI - Nuclide identification is tentative.

##### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: GSW0006226-1

# Gamma Spectroscopy Results

## Method PAI 713R5

### Sample Duplicate Results

Page: 1 of 2

Reported on: Thursday, August 17, 2000

13:46:33

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: DP SPRING

Lab ID: 0006226-1-D1

Sample Matrix: Water

Date Prepared: 21-Jul-00

Prep SOP: PAI 739R3

Prep Batch: GS00358

Date Collected: 26-Jun-00

Date Analyzed: 28-Jul-00

Analytical SOP: PAI 713R5

Final Aliquot: 1.000

Aliquot Units: L

Report Basis: Total

Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Ac-228	-9 +/- 18	15	pCi/L	U
Ag-110m	-0.3 +/- 2.6	4.0	pCi/L	U
Al-26	0 +/- 0	2.4	pCi/L	SQ
Am-241	-5 +/- 15	25	pCi/L	U
Be-7	7 +/- 41	46	pCi/L	U
Bi-212	-2 +/- 37	34	pCi/L	U
Bi-214	-12 +/- 13	10	pCi/L	U
Ce-139	0.6 +/- 2.5	3.6	pCi/L	U
Ce-144	0 +/- 16	24	pCi/L	U
Co-56	0.7 +/- 4.1	5.3	pCi/L	U
Co-57	0.0 +/- 2.0	3.2	pCi/L	U
Co-58	0.1 +/- 3.9	4.9	pCi/L	U
Co-60	0.8 +/- 2.3	3.9	pCi/L	U
Cr-51	1 +/- 90	69	pCi/L	U
Cs-134	0.2 +/- 2.5	4.2	pCi/L	U
Cs-137	0.6 +/- 2.3	4.0	pCi/L	U
Eu-152	0.0 +/- 7.2	12	pCi/L	U
Eu-154	1 +/- 14	24	pCi/L	U
Eu-155	-2.2 +/- 7.8	13	pCi/L	U
Fe-59	1 +/- 12	13	pCi/L	U
I-131	0 +/- 600	64	pCi/L	U
K-40	130 +/- 110	83	pCi/L	
Mn-54	-0.6 +/- 2.7	4.4	pCi/L	U
Na-22	0.3 +/- 2.4	4.1	pCi/L	U
Nb-94	-0.1 +/- 2.5	4.3	pCi/L	U
Nb-95	1.0 +/- 4.4	5.3	pCi/L	U
Pa-234m	70 +/- 400	700	pCi/L	U
Pb-212	-1.1 +/- 4.2	6.5	pCi/L	U
Pb-214	1.0 +/- 10.0	11	pCi/L	U
Ru-106	0 +/- 22	35	pCi/L	U
Sb-124	0.6 +/- 4.9	5.7	pCi/L	U

Data Package ID: GSW0006226-1

Paragon Analytics Inc.

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# Gamma Spectroscopy Results

Method PAI 713R5

## Sample Duplicate Results

Page: 2 of 2

Reported on: Thursday, August 17, 2000  
13:46:33

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: DP SPRING  
Lab ID: 0006226-1-D1

Sample Matrix: Water  
Date Prepared: 21-Jul-00  
Prep SOP: PAI 739R3  
Prep Batch: GS00358

Date Collected: 26-Jun-00  
Date Analyzed: 28-Jul-00  
Analytical SOP: PAI 713R5

Final Aliquot: 1.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Sb-125	-0.5 +/- 6.3	11	pCi/L	U
Sc-46	-2.0 +/- 4.1	5.3	pCi/L	U
Sr-85	10.1 +/- 6.0	6.7	pCi/L	SI
Th-227	-13 +/- 50	26	pCi/L	U
Th-234	380 +/- 130	71	pCi/L	TI
Ti-208	1.2 +/- 4.0	4.7	pCi/L	U
U-235	-5 +/- 14	24	pCi/L	U
Zn-65	1.9 +/- 5.8	9.1	pCi/L	U

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.  
Y2 - Chemical Yield outside default limits.  
\* - Duplicate DER not within control limits.  
LT - Result is less than Requested MDC, greater than sample specific MDC.  
SQ - Spectral interference prevents accurate quantitation.  
SI - Identification is tentative due to spectral interference.  
TI - Nuclide identification is tentative.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: GSW0006226-1

Paragon Analytics Inc.

00021



# Paragon Analytics, Inc.

## TOTAL ORGANIC CARBON CASE NARRATIVE

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### **NMED DOE Oversight Bureau**

HRMB 6.26.00

### **Order Number - 0006226**

1. This report consists of three water samples.
  2. The samples were received cool and intact on June 28, 2000.
  3. The samples had been correctly preserved for the requested analysis.
  4. The samples were prepared for analysis based on method 415.1-Total Organic Carbon and PAI SOP 803 revision 4.
  5. All standards and solutions were used within their recommended shelf life.
  6. The samples were prepared and analyzed within the established hold time.
- All in house quality control procedures were followed, as described below.
7. General quality control procedures.
    - All method blanks prepared and analyzed with this batch of samples were below reporting limits in total organic carbon.
    - A second source (DEMAND) standard at 29.5 ppm was run every twenty injections to ensure the calibration curve was correct and that the instrument was continually running within working parameters.
    - A laboratory control sample and laboratory control sample duplicate were prepared and analyzed with this batch and were within control limits for total organic carbon.
    - A matrix duplicate, matrix spike, and matrix spike duplicate were analyzed with this batch on PAI sample ID 0006226-5 and were within acceptance criteria for total organic carbon.



The data contained in the following report have been reviewed and approved by the personnel listed below:

Tony Briney  
Tony Briney  
TOC Analyst

7/10/00  
Date

SW  
Reviewer's Initials

7/10/00  
Date

#### CERTIFICATION

Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

### **Data Reporting Qualifiers**

The following qualifiers are used by the laboratory when reporting results of analyses.

- U - If the analyte was analyzed for but not detected.
- N - Spiked sample recovery not within control limits.
- \* - Duplicate analysis ( relative percent difference) not within control limits.
- B - The method blank for the analysis contained the analyte of interest above the reporting limit.

# Paragon Analytics, Incorporated

## Sample Number(s) Cross-Reference Table

---

**Paragon OrderNum:** 0006226

**Client Name:** NMED DOE Oversight Bureau

**Client Project Name:**

**Client Project Number:** HRMB 6.26.00

**Client PO Number:**

---

Client Sample	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
DP SPRING	0006226-1		WATER	6/26/00	10:20
DP SPRING	0006226-2		WATER	6/26/00	10:20
LAO-2	0006226-3		WATER	6/26/00	10:46
LAO-2	0006226-4		WATER	6/26/00	10:46
LAO-3A	0006226-5		WATER	6/26/00	13:23
LAO-3A	0006226-6		WATER	6/26/00	13:23

# TOTAL ORGANIC CARBON

## Method EPA415.1

### Sample Results

Lab Name: Paragon Analytics, Inc.

Client Name: NMED DOE Oversight Bureau

Client Project ID: HRMB 6.26.00

Work Order Number: 0006226

Reporting Basis: As Received

Final Volume: 1 ML

Matrix: WATER

Result Units: MG/L

---

Client Sample ID	Lab ID	Date Collected	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Reporting Limit	Flag	Sample Aliquot
DP SPRING	0006226-1	6/26/2000	7/5/2000	07/05/2000	N/A	1	2	1		1 ML
LAO-2	0006226-3	6/26/2000	7/5/2000	07/05/2000	N/A	1	1	1	U	1 ML
LAO-3A	0006226-5	6/26/2000	7/5/2000	07/05/2000	N/A	1	1	1	U	1 ML

#### Comments:

---

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: MW0006226-1

# Total Organic Carbon

## Method EPA415.1

### Duplicate Sample Results

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Reporting Basis: As Received

Sample Aliquot: 1 ML

Final Volume: 1ML

Matrix: WATER

Result Units MG/L

Client Sample ID	Lab ID	Date Prepared	Date Analyzed	Dilution Factor	Duplicate Result	Dup Qual	Sample Result	Samp Qual	Reporting Limit	RPD	RPD Limit
LAO-3A	0006226-5	07/05/2000	07/05/2000	1	1	U	1	U	1		20

#### Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: MW0006226-1

Date Printed: Monday, July 10, 2000

Paragon Analytics Inc.

Page 1 of 1

LIMS Version: 1.882

00006

# Total Organic Carbon

Method EPA415.1

Method Blank

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: MW000705-1MB

Sample Matrix: WATER  
% Moisture: N/A

Prep Batch: MW000705-1  
QCBatchID: MW000705-1-1  
Run ID: MW000705-1A  
Cleanup: NONE  
Basis: N/A

Sample Aliquot: 1 ML  
Final Volume: 1 ML  
Result Units: MG/L

Lab ID	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Reporting Limit	Flag
MW000705-1MB	7/5/2000	07/05/2000	N/A	1	1	1	U

## Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: MW0006226-1

00007

# Total Organic Carbon

## Method EPA415.1

### Blank Spike and Blank Spike Duplicate

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Lab ID: MW000705-1LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 05-Jul-00

Date Analyzed: 05-Jul-00

Prep Batch: MW000705-1

QCBatchID: MW000705-1-1

Run ID: MW000705-1A

Cleanup: NONE

Basis: N/A

Sample Aliquot: 1 ML

Final Volume: 1 ML

Result Units: MG/L

CASNO	Target Analyte	Spike Added	BS Result	Reporting Limit	Result Qualifier	BS % Rec.	Control Limits
10-35-5	TOTAL ORGANIC CARBON	29.5	28.2	1		96	90 - 110

BSD ID: MW000705-1LCSD

CASNO	Target Analyte	Spike Added	BSD Result	Reporting Limit	BSD % Rec.	RPD	RPD Limits
10-35-5	TOTAL ORGANIC CARBON	29.5	28.7	1	97	2	20

Data Package ID: MW0006226-1

# Total Organic Carbon

Method EPA415.1

## Matrix Spike And Matrix Spike Duplicate

Lab Name: Paragon Analytics, Inc.

Work Order Number: 0006226

Client Name: NMED DOE Oversight Bureau

ClientProject ID: HRMB 6.26.00

Field ID: LAO-3A

LabID: 0006226-5MS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 26-Jun-00

Date Extracted: 05-Jul-00

Date Analyzed: 05-Jul-00

Prep Batch: MW000705-1

QCBatchID: MW000705-1-1

Run ID: MW000705-1A

Cleanup: NONE

Basis: As Received

Sample Aliquot: 1 ML

Final Volume: 1 ML

Result Units: MG/L

Spike Added	Sample Result	Samp Qual	Reporting Limit	MS Result	MS % Rec.	MS Qualifier	Control Limits
16	1	U	1	18.5	110		80 - 120%

MSD Lab ID: 0006226-5MSD

Spike Added	MSD Result	MSD Qual	Reporting Limit	MSD % Rec.	RPD	RPD Limits
16	18.6		1	111	1	20

Data Package ID: MW0006226-1



# Paragon Analytics, Inc.

## Radiochemistry Case Narrative

### Isotopic Americium and Isotopic Curium

---

#### NMED DOE Oversight Bureau

HRMB 6.26.00

PAI WO 0006226

1. This report consists of 6 water samples received by Paragon on 06/28/2000.
2. These samples were prepared according to Paragon Analytics, Inc. procedures PAI SOP776R3, PAI SOP778R4, and PAI SOP780R2.
3. All samples were analyzed for the presence of isotopic americium according to Paragon Analytics, Inc. procedure PAI SOP714R5. In addition, sample DP SPRING (PAI ID 0006226-1) was analyzed for the presence of isotopic curium by the same method. The analyses were completed on 08/24/2000.
4. The analysis results for these samples are reported in units of pCi/L. The samples were not filtered prior to analysis.
5. Due to insufficient sample volume, a duplicate laboratory control sample (LCS) was prepared in lieu of a prep batch duplicate.
6. Cm-244 activity is reported in the associated method blank above the minimum detectable concentration value. The measured blank activity is below the standard MDC (0.1 pCi/L). Results should be compared to the method blank activity to determine the validity of the measurement.
7. No further anomalous situations were encountered during the preparation or analysis of these samples. All quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

  
Kurt Garrett  
Radiochemistry Instrumentation

9/1/00  
Date

  
Renee Holley  
Radiochemistry Final Data Review

9/1/00  
Date

# Isotopic Curium By Alpha Spectroscopy

Method PAI 714R5

## Method Blank Results

Page: 1 of 2

Reported on: Friday, September 01, 2000  
10:20:05

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:  
Lab ID: AS03598BLK1

Sample Matrix: Water  
Date Prepared: 02-Aug-00  
Prep SOP: PAI 780R2  
Prep Batch: AS03598

Date Collected: 02-Aug-00  
Date Analyzed: 19-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 2.000  
Aliquot Units: L  
Report Basis: As Received  
Count Time (min.): 1000

Target Nuclide	Result +/- 2s TPU	MDC	Reporting Units	Lab Qualifier
Am-241	0.0054 +/- 0.0064	0.010	pCi/L	U
Cm-242	0.0023 +/- 0.0033	0.0032	pCi/L	U
Cm-244	0.0054 +/- 0.0048	0.0029	pCi/L	B3

## Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Am-243	2.25	1.62	pCi/L	72%	30-110%

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.  
LT - Result is less than Requested MDC, greater than sample specific MDC.  
Y2 - Chemical Yield outside default limits.  
B3 - Analyte concentration greater than MDC but less than Requested MDC.  
B - Analyte concentration greater than MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: ACW0006226-1

# Isotopic Americium By Alpha Spectroscopy

Method PAI 714R5

## Method Blank Results

Page: 2 of 2

Reported on: Friday, September 01, 2000  
10:20:06

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:  
Lab ID: AS03619BLK1

Sample Matrix: Water  
Date Prepared: 11-Aug-00  
Prep SOP: PAI 778R4  
Prep Batch: AS03619

Date Collected: 11-Aug-00  
Date Analyzed: 19-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 2.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	Result +/- 2s TPU	MDC	Reporting Units	Lab Qualifier
Am-241	0.0010 +/- 0.0052	0.011	pCi/L	U

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Am-243	2.25	1.62	pCi/L	72%	30-110%

### Comments:

#### Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- LT - Result is less than Requested MDC, greater than sample specific MDC.
- Y2 - Chemical Yield outside default limits.
- B3 - Analyte concentration greater than MDC but less than Requested MDC.
- B - Analyte concentration greater than MDC.

#### Abbreviations:

- TPU - Total Propagated Uncertainty (see PAI SOP 743)
- MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: ACW0006226-1

# Isotopic Curium By Alpha Spectroscopy

Method PAI 714R5

## LCS Results

Page: 1 of 4

Reported on: Friday, September 01, 2000  
10:20:05

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:  
Lab ID: AS03598LCS1

Sample Matrix: Water  
Date Prepared: 02-Aug-00  
Prep SOP: PAI 780R2  
Prep Batch: AS03598

Date Collected: 02-Aug-00  
Date Analyzed: 19-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 2.000  
Aliquot Units: L  
Report Basis: As Received  
Count Time (min.): 1000

Target Nuclide	LCS Results +/- 2s TPU	MDC	Spike Added	Reporting Units	LCS Recovery	Control Limits	Lab Qualifier
Am-241	2.20 +/- 0.29	0.012	2.25	pCi/L	98%	79-118%	P
Cm-242	-0.0021 +/- 0.0059	0.014	N/A	pCi/L	N/A	N/A	U
Cm-244	0.0089 +/- 0.0076	0.011	N/A	pCi/L	N/A	N/A	U

## Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Am-243	2.25	1.57	pCi/L	70%	30-110%

### Comments:

Data Package ID: ACW0006226-1

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.  
LT - Result is less than Requested MDC, greater than sample specific MDC.  
Y2 - Chemical Yield outside default limits.  
\* - Duplicate DER not within control limits.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

# Isotopic Curium By Alpha Spectroscopy

## Method PAI 714R5

### LCS Results

Page: 2 of 4

Reported on: Friday, September 01, 2000  
10:20:05

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:

Lab ID: AS03598LCS1-D1

Sample Matrix: Water

Date Prepared: 02-Aug-00

Prep SOP: PAI 780R2

Prep Batch: AS03598

Date Collected: 02-Aug-00

Date Analyzed: 19-Aug-00

Analytical SOP: PAI 714R5

Final Aliquot: 2.000

Aliquot Units: L

Report Basis: As Received

Count Time (min.): 1000

Target Nuclide	LCS Results +/- 2s TPU	MDC	Spike Added	Reporting Units	LCS Recovery	Control Limits	Lab Qualifier
Am-241	2.25 +/- 0.29	0.015	2.25	pCi/L	100%	79-118%	P
Cm-242	0.0011 +/- 0.0049	0.010	N/A	pCi/L	N/A	N/A	U
Cm-244	0.0041 +/- 0.0041	0.0028	N/A	pCi/L	N/A	N/A	LT

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Am-243	2.25	1.60	pCi/L	71%	30-110%

#### Comments:

Data Package ID: ACW0006226-1

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y2 - Chemical Yield outside default limits.

\* - Duplicate DER not within control limits.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

# Isotopic Americium By Alpha Spectroscopy

## Method PAI 714R5

### LCS Results

Page: 3 of 4

Reported on: Friday, September 01, 2000  
10:20:06

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:  
Lab ID: AS03619LCS1

Sample Matrix: Water  
Date Prepared: 11-Aug-00  
Prep SOP: PAI 778R4  
Prep Batch: AS03619

Date Collected: 11-Aug-00  
Date Analyzed: 24-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 2.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	LCS Results +/- 2s TPU	MDC	Spike Added	Reporting Units	LCS Recovery	Control Limits	Lab Qualifier
Am-241	2.33 +/- 0.30	0.0071	2.25	pCi/L	104%	79-118%	P

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Am-243	2.25	1.67	pCi/L	74%	30-110%

#### Comments:

Data Package ID: ACW0006226-1

#### Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- LT - Result is less than Requested MDC, greater than sample specific MDC.
- Y2 - Chemical Yield outside default limits.
- \* - Duplicate DER not within control limits.

#### Abbreviations:

- TPU - Total Propagated Uncertainty (see PAI SOP 743)
- MDC - Minimum Detectable Concentration (see PAI SOP 709)

# Isotopic Americium By Alpha Spectroscopy

## Method PAI 714R5

### LCS Results

Page: 4 of 4

Reported on: Friday, September 01, 2000  
10:20:06

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:  
Lab ID: AS03619LCS1-D1

Sample Matrix: Water  
Date Prepared: 11-Aug-00  
Prep SOP: PAI 778R4  
Prep Batch: AS03619

Date Collected: 11-Aug-00  
Date Analyzed: 24-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 2.000  
Aliquot Units: L  
Report Basis: Total  
Count Time (min.): 1000

Target Nuclide	LCS Results +/- 2s TPU	MDC	Spike Added	Reporting Units	LCS Recovery	Control Limits	Lab Qualifier
Am-241	2.18 +/- 0.28	0.0025	2.25	pCi/L	97%	79-118%	P

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Am-243	2.25	1.66	pCi/L	74%	30-110%

#### Comments:

Data Package ID: ACW0006226-1

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.  
LT - Result is less than Requested MDC, greater than sample specific MDC.  
Y2 - Chemical Yield outside default limits.  
\* - Duplicate DER not within control limits.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

# Isotopic Curium By Alpha Spectroscopy

Method PAI 714R5

## Duplicate Sample Results (DER)

Page: 1 of 2

Reported on: Friday, September 01, 2000  
10:20:05

Client Name: NMED DOE Oversight Bureau

Laboratory Name: Paragon Analytics, Inc.

Client Project Name:

PAI Work Order: 0006226

Client Project Number: HRMB 6.26.00

Field ID:	Prep Date	Analysis Date	Prep Batch	Final Aliquot
Lab ID: AS03598LCS1	8/2/2000	8/19/2000	AS03598	2.000
DUP ID: AS03598LCS1-D1	8/2/2000	8/19/2000	AS03598	2.000

Sample Matrix: Water  
Date Collected: 02-Aug-00  
Analytical SOP: PAI 714R5  
Prep SOP: PAI 780R2  
Aliquot Units: L  
Report Basis: As Received

Analyte	Sample Result +/- 2s TPU	Duplicate Result +/- 2s TPU	Units	DER	Warning Limit	Lab Qualifiers
Am-241	2.20 +/- 0.29	2.25 +/- 0.29	pCi/L	0.12	< 1.42	
Cm-242	-0.0021 +/- 0.0059	0.0011 +/- 0.0049	pCi/L	0.42	< 1.42	
Cm-244	0.0089 +/- 0.0076	0.0041 +/- 0.0041	pCi/L	0.55	< 1.42	

## Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Am-243	2.25	1.60	pCi/L	71%	30-110%

### Comments:

#### Qualifiers/Flags:

W - DER is greater than Warning Limit of 1.42  
H - DER is Higher than Control Limit of 2.13

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
DER - Duplicate Error Ratio

Data Package ID: ACW0006226-1

# Isotopic Americium By Alpha Spectroscopy

Method PAI 714R5

## Duplicate Sample Results (DER)

Page: 2 of 2

Reported on: Friday, September 01, 2000  
10:20:06

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID:	Prep Date	Analysis Date	Prep Batch	Final Aliquot
Lab ID: AS03619LCS1	8/11/2000	8/24/2000	AS03619	2.000
DUP ID: AS03619LCS1-D1	8/11/2000	8/24/2000	AS03619	2.000

Sample Matrix: Water  
Date Collected: 11-Aug-00  
Analytical SOP: PAI 714R5  
Prep SOP: PAI 778R4  
Aliquot Units: L  
Report Basis: Total

Analyte	Sample Result +/- 2s TPU	Duplicate Result +/- 2s TPU	Units	DER	Warning Limit	Lab Qualifiers
Am-241	2.33 +/- 0.30	2.18 +/- 0.28	pCi/L	0.37	< 1.42	

## Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Am-243	2.25	1.66	pCi/L	74%	30-110%

### Comments:

**Qualifiers/Flags:**

W - DER is greater than Warning Limit of 1.42

H - DER is Higher than Control Limit of 2.13

**Abbreviations:**

TPU - Total Propagated Uncertainty (see PAI SOP 743)

DER - Duplicate Error Ratio

Data Package ID: ACW0006226-1

# Isotopic Curium By Alpha Spectroscopy

## Method PAI 714R5

### Sample Results

Page: 1 of 6

Reported on: Friday, September 01, 2000  
10:20:04

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: DP SPRING

Lab ID: 0006226-1

Sample Matrix: Water

Date Prepared: 02-Aug-00

Prep SOP: PAI 780R2

Prep Batch: AS03598

Date Collected: 26-Jun-00

Date Analyzed: 19-Aug-00

Analytical SOP: PAI 714R5

Final Aliquot: 2.000

Aliquot Units: L

Report Basis: As Received

Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Am-241	0.0127 +/- 0.0089	0.012	pCi/L	LT
Cm-242	0.0050 +/- 0.0049	0.0034	pCi/L	LT
Cm-244	0.0020 +/- 0.0027	0.0027	pCi/L	U

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Am-243	2.25	1.78	pCi/L	79%	30-110%

#### Comments:

##### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y2 - Chemical Yield outside default limits.

\* - Duplicate DER not within control limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

##### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: ACW0006226-1

Paragon Analytics Inc.

00010

# Isotopic Americium By Alpha Spectroscopy

## Method PAI 714R5

### Sample Results

Page: 2 of 6

Reported on: Friday, September 01, 2000  
10:20:06

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: DP SPRING

Lab ID: 0006226-2

Sample Matrix: Water

Date Prepared: 11-Aug-00

Prep SOP: PAI 778R4

Prep Batch: AS03619

Date Collected: 26-Jun-00

Date Analyzed: 19-Aug-00

Analytical SOP: PAI 714R5

Final Aliquot: 2.000

Aliquot Units: L

Report Basis: Total

Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Am-241	0.0186 +/- 0.0091	0.0072	pCi/L	LT

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Am-243	2.25	1.66	pCi/L	74%	30-110%

#### Comments:

##### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y2 - Chemical Yield outside default limits.

\* - Duplicate DER not within control limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

##### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: ACW0006226-1

Paragon Analytics Inc.

00011

# Isotopic Americium By Alpha Spectroscopy

## Method PAI 714R5

### Sample Results

Page: 3 of 6

Reported on: Friday, September 01, 2000  
10:20:04

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: LAO-2  
Lab ID: 0006226-3

Sample Matrix: Water  
Date Prepared: 02-Aug-00  
Prep SOP: PAI 780R2  
Prep Batch: AS03598

Date Collected: 26-Jun-00  
Date Analyzed: 19-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 1.960  
Aliquot Units: L  
Report Basis: As Received  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Am-241	0.011 +/- 0.010	0.016	pCi/L	U

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Am-243	2.30	1.70	pCi/L	74%	30-110%

### Comments:

**Qualifiers/Flags:**

U - Result is less than the sample specific MDC.  
Y2 - Chemical Yield outside default limits.  
\* - Duplicate DER not within control limits.  
LT - Result is less than Requested MDC, greater than sample specific MDC.

**Abbreviations:**

TPU - Total Propagated Uncertainty (see PAI SOP 743)  
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: ACW0006226-1

# Isotopic Americium By Alpha Spectroscopy

## Method PAI 714R5

### Sample Results

Page: 4 of 6

Reported on: Friday, September 01, 2000  
10:20:04

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: LAO-2

Lab ID: 0006226-4

Sample Matrix: Water

Date Prepared: 02-Aug-00

Prep SOP: PAI 780R2

Prep Batch: AS03598

Date Collected: 26-Jun-00

Date Analyzed: 19-Aug-00

Analytical SOP: PAI 714R5

Final Aliquot: 1.925

Aliquot Units: L

Report Basis: As Received

Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Am-241	0.021 +/- 0.012	0.013	pCi/L	LT

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Am-243	2.34	1.53	pCi/L	65%	30-110%

#### Comments:

##### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y2 - Chemical Yield outside default limits.

\* - Duplicate DER not within control limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

##### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: ACW0006226-1

Paragon Analytics Inc.

00013

# Isotopic Americium By Alpha Spectroscopy

## Method PAI 714R5

### Sample Results

Page: 5 of 6

Reported on: Friday, September 01, 2000  
10:20:04

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: LAO-3A

Lab ID: 0006226-5

Sample Matrix: Water

Date Prepared: 02-Aug-00

Prep SOP: PAI 780R2

Prep Batch: AS03598

Date Collected: 26-Jun-00

Date Analyzed: 19-Aug-00

Analytical SOP: PAI 714R5

Final Aliquot: 1.610

Aliquot Units: L

Report Basis: As Received

Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Am-241	0.011 +/- 0.013	0.022	pCi/L	U

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Am-243	2.80	1.57	pCi/L	56%	30-110%

### Comments:

**Qualifiers/Flags:**

U - Result is less than the sample specific MDC.

Y2 - Chemical Yield outside default limits.

\* - Duplicate DER not within control limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

**Abbreviations:**

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: ACW0006226-1

Paragon Analytics Inc.

00014

# Isotopic Americium By Alpha Spectroscopy

## Method PAI 714R5

### Sample Results

Page: 6 of 6

Reported on: Friday, September 01, 2000  
10:20:04

Client Name: NMED DOE Oversight Bureau

Client Project Name:

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: HRMB 6.26.00

PAI Work Order: 0006226

Field ID: LAO-3A  
Lab ID: 0006226-6

Sample Matrix: Water  
Date Prepared: 02-Aug-00  
Prep SOP: PAI 780R2  
Prep Batch: AS03598

Date Collected: 26-Jun-00  
Date Analyzed: 19-Aug-00  
Analytical SOP: PAI 714R5

Final Aliquot: 1.570  
Aliquot Units: L  
Report Basis: As Received  
Count Time (min.): 1000

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Am-241	0.0100 +/- 0.0085	0.010	pCi/L	U

### Chemical Yield Summary

Tracer Nuclide	Tracer Known	Tracer Measured	Units	Tracer Yield	Control Limits
Am-243	2.87	2.01	pCi/L	70%	30-110%

#### Comments:

##### Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- Y2 - Chemical Yield outside default limits.
- \* - Duplicate DER not within control limits.
- LT - Result is less than Requested MDC, greater than sample specific MDC.

##### Abbreviations:

- TPU - Total Propagated Uncertainty (see PAI SOP 743)
- MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: ACW0006226-1

Paragon Analytics Inc.

00015